Technical Memorandum

To:	Syed Rizvi – Town of Oakville	Date:	2021-07-27
Cc:	Wajeeha Shahrukh – Digram Developments Incorporated Christopher Gordon – CGH Transportation Robin Marinac – CGH Transportation		
From:	Mark Crockford, P.Eng.	Project Number:	2019-67

Re: Digram North Oakville (Part Lot 16, Concession 1)– Neighbourhood 9/10/11 Transportation Impact Study Addendum

1 Introduction

To support several residential developments in the Neighbourhood 9/10/11 areas of North Oakville, a Transportation Impact Study (TIS) was prepared and finalized in late May 2020. This study used the initial concept plan for each development to develop a TIS that examined the overall impact of the subject developments on the transportation network. The Neighbourhood 9/10/11 TIS, referred to herein as the TIS, forms the basis for this memo. This addendum acts as a covering letter for the Neighbourhood 9/10/11 TIS.

This addendum has been prepared to support Digram's development and will examine the changes between the original concept plan considered in the TIS and the current plan that is being put forward. This includes examining the unit count and type, preparing an updated trip generation (using the same factors as those presented in the TIS), and, if significant changes to the trip generation are noted, providing updated Synchro results at key Study Area intersections.

2 Site Plan Comparison

The previous concept plan considered in the TIS is included as Attachment 1. The updated plan, to be analyzed through this memo, is included as Attachment 2. Table 1 summarizes the unit count changes between the previous concept and the updated plan.

Table 1: Land Use Statistic Comparison

	Multifamily Housing (Low-Rise) LUC 220	Multifamily Housing (Mid-Rise) LUC 221
Original	172	100
Updated	154	360
Change	-18	260
% Change	-10.5%	260.0%

As shown above, the revised plan would reduce the townhouse units by 18 (10.5% of the total number of townhouses) and increase the number of mid-rise residential units by 260 (260% of the total number of mid-rise residential units). Due to the change in unit counts the trip generation has been examined to determine if the proposed changes would significantly differ relative to the trip generation originally considered. The trip generation equations for the townhouse units, and mid-rise apartment units were used in the TIS as the rates produced using these equations were within the range of rates listed in the data statistics for each land use code. The trip generation factors used for each of the land uses are summarized in Table 2.

Table 2: ITE Trip Generation Factor

	Townhouses LUC 220	Mid-Rise LUC 221
AM Peak	$\ln(T) = 0.95\ln(T) - 0.51$	$\ln(T) = 0.98\ln(T) - 0.98$
PM Peak	$\ln(T) = 0.89\ln(T) - 0.02$	$\ln(T) = 0.96\ln(T) - 0.63$

Using the above trip generation rates the total vehicle trip generation for the site has been recalculated. Table 3 summarizes and compares the trip generation of the Digram site as considered in the TIS compared to the updated considered in this memo. Table 4 summarizes and compares the overall trip generation of all the developments considered in the TIS before and after the Digram update addressed in this memo. Both scenarios shown in Table 4 consider the overall trip generation of all the developments considered in the TIS including any updates made to other developments.

Table 3: Vehicle Trip Generation Comparison – Digram Site Only

Scenario	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Previous	22	72	95	73	44	117
Updated	39	119	158	123	76	198
Difference	17	47	63	50	32	81
% Difference	77%	65%	66%	68%	73%	69%

Table 4: Vehicle Trip Generation – All Developments Considered in the TIS

Scenario	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Previous	346	1090	1437	1184	703	1888
Updated	363	1137	1500	1234	735	1969
Difference	17	47	63	50	32	82
% Difference	5%	4%	4%	4%	5%	4%

As shown above the changes to the trip generation of just the Digram site will result in a net increase of approximately 70% in vehicle traffic. When the entire trip generation of all the developments considered in the TIS is considered, the resulting changes to the trip generation will result in a net increase of approximately 5% in vehicle traffic.

In addition to the changes to the unit count, the updated concept plan considers an additional access to Sixth Line approximately 150 metres north of Marvin Avenue / Access #6, measured intersection centreline to intersection centreline. This access is stop-controlled on the west leg and will operate as a right-in / right-out access. A median is expected to be present on Sixth Line at this intersection to prevent any prohibited movements.

As a result, the increase in traffic and the consideration of an additional access necessitates a re-examination of the operational analysis of Marvin Avenue at Sixth Line, Marvin Avenue at Preserve Drive, and the New Access at Sixth Line (Access #10). A few of the other developments have also had slight changes to their plans and unit counts, and as a result, the volumes considered below may differ slightly from the exact volumes presented in the TIS. Not all of the other developments have put forward finalized plans to be considered at this time. As those other properties are put forward, they will consider the changes accounted for here-in.

The updated vehicle trip generation has been applied to the study area intersections using the same assumptions as the TIS. Figure 1 illustrates the original traffic volumes at the intersections of Marvin Avenue / Access #6 at Sixth Line and Marvin Avenue / Access #6 at Preserve Drive. As mentioned above, these volumes differ slightly from the exact volumes presented in the TIS as an update to another development considered within the TIS has been made. Figure 2 illustrates the updated

traffic volumes at the intersections of Marvin Avenue / Access #6 at Sixth Line and Marvin Avenue / Access #6 at Preserve Drive as well as the new intersection of Access #10 at Sixth Line.

Figure 1: Original Turning Movement Volumes (2024 Horizon)

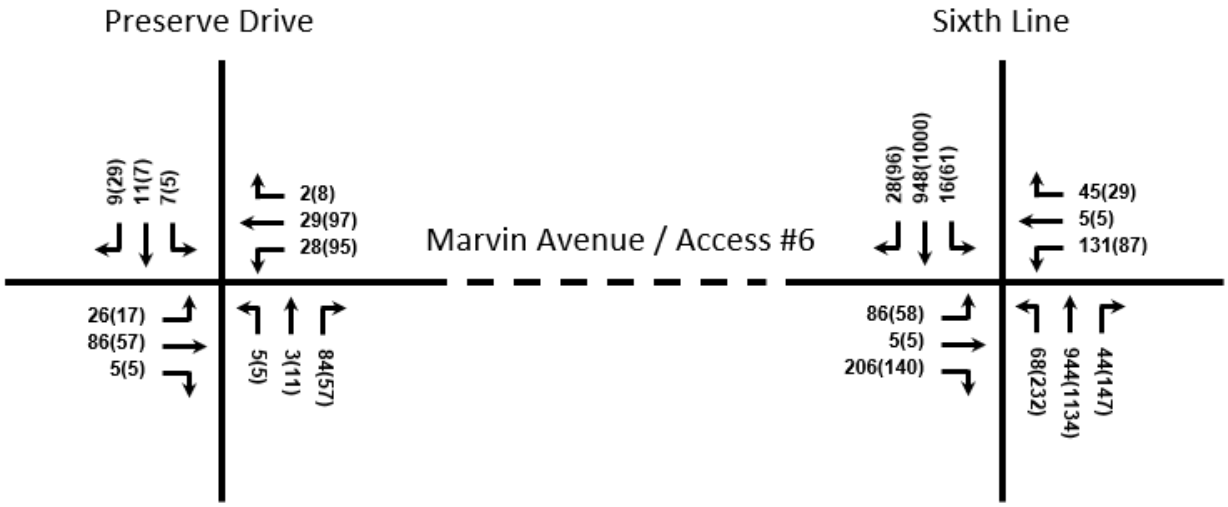
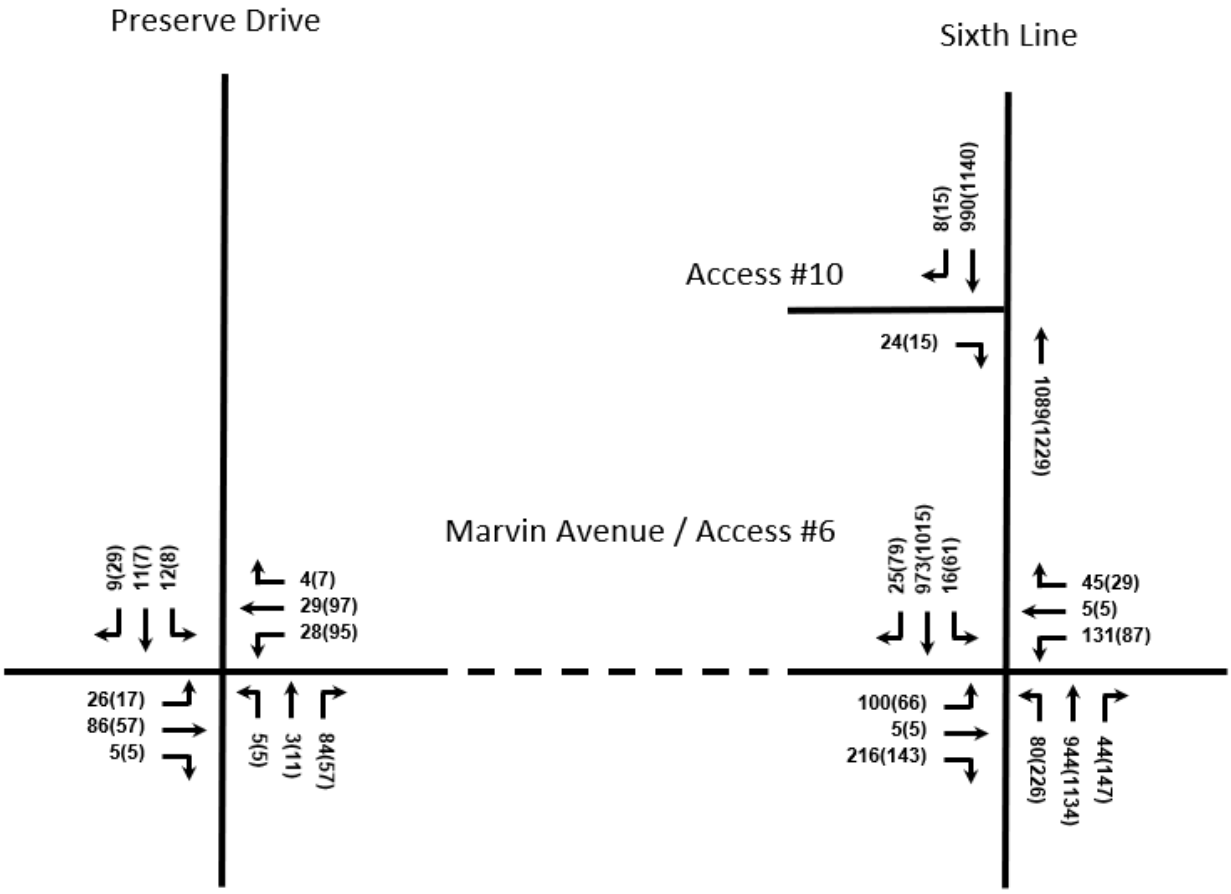


Figure 2: Updated Turning Movement Volumes (2024 Horizon)



While the differences between the original and updated volumes are minor, the Synchro analysis for these intersections has been updated to ensure that the analysis results are accurate, as well as to provide analysis for the new intersection of Access #10 and Sixth Line. The Synchro parameters and analysis assumptions used in the TIS have been carried forward and only the turning movement volumes have been changed. The comparison of the operational analysis is presented in Table 5. The Previous Analysis Synchro Worksheets can be found in Attachment 3 and the Updated Analysis Synchro Worksheets can be found in Attachment 4.

Table 5: Operational Analysis Comparison

Intersection	Mvmnt	AM Peak Hour					PM Peak Hour				
		LOS	V/C	Del. (s)	Q (50th)	Q (95th)	LOS	V/C	Del. (s)	Q (50th)	Q (95th)
Marvin Avenue / Access #6 & Sixth Line (Signalized)	**Previous Analysis**										
	Overall	B	-	13	-	-	B	-	13	-	-
	Updated Analysis										
	Overall	B	-	14	-	-	B	-	13	-	-
Marvin Avenue / Preserve Drive (All-way Stop Control)	**Previous Analysis**										
	EBL/T/R	A	0.15	8	-	4	A	0.11	8	-	3
	WBL/T/R	A	0.08	8	-	2	A	0.26	9	-	8
	Updated Analysis										
	EBL/T/R	A	0.15	8	-	4	A	0.11	8	-	3
	WBL/T/R	A	0.08	8	-	2	A	0.26	9	-	8
Access #10 & Sixth Line (One-way Stop Control)	**Previous Analysis**										
	N/A										
	Updated Analysis										
	EBR	B	0.05	13	-	1	B	0.04	14	-	1

As shown above the incremental change of traffic, while increased by 50% from the previous version, has a minimal impact on the operational analysis of both previously analyzed intersections. The new intersection of Access #10 and Sixth Line operates with no critical movements. As the results for 2024 remain consistent with the TIS it can be concluded that the 2030 analysis will have a similar result and there is no need to re-examine the results for the 2030 horizon. Therefore, the result of the original TIS remain valid with respect to the Digram's proposed development.

3 Parking

Both surface and underground residential and visitor parking will be provided in accordance with the Town of Oakville Parking Zoning By-Law requirements for both the townhouse and the mid-rise residential units. The parking plan can be found in Attachment 5.

4 Site Specific Transportation Review

This memo has been prepared to address some site-specific considerations for Digram's development including Transit Facilities Plan, Road Cross-Sections, Pedestrian Circulation Plan, Cycling Facilities Plan, and Parking Provisions.

4.1 Transit Facilities Plan

A Transit Facilities Plan was created as part of the Neighbourhood 9/10/11 TIS. The Transit Facilities Plan has been recreated, focusing on the Digram development and is included in Drawing 001, Attachment 6. As per the Transit Facilities Plan, all of the residential units are within 400 metres of at least one proposed transit station.

4.2 Road Cross-sections

The proposed right-of-ways and cross-sections are illustrated on Drawing 002, Attachment 6. These cross-sections are proposed to be consistent with the North Oakville Urban Design and Open Space. The cross-sections used in this plan from these guidelines have been included in Attachment 7.

4.3 Pedestrian Concept Plan

Sidewalk provisions are illustrated on Drawing 003, Attachment 6, and are generally per the road cross-section. Sidewalks are provided on both sides of the 17 metre local roads and the 19 metre connector roads. Additionally, a Pedestrian Circulation Plan has been prepared by Korsiak Planning and is included in Attachment 8.

4.4 Cycling Facilities Plan

A Cycling Facilities Plan was created as part of the Neighbourhood 9/10/11 TIS. The Cycling Facilities Plan has been recreated, focusing on the Digram development. This plan is included in Drawing 004, Attachment 6. Per the Cycling Facilities Plan, a signed route is provided along Marvin Avenue and a bicycle lane is provided along Sixth Line.

5 Conclusions

The proposed development concept has been refined since the original TIS was prepared. This addendum has verified that the changes to the unit counts and land uses will have no impact on the operational analysis and that the Neighbourhood 9/10/11 TIS remains valid.

This addendum has also addressed the site-specific issues including, parking, multi-modal transportation facilities, and roadway cross-sections. Through the plans prepared as part of this work it has been shown that the proposed development will have adequate cycling, pedestrian, and transit facilities and that the proposed right of ways are sufficient to support the appropriate cross-sections.

If you have any questions or comments, please do not hesitate to contact the undersigned.

Prepared By:

Mark Crockford, P. Eng.
P: 905-251-4070
Mark.Crockford@CGHTransportation.com

Reviewed By:

Christopher Gordon, P. Eng.
P: 343-999-9117
Christopher.Gordon@CGHTransportation.com

Attachment 1

Original Concept Plan

Multifamily Housing (Low-Rise): 172 Units							
Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	65%	15	51	66	51	30	81
Auto Passenger	15%	3	12	15	12	7	19
Transit	15%	3	12	15	12	7	19
Non-Auto Modes	5%	1	4	5	4	2	6
Total	100%	23	78	101	78	46	124

Multifamily Housing (Mid-Rise): 100 Units							
Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	65%	7	21	29	22	14	36
Auto Passenger	15%	2	5	7	5	3	8
Transit	15%	2	5	7	5	3	8
Non-Auto Modes	5%	1	2	2	2	1	3
Total	100%	11	33	44	34	22	56

Digram Subtotal							
Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	65%	22	72	95	73	44	117
Auto Passenger	15%	5	17	22	17	10	27
Transit	15%	5	17	22	17	10	27
Non-Auto Modes	5%	2	6	7	6	3	9
Total	100%	34	111	145	112	68	180

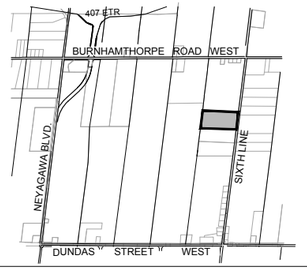
Attachment 2

Updated Draft Plan

DRAFT PLAN OF SUBDIVISION
24T-20003/1316
Digram Developments Oakville Inc.

PART OF LOT 16
CONCESSION 1, NORTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR
NOW IN THE
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON



KEY MAP N.T.S. — SUBJECT PROPERTY

FUTURE RESIDENTIAL
Future SWM Pond
NHS
N40°33'40"E
405.737
BLOCK 1 6 Units
BLOCK 2 6 Units
BLOCK 3 6 Units
BLOCK 4 6 Units
27.40
BLOCK 5 6 Units
BLOCK 22 SWM Pond 0.60 ha
BLOCK 23 Walkway (6.0m) 0.02 ha
BLOCK 28 Road Widening (5.5m) 0.11 ha
STREET 'C'
17
6.0
FUTURE RESERVE DRIVE
203.422
23.75
7.5
BLOCK 17 6 Units
BLOCK 16 7 Units
28.08
BLOCK 12 12 Units
28.00
BLOCK 11 12 Units
BLOCK 6 8 Units
BLOCK 21 Mixed-Use 216 Units 0.72 ha
196.827
50.00
53.85
38.79
46.63
24.72
LANE 'A'
STREET 'D'
STREET 'E'
STREET 'B'
BLOCK 18 7 Units
BLOCK 15 7 Units
BLOCK 13 10 Units
BLOCK 10 10 Units
BLOCK 7 7 Units
BLOCK 24 Natural Heritage System 1.94 ha
SIXTH LINE
N45°34'25"W
BLOCK 19 8 Units
BLOCK 14 12 Units
BLOCK 9 12 Units
BLOCK 8 6 Units
28.35
27.40
STREET 'F'
79.68
71.25
BLOCK 20 Mixed-Use 144 Units 0.53 ha
N45°10'20"W
19
STREET 'A'
℄R = 99.5m
100.00
27.50
404.860
N39°37'00"E
BLOCK 27 Residential Reserve 0.02 ha
BLOCK 26 Residential Reserve 0.16 ha
BLOCK 25 NHS 0.001 ha
FUTURE RESIDENTIAL
Natural Heritage System

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE KORSIAK URBAN PLANNING TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF OAKVILLE FOR APPROVAL.

SIGNED _____ DATE January 21, 2020
Abubakar Masood
Digram Developments Oakville Inc.
327 Renfrew Drive, Suite 201
Markham, Ontario L3R 9S8

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED _____ DATE January 8, 2020
Gary B. Vanderveen, Ontario Land Surveyor
Holding Jones Vanderveen Inc.
Ontario Land Surveyors
1700 Langstaff Road, Suite 1002, Vaughan, Ontario L4K 3S3
Tel.(905)660-4000

ADDITIONAL INFORMATION (UNDER SECTION 51 (17) OF THE PLANNING ACT)

A) SHOWN ON PLAN	G) SHOWN ON PLAN
B) SHOWN ON PLAN	H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
C) SHOWN ON PLAN	I) CLAY LOAM
D) SHOWN ON PLAN	J) SHOWN ON PLAN
E) SHOWN ON PLAN	K) SANITARY AND STORM SEWERS TO BE PROVIDED
F) SHOWN ON PLAN	L) SHOWN ON PLAN

LAND USE SCHEDULE

Land Use	Blocks	Block Total	Area (ha)	Units
Street Townhouse (5.5 m)	1-8	8	0.88	51
Back to Back Townhouse (6.4 m)	9-14	6	0.72	68
Rear Lane Townhouse (6.05 m)	15-19	5	0.61	35
Mixed-Use	20, 21	2	1.25	360
SWM Pond	22	1	0.60	
Walkway (6.0 m)	23	1	0.02	
Natural Heritage System (NHS)	24, 25	2	1.94	
Residential Reserve	26, 27	2	0.18	
Road Widening (5.5 m)	28	1	0.11	
7.5 m ROW (124 m)			0.10	
17 m ROW (734 m)			1.26	
19 m ROW (215 m)			0.41	
Total	28	28	8.08	514

24T-20003/1316 SDE CALCULATIONS

Unit Type	Blocks	Units	SDE*
Townhouse	1-8, 15-19	86	65.4
Back to Back Townhouse	9-14	68	30.6
Apartment	20, 21	360	162.0
Total	21	514	258.0

* SDE Factors:
Townhouse - 0.76
Back to Back Townhouse - 0.45
Apartment - 0.45

NOTES:
- Pavement illustration is diagrammatic
- Connector to Connector or Avenue daylight triangle = 7.5m
- Local to Local or Collector daylight triangle = 3.5m

SCALE 1:1500 | June 28, 2021 | DRAWN BY: KC | CHECKED BY: SE | C

DATE [D.M.Y]	REVISION	DWG	BY
28/06/2021	Rear Lane TH Revision - Fourth Submission	C	KC
19/01/2021	Adjusted Townhouses - Third Submission	B	EC
02/10/2020	Second Submission	A	EC
15/04/2020	Updated Surrounding Linework	A	EC
14/01/2020	First Submission	A	KC

DIGRAM DEVELOPMENTS INC.

KORSIAK Urban Planning
206-277 Lakeshore Road East
Oakville, Ontario L6J 1H9
T: 905-257-0227
info@korsiak.com

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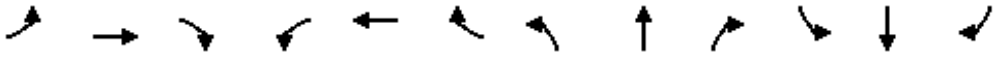
Attachment 3

TIS Analysis Synchro Worksheets



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	5	206	131	5	45	68	944	44	16	948	28
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	5.2	5.2	4.0	5.2	5.2	4.0	5.2	5.2	4.0	5.2	5.2	4.0
Minimum Green (s)	10.0	10.0	4.0	10.0	10.0	4.0	20.0	20.0	4.0	20.0	20.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	86	211	0	131	50	0	68	988	0	16	976	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.85	0.85	0.95	0.86	0.85	0.95	0.99	0.85	0.95	1.00	0.85
Saturated Flow (vph)	1805	1622	0	1805	1644	0	1805	3593	0	1805	3602	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	5.7	15.6	0.0	8.7	3.7	0.0	4.5	33.0	0.0	1.1	32.5	0.0
Adj Reference Time (s)	15.2	20.8	0.0	15.2	15.2	0.0	25.2	38.2	0.0	25.2	37.7	0.0
Permitted Option												
Adj Saturation A (vph)	120	1622		120	1644		120	1797		120	1801	
Reference Time A (s)	85.8	15.6		130.6	3.7		67.8	33.0		16.0	32.5	
Adj Saturation B (vph	0	1622		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	13.7	15.6		NA	NA		NA	NA		NA	NA	
Reference Time (s)		15.6			130.6			67.8			32.5	
Adj Reference Time (s)		20.8			135.8			73.0			37.7	
Split Option												
Ref Time Combined (s)	5.7	15.6		8.7	3.7		4.5	33.0		1.1	32.5	
Ref Time Seperate (s)	5.7	0.4		8.7	0.4		4.5	31.5		1.1	31.6	
Reference Time (s)	15.6	15.6		8.7	8.7		33.0	33.0		32.5	32.5	
Adj Reference Time (s)	20.8	20.8		15.2	15.2		38.2	38.2		37.7	37.7	

Summary	EB WB	NB SB	Combined
Protected Option (s)	36.0	63.4	
Permitted Option (s)	135.8	73.0	
Split Option (s)	36.0	75.9	
Minimum (s)	36.0	63.4	99.4

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	82.8%	ICU Level of Service	E

Reference Times and Phasing Options do not represent an optimized timing plan.

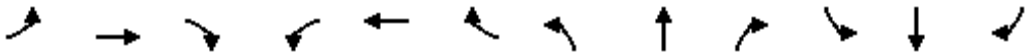
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	5	206	131	5	45	68	944	44	16	948	28
Future Volume (veh/h)	86	5	206	131	5	45	68	944	44	16	948	28
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	5	224	142	5	49	74	1026	48	17	1030	30
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	461	10	442	300	42	415	307	1906	89	303	1945	57
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.55	0.55	0.55	0.55	0.55	0.55
Sat Flow, veh/h	1345	35	1554	1147	149	1457	530	3443	161	523	3512	102
Grp Volume(v), veh/h	93	0	229	142	0	54	74	527	547	17	519	541
Grp Sat Flow(s),veh/h/ln	1345	0	1589	1147	0	1606	530	1770	1834	523	1770	1845
Q Serve(g_s), s	3.5	0.0	7.7	7.6	0.0	1.6	6.6	12.2	12.2	1.4	11.9	11.9
Cycle Q Clear(g_c), s	5.1	0.0	7.7	15.3	0.0	1.6	18.5	12.2	12.2	13.6	11.9	11.9
Prop In Lane	1.00		0.98	1.00		0.91	1.00		0.09	1.00		0.06
Lane Grp Cap(c), veh/h	461	0	452	300	0	457	307	980	1016	303	980	1021
V/C Ratio(X)	0.20	0.00	0.51	0.47	0.00	0.12	0.24	0.54	0.54	0.06	0.53	0.53
Avail Cap(c_a), veh/h	790	0	840	580	0	849	307	980	1016	303	980	1021
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.9	0.0	19.2	25.6	0.0	17.0	14.9	9.1	9.1	13.4	9.1	9.1
Incr Delay (d2), s/veh	0.2	0.0	0.9	1.2	0.0	0.1	1.8	2.1	2.0	0.4	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	3.5	2.5	0.0	0.7	1.1	6.4	6.7	0.2	6.3	6.6
LnGrp Delay(d),s/veh	19.1	0.0	20.1	26.8	0.0	17.1	16.7	11.2	11.2	13.8	11.1	11.0
LnGrp LOS	B		C	C		B	B	B	B	B	B	B
Approach Vol, veh/h		322			196			1148			1077	
Approach Delay, s/veh		19.8			24.1			11.6			11.1	
Approach LOS		B			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		40.8		23.5		40.8		23.5
Change Period (Y+Rc), s		* 5.2		* 5.2		* 5.2		* 5.2
Max Green Setting (Gmax), s		* 36		* 34		* 36		* 34
Max Q Clear Time (g_c+I1), s		20.5		9.7		15.6		17.3
Green Ext Time (p_c), s		8.0		2.2		8.6		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	13.3
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	86	5	28	29	2	5	3	84	7	11	9
Future Volume (vph)	26	86	5	28	29	2	5	3	84	7	11	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.996			0.876			0.955	
Flt Protected		0.989			0.977			0.997			0.987	
Satd. Flow (prot)	0	1833	0	0	1813	0	0	1627	0	0	1756	0
Flt Permitted		0.989			0.977			0.997			0.987	
Satd. Flow (perm)	0	1833	0	0	1813	0	0	1627	0	0	1756	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		58.8			148.3			256.7			383.9	
Travel Time (s)		4.2			10.7			18.5			27.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	93	5	30	32	2	5	3	91	8	12	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	126	0	0	64	0	0	99	0	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	86	5	28	29	2	5	3	84	7	11	9
Future Vol, veh/h	26	86	5	28	29	2	5	3	84	7	11	9
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	93	5	30	32	2	5	3	91	8	12	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	7.8	7.3	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	22%	47%	26%
Vol Thru, %	3%	74%	49%	41%
Vol Right, %	91%	4%	3%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	92	117	59	27
LT Vol	5	26	28	7
Through Vol	3	86	29	11
RT Vol	84	5	2	9
Lane Flow Rate	100	127	64	29
Geometry Grp	1	1	1	1
Degree of Util (X)	0.107	0.149	0.077	0.035
Departure Headway (Hd)	3.862	4.227	4.333	4.318
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	933	839	816	833
Service Time	1.863	2.298	2.419	2.321
HCM Lane V/C Ratio	0.107	0.151	0.078	0.035
HCM Control Delay	7.3	8	7.8	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.5	0.2	0.1

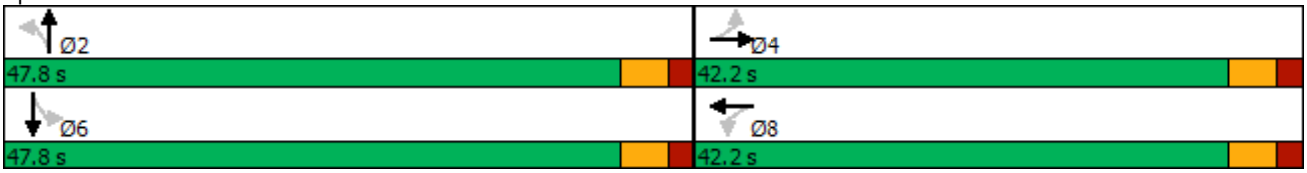
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	5	140	87	5	29	232	1134	147	61	1000	96
Future Volume (vph)	58	5	140	87	5	29	232	1134	147	61	1000	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		50.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			50.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.855			0.870			0.983			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1593	0	1770	1621	0	1770	3479	0	1770	3493	0
Flt Permitted	0.733			0.649			0.203			0.152		
Satd. Flow (perm)	1365	1593	0	1209	1621	0	378	3479	0	283	3493	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50			32			21			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.7			108.4			226.5			436.9	
Travel Time (s)		8.8			7.8			16.3			31.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	5	152	95	5	32	252	1233	160	66	1087	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	157	0	95	37	0	252	1393	0	66	1191	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	10.0		2.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	33.2	33.2		39.2	39.2		33.2	33.2		39.2	39.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	42.2	42.2		42.2	42.2		47.8	47.8		47.8	47.8	
Total Split (%)	46.9%	46.9%		46.9%	46.9%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	37.0	37.0		37.0	37.0		42.6	42.6		42.6	42.6	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		27.0	27.0		21.0	21.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.4	11.4		11.4	11.4		45.4	45.4		45.4	45.4	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.67	0.67		0.67	0.67	
v/c Ratio	0.27	0.51		0.47	0.12		0.99	0.59		0.35	0.50	
Control Delay	26.1	22.3		31.8	11.0		72.1	7.4		11.7	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.1	22.3		31.8	11.0		72.1	7.4		11.7	6.5	
LOS	C	C		C	B		E	A		B	A	
Approach Delay		23.4			26.0			17.3			6.8	
Approach LOS		C			C			B			A	
Queue Length 50th (m)	6.9	12.0		10.8	0.5		24.5	38.5		2.8	30.2	
Queue Length 95th (m)	16.6	27.8		23.7	7.3		#48.1	69.2		13.1	54.0	
Internal Link Dist (m)		97.7			84.4			202.5			412.9	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)	755	903		668	910		255	2356		191	2363	
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	0.17		0.14	0.04		0.99	0.59		0.35	0.50	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 67.3
Natural Cycle: 140
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 14.0 Intersection LOS: B
Intersection Capacity Utilization 87.3% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 15: Sixth Line & Access #6/Marvin Avenue



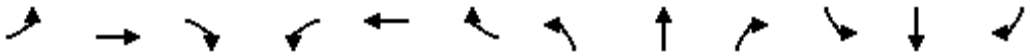
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	5	140	87	5	29	232	1134	147	61	1000	96
Future Volume (veh/h)	58	5	140	87	5	29	232	1134	147	61	1000	96
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	63	5	152	95	5	32	252	1233	160	66	1087	104
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	358	10	310	248	44	282	325	2023	262	267	2095	200
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.64	0.64	0.64	0.64	0.64	0.64
Sat Flow, veh/h	1365	51	1540	1225	218	1398	468	3153	407	386	3265	312
Grp Volume(v), veh/h	63	0	157	95	0	37	252	690	703	66	589	602
Grp Sat Flow(s),veh/h/ln	1365	0	1591	1225	0	1616	468	1770	1791	386	1770	1808
Q Serve(g_s), s	2.6	0.0	5.8	4.9	0.0	1.2	30.7	15.2	15.4	8.1	11.9	11.9
Cycle Q Clear(g_c), s	3.9	0.0	5.8	10.7	0.0	1.2	42.6	15.2	15.4	23.4	11.9	11.9
Prop In Lane	1.00		0.97	1.00		0.86	1.00		0.23	1.00		0.17
Lane Grp Cap(c), veh/h	358	0	321	248	0	326	325	1136	1149	267	1136	1160
V/C Ratio(X)	0.18	0.00	0.49	0.38	0.00	0.11	0.77	0.61	0.61	0.25	0.52	0.52
Avail Cap(c_a), veh/h	844	0	887	684	0	901	325	1136	1149	267	1136	1160
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.2	0.0	23.5	28.2	0.0	21.7	20.0	7.0	7.0	13.9	6.4	6.4
Incr Delay (d2), s/veh	0.2	0.0	1.2	1.0	0.0	0.2	16.4	2.4	2.4	2.2	1.7	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	2.6	1.7	0.0	0.6	6.0	8.0	8.2	1.0	6.3	6.4
LnGrp Delay(d),s/veh	23.5	0.0	24.6	29.2	0.0	21.8	36.4	9.4	9.4	16.1	8.1	8.0
LnGrp LOS	C		C	C		C	D	A	A	B	A	A
Approach Vol, veh/h		220			132			1645			1257	
Approach Delay, s/veh		24.3			27.1			13.6			8.5	
Approach LOS		C			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		47.8		18.6		47.8		18.6
Change Period (Y+Rc), s		* 5.2		* 5.2		* 5.2		* 5.2
Max Green Setting (Gmax), s		* 43		* 37		* 43		* 37
Max Q Clear Time (g_c+I1), s		44.6		7.8		25.4		12.7
Green Ext Time (p_c), s		0.0		1.5		9.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	12.9
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	57	5	95	97	8	5	11	57	5	7	29
Future Volume (vph)	17	57	5	95	97	8	5	11	57	5	7	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.994			0.894			0.904	
Flt Protected		0.990			0.977			0.997			0.994	
Satd. Flow (prot)	0	1829	0	0	1809	0	0	1660	0	0	1674	0
Flt Permitted		0.990			0.977			0.997			0.994	
Satd. Flow (perm)	0	1829	0	0	1809	0	0	1660	0	0	1674	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		58.8			148.3			256.7			383.9	
Travel Time (s)		4.2			10.7			18.5			27.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	62	5	103	105	9	5	12	62	5	8	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	217	0	0	79	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	57	5	95	97	8	5	11	57	5	7	29
Future Vol, veh/h	17	57	5	95	97	8	5	11	57	5	7	29
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	62	5	103	105	9	5	12	62	5	8	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

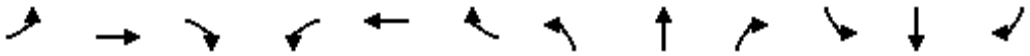
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8.9	7.7	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	22%	47%	12%
Vol Thru, %	15%	72%	48%	17%
Vol Right, %	78%	6%	4%	71%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	79	200	41
LT Vol	5	17	95	5
Through Vol	11	57	97	7
RT Vol	57	5	8	29
Lane Flow Rate	79	86	217	45
Geometry Grp	1	1	1	1
Degree of Util (X)	0.093	0.106	0.259	0.053
Departure Headway (Hd)	4.219	4.443	4.288	4.313
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	853	810	824	834
Service Time	2.227	2.455	2.384	2.322
HCM Lane V/C Ratio	0.093	0.106	0.263	0.054
HCM Control Delay	7.7	8	8.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.4	1	0.2

Attachment 4

Updated Analysis Synchro Worksheets

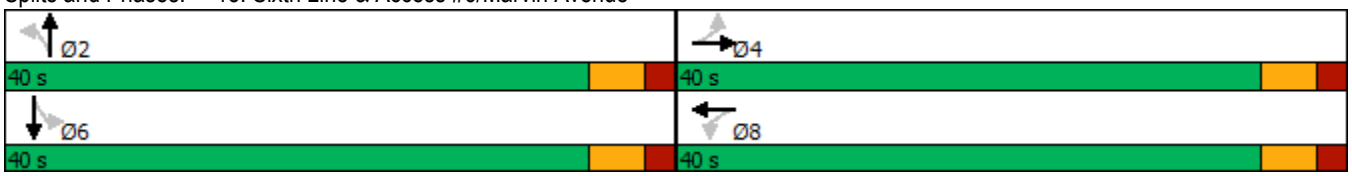
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	5	216	131	5	45	80	944	44	16	973	25
Future Volume (vph)	100	5	216	131	5	45	80	944	44	16	973	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		50.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			50.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.853			0.864			0.993			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1589	0	1770	1609	0	1770	3514	0	1770	3525	0
Flt Permitted	0.722			0.526			0.220			0.223		
Satd. Flow (perm)	1345	1589	0	980	1609	0	410	3514	0	415	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			46			7			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.7			102.5			226.5			153.8	
Travel Time (s)		8.8			7.4			16.3			11.1	
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
Adj. Flow (vph)	109	5	235	142	5	49	87	1026	48	17	1058	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	240	0	142	54	0	87	1074	0	17	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	10.0		2.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

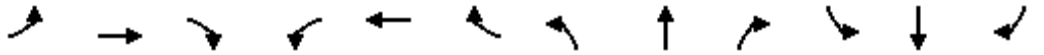


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	33.2	33.2		39.2	39.2		33.2	33.2		39.2	39.2	
Total Split (s)	40.0	40.0		40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	34.8	34.8		34.8	34.8		34.8	34.8		34.8	34.8	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		27.0	27.0		21.0	21.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	13.4	13.4		13.4	13.4		35.4	35.4		35.4	35.4	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.60	0.60		0.60	0.60	
v/c Ratio	0.36	0.61		0.64	0.14		0.36	0.51		0.07	0.51	
Control Delay	22.2	23.8		34.4	8.1		12.8	8.5		7.3	8.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.2	23.8		34.4	8.1		12.8	8.5		7.3	8.6	
LOS	C	C		C	A		B	A		A	A	
Approach Delay		23.3			27.1			8.9			8.6	
Approach LOS		C			C			A			A	
Queue Length 50th (m)	10.3	19.8		14.5	0.7		4.2	30.7		0.7	31.3	
Queue Length 95th (m)	22.1	39.2		30.7	7.7		17.3	59.1		3.8	60.1	
Internal Link Dist (m)		97.7			78.5			202.5			129.8	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)	793	953		577	967		244	2101		247	2107	
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	0.14	0.25		0.25	0.06		0.36	0.51		0.07	0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 59.2			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 11.8		Intersection LOS: B	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 15: Sixth Line & Access #6/Marvin Avenue



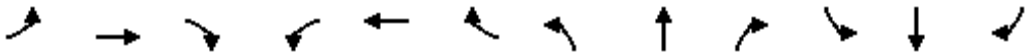


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	5	216	131	5	45	80	944	44	16	973	25
Future Volume (veh/h)	100	5	216	131	5	45	80	944	44	16	973	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	109	5	235	142	5	49	87	1026	48	17	1058	27
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	472	10	454	301	43	425	294	1877	88	297	1923	49
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.55	0.55	0.55	0.55	0.55	0.55
Sat Flow, veh/h	1345	33	1555	1135	149	1457	518	3443	161	523	3526	90
Grp Volume(v), veh/h	109	0	240	142	0	54	87	527	547	17	531	554
Grp Sat Flow(s),veh/h/ln	1345	0	1588	1135	0	1606	518	1770	1834	523	1770	1847
Q Serve(g_s), s	4.1	0.0	8.0	7.6	0.0	1.6	8.4	12.3	12.3	1.4	12.4	12.4
Cycle Q Clear(g_c), s	5.7	0.0	8.0	15.7	0.0	1.6	20.8	12.3	12.3	13.7	12.4	12.4
Prop In Lane	1.00		0.98	1.00		0.91	1.00		0.09	1.00		0.05
Lane Grp Cap(c), veh/h	472	0	463	301	0	469	294	965	1000	297	965	1007
V/C Ratio(X)	0.23	0.00	0.52	0.47	0.00	0.12	0.30	0.55	0.55	0.06	0.55	0.55
Avail Cap(c_a), veh/h	813	0	866	589	0	875	294	965	1000	297	965	1007
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	0.0	18.9	25.4	0.0	16.6	16.2	9.4	9.4	13.8	9.4	9.4
Incr Delay (d2), s/veh	0.2	0.0	0.9	1.1	0.0	0.1	2.5	2.2	2.1	0.4	2.3	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	3.6	2.5	0.0	0.7	1.4	6.6	6.8	0.2	6.7	6.9
LnGrp Delay(d),s/veh	18.9	0.0	19.8	26.5	0.0	16.7	18.7	11.6	11.5	14.2	11.7	11.6
LnGrp LOS	B		B	C		B	B	B	B	B	B	B
Approach Vol, veh/h		349			196			1161			1102	
Approach Delay, s/veh		19.5			23.8			12.1			11.7	
Approach LOS		B			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		40.0		23.8		40.0		23.8
Change Period (Y+Rc), s		* 5.2		* 5.2		* 5.2		* 5.2
Max Green Setting (Gmax), s		* 35		* 35		* 35		* 35
Max Q Clear Time (g_c+I1), s		22.8		10.0		15.7		17.7
Green Ext Time (p_c), s		7.0		2.4		8.6		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.7
HCM 2010 LOS	B

Notes



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	86	5	28	29	4	5	3	84	12	11	9
Future Volume (vph)	26	86	5	28	29	4	5	3	84	12	11	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.992			0.876			0.961	
Flt Protected		0.989			0.978			0.997			0.982	
Satd. Flow (prot)	0	1833	0	0	1807	0	0	1627	0	0	1758	0
Flt Permitted		0.989			0.978			0.997			0.982	
Satd. Flow (perm)	0	1833	0	0	1807	0	0	1627	0	0	1758	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		58.8			148.3			256.7			383.9	
Travel Time (s)		4.2			10.7			18.5			27.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	93	5	30	32	4	5	3	91	13	12	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	126	0	0	66	0	0	99	0	0	35	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

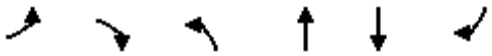
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	86	5	28	29	4	5	3	84	12	11	9
Future Vol, veh/h	26	86	5	28	29	4	5	3	84	12	11	9
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	93	5	30	32	4	5	3	91	13	12	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.8	7.3	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	22%	46%	38%
Vol Thru, %	3%	74%	48%	34%
Vol Right, %	91%	4%	7%	28%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	92	117	61	32
LT Vol	5	26	28	12
Through Vol	3	86	29	11
RT Vol	84	5	4	9
Lane Flow Rate	100	127	66	35
Geometry Grp	1	1	1	1
Degree of Util (X)	0.108	0.15	0.08	0.042
Departure Headway (Hd)	3.876	4.239	4.32	4.381
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	930	836	817	822
Service Time	1.877	2.316	2.413	2.384
HCM Lane V/C Ratio	0.108	0.152	0.081	0.043
HCM Control Delay	7.3	8.1	7.8	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.5	0.3	0.1



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	24	0	1089	990	8
Future Volume (vph)	0	24	0	1089	990	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.999	
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3536	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3536	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	149.9			153.8	283.1	
Travel Time (s)	10.8			11.1	20.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	26	0	1184	1076	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	0	1184	1085	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.1

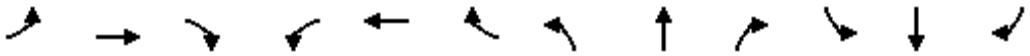
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	24	0	1089	990	8
Future Vol, veh/h	0	24	0	1089	990	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	0	1184	1076	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	543	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	484	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	484	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	484	-	-
HCM Lane V/C Ratio	-	0.054	-	-
HCM Control Delay (s)	-	12.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	5	143	87	5	29	226	1134	147	61	1015	79
Future Volume (vph)	66	5	143	87	5	29	226	1134	147	61	1015	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		50.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			50.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.855			0.870			0.983			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1593	0	1770	1621	0	1770	3479	0	1770	3500	0
Flt Permitted	0.733			0.646			0.203			0.151		
Satd. Flow (perm)	1365	1593	0	1203	1621	0	378	3479	0	281	3500	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45			30			21			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.7			108.4			226.5			153.8	
Travel Time (s)		8.8			7.8			16.3			11.1	
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
Adj. Flow (vph)	72	5	155	95	5	32	246	1233	160	66	1103	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	160	0	95	37	0	246	1393	0	66	1189	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	10.0		2.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

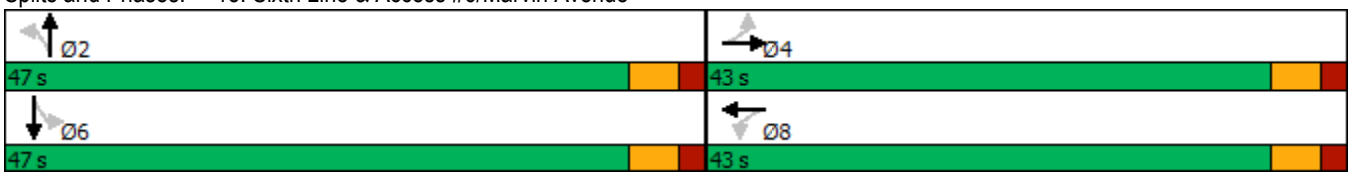


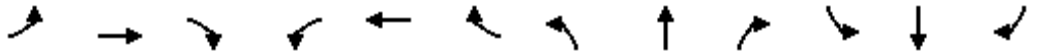
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	33.2	33.2		39.2	39.2		33.2	33.2		39.2	39.2	
Total Split (s)	43.0	43.0		43.0	43.0		47.0	47.0		47.0	47.0	
Total Split (%)	47.8%	47.8%		47.8%	47.8%		52.2%	52.2%		52.2%	52.2%	
Maximum Green (s)	37.8	37.8		37.8	37.8		41.8	41.8		41.8	41.8	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		27.0	27.0		21.0	21.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.4	11.4		11.4	11.4		44.7	44.7		44.7	44.7	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.67	0.67		0.67	0.67	
v/c Ratio	0.31	0.52		0.46	0.12		0.97	0.59		0.35	0.50	
Control Delay	26.4	23.3		31.3	11.5		67.9	7.5		12.0	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.4	23.3		31.3	11.5		67.9	7.5		12.0	6.5	
LOS	C	C		C	B		E	A		B	A	
Approach Delay		24.2			25.8			16.5			6.8	
Approach LOS		C			C			B			A	
Queue Length 50th (m)	7.8	12.7		10.6	0.7		22.8	38.5		2.8	30.2	
Queue Length 95th (m)	18.4	28.8		23.5	7.5		#45.9	69.0		13.2	53.8	
Internal Link Dist (m)		97.7			84.4			202.5			129.8	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)	781	930		688	940		253	2343		188	2355	
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	0.09	0.17		0.14	0.04		0.97	0.59		0.35	0.50	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 66.5
Natural Cycle: 140
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 13.7 Intersection LOS: B
Intersection Capacity Utilization 87.5% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 15: Sixth Line & Access #6/Marvin Avenue



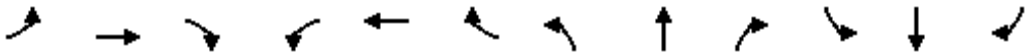


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	5	143	87	5	29	226	1134	147	61	1015	79
Future Volume (veh/h)	66	5	143	87	5	29	226	1134	147	61	1015	79
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	72	5	155	95	5	32	246	1233	160	66	1103	86
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	10	314	250	45	285	324	2010	260	265	2121	165
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.64	0.64	0.64	0.64	0.64	0.64
Sat Flow, veh/h	1365	50	1541	1221	218	1398	469	3153	407	386	3327	259
Grp Volume(v), veh/h	72	0	160	95	0	37	246	690	703	66	586	603
Grp Sat Flow(s),veh/h/ln	1365	0	1591	1221	0	1616	469	1770	1791	386	1770	1817
Q Serve(g_s), s	3.0	0.0	5.8	4.9	0.0	1.2	30.0	15.2	15.4	8.1	11.8	11.8
Cycle Q Clear(g_c), s	4.2	0.0	5.8	10.7	0.0	1.2	41.8	15.2	15.4	23.4	11.8	11.8
Prop In Lane	1.00		0.97	1.00		0.86	1.00		0.23	1.00		0.14
Lane Grp Cap(c), veh/h	363	0	324	250	0	330	324	1128	1142	265	1128	1158
V/C Ratio(X)	0.20	0.00	0.49	0.38	0.00	0.11	0.76	0.61	0.62	0.25	0.52	0.52
Avail Cap(c_a), veh/h	871	0	917	705	0	932	324	1128	1142	265	1128	1158
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	23.1	27.8	0.0	21.3	19.7	7.1	7.1	14.1	6.4	6.4
Incr Delay (d2), s/veh	0.3	0.0	1.2	0.9	0.0	0.1	15.3	2.5	2.5	2.2	1.7	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	2.6	1.7	0.0	0.6	5.7	8.1	8.2	1.0	6.2	6.4
LnGrp Delay(d),s/veh	23.2	0.0	24.3	28.8	0.0	21.4	35.0	9.5	9.6	16.3	8.2	8.1
LnGrp LOS	C		C	C		C	C	A	A	B	A	A
Approach Vol, veh/h		232			132			1639			1255	
Approach Delay, s/veh		23.9			26.7			13.4			8.6	
Approach LOS		C			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		47.0		18.6		47.0		18.6
Change Period (Y+Rc), s		* 5.2		* 5.2		* 5.2		* 5.2
Max Green Setting (Gmax), s		* 42		* 38		* 42		* 38
Max Q Clear Time (g_c+I1), s		43.8		7.8		25.4		12.7
Green Ext Time (p_c), s		0.0		1.6		9.5		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Notes



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	57	5	95	97	7	5	11	57	8	7	29
Future Volume (vph)	17	57	5	95	97	7	5	11	57	8	7	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.995			0.894			0.912	
Flt Protected		0.990			0.977			0.997			0.991	
Satd. Flow (prot)	0	1829	0	0	1811	0	0	1660	0	0	1684	0
Flt Permitted		0.990			0.977			0.997			0.991	
Satd. Flow (perm)	0	1829	0	0	1811	0	0	1660	0	0	1684	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		58.8			148.3			256.7			383.9	
Travel Time (s)		4.2			10.7			18.5			27.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	62	5	103	105	8	5	12	62	9	8	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	216	0	0	79	0	0	49	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

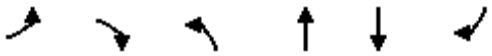
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	57	5	95	97	7	5	11	57	8	7	29
Future Vol, veh/h	17	57	5	95	97	7	5	11	57	8	7	29
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	62	5	103	105	8	5	12	62	9	8	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	9	7.7	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	22%	48%	18%
Vol Thru, %	15%	72%	49%	16%
Vol Right, %	78%	6%	4%	66%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	79	199	44
LT Vol	5	17	95	8
Through Vol	11	57	97	7
RT Vol	57	5	7	29
Lane Flow Rate	79	86	216	48
Geometry Grp	1	1	1	1
Degree of Util (X)	0.093	0.106	0.264	0.058
Departure Headway (Hd)	4.221	4.45	4.397	4.352
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	850	806	822	824
Service Time	2.241	2.47	2.397	2.373
HCM Lane V/C Ratio	0.093	0.107	0.263	0.058
HCM Control Delay	7.7	8	9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.4	1.1	0.2



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	15	0	1229	1140	15
Future Volume (vph)	0	15	0	1229	1140	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1611	0	3539	3532	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	3539	3532	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	149.9			153.8	283.1	
Travel Time (s)	10.8			11.1	20.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	16	0	1336	1239	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	0	1336	1255	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	15	0	1229	1140	15
Future Vol, veh/h	0	15	0	1229	1140	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	0	1336	1239	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	628	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	426	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	426	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	426	-	-
HCM Lane V/C Ratio	-	0.038	-	-
HCM Control Delay (s)	-	13.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Attachment 5

Parking Plan

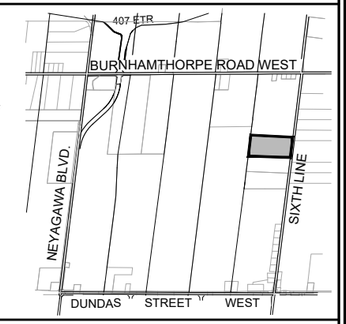
PRELIMINARY ON-STREET PARKING ANALYSIS
Digram Development Oakville Inc.

PART OF LOT 16
CONCESSION 1, NORTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR
NOW IN THE
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

KEY MAP
N.T.S.

SUBJECT PROPERTY



Street Townhouse, Back to Back Townhouse and Rear Lane Townhouse Dwellings (West of NHS Block)

154 residential units

± 42 on-street Parking within Development*

0.27 Visitor parking spaces / unit

± 17 additional adjacent on-street parking spaces (Preserve Drive)

Mixed-Use Blocks (East of NHS Block)

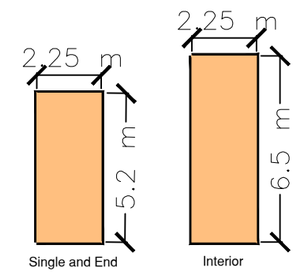
360 residential units

Residential, visitor and commercial parking to be provided in accordance with Zoning By-law

± 16 on-street parking spaces

± 12 potential adjacent on-street parking spaces (Sixth Line)

TYPICAL ON-STREET PARKING SPACE**



* Subject to adjustment during detailed engineering design

** Per North Oakville Parking Strategy

DIGRAM DEVELOPMENTS INC.

SCALE 1:1500

July 22, 2021

KORSIAK Urban Planning
206-277 Lakeshore Road East
Oakville, Ontario L6J 1H9
T: 905-257-0227
info@korsiak.com

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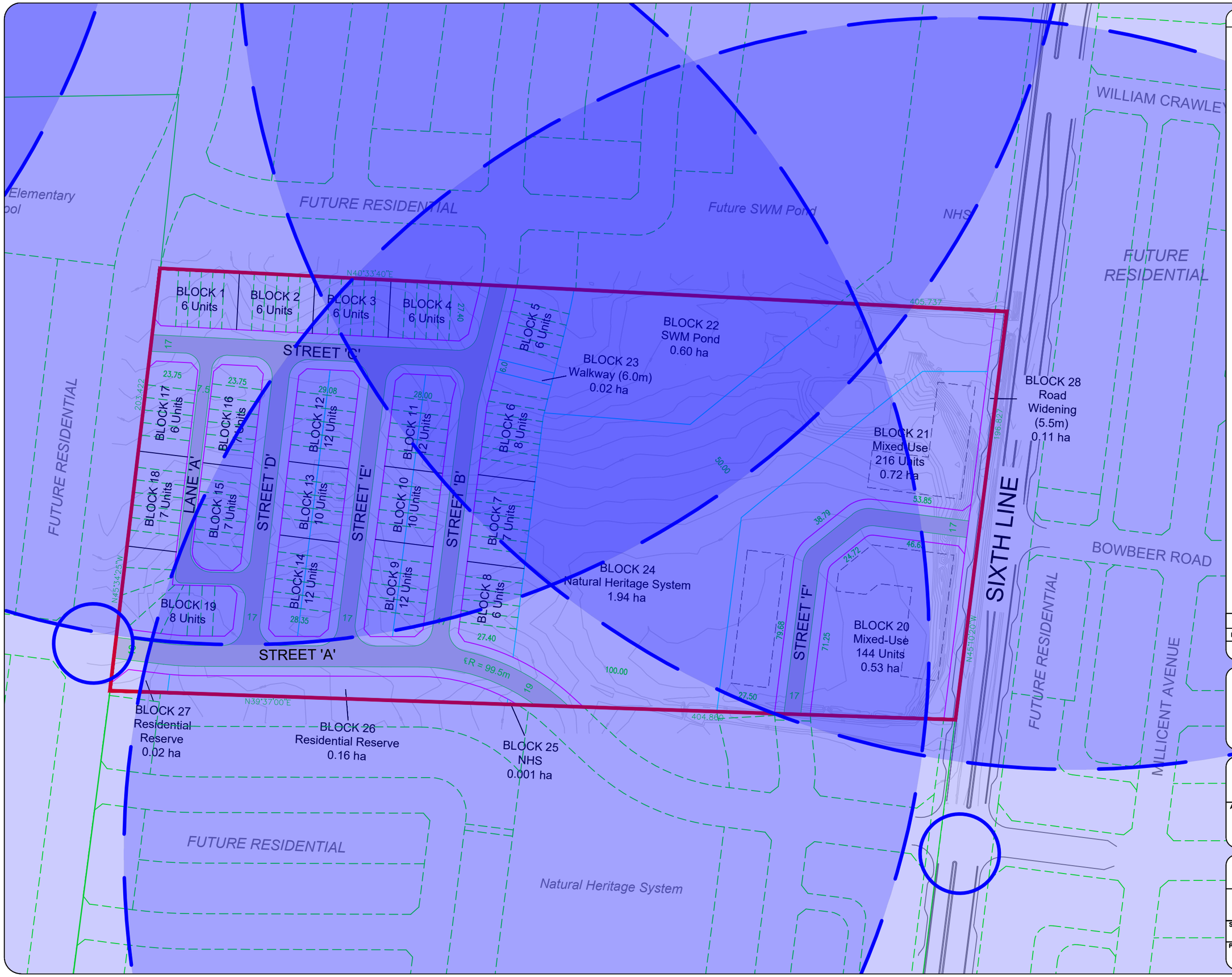
Attachment 6

Transit, Cross-sections, Pedestrian and Cycling Plans



Notes:

LEGEND:

400m Transit Walking Distance

REV:	DESCRIPTION:	BY:	DATE:
-	-	-	xx/xx/xx

STATUS: status

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: Digram Developments Inc
Digram North Oakville

ARCHITECT:

SITE: Neighbourhood 9/10/11

TITLE: Transit Facilities Concept Plan

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2021-07-22		

PROJECT NO:	DRAWING NO:	REVISION:
2019-67	001	

Notes:

FUTURE RESIDENTIAL

Elementary
bol

FUTURE RESIDENTIAL

Future SWM Pond

NHS

WILLIAM CRAWLEY

FUTURE RESIDENTIAL

BLOCK 1
6 Units

BLOCK 2
6 Units

BLOCK 3
6 Units

BLOCK 4
6 Units

N40°33'40"E

27.40

17m Local Road Cross Section

17

BLOCK 5
6 Units

BLOCK 22
SWM Pond
0.60 ha

BLOCK 23
Walkway (6.0m)
0.02 ha

6.0

405.737

BLOCK 28
Road
Widening
(5.5m)
0.11 ha

196.827

22m Avenue/Transit Corridor Cross Section

203.422

23.75

BLOCK 17
6 Units

7.5m Local Lane Cross Section

BLOCK 16
7 Units

23.75

17m Local Road Cross Section

29.08

BLOCK 12
12 Units

17m Local Road Cross Section

28.00

BLOCK 11
12 Units

17m Local Road Cross Section

BLOCK 6
8 Units

BLOCK 21
Mixed-Use
216 Units
0.72 ha

50.00

53.85

BLOCK 18
7 Units

BLOCK 15
7 Units

BLOCK 13
10 Units

BLOCK 10
10 Units

BLOCK 7
7 Units

38.79

17m Local Road Cross Section

17

46.63

24.72

SIXTH LINE

BOWBEER ROAD

N45°34'25"W

BLOCK 19
8 Units

17

BLOCK 14
12 Units

28.35

17

BLOCK 9
12 Units

17

BLOCK 8
6 Units

27.40

BLOCK 24
Natural Heritage System
1.94 ha

BLOCK 20
Mixed-Use
144 Units
0.53 ha

79.68

71.25

17

N45°10'20"W

FUTURE RESIDENTIAL

MILLICENT AVENUE

19

19m Connector/Transit Cross Section

℄R = 99.5m

19

100.00

27.50

17

404.880

N39°37'00"E

BLOCK 27
Residential
Reserve
0.02 ha

BLOCK 26
Residential Reserve
0.16 ha

BLOCK 25
NHS
0.001 ha

FUTURE RESIDENTIAL

Natural Heritage System

REV:	DESCRIPTION:	BY:	DATE:
-	-	-	xx/xx/xx

STATUS: status

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: Digram Developments Inc
Digram North Oakville

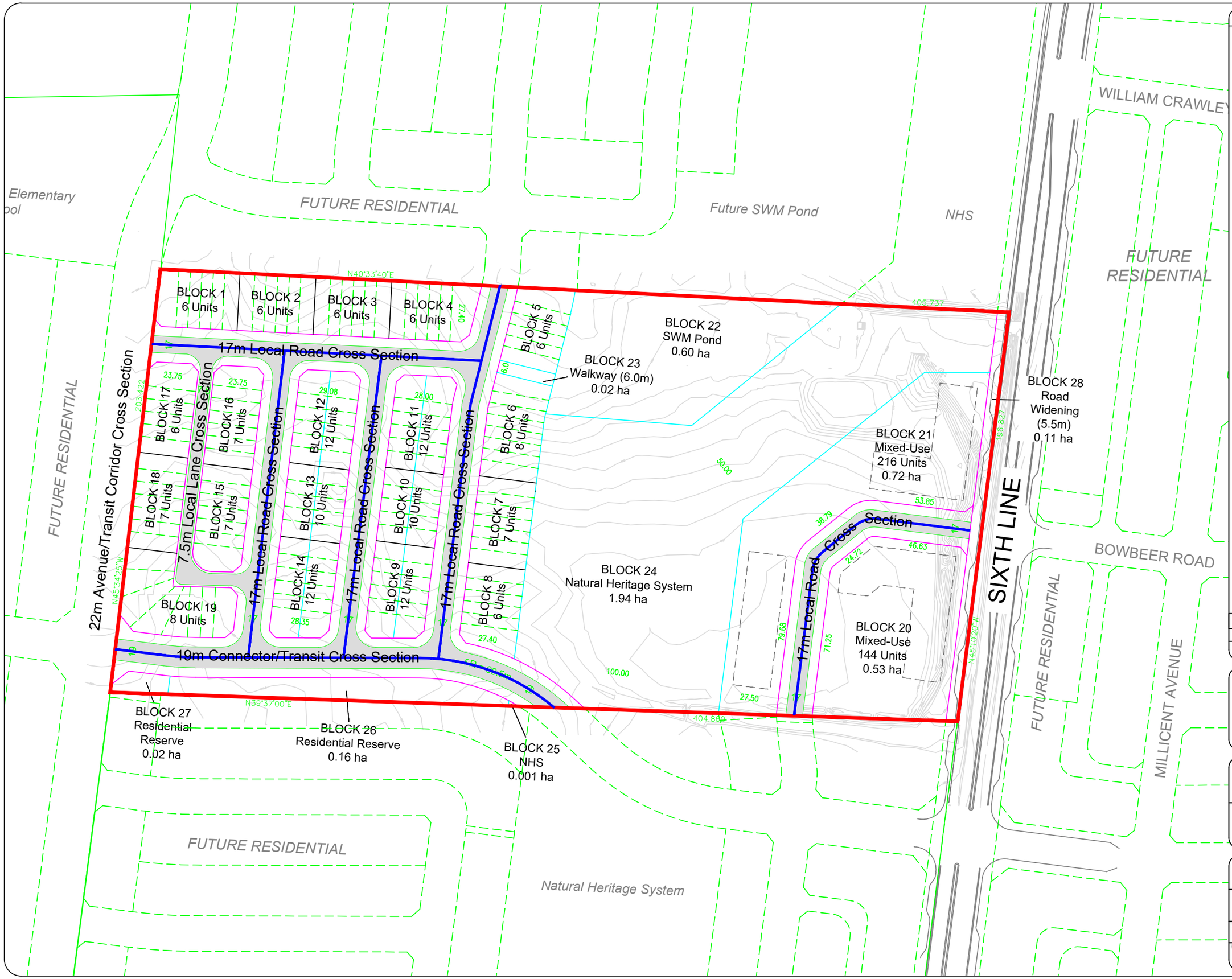
ARCHITECT:

SITE: Neighbourhood 9/10/11

TITLE: Road Cross-Section
Concept Plan

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2021-07-22		

PROJECT NO:	DRAWING NO:	REVISION:
2019-67	002	



Notes:

LEGEND:

Both Side Sidewalk

REV:	DESCRIPTION:	BY:	DATE:
-	-	-	xx/xx/xx

STATUS: status

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: Digram Developments Inc
Digram North Oakville

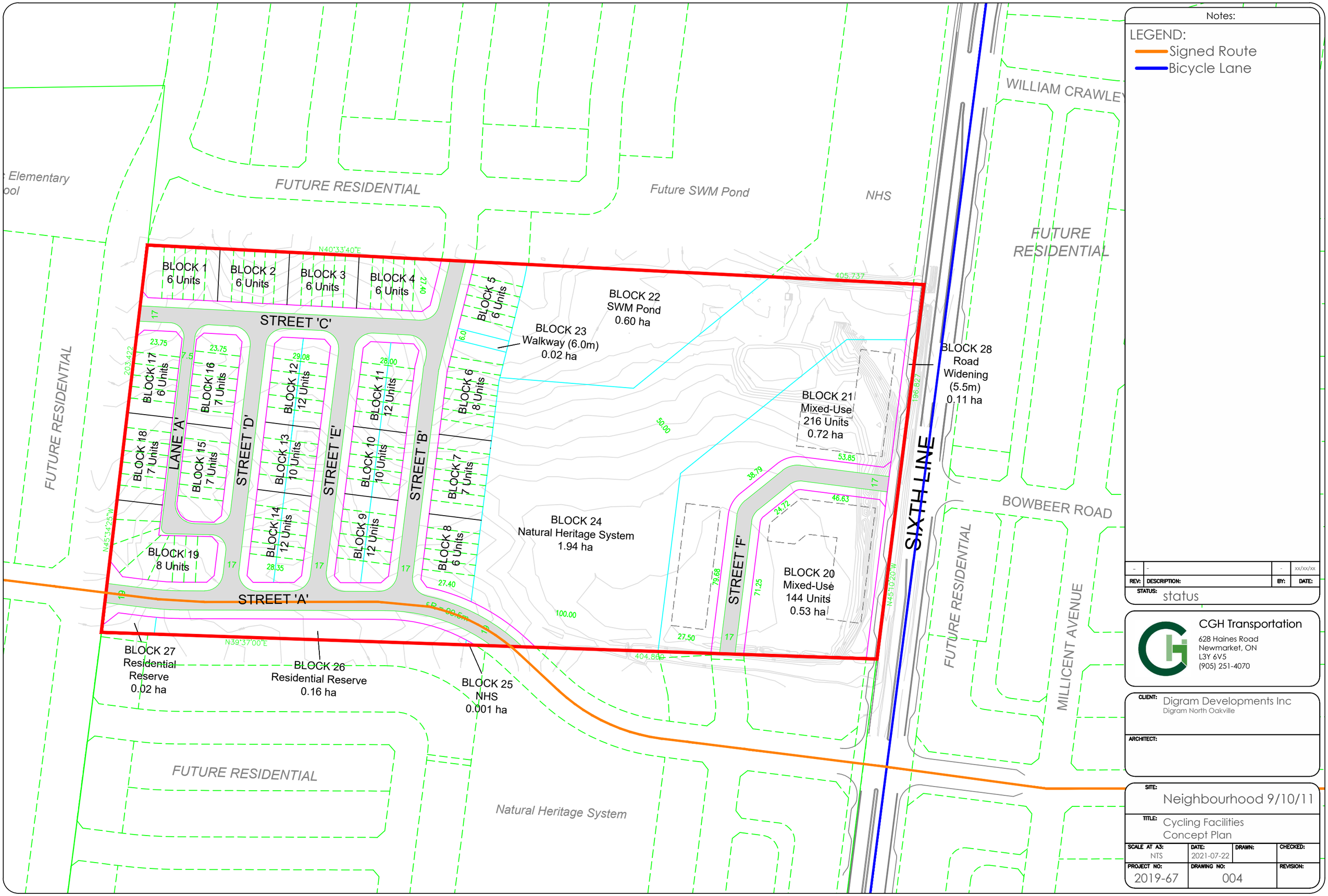
ARCHITECT:

SITE: Neighbourhood 9/10/11

TITLE: Pedestrian Facilities Concept Plan

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2021-07-22		

PROJECT NO:	DRAWING NO:	REVISION:
2019-67	003	



Notes:

LEGEND:
- Signed Route
- Bicycle Lane

REV:	DESCRIPTION:	BY:	DATE:
-	-	-	xx/xx/xx

STATUS: status

CGH Transportation
628 Haines Road
Newmarket, ON
L3Y 6V5
(905) 251-4070

CLIENT: Digram Developments Inc
Digram North Oakville

ARCHITECT:

SITE: Neighbourhood 9/10/11

TITLE: Cycling Facilities Concept Plan

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2021-07-22		

PROJECT NO:	DRAWING NO:	REVISION:
2019-67	004	

Attachment 7

North Oakville Urban Design and Open Space Guideline: Cross-sections

5.2.2. Avenue/Transit Corridor

Between the Arterial/Transit Corridors, the Avenue/Transit Corridors provide a finer grid of connection within and between neighbourhoods. These connections provide alternative routes for access to Neighbourhood Centres and serve to disperse traffic on a smaller street section.

Avenue/Transit Corridors serve mainly intermediate volumes of intra-neighbourhood/district travel, accommodate local transit, connect Urban Centres Areas and serve as a major internal connector for Urban Core Areas.

The treatment of the boulevard will reflect adjacent land use and whether on-street parking is provided.

Specific technical details of the cross-section (i.e. plant material, soil type, engineering standards) will be determined through the appropriate design review process.

Transit Supportive Uses

Transit supportive land uses are to be encouraged along the right-of-way, such as:

- Walk-up apartments;
- Townhouses; and,
- Small-lot detached homes.

Figure 5.4: Typical Avenue/Transit Corridor section through the General Urban and Sub Urban Designation. Street tree height at maturity will vary according to species and the availability of optimum growing conditions (i.e. adequate water, sunlight, soil volume), the protection from compacted soils, salt spray, mechanical damage, pests, and maintenance programs. Please refer to tree habitat design guidelines found in Table 9 of Oakville's Urban Forest: Our Solution to Our Pollution (2006).

5.2.3. Connector/Transit Corridor

Connector/Transit Corridors should be designed to serve relatively low volumes of intra-neighbourhood travel, accommodate local transit service and distribute traffic to and from Major and Minor Arterial/Transit Corridors and Avenue/ Transit Corridors.

The treatment of the boulevard will reflect adjacent land use and whether on-street parking is provided.

Specific technical details of the cross-section (i.e. plant material, soil type, engineering standards) will be determined through the appropriate design review process.

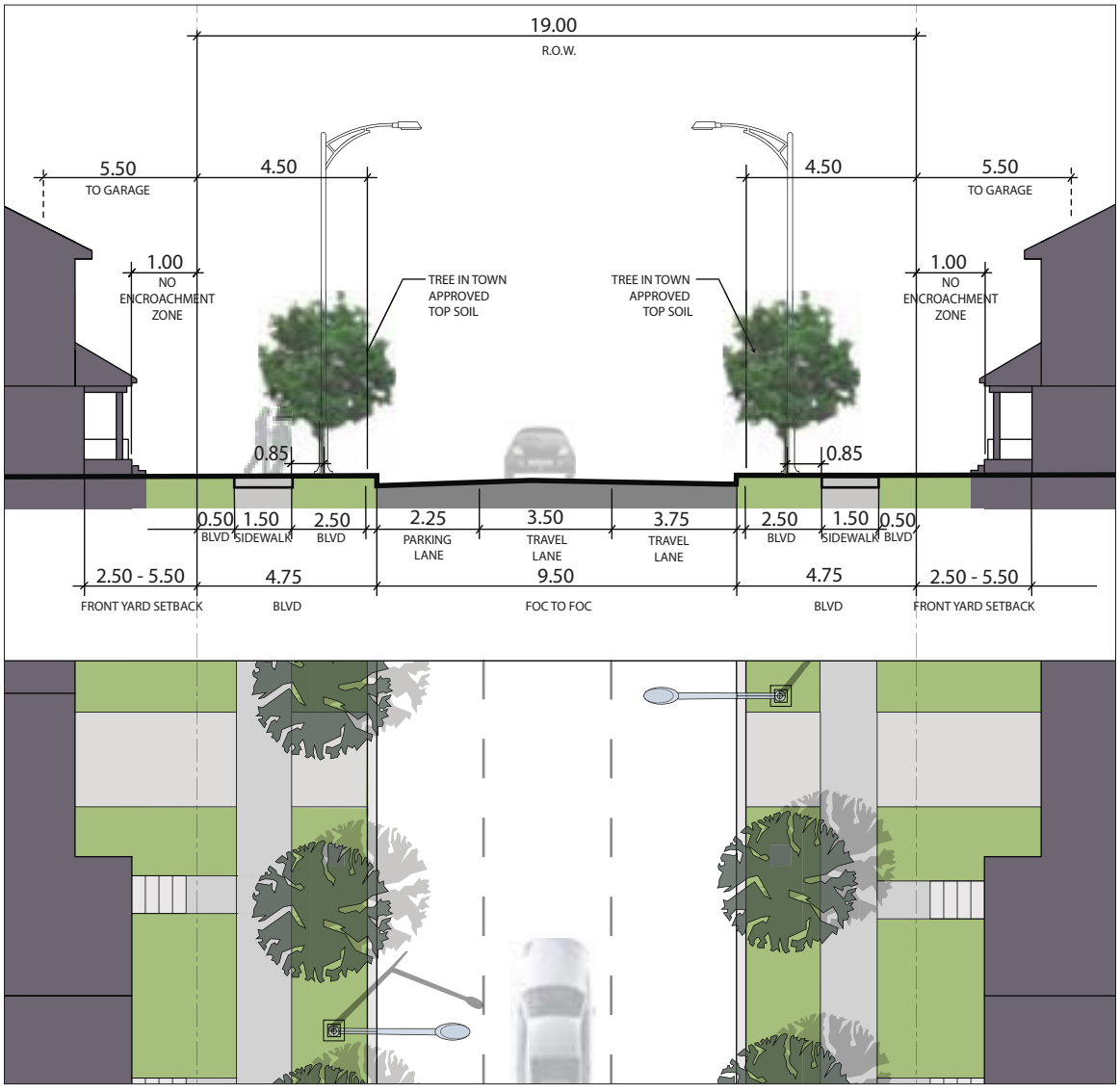


Figure 5.5: Typical Connector/Transit Corridor section through the General Urban and Sub Urban Designation. Street tree height at maturity will vary according to species and the availability of optimum growing conditions (i.e. adequate water, sunlight, soil volume), the protection from compacted soils, salt spray, mechanical damage, pests, and maintenance programs. Please refer to tree habitat design guidelines found in Table 9 of Oakville's Urban Forest: Our Solution to Our Pollution (2006).

5.2.4. Local Road

Local Roads will be designed to provide access to individual properties and serve internal residential neighbourhood, Core Area or Employment District travel demands. Local Roads will also connect individual properties to other Local Roads, Avenue/ Transit Corridors or Connector/Transit Corridors.

The treatment of the boulevard will reflect adjacent land use and whether on-street parking is provided.

Specific technical details of the cross-section (i.e. plant material, soil type, engineering standards) will be determined through the appropriate design review process.

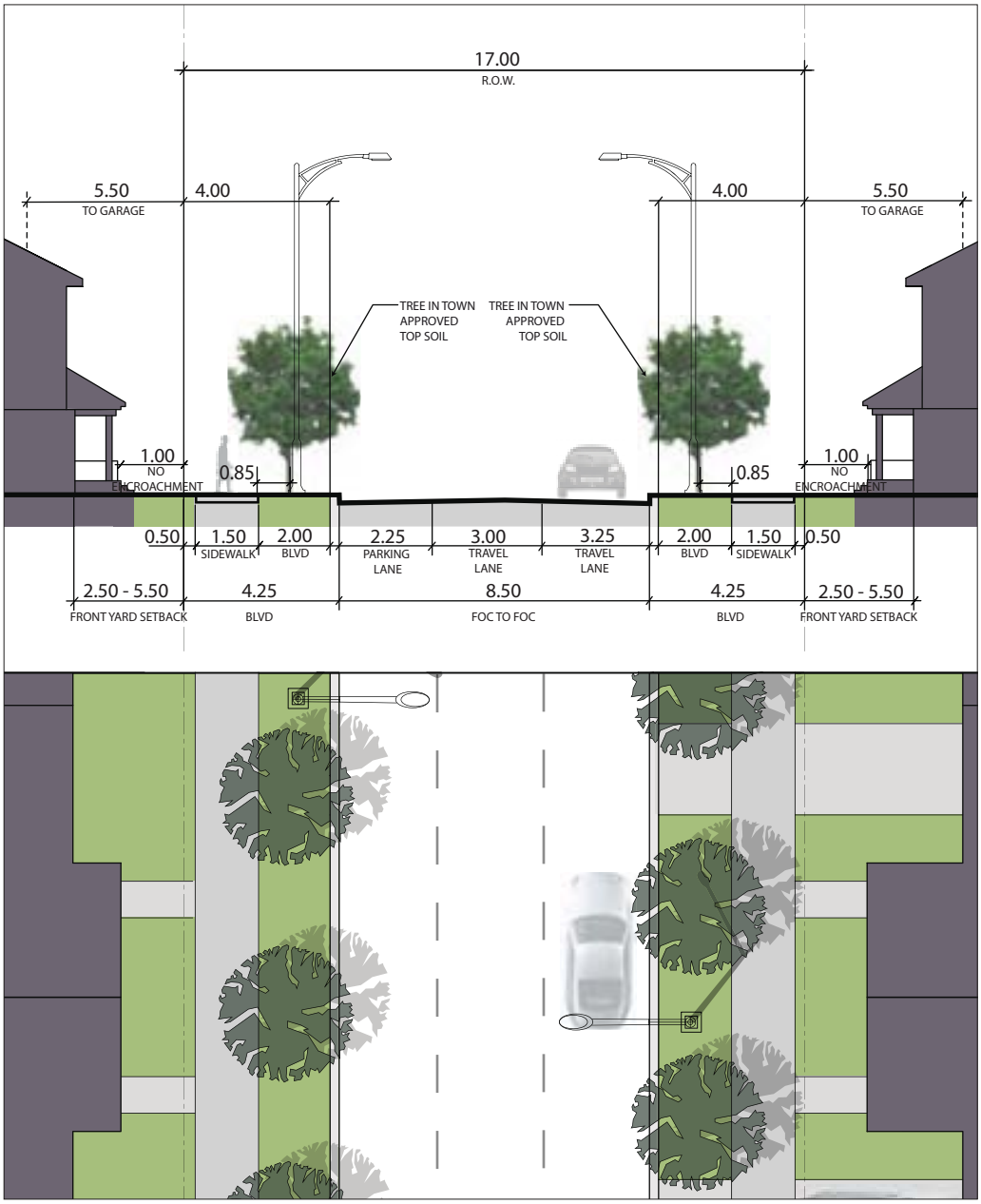


Figure 5.6: Typical Local Road section through the General Urban and Sub Urban Designation. Street tree height at maturity will vary according to species and the availability of optimum growing conditions (i.e. adequate water, sunlight, soil volume), the protection from compacted soils, salt spray, mechanical damage, pests, and maintenance programs. Please refer to tree habitat design guidelines found in Table 9 of Oakville's Urban Forest: Our Solution to Our Pollution (2006).

5.2.5. Laneways

Laneways provide rear access to individual properties and connect them to Local Roads, Avenue/Transit Corridors and Connector/Transit Corridors. Lanes are recommended where narrow lot frontages (i.e. townhouses) are proposed or to provide access to parking garages.

Specific technical details of the cross-section (i.e. plant material, soil type, engineering standards) will be determined through the appropriate design review process.

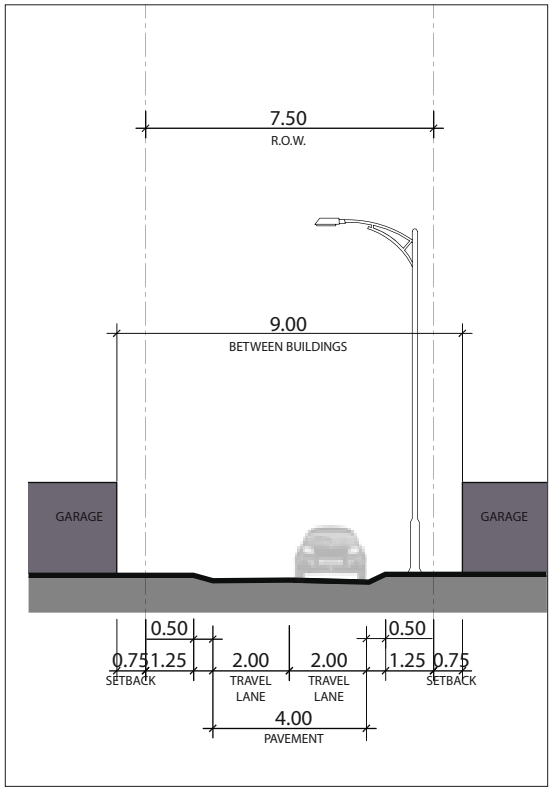
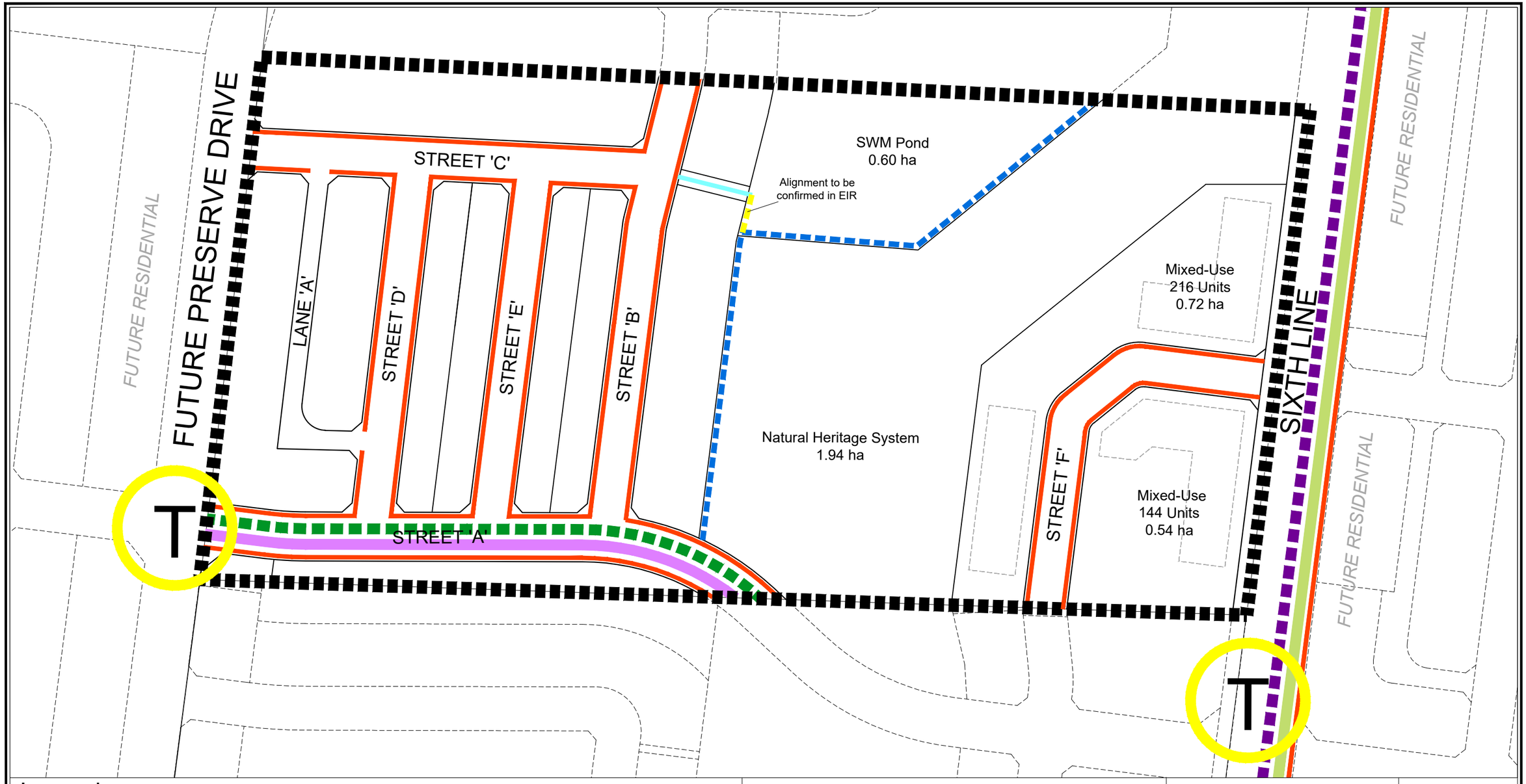


Figure 5.7: Typical Residential Lane section through the General Urban and Sub Urban Designation.

Attachment 8

Pedestrian Circulation Plan



Legend

- Sidewalks
- Walkways
- Bicycle Lane**
- Signed Bike Route**
- Major Trail System**
- Proposed Trail Extension
- Secondary Transit Corridor Service*
- Community Service*
- T — Potential Transit Stop Location

* From Figure NOE4 - Transportation Plan - NOESP

** From Figure 1 - North Oakville Trails Plan

Digram Developments Oakville Inc.

PEDESTRIAN CIRCULATION / TRANSIT FACILITY PLAN

SCALE 1:1500

July 19, 2021

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KORSIAK Urban Planning
206-277 Lakeshore Road East
Oakville, Ontario L6J 1H9
T: 905-257-0227
info@korsiak.com