

QUADREAL PROPERTY GROUP

LAZY PAT FARMS PROPERTY (3269 DUNDAS STREET WEST) TRANSPORTATION STUDY UPDATE - RESPONSE TO COMMENTS

AUGUST 04, 2020





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TRANSPORTATION STUDY UPDATE - RESPONSE TO COMMENTS

QUADREAL PROPERTY GROUP

TRANSPORTATION STUDY

PROJECT NO.: 09M-00013-01

DATE: AUGUST 04, 2020

WSP
100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON
CANADA L3T 0A1

T: +1 905 882-1100
F: +1 905 882-0055
WSP.COM

wsp



August 04, 2020

QuadReal Property Group
Commerce Court West
199 Bay Street, Suite 4900
P.O Box 373
CC Postal Station
Toronto, Ontario M5L 1G2

Attention: Michael Reel, Vice President, Investment Management

Subject: Transportation Impact Study Update - Response to Comments - Lazy Pat Farms Property (3269 Dundas Street West)

Dear Mr. Reel,

WSP is pleased to present the findings of our updated Transportation Impact Study for the proposed 407 West Employment Area (also known as Lazy Pat Farms Property), in the Town of Oakville. This updated study has been completed to address the Halton Region comments (dated April 7th, 2020) related to the April 2019 study submitted for the subject lands.

The analysis completed as part of this study includes a review of traffic operations for the study area intersections under existing 2020 conditions, as well as future background and future total operations under the 2025 and 2030 horizon years, as updated per the Region's comments. As part of the 2030 future total conditions, WSP completed a sensitivity analysis to assess the impacts of removing the Avenue One creek crossings on study area traffic operations.

In addition to the study intersection operations, WSP completed a review of the existing and future transit and active transportation facilities for the study area based on the North Oakville Secondary Plan, Transit Plan and the Oakville Active Transportation Master Plan.

The detailed study analyses, findings and recommendations have been documented within this report. Should you have any questions about the content of this study, please do not hesitate to contact us.

Kind regards,

A handwritten signature in blue ink, appearing to read 'Craig Kelly'.

Craig Kelly, P.Eng., PTOE,
Senior Project Manager, Transportation Planning

NK/ck
WSP ref.: 09M-00013-01

100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON
CANADA L3T 0A1

T: +1 905 882-1100
F: +1 905 882-0055
wsp.com

SIGNATURES

PREPARED BY



Nawfal Kammah, B.Eng., E.I.T.,
Designer, Transportation Planning

APPROVED¹ BY



David Lukezic, M.Eng., LEL, RPP,
Project Manager, Transportation Planning



Craig Kelly, P.Eng., PTOE,
Senior Project Manager, Transportation Planning

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1 INTRODUCTION

QuadReal Property Group is proposing to develop the Lazy Pat Farms Property, located north of Dundas Street West and mid-block between Bronte Road and Tremaine Road at 3269 Dundas Street West, in the Town of Oakville. As per the North Oakville West Secondary Plan (NOWSP), the subject property is designated as an Employment District. A mix of uses, including General Employment, Light Employment and Employment Related Service-Commercial uses are proposed within the Lazy Pat Farms Property. Please refer to **Figure 1-1** for the site location.

In May 2011, WSP (formerly MMM Group) prepared and submitted a Transportation Impact Study related to the subject property. Following the submission, the Town of Oakville and Halton Region provided comments on the study, which lead to the submission of a second Transportation Impact Study in August 2013. Following the second TIS submission, the Town of Oakville retained CIMA to undertake a peer review of the study, which lead to the submission of a Response to Comments Letter in August 2014.

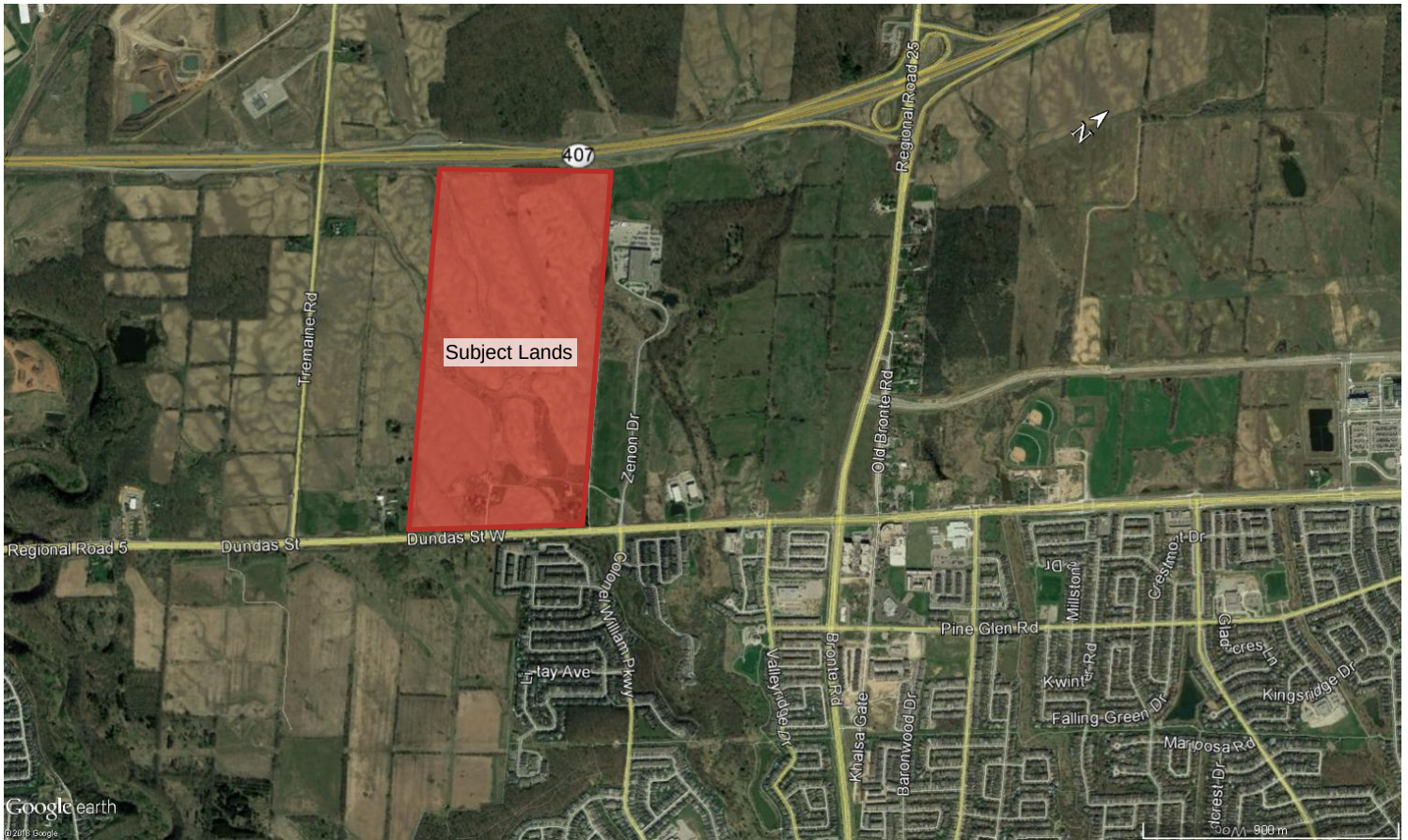
Halton Region in June of 2018 has provided written comments to the Town of Oakville. In these comments, they indicate they are generally satisfied with the August 2014 response report based on a second peer review in September 2015 by CIMA conducted on behalf of both the Town and Region. However, they have stated: “a revised TIS, using 2017 as the base year (due to the lapse in time), is required by the applicant that incorporates all of the revisions outlined in the response report”.

As updates were made to the development proposal since receipt of the 2018 comments, an updated TIS was completed and submitted in April of 2019. All assumptions made as part of the 2019 study were established via correspondence of the Terms of Reference with Halton Region and Town of Oakville Staff, and included a review of the impacts of the proposed development on the boundary roadway intersections in the vicinity of the property, as well as the Transit Facilities Plan and Active Transportation Plan.

Subsequent to the April 2019 submission, Halton Region retained CIMA to complete a peer review of the study and provided comments dated April 2020. Following a review of the comments and correspondence between Halton Region and WSP (included in **Appendix A**), it was established that an updated study was to be completed to review existing 2020 conditions, as well as the 2025 and 2030 horizon years (as opposed to 2018, 2021 and 2031 as reviewed in the 2019 study). WSP also used the updated capital works timing in this revised TIS. The updated review was completed and detailed within this report.

Figure 1-1

Site Location



Source: Google Earth

2 407 WEST EMPLOYMENT AREA CONCEPT PLAN

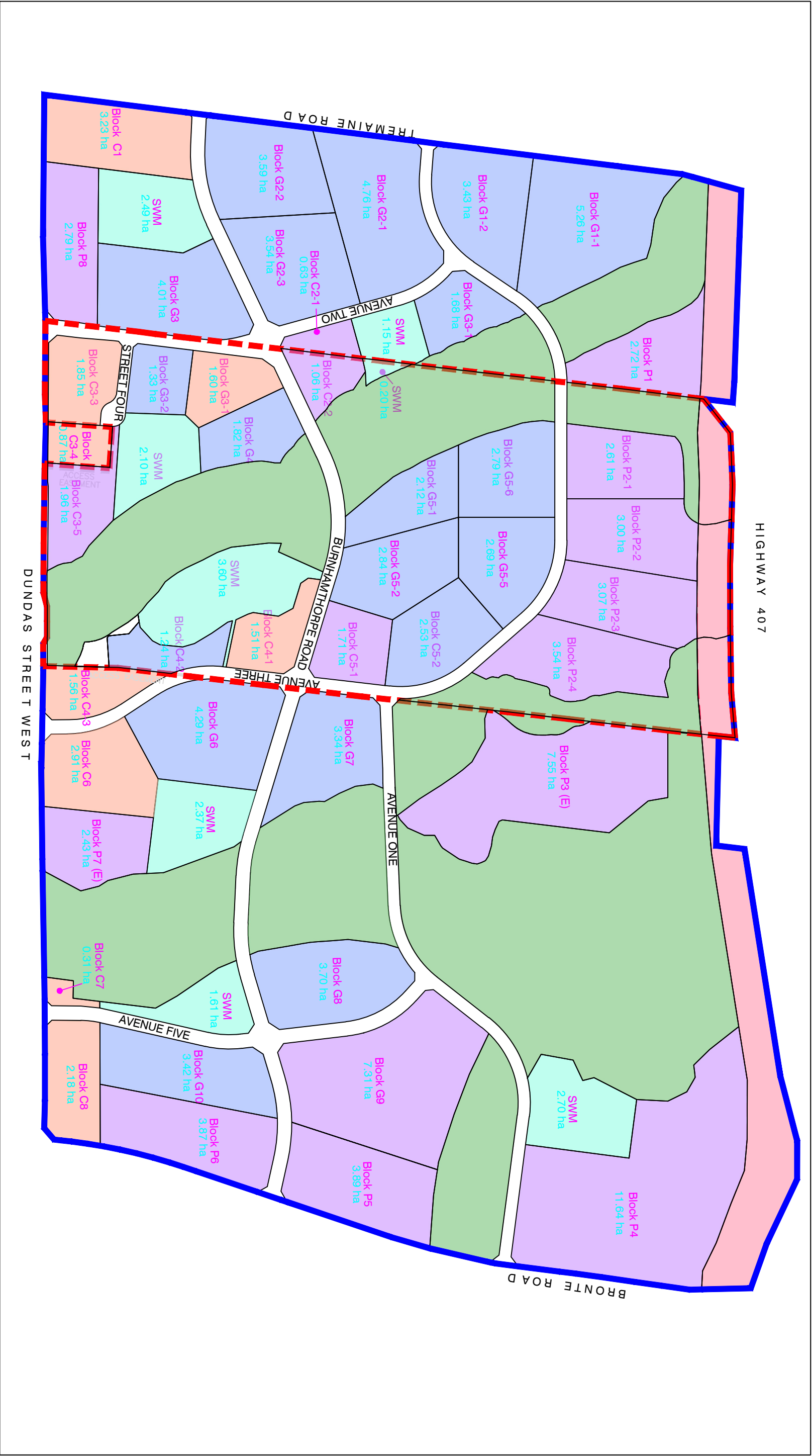
The development is proposed to accommodate an employment area on the subject property. The development is intended to include light and general employment uses and limited retail and service commercial uses, which serve the employment area in accordance with the Town's land use and planning directions for the 407 West Employment Area. The vision for the subject property is to develop an environmentally and economically sustainable employment district that will contribute to the dynamic character of the Town of Oakville. The 407 West Employment Area concept plan is shown in **Figure 2-1**.

The range of employment land uses for the subject property have been further characterized as light employment (prestige office uses), general employment, and service area (service/retail/office) uses, in accordance with the NOWSP and implementing Comprehensive Zoning By-law for North Oakville. The development concept envisions more prestige office uses adjacent to Highway 407 and Bronte Road, due to increased visibility along these major roads. Limited commercial (service/retail/office) uses are envisioned to be clustered at the intersections with Arterial Roads and Avenues along the Dundas Street corridor to serve the employment area. It is recognized that more general industrial uses, such as mixed warehousing and office uses may be accommodated internal to the employment area, and appropriately buffered from surrounding land uses.

The concept plan is consistent with the Town's NOWSP and incorporates an appropriate implementation of the proposed road network based on more detailed study. The road pattern follows a modified grid pattern which responds to the existing environmental and site conditions, while encouraging accessibility and a viable transit network throughout the 407 West Employment Area.

The concept plan accommodates three intersection locations with Dundas Street West, including the existing intersections with Valleyridge Drive and Zenon Drive/Colonel Williams Parkway. A new intersection at Dundas Street is proposed at approximately 750 metres from the Colonel Williams Parkway intersection. Two major east/west road corridors are proposed as identified in the NOWSP to provide access from Tremaine Road to Bronte Road, across the employment area. The southern east/west road aligns with the William Halton Parkway as part of the proposed New North Oakville Transportation Corridor (i.e., Burnhamthorpe Road extension) on the east side of Bronte Road. Additionally, an east-west local road is proposed between the Burnhamthorpe Road extension and Dundas Street West via the proposed north-south roadway west of Colonel William Parkway, providing access to the proposed development blocks and ending in a cul-de-sac.

The development proposal identifies the natural heritage and open space system and stormwater management facilities based on the Town's NOWSP, which has been further refined for the subject property based upon the Environmental Implementation Report and Functional Servicing Study (EIR/FSS) previously prepared in support of these applications.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

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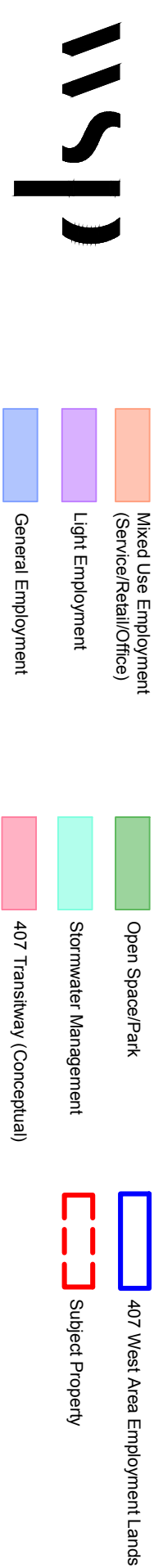


Figure 2-1
407 West Employment Area Concept Plan
Lazy Pat Farms Property Transportation Study

3 PROPOSED LAND USES AND SITE ACCESS

3.1 PROPOSED LAND USES

The subject property is situated mid-block between Bronte Road and Tremaine Road, and bounded by Dundas Street West to the south and Highway 407 to the north. The development proposal consists of a mix of General Employment lands, Light Employment lands, and Service Area Employment lands, with the remaining area used as open space and for stormwater management purposes. The subject property is within the North Oakville West Secondary Plan area, where the general development objective for employment uses is a minimum of 0.35 FSI.

The proposed development and the supporting internal road network will be developed in two phases. **Figure 3-1** illustrates the proposed block plan related to the property by phase. **Table 3-1** summarizes the proposed subject property uses and gross floor area by phase.

Table 3-1 – Summary of Proposed Uses by Phase

PHASE	SERVICE AREA EMPLOYMENT (SERVICE/RETAIL/OFFICE)	GENERAL EMPLOYMENT	LIGHT EMPLOYMENT	TOTAL BY PHASE
Phase 1	202,879 ft ²	279,344 ft ²	254,566 ft ²	736,789 ft ²
Phase 2	-	318,612 ft ²	657,675 ft ²	976,287 ft ²
TOTAL	202,879 ft²	597,956 ft²	912,241 ft²	1,713,076 ft²

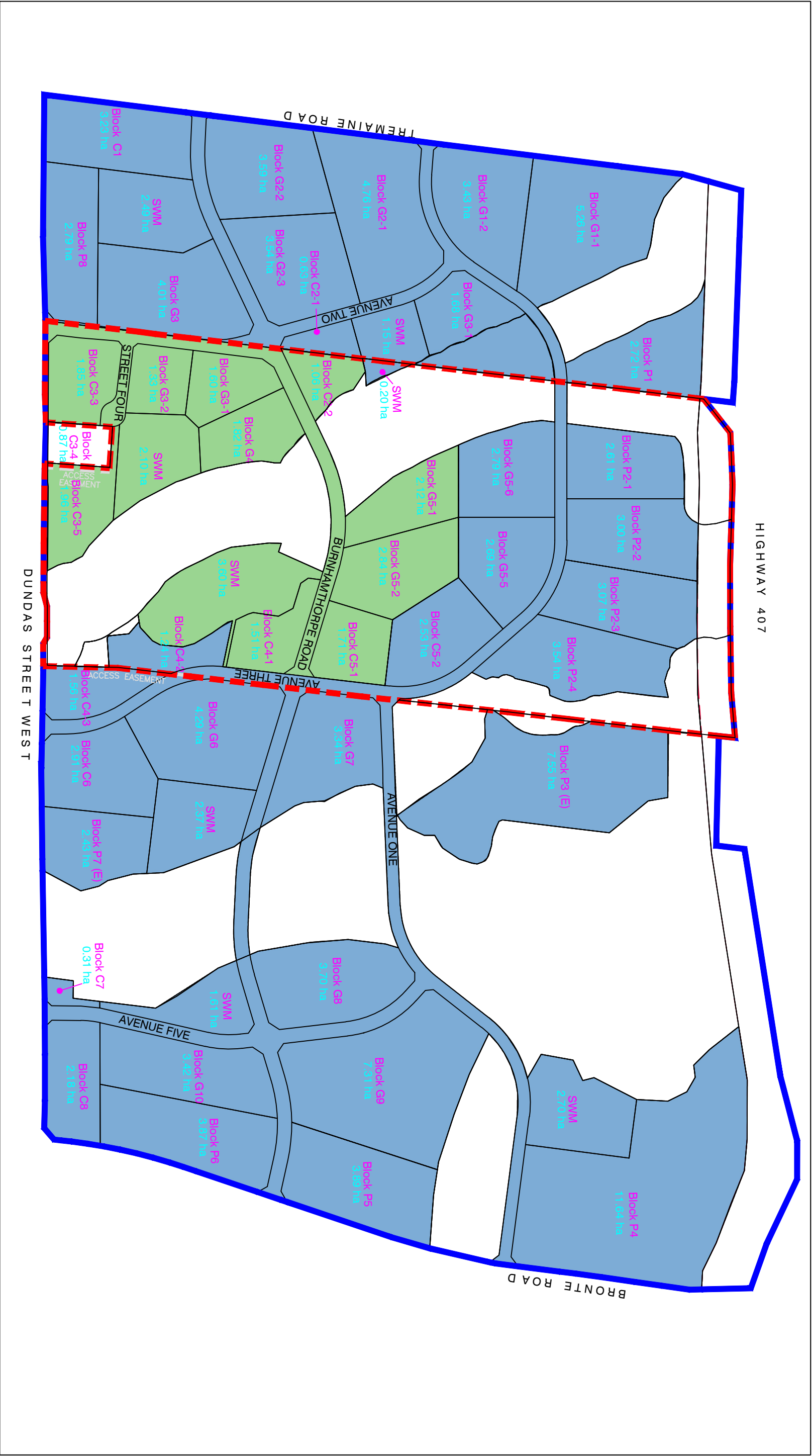
3.2 PROPOSED SITE ACCESS

The proposed development is part of the 407 West Employment Area (also referred to as the 407 Employment Lands within this report) bounded by Bronte Road, Tremaine Road, Dundas Street West, and Highway 407. On the basis of the Transportation Plan for the North Oakville West Secondary Plan (NOWSP), the 407 West Employment Area will be served by a grid network of roadways, as shown in **Figure 2-1**, including:

- Two (2) major east-west roadways, namely Avenue One and the New North Oakville Transportation Corridor (NNOTC), shown as Burnhamthorpe Road;
- Three (3) major north-south roadways, namely Avenue Two, Avenue Three, and Avenue Five; and
- One (1) minor roadway, namely Street Four, connected to Avenue Two.

As shown in **Figure 2-1**, both major east-west roadways are parallel with Dundas Street West, connecting Tremaine Road and Bronte Road, between Highway 407 and Dundas Street West. Both roadways are expected to be aligned with the two future east-west roadways in the Tremaine and Dundas Secondary Plan Area, extending to the west of Tremaine Road. Avenue One will terminate eastward at its intersection with Bronte Road. The proposed NNOTC extension (Burnhamthorpe Road) will extend eastward via the existing William Halton Parkway roadway.

Avenue Two will run in the north-south direction between Dundas Street West and Avenue One located approximately 450 metres to the east of Tremaine Road. Avenue Three will run in the north-south direction, aligned with Colonel William Parkway at its intersection with Dundas Street West, terminating at its intersection with Avenue One. Similarly, Avenue Five will run in the north-south direction, aligned with Valleyridge Drive at its intersection with Dundas Street, terminating at its intersection with Avenue One. Please refer to **Figure 3-1** for the assumed phasing of the future road network in the 407 West Employment Area.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

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Figure 3-1
Proposed Block Plan Phasing Per Traffic Analysis
Lazy Pat Farms Property Transportation Study



Phase 1 Blocks As Per Traffic Analysis

Phase 2 Blocks As Per Traffic Analysis

407 West Area Employment Lands

Subject Property

4 EXISTING TRAFFIC CONDITIONS

4.1 BOUNDARY ROADWAYS

The key boundary roadways in the vicinity of the property are Dundas Street West, Bronte Road, Tremaine Road, Colonel William Parkway, and Valleyridge Drive.

Dundas Street West bounds the property to the south, and is a major east-west arterial road under the jurisdiction of the Region of Halton. It has a posted speed limit of 60 km/h between Bronte Road and west of Colonel William Parkway. The speed limit increases to 80 km/h beyond west of Colonel William Parkway. It currently consists of a six-lane cross-section roadway with three lanes in each direction between east of Bronte Road and west of Valleyridge Drive, and reduces to a four-lane cross-section roadway to the west of Valleyridge Drive.

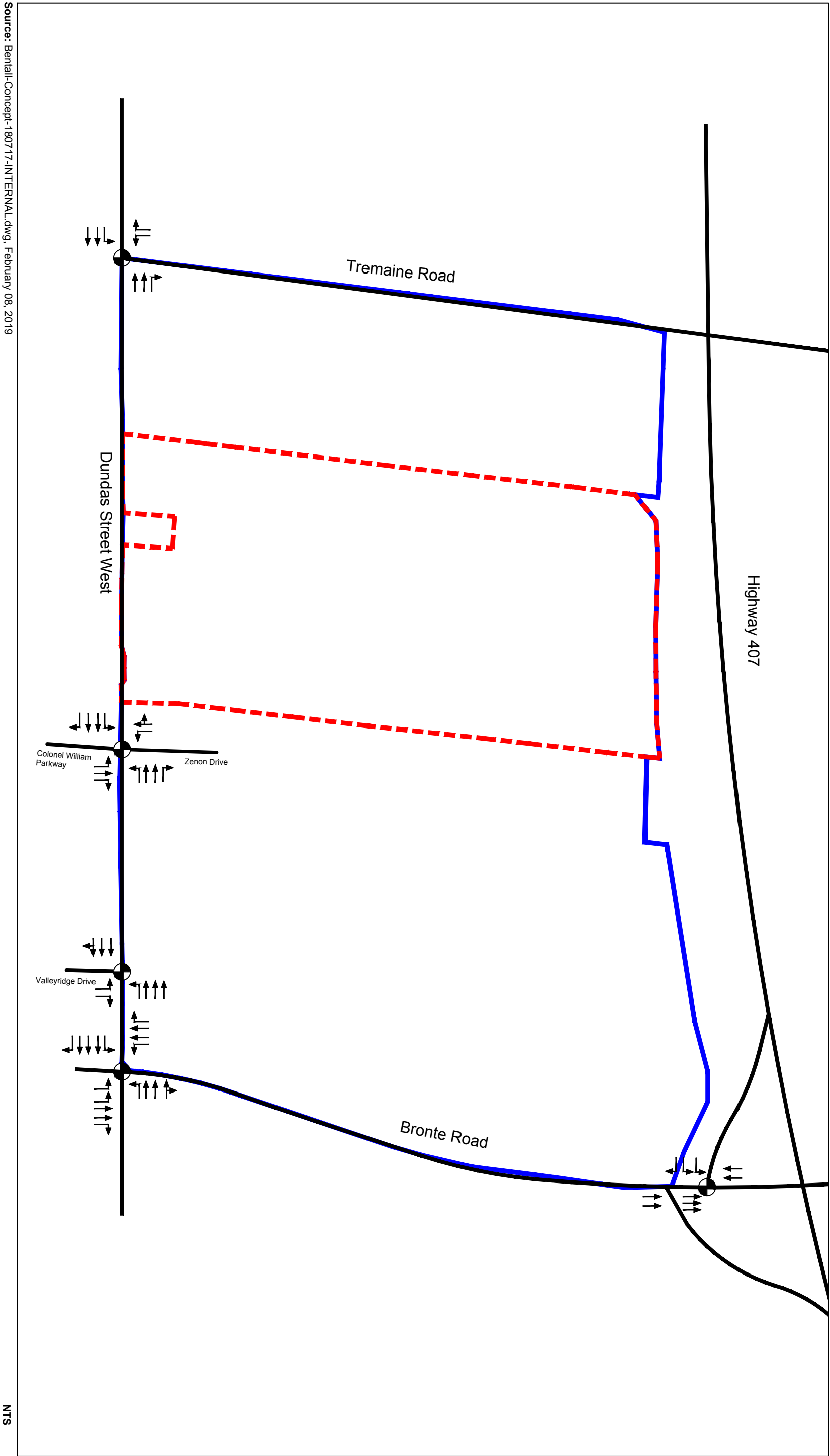
Bronte Road is located to the east of the property, and is a north-south arterial road under the jurisdiction of the Region of Halton and has a posted speed limit of 70 km/h and 60 km/h to the north and south of Dundas Street West, respectively. It currently consists of a four-lane cross-section roadway, with two lanes in each direction.

Tremaine Road is located to the west of the property, and is a north-south arterial road under the jurisdiction of the Region of Halton, with a posted speed limit of 80 km/h. It consists of a two-lane cross-section roadway, with one lane in each direction.

Colonel William Parkway is located to the south-east of the property, and is a north-south local road with a posted speed limit of 50 km/h, under the jurisdiction of the Town of Oakville. Currently, the road terminates at its intersection Dundas Street West, with another roadway named Zenon Drive as the north approach. Colonel William Parkway consists of a two-lane cross-section roadway, with one lane in each direction.

Valleyridge Drive is located to the south-east of the property, and is a north-south local road with a posted speed limit of 40 km/h, under the jurisdiction of the Town of Oakville. It consists of a two-lane cross-section roadway, with one lane in each direction.

Please refer to **Figure 4-1** for the existing lane configurations related to the boundary road intersections.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

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Signalized Intersection

407 West Area Employment Lands

Subject Property



Figure 4-1
Existing Lane Configuration
Lazy Pat Farms Property Transportation Study

4.2 TRANSIT SERVICES

The subject property is serviced by Oakville Transit Routes 5 (Dundas) and 33 (Palermo):

- Transit Route 5 runs between the Oakville GO Station to the 407 GO Station at Dundas Street and Walkers Line, travelling primarily along Trafalgar Road and Dundas Street West. It provides access to the Uptown Core, Sheridan College and Oakville Trafalgar memorial Hospital. Route 5 has headways of 30 minutes during the AM and PM peak hours.
- Transit Route 33 runs between the Bronte GO Station and the intersection of Dundas Street West at Colonel William Parkway, travelling primarily along Bronte Road and Colonel William Parkway. It operates solely during weekday peak hours, with headways of 30 minutes.

4.3 TRAFFIC DATA

Turning movement counts were undertaken by Accu-Traffic under WSP's direction on Tuesday, December 11, 2018 from 7:00 AM to 9:00 AM, and from 4:00 PM to 6:00 PM at the following intersections:

- Dundas Street West and Bronte Road
- Dundas Street West and Tremaine Road
- Dundas Street West and Colonel William Parkway/Private Driveway
- Dundas Street West and Valleyridge Drive
- Bronte Road and Highway 407 Eastbound Off-Ramp

The 2018 surveyed turning movement counts were then compared with turning movement count volumes provided by Halton Region staff for the study intersections (collected in 2017). Using the 2017 counts, and additional surveyed volumes used in Transportation Studies submitted for surrounding developments in the study area, Region staff provided changes to select turning movements at the study intersections. Please refer to **Appendix B** for the 2018 surveyed TMC volumes, 2017 Region volumes, and the traffic volumes confirmed by Region staff to be used within the study for the signalized intersections.

Per the Halton Region comments dated April 7th, 2020, the updated analysis is to assess traffic under existing 2020 conditions. Due to state of emergency on-going in Ontario at the time of this analysis (due to the Covid-19 pandemic outbreak), existing traffic patterns do not represent typical conditions for the study area. As such, WSP confirmed with the Region staff the use of 2018 data to be grown to 2020 using the growth rates provided by the Region as part of the TOR, in order to derive 2020 existing traffic conditions.

The turning movement volumes used for existing conditions have been illustrated in **Figure 4-2** and **Figure 4-3** for the AM and PM peak hours, respectively (Zenon Drive was labelled as a Private Driveway within the Figure, as it yields access to the Suez Water Technologies and Solution station).

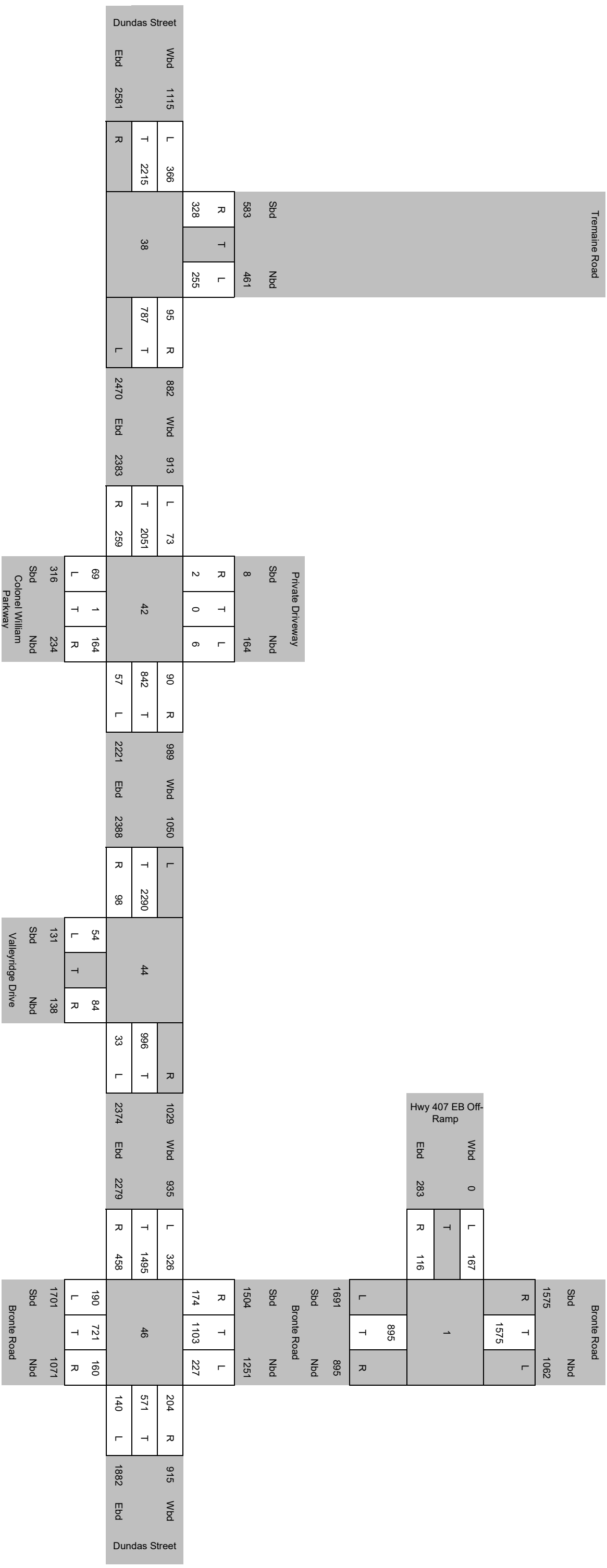
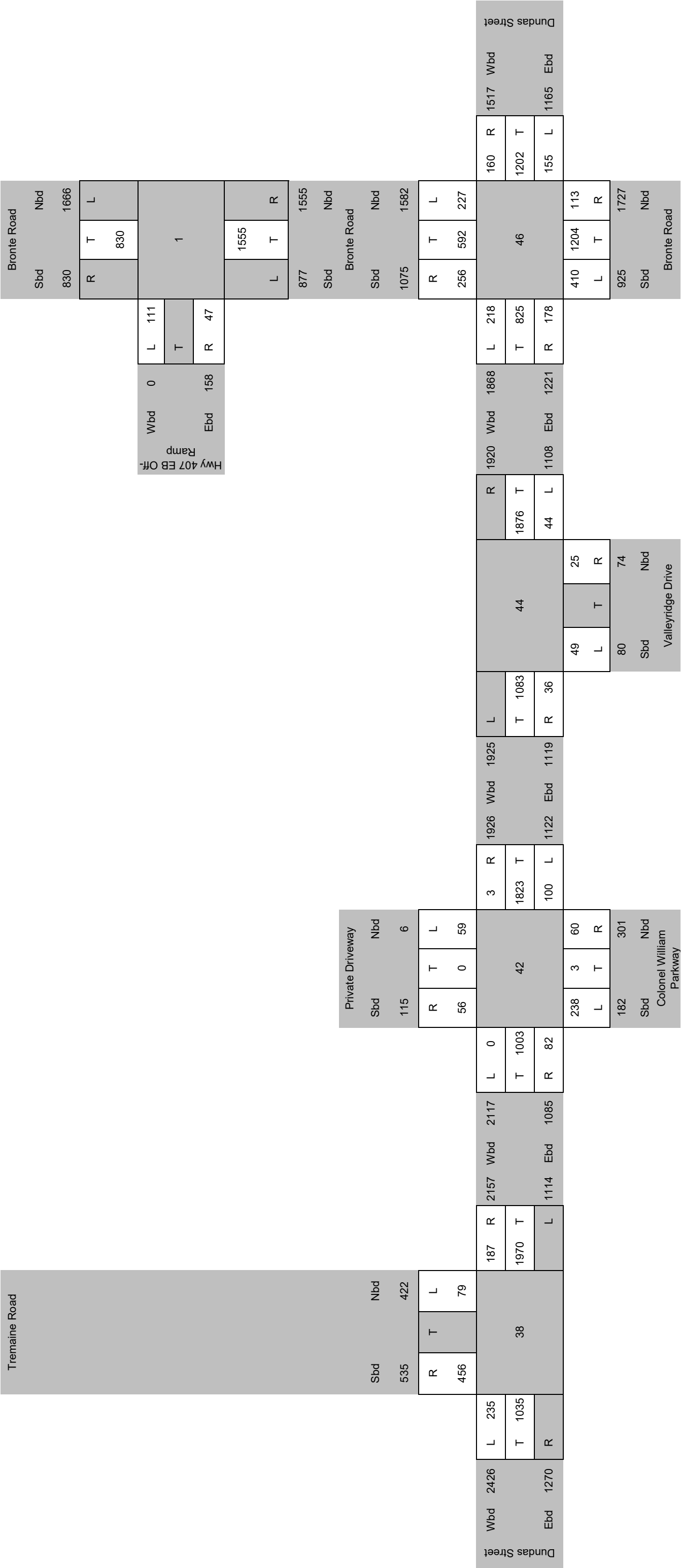


Figure 4-2
Derived 2020 Existing Traffic Volumes - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



Scale: NTS

Figure 4-3
Derived 2020 Existing Traffic Volumes - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

4.4 EXISTING INTERSECTION OPERATIONS

The operations of the study intersections have been analyzed on the basis of the 2020 AM and PM peak hour volumes derived as confirmed with Region staff, and existing signal timing plans. It should be noted that the volumes at each intersection reflect the individual peak hours of each intersection, for the purpose of conservative analysis (as such traffic volumes may not be balanced between all intersections).

The signalized intersections were analyzed on the basis of the approach outlined in the Highway Capacity Manual, 2000 Edition, using Synchro v10.0. Please refer to **Appendix C** for the level of service definitions, and **Appendix D** for the Synchro traffic operations assessment results. **Table 4-1** provides a summary of the traffic operations under existing conditions.

Table 4-1 – Intersection Levels of Service Under Existing Conditions

Intersection Name Movement	Intersection Type	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Bronte Road at Hwy 407 EB Off-Ramp Eastbound Left Eastbound Right Northbound Through Southbound Through	Signalized	0.72 0.40 0.52 0.30 0.76	11 33 36 5 10	B C D A B	0.40 0.36 0.03 0.40 0.31	6 37 35 4 3	A D D A A
Dundas Street West at Tremaine Road Eastbound Left Eastbound Through Westbound Through Westbound Right Southbound Left Southbound Right	Signalized	1.02 0.76 1.04 0.60 0.08 0.81 0.23	38 20 47 18 14 58 41	D C D B B E D	1.06 1.01 0.47 1.12 0.18 0.20 0.97	62 102 11 84 11 38 85	E F B F B D F
Dundas Street West at Colonel William Parkway Eastbound Left Eastbound Through Eastbound Right Westbound Left Westbound Through Westbound Right Northbound Left Northbound Through Northbound Right Southbound Left Southbound Through/Right	Signalized	0.80 0.16 0.87 0.19 0.44 0.39 0.06 0.48 0.00 0.43 0.04 0.00	10 2 8 0 36 7 6 53 48 52 48 48	B A A A D A D D D D D D	0.85 0.00 0.54 0.06 0.31 0.82 0.00 0.82 0.01 0.04 0.19 0.04	15 0 12 4 5 10 7 60 36 36 37 36	B A B A A A A E D D D D
Dundas Street West at Valleyridge Drive Eastbound Through/Right Westbound Left Westbound Through Northbound Left Northbound Right	Signalized	0.64 0.70 0.30 0.29 0.34 0.06	4 2 36 1 53 49	A A D A D D	0.50 0.33 0.13 0.49 0.37 0.02	9 16 2 3 56 51	A B A A E D
Dundas Street West at Bronte Road Eastbound Left Eastbound Through Eastbound Right Westbound Left Westbound Through/Right Northbound Left Northbound Through Northbound Right Southbound Left Southbound Through Southbound Right	Signalized	1.13 1.19 0.92 0.66 0.99 0.52 0.71 0.68 0.17 0.93 1.10 0.23	67 155 60 64 98 34 60 36 29 69 102 31	E F E E F C E D C E F C	1.13 1.24 0.54 0.12 0.65 0.89 0.92 1.05 0.09 0.91 0.56 0.32	55 216 13 4 31 48 74 81 28 66 36 32	D F B A C D E F C E D C

Note: V/C ratios noted in **red** indicates that the movement is considered "critical" per the Halton Region Transportation Impact Study Guidelines (January 2015) – V/C of 0.85 or over for through movements and 0.95 or over for exclusive turning movements.

As indicated in **Table 4-1**, all study intersections operate below overall capacity during the AM and PM peak hours, with the exception of the intersections of Dundas Street West at Bronte Road and at Tremaine Road during the study periods. At the remaining study intersections, only the eastbound through movement at the intersection of Dundas Street West at Colonel William Parkway is classified as critical per regional guidelines during the AM peak hours, with a v/c below 0.90 which is deemed acceptable.

The intersections of Dundas Street West at Tremaine Road and Dundas Street West at Bronte Road operate over capacity during the study periods based on the Synchro analysis results. The volume-to-capacity ratios reported by Synchro 10.0 indicate that volumes exceed the theoretical capacity for several movements under existing conditions, which implies that more traffic is attempting to travel through the intersection than considered physically feasible when using Synchro default parameters. Once traffic volumes reach the theoretical capacity of a lane, drivers tend to change their driving behaviour and become more aggressive, which may result in increased saturation flow rates at intersections. Under these conditions, it is customary for the intersection parameters to be calibrated within the Synchro model to reflect actual roadway conditions and travel patterns.

Additional custom left-turn surveys were conducted by Accu-Traffic to derive the number of vehicles completing the turn during the protected phase and during the permitted phase. The surveys were conducted on Thursday January 31, 2019, under WSP's direction, for the eastbound left-turn movement at the intersection of Dundas Street West at Bronte Road during the AM peak hour (7:30-8:30 AM) and PM peak hour (4:30-5:30 PM), and for the eastbound left-turn movement at the intersection of Dundas Street West at Tremaine Road during the PM peak hour (4:15-5:15 PM). Using the surveyed data, the percentage of vehicles completing the turn during the permissive and protected phases, respectively, was derived and applied to the TMC eastbound left-turn volume to derive an estimate of the surveyed capacity for each phase. The Synchro model volume-to-capacity ratio was then used to derive capacities for the protected and permissive phases, respectively. Finally, the permissive and protected capacities derived from the Synchro model were compared to the capacities derived using the field survey distribution to derive a growth factor, which was applied to the permissive and protected saturation flow rates for the left-turn movement within the Synchro model. This calibration was completed to achieve a volume-to-capacity ratio of 1.0 for the left-turn movements during the AM and PM peak hours. The detailed left-turn saturation flow calibration has been included in **Appendix B** for the applicable movements. The left-turn saturation flow rate calibration, along with the additional calibration adjustments, have been detailed below:

- For the intersection of Dundas Street West at Bronte Road
 - AM Peak Hour:
 - The saturation flow rate of the eastbound left-turn movement protected phase was decreased from 1772 to 1630 based on the special survey results, and increased from 377 to 486 for the permissive phase.
 - The lost time adjustment was coded as “-1” seconds for all exclusive left-turn movements and “-3” seconds for through and right-turn movements. All lost time adjustments were applied following the following equations:

$$Y(\text{amber}) + AR(\text{all-red}) - Tl (\text{lost time}) \geq 3 \text{ seconds}$$

- PM Peak Hour:
 - The saturation flow rate of the eastbound left-turn movement protected phase was increased from 1789 to 1807 based on the special survey results, and from 198 to 238 for the permissive phase.
 - The lost time adjustment was coded as “-1” seconds for all exclusive left-turn movements and “-2” seconds for through and right-turn movements.

- For the intersection of Dundas Street West at Tremaine Road
 - During the AM peak Hour:
 - The lost time adjustment was coded as “-1” seconds for the eastbound left-turn movement and “-4” seconds for the remaining turning movements.
 - During the PM peak Hour:
 - The saturation flow rate of the eastbound left-turn movement protected phase was decreased from 1807 to 1301 based on the special survey results, and increased from 110 to 223 for the permissive phase.
 - The lost time adjustment was coded as “-1” seconds for the eastbound left-turn movement and “-4” seconds for the remaining turning movements.

Following the calibration detailed above, the existing traffic operations for the two study intersections have been detailed in **Table 4-2**.

Table 4-2 – Intersection Levels of Service Under Existing Conditions

Intersection Name Movement	Intersection Type	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Dundas Street West at Tremaine Road	Signalized	0.94	28	C	0.98	37	D
Eastbound Left		0.75	21	C	1.00	87	F
Eastbound Through		0.99	32	C	0.44	9	A
Westbound Through		0.56	15	B	0.99	41	D
Westbound Right		0.08	14	B	0.16	11	B
Southbound Left		0.69	47	D	0.18	35	D
Southbound Right		0.23	38	D	0.93	71	E
Dundas Street West at Bronte Road	Signalized	0.98	51	D	0.99	44	D
Eastbound Left		1.00	90	F	1.00	128	F
Eastbound Through		0.86	54	D	0.51	12	B
Eastbound Right		0.65	60	E	0.12	4	A
Westbound Left		0.91	74	E	0.62	30	C
Westbound Through/Right		0.52	34	C	0.87	46	D
Northbound Left		0.89	86	F	0.87	66	E
Northbound Through		0.63	33	C	0.96	53	D
Northbound Right		0.15	26	C	0.09	25	C
Southbound Left		0.91	58	E	0.97	82	F
Southbound Through/Right		0.95	52	D	0.53	34	C
Southbound Right		0.17	26	C	0.30	31	C

Note: V/C ratios and LOS noted in **red** indicates that the movement is considered “critical” per the Halton Region Transportation Impact Study Guidelines (January 2015) – V/C of 0.85 or over for through movements and 0.95 or over for exclusive turning movements.

As per the above table, the calibrated Synchro model shows that the study intersections operate with overall LOS D, with all turning movements under capacity, with the exception of the calibrated eastbound left-turn movements at the intersections of Dundas Street West at Bronte Road and at Tremaine Road. Various turning movements remain classified as critical per regional guidelines. Recommendations to improve operations at the turning movements will be made as part of the future background conditions.

5 SITE TRIP GENERATION AND PLANNED ROADWAY IMPROVEMENTS

This section of the report provides details with regards to the land use assumptions for the 407 Employment Lands, the planned internal roadway network per phase, and the trip generation and trip distribution used to assign the 407 Employment Lands site generated trips.

5.1 LAND USE ASSUMPTIONS

Two horizon years have been assessed in this study, updated based on the Region's comments:

- A horizon year to 2025, which accounts for a partial build-out of the subject lands.
- A horizon year to 2030, which accounts for the full build-out of the subject lands as well as the surrounding 407 Employment Lands.

The land use assumptions for the subject property by phase are summarized in **Table 5-1**.

Table 5-1 – Development Proposal Land Uses by Phase

PHASE	SERVICE AREA EMPLOYMENT			GENERAL EMPLOYMENT	LIGHT EMPLOYMENT	TOTAL BY PHASE
	Service Uses	Retail Uses	Office Uses			
Phase 1	81,151 ft ²	50,720 ft ²	71,008 ft ²	279,344 ft ²	254,566 ft ²	736,789 ft ²
Phase 2	-		-	318,612 ft ²	657,675 ft ²	976,287 ft ²
TOTAL	81,151 ft²	50,720 ft²	71,008 ft²	597,956 ft²	912,241 ft²	1,713,076 ft²

5.2 PROPOSED ROAD NETWORK AND PLANNED IMPROVEMENTS

The following roadway improvements have been assumed per correspondence with the Region and City staff and the Halton Region Transportation Development and Non-Development Capital Implementation Plan, updated per the Region's comments as of June 2020.

To support Phase 1 development on the subject property, the following road infrastructure has been assumed for the 2025 horizon:

- The segment of Avenue Two between Dundas Street West and Burnhamthorpe Road extension would be built. Avenue Two would connect to a section of Burnhamthorpe that would be built, which would then end in a cul-de-sac.
- Street Four Connecting Avenue Two to the proposed development would be built.
- Widening of Dundas Street West between Tremaine Road and Bronte Road from 4 to 6 lanes, along with the planned intersection improvements along the corridor. The two additional lanes are assumed to be high-occupancy vehicle (HOV) lanes.
- The William Halton Parkway Widening between Old Bronte Road and Hospital Gate from 2 to 4 lanes.

- The Tremaine Road widening between Dundas Street West and Lower Base Line from 2 to 4 lanes.

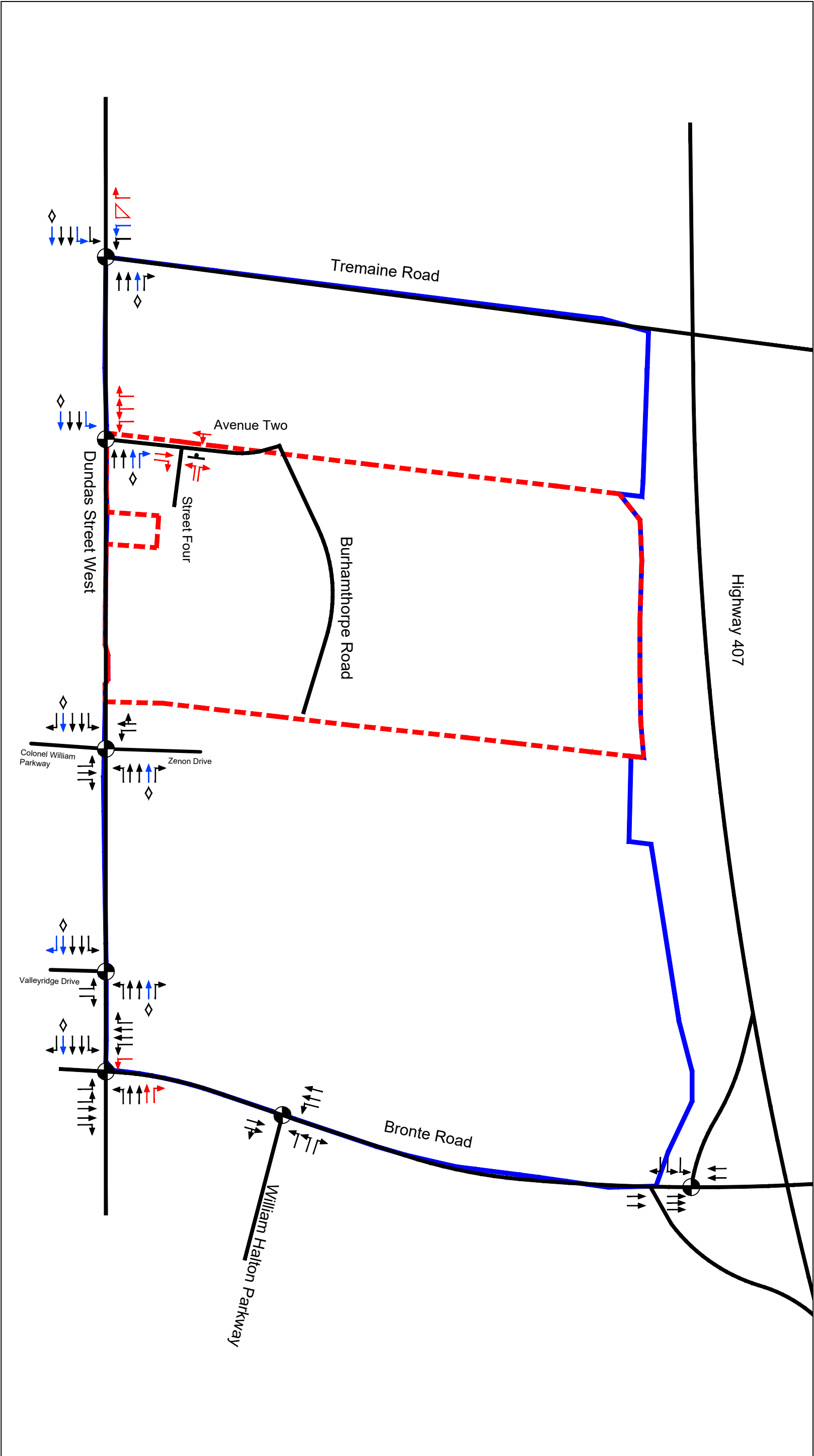
To support Phase 2 development on the subject property, the following road infrastructure has been assumed for the 2030 horizon:

- The Bronte Road widening between Speers Road and Derry Road from 4 to 6 lanes.
- Burnhamthorpe Road extension would be constructed between Tremaine Road and Bronte Road, connecting to the NNOTC to the east of Bronte Road.
- Avenue Three and Avenue Five would be built.
- Avenue One would be built, projected to intersect with Tremaine Road and Bronte Road.

In addition to the proposed Phase 2 scenario, a sensitivity analysis was completed to determine traffic operations assuming the removal of creek crossings at Avenue One (as detailed in the bullet below). This scenario was named Phase 2A within this study, and consist of the following changes compared to the Phase 2 road network:

- The removal of creek crossings would create a segmentation of Avenue One east of Avenue Two and west of Avenue Five, rendering Avenue One non-continuous within the subject lands between Tremaine Road and Bronte Road.

Please refer to **Figure 5-1**, **Figure 5-2** and **Figure 5-3** for the assumed boundary road network for Phase 1 (2025), Phase 2 (2030) and Phase 2A (2030). The lane configuration at the study intersections along Dundas Street West are based on the Environmental Assessment completed in June 2015 by WSP (formerly MMM) as well as recommendations based on the traffic operations analysis completed within this study (detailed in later sections). The proposed signal control for some of the internal intersections are based on signal warrants as detailed in Section 7.2.1. The warrants have been completed using the Phase 2 (2030) traffic volumes for the proposed development. Similarly, exclusive turning lane warrants completed for the internal intersections were based on the Phase 2 (2030) traffic volumes as detailed in Section 7.2.2, as well as projected traffic operations. The results of both warrant types were used to derive the projected internal roadway network used under future background and future total conditions.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

NTS



 Signalized Intersection

 Stop-Controlled Intersection

 Recommended Lane Configuration

 Planned Lane Configuration per Dundas Street West EA and Planned Widening

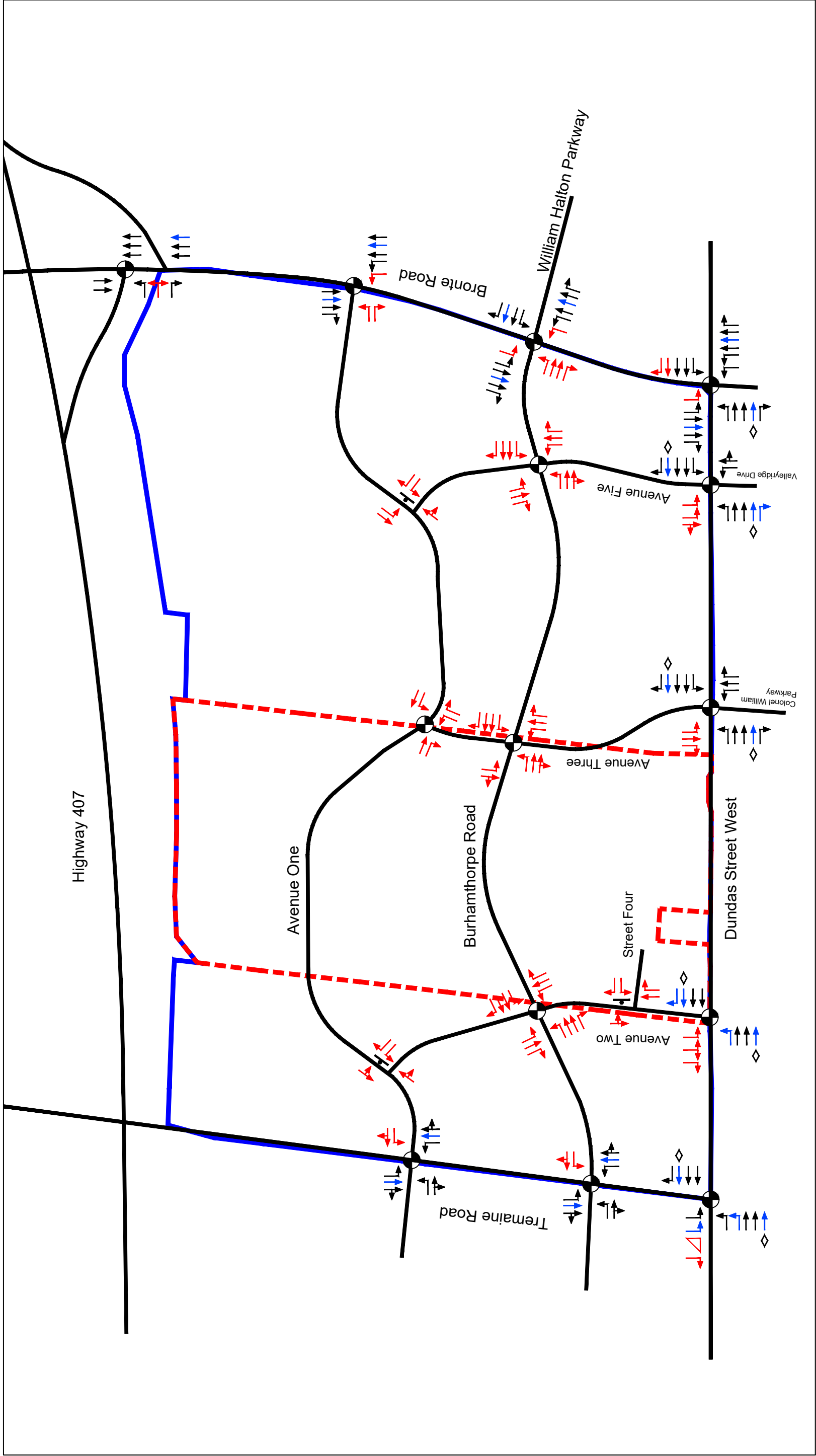
 HOV Lane

 407 West Area Employment Lands

 Subject Property

Note: All Channelized right-turn lanes are recommended to be implemented along with an additional receiving lane that would taper out.

Figure 5-1
Phase 1 (2025) Lane Configuration
Lazy Pat Farms Property Transportation Study



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

NTS

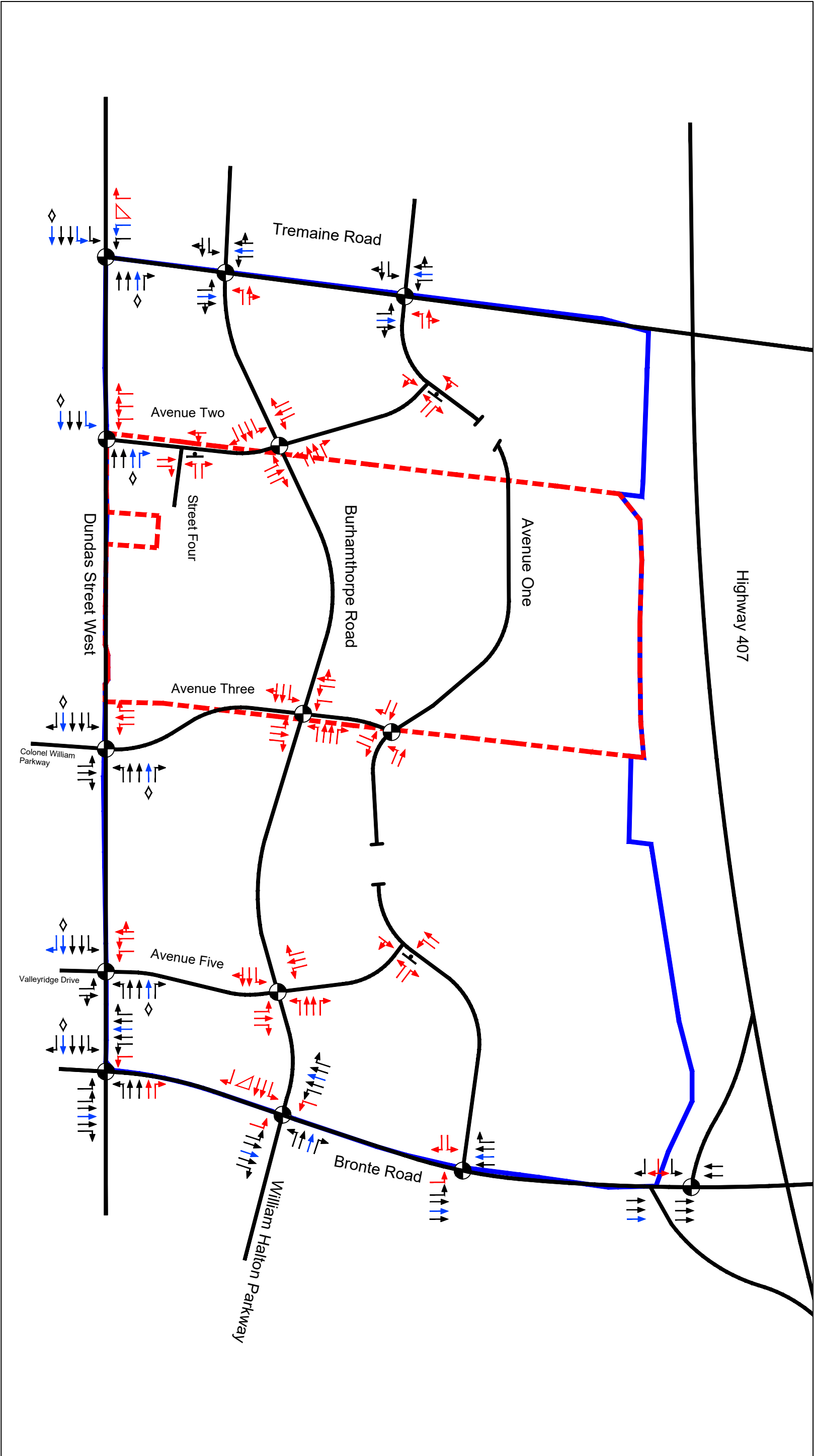
- Signalized Intersection
- Stop-Controlled Intersection
- Recommended Lane Configuration
- Planned Lane Configuration per Dundas Street West EA and Planned Widenings
- HOV Lane

407 West Area Employment Lands

Subject Property

Figure 5-2
Phase 2 (2030) Lane Configuration
Lazy Pat Farms Property Transportation Study

Note: All Channelized right-turn lanes are recommended to be implemented along with an additional receiving lane that would taper out.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

NTS




Signalized Intersection


Stop-Controlled Intersection


Recommended Lane Configuration


Planned Lane Configuration per Dundas Street West EA and Planned Widenings


HOV Lane


407 West Area Employment Lands


Subject Property

Note: All Channelized right-turn lanes are recommended to be implemented along with an additional receiving lane that would taper out.

Figure 5-3
Phase 2A (2030) Lane Configuration
Lazy Pat Farms Property Transportation Study

5.3 TRIP GENERATION

This section details the methodology used when completing the trip generation for the subject lands and surrounding 407 Employment Lands.

5.3.1 TRIP GENERATION – GENERAL EMPLOYMENT

According to the comprehensive Zoning By-law for North Oakville (2009-189), permitted uses for the General Employment zone generally includes light employment uses (except hotel and service establishments), general industrial, outside storage and processing, among others.

The trip generation related to the proposed General Employment lands was determined using the Business Park (Land Use 770) code published in the **ITE Trip Generation Manual, 10th Edition**.

The following equation and directional distributions from the ITE publications were used in the analysis:

Weekday AM Peak Hour: $\ln(T) = 0.97 \ln(X) + 0.49$
Where $X = 1,000 \text{ ft}^2 \text{ GFA}$
 T = Total Vehicle Trips
Distribution = 85% entering and 15% exiting

Weekday PM Peak Hour: $\ln(T) = 0.90 \ln(X) + 0.85$
Where $X = 1,000 \text{ ft}^2 \text{ GFA}$
 T = Total Vehicle Trips
Distribution = 26% entering and 74% exiting

5.3.2 TRIP GENERATION – LIGHT EMPLOYMENT

The proposed Light Employment lands mainly consist of office development, including general office, medical office, research and development, and information processing centres. The trip generation related to the proposed Light Employment lands was determined using the General Office (Land Use 710) code published in the **ITE Trip Generation Manual, 10th Edition**.

The following equation and directional distributions from the ITE publications were used in the analysis:

Weekday AM Peak Hour: $\ln(T) = 0.88 \ln(X) + 1.06$
Where $X = 1,000 \text{ ft}^2 \text{ GFA}$
 T = Total Vehicle Trips
Distribution = 88% entering and 12% exiting

Weekday PM Peak Hour: $T = 1.10 (X) + 65.39$
Where $X = 1,000 \text{ ft}^2 \text{ GFA}$
 T = Total Vehicle Trips
Distribution = 18% entering and 82% exiting

5.3.3 TRIP GENERATION – SERVICE AREA EMPLOYMENT USES

The proposed Service Area Employment lands mainly consist of a combination of service, retail and office uses, serving the employment uses.

The trip generation related to the office component of the Service Area Employment lands was determined using the General Office (Land Use 710) code published in the **ITE Trip Generation Manual, 10th Edition**, as detailed in Section 5.3.2.

The trip generation related to the service and retail components of the Service Area Employment lands were determined using the Shopping Centre (Land Use 820) code published in the **ITE Trip Generation Manual, 10th Edition**. The Shopping Centre Land Use was used as it provides the most appropriate trip rates and associated trip generation related to the service and retail components of the Service Area Employment lands.

The following equation and directional distributions from the ITE publications were used in the analysis related to the service and retail uses:

Weekday AM Peak Hour: $T = 0.50 (X) + 151.78$
Where $X = 1,000 \text{ ft}^2 \text{ GFA}$
 $T = \text{Total Vehicle Trips}$
Distribution = 62% entering and 38% exiting

Weekday PM Peak Hour: $\ln (T) = 0.74 \ln (X) + 2.89$
Where $X = 1,000 \text{ ft}^2 \text{ GFA}$
 $T = \text{Total Vehicle Trips}$
Distribution = 48% entering and 52% exiting

Internal Trips

As noted, the proposed Service Area Employment lands (blocks) consist of service, retail, and office uses. The service and retail components of the development are intended to serve the people who work in the proximity. Thus, it is expected that some of the vehicle trips will be joint trips (internal) between the different uses within the subject property, rather than new trips that are coming from the external roadway network. These trips can be made either by walking or by driving using internal roadways within the individual blocks.

The internal trip estimation within the Service Area Employment blocks is based on the procedure outlined in the **ITE Trip Generation Handbook, 3rd Edition**. It should be noted that no joint trips were assumed for the AM peak hour.

Table 5-2 summarizes the typical internal capture rates for trip origins and trip destinations within a multi-use development as outlined in the ITE Trip Generation Handbook.

Table 5-2 – Typical Internal Capture Rates for Trip Origins and Trip Destinations for the Weekday P.M. Peak Hour

TRIP ORIGIN TO TRIP DESTINATION	CAPTURE RATE FOR TRIP ORIGIN	TRIP DESTINATION FROM TRIP ORIGIN	CAPTURE RATE FOR TRIP DESTINATION
From Office to Retail	20%	To Retail from Office	8%
From Retail to Office	2%	To Office from Retail	31%

The internal capture percentages were applied to the appropriate directional trip generation value. For instance:

- A. Internal trips from office to retail = 20 percent x P.M. outbound trips related to the office use
- B. Internal trips to retail from office = 8 percent x P.M. inbound trips related to the retail uses

The two internal trip values are compared and the lower value is selected. For instance, if internal trips from office to retail (A) consist of 22 trips, while the internal trips to retail from office (B) consist of 26 trips, the controlling value is 22 internal trips.

These internal trips are assumed to be made by walking or driving within the Service Area Employment block without accessing the public road network. Thus, these internal trips are subtracted from the overall trip generation related to the Service Area Employment blocks. The internal trips were derived using volumes for which the mode split adjustment was also factored (as detailed in Section 5.3.4) in order to base the internal trip reduction solely on vehicle trips.

Pass-by Trips

The Service Area Employment blocks are anticipated to attract some trips from drivers who are already travelling along a roadway adjacent to a Service Area Employment block, and choose to make an intermediate stop while on their way to their primary destination. These are referred to as pass-by-trips. The pass-by trip percentage is the proportion of vehicles entering the development that would have already been travelling by the property while heading to other destinations, but made this intermediate stop along the way. Therefore, the site generated trips added to the boundary road network by the proposed development is typically reduced to account for a certain percentage of site trips which would be on the road network for other purposes, even if the subject development was not there.

This is expected to be the case for the Service Area Employment Blocks which are proposed to be located at the major intersections along Dundas Street West. No pass-by trips were assumed for the AM peak hour, as it is expected that the number of pass-by trips during this time are few and insignificant.

The following equation from the **ITE Trip Generation Handbook, 3rd Edition**, was used to develop the pass-by trip percentage for the weekday PM peak period for shopping centre uses:

$$T = 0.34 (X)$$

Where X = General Trip Generation (minus internal trip capture)
T = Pass-by Trip General

5.3.4 MODEL SPLIT ADJUSTMENT

The subject property will be well served by various travel modes (e.g. bike path, transit, etc.). Since only nominal non-auto usage has been built into the ITE trip generation rates, further reduction was applied to reflect the growing transit services available in the NOWSP area and TDM initiatives implemented for the subject property, as well as the neighbouring lands.

Based on the 2016 Transportation Tomorrow Survey (TTS) Data, a non-auto mode split of 12% has been surveyed in the Town of Oakville. Assuming a non-auto mode split reduction of 5% included within the ITE trip generation rate, WSP assumed a non-auto mode split reduction of 7% to be applied for the short-term horizon year. Following the approach previously approved by the Region and Town, the non-auto mode split for 2030 is assumed to double to a reduction rate of 14%. Accordingly, the following mode split reductions were applied to the trip generation for the proposed 407 Employment Lands to account for non-auto modes of travel:

- Phase 1 (2025) – 7% reduction
- Phase 2 (2030) – 14% reduction
- Phase 2A (2030) – 14% reduction

The non-auto split adjustment was applied to the General Employment and Light Employment lands.

5.3.5 TRIP GENERATION VOLUMES

Table 5-3 to **Table 5-4** summarize the resulting trip generation related to the subject property, incorporating the non-auto split adjustment to the General Employment and Light Employment lands, and internal trip and pass-by trip reduction to the Service Area Employment lands by Phase.

Table 5-3 – Proposed Development Trip Generation – Phase 1 (2025 Horizon)

LAND USE	TRIP GENERATION	GFA (SQ.FT)	VEHICLE TRIPS					
			Weekday AM Peak Hour			Weekday PM Peak Hour		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Service Area Employment	General office (ITE 10th Edition Manual)	71,008	108	15	123	26	118	144
	Mode Split Adjustment (7%)		8	1	9	2	8	10
	Internal Trip Reduction		0	0	0	7	22	29
	Sub-Total		100	14	114	17	88	105
	Shopping Centre (ITE 10th Edition Manual)	131,871	135	83	218	320	347	667
	Internal Trip Reduction		0	0	0	22	7	29
	Pass-By Trip Reduction (ITE 3rd Edition Handbook)		0	0	0	108	108	216
	Sub-Total		135	83	218	190	232	422
Light Employment	General office (ITE 10th Edition Manual)	254,566	333	45	378	62	284	346
	Mode Split Adjustment (7%)		23	3	26	4	20	24
	Sub-Total		310	42	352	58	264	322
General Employment	Business Park (ITE 10th Edition Manual)	279,344	328	58	386	97	276	373
	Mode Split Adjustment (7%)		23	4	27	7	19	26
	Sub-Total		305	54	359	90	257	347
Total Phase 1 Development Primary Trips			850	193	1043	355	841	1196

Table 5-4 – Proposed Development Trip Generation – Phase 1+2/2A (2030 Horizon)

LAND USE	TRIP GENERATION	GFA (SQ.FT)	VEHICLE TRIPS					
			Weekday AM Peak Hour			Weekday PM Peak Hour		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Service Area Employment	General office (ITE 10th Edition Manual)	71,008	108	15	123	26	118	144
	Mode Split Adjustment (14%)		15	2	17	4	16	20
	Internal Trip Reduction		0	0	0	7	20	27
	Sub-Total		93	13	106	15	82	97
	Shopping Centre (ITE 10th Edition Manual)	131,871	135	83	218	320	347	667
	Internal Trip Reduction		0	0	0	20	7	27
	Pass-By Trip Reduction (ITE 3rd Edition Handbook)		0	0	0	109	109	218
	Sub-Total		135	83	218	191	231	422
Light Employment	General office (ITE 10th Edition Manual)	912,241	1023	140	1163	192	877	1069
	Mode Split Adjustment (14%)		143	20	163	27	123	150
	Sub-Total		880	120	1000	165	754	919
General Employment	Business Park (ITE 10th Edition Manual)	597,956	685	121	806	192	547	739
	Mode Split Adjustment (14%)		96	17	113	27	76	103
	Sub-Total		589	104	693	165	471	636
Total Phase 1 and 2 Development Primary Trips			1697	320	2017	536	1538	2074

5.4 TRIP DISTRIBUTION AND ASSIGNMENT

The 2016 Transportation Tomorrow Survey (TTS) findings were reviewed to determine the site traffic distribution to the boundary roadways. The “auto-driver” data was used to determine the distribution related to the subject property, located in the Oakville Planning District (PD 39). **Table 5-5** summarizes the distributions to/from PD 39, indicating the employment based distribution.

Table 5-5 – Employment Based General Trip Distribution

DIRECTION	PERCENTAGE
Within Oakville	27%
Toronto	11%
York Region	3%
Peel Region	27%
Burlington	13%
Milton	4%
Halton Hills	1%
Hamilton-Niagara Region	12%
Waterloo Region	1%
Guelph	1%
Total	100%

The traffic was assigned to the boundary road network accordingly based on the available road links anticipated to be in place during each phase. **Table 5-6** summarizes the trip assignments to the boundary road network by Phase, reflecting the respective assumed road network.

Table 5-6 – Trip Assignment by Phase

TO/FROM	TRIP ASSIGNMENT PERCENTAGES	
	2025 (Phase 1)	2030 (Phase 2/2A)
Tremaine Road North	2%	2%
Bronte Road North	3%	3%
Bronte Road South	35%	32%
Dundas Street East	28%	21%
Dundas Street West	18%	18%
Highway 407 East	8%	6%
Highway 407 West	4%	4%
Colonel William Parkway	1%	1%
Valleyridge Drive	1%	1%
Burnhamthorpe Road East	-	12%
Total	100%	100%

Please refer to **Figure 5-4** to **Figure 5-9** for the proposed development site traffic assignment under Phase 1 (2025) and Phase 2 (2030) during the AM and PM peak hours.

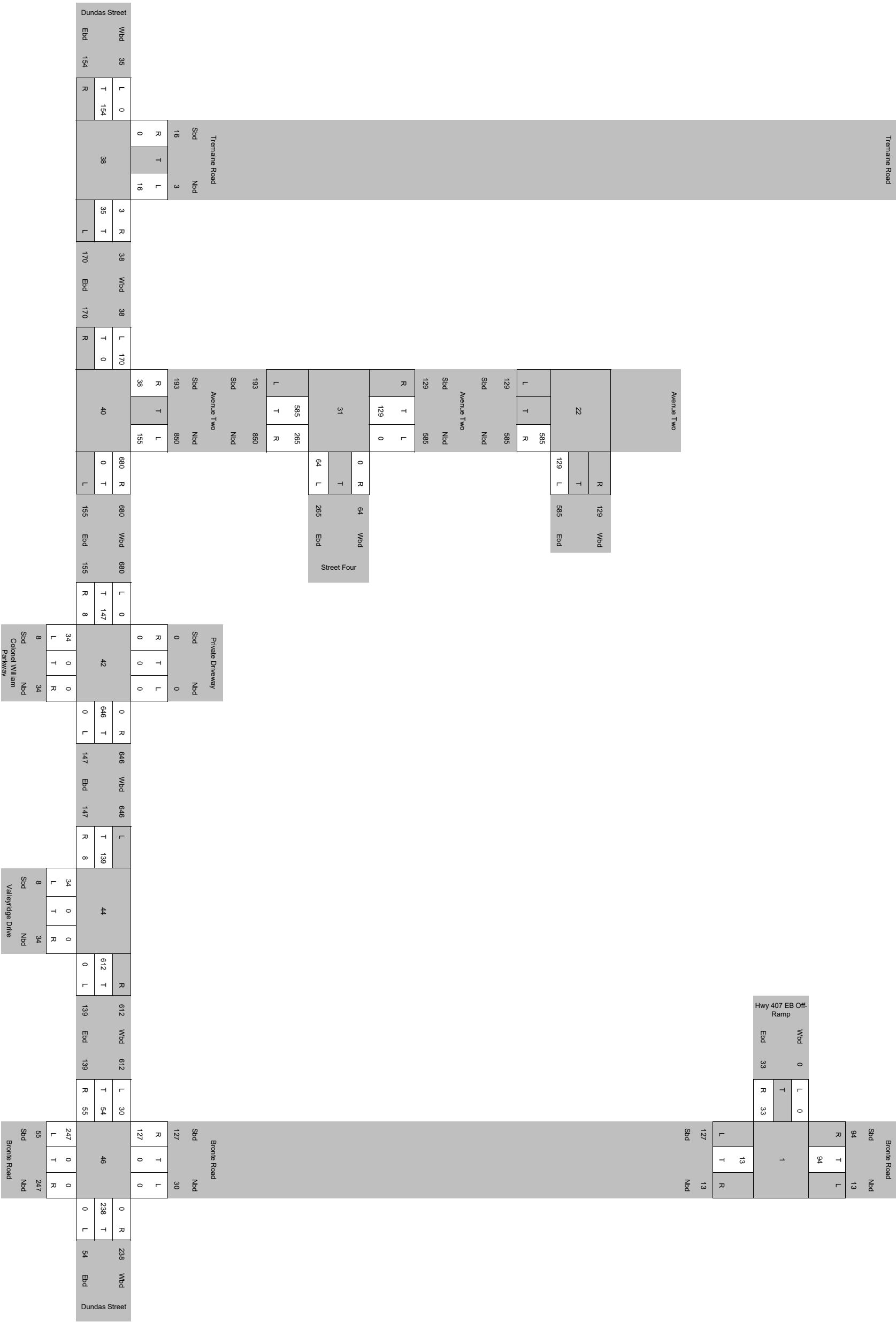


Figure 5-4
Primary Site Generated Trip Assignment - Phase 1 (2025) - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

1-459222_Traffic Model AM_20200822.docx

Scale: NTS



Tremaine Road		

Bronte Road		
Sbd	Nbd	59
39		
R	T	L
0	39	

Hwy 407 EB Off-Ramp	Wbd	0	L	0
			T	
	Ebd	14	R	14

1		
0	59	
L	T	R

53	59	
Sbd	Nbd	

Avenue Two		

22	R	570	Wbd
	T		
	570	L	239 Ebd

L	T	R

570	239	
Sbd	Nbd	

Avenue Two		
Sbd	Nbd	
570	239	

R	T	L
570	0	

31	0	R	271	Wbd
		T		
	271	L	116	Ebd

239	116	
L	T	R

841	355	
Sbd	Nbd	

Private Driveway		
Sbd	Nbd	
0	0	
R	T	L
0	0	0

R	T	L
168	673	

L	0	284	Wbd	284
T	639			
R	34	673	Ebd	673

40		
16	R	168
152	T	
L	71	Ebd
71		

Wbd	152	L	0
T	64		
Ebd	64	R	

38		
16	R	168
152	T	
L	71	Ebd
71		

0	100	Wbd
100	T	
0	L	236
0		Ebd

44		
256	T	
0	L	606
0		Ebd

Scale: NTS

Figure 5-5
Primary Site Generated Trip Assignment - Phase 1 (2025) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



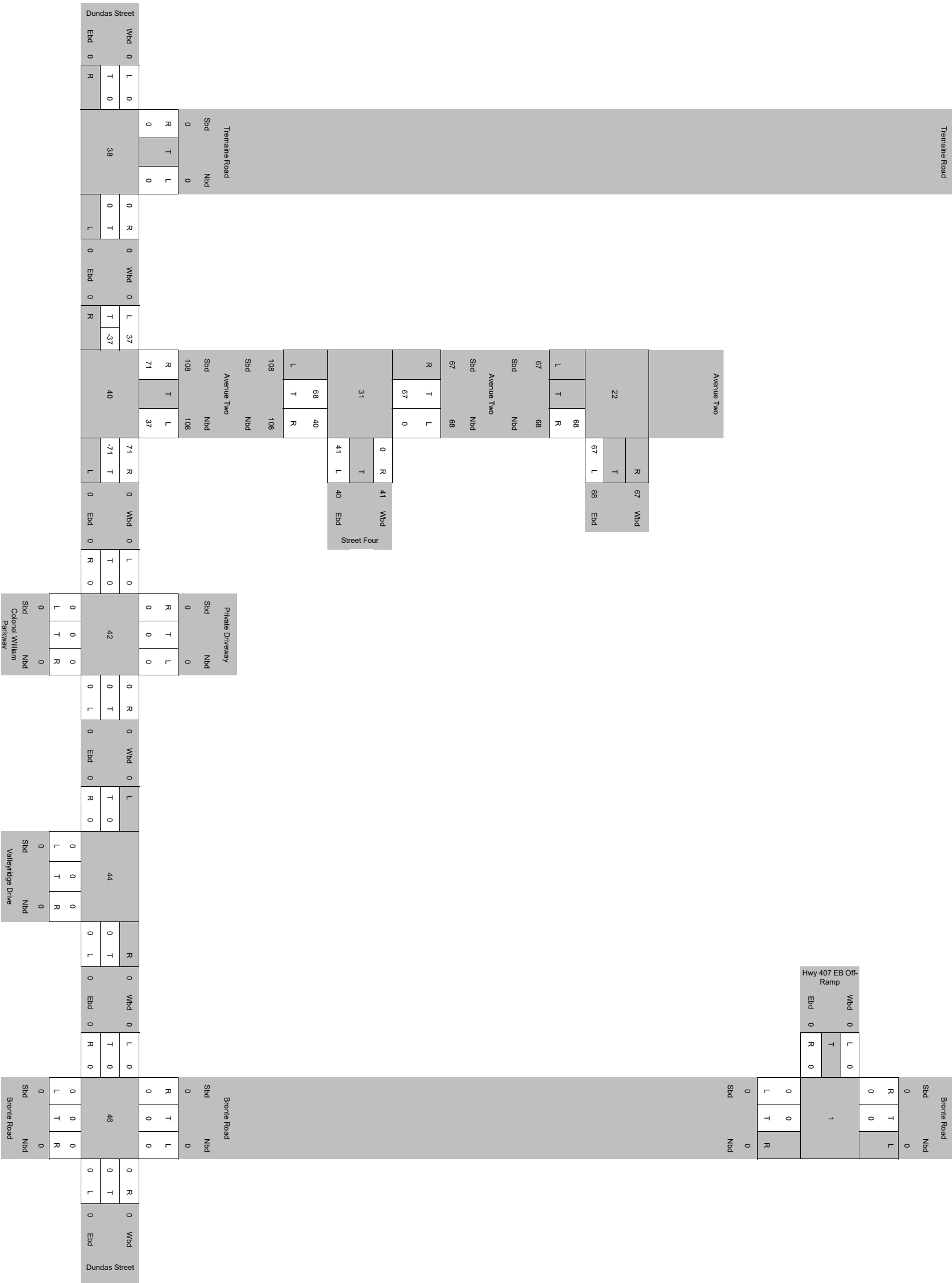


Figure 5-6
Pass-By Site Generated Trip Assignment - Phase 1 (2025) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

14-09222_Traffic Model AM_20200922.docx

Scale: NTS



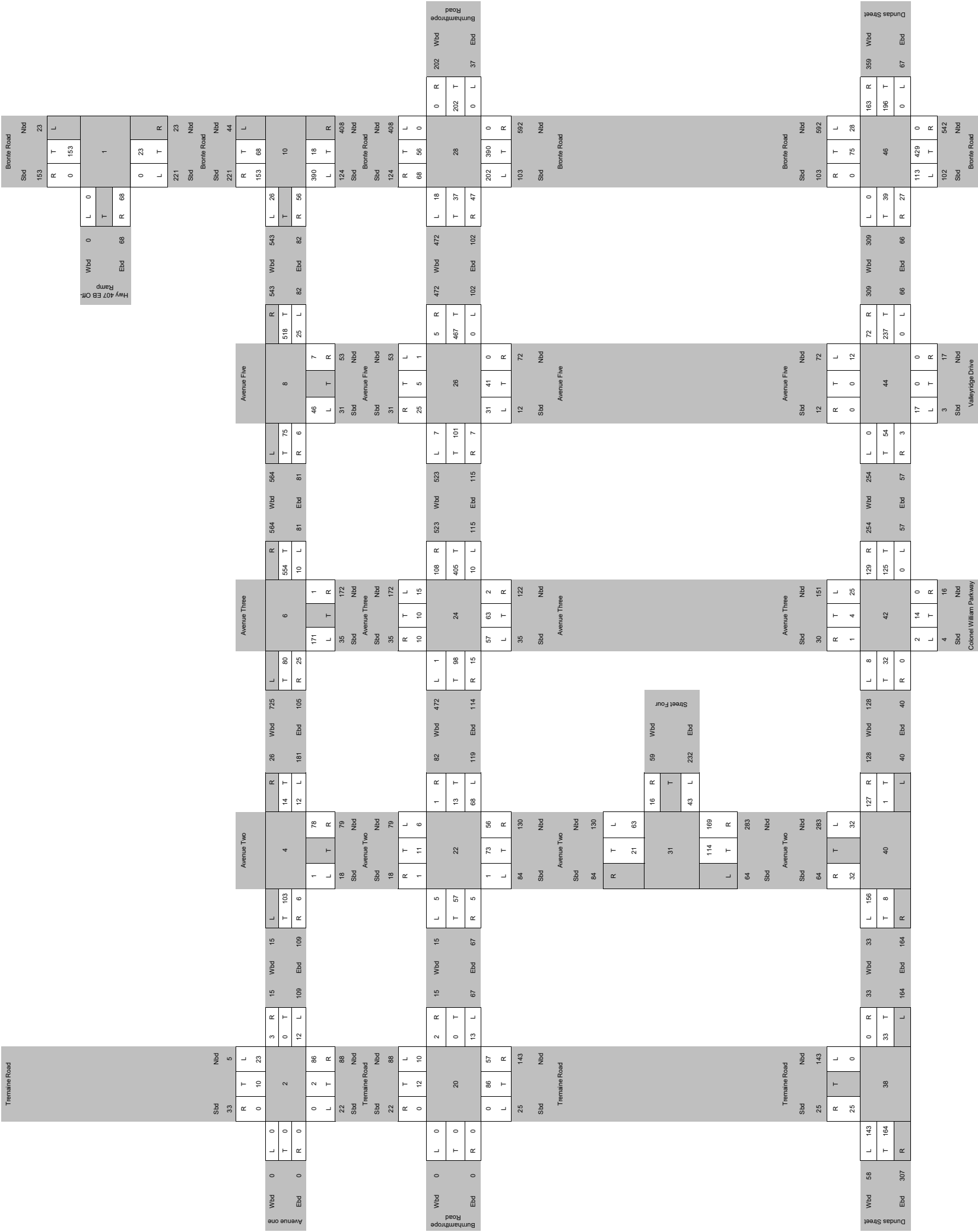
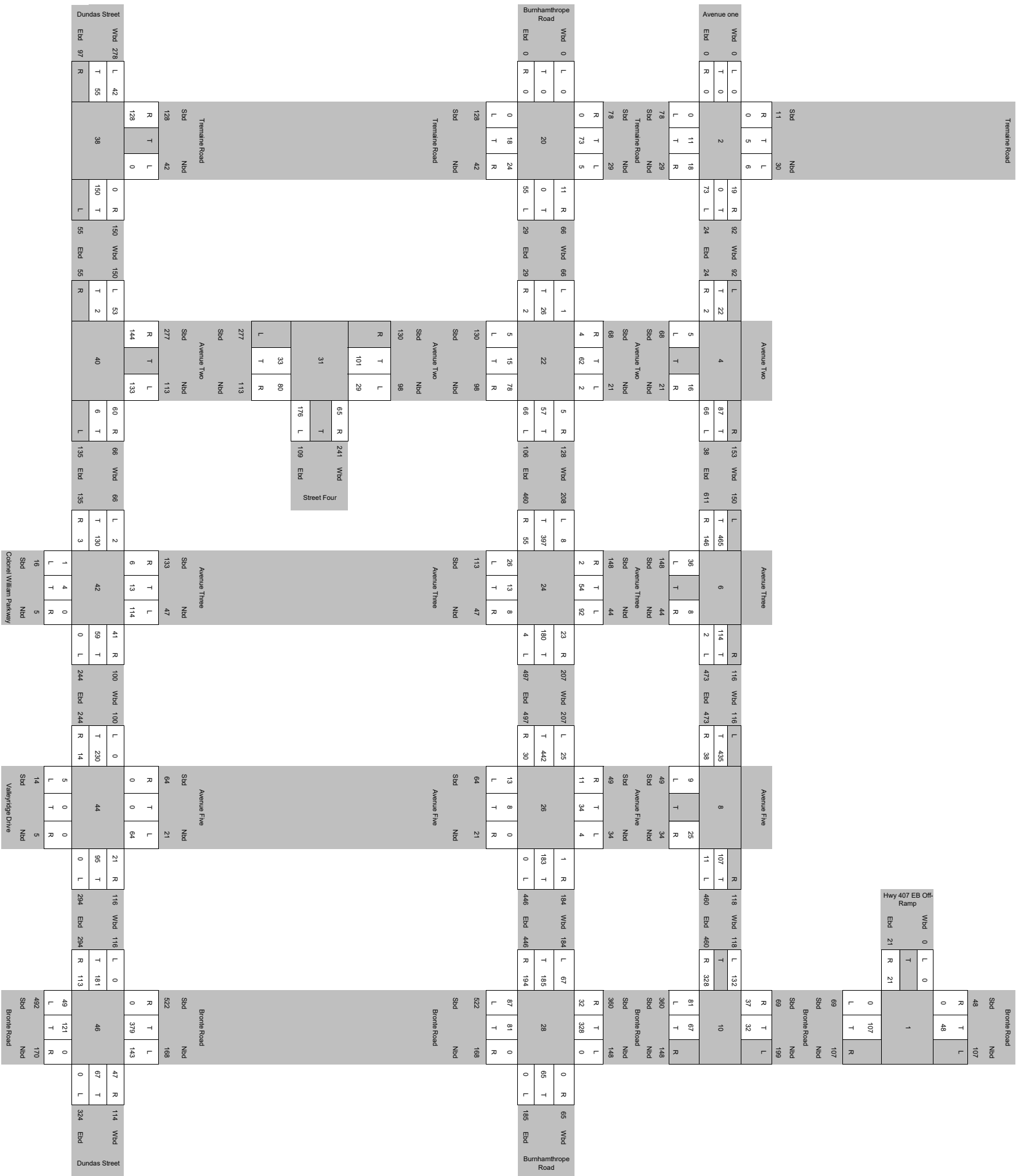


Figure 5-7
Primary Site Generated Trip Assignment - Phase 2 (2030) - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Note: Volume may not be balanced between study intersections as per the proposed development block driveways within the subject lands.



[illegible]

Scale: NTS

Figure 5-9
Pass-By Site Generated Trip Assignment - Phase 2 (2030) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Note: Volume may not be balanced between study intersections as per the proposed development block driveways within the subject lands.

6 FUTURE BACKGROUND CONDITIONS

6.1 ADJACENT BACKGROUND DEVELOPMENTS

Developments located in the vicinity of the property have been included in the background traffic forecasts as detailed below. All developments were discussed with, and approved by, Town and Region staff. Figures illustrating the assignment of trips generated from all adjacent developments, along the boundary road network, have been included in **Appendix E**, for each study horizon year. A summary of the developments used for the study horizon years has been tabulated in **Table 6-4**.

Mixed-Use Development at 2390 Khalsa Gate (Ballantry Homes)

This development proposal consists of 152 townhouse units, 3,000 square feet of commercial space and 12 gas fuelling stations. The trip generation, distribution and traffic assignment are taken directly from the Traffic Impact Study entitled “Khalsa Gate Mixed Use Development” prepared by Cole Engineering Group Limited in February 2010. A full-moves access at the Bronte Road/Khalsa Gate intersection was assumed.

Residential Development at 2385 & 2389 Khalsa Gate (Peppergate Developments)

This development proposal consists of 147 townhouse units. The trip generation, distribution and traffic assignment are taken directly from the Traffic Impact Study entitled “Khalsa Gate Residential Development” prepared by GENIVAR Inc. (now WSP) in November 2010.

ORC Lands

The ORC Lands surrounding the new Oakville Trafalgar Memorial Hospital have yet to be developed. The lands are divided into 12 parcels, two of which (Parcel 1 and Parcel 3) have development plans. Parcels 1 and 3 were included a part of the adjacent background developments as detailed in the following adjacent development descriptions.

Site traffic generated by ORC Lands was based on a blend of trip generation rates from various ITE employment land uses as detailed within the “Halton Healthcare Services, New Oakville Hospital Transportation Impact Study” Exhibit 5-8 prepared by IBI Group in June 2010. After removing the trip generation from parcels 1 and 3, the trip generation for the remaining 10 ORC Lands parcels has been tabulated in **Table 6-1**.

Table 6-1 ORC Lands Trip Generation

HORIZON YEAR	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Phase 1 Parcels 2, 6-10	685	140	825	182	608	790
Phase 2 Parcels 2, 4-12	986	201	1187	263	875	1138

The trip distribution for the ORC Lands site generated trips was based on the IBI report. The generation for Phase 1 was applied to our 2025 horizon year traffic forecast, while the generation for Phase 2 was applied to our 2030 horizon year traffic forecast.

Oakville Green Life Science District (ORC Lands Parcel 1)

The proposed Oakville Green Life Sciences and Technology District is a mixed-use development located adjacent to the new Oakville Hospital within Parcel 1 of the ORC Lands. The subject lands consist of 4.7 million square feet to be developed in three phases starting in 2021 with the ultimate phase projected to 2031. The proposed development consists of 1,680 residential units, 400 hotel suites, 157,001 square metres of office use, 65,030 square metres of research and institutional use and 24,527 square metres of retail use. The trip generation, distribution and traffic assignment are taken directly from the “Transportation Impact Study Oakville Green Life Sciences and Technology District” prepared by WSP (formerly MMM Group) in October 2016, for the 2025 and 2030 horizon years of this study.

Erinoak Kids Centre for Treatment and Development (ORC Lands Parcel 3)

The Erinoak Kids Centre for Treatment and Development is to be located adjacent to the new Oakville Hospital within Parcel 3 of the ORC Lands. The development is proposed to consist of 6,780 square metres of clinical use supporting 210 staff. The trip generation, distribution and traffic assignment are taken directly from the “EOK Traffic Impact Study” prepared by Paradigm Transportation Solutions Limited (Paradigm) in November 2012, for which the volumes were included within the “Halton Region Courthouse Transportation Impact Study” completed by Paradigm in April 2018.

Halton Region Courthouse

The Halton Region Courthouse is proposed to be located adjacent (to the west) of the Erinoak Kids Centre and is proposed to include a total of 33 courthouses at full build out, as well as 27,000 square metres of office use. The trip generation, distribution and traffic assignment are taken directly from the “Halton Region Courthouse Transportation Impact Study” completed by Paradigm in April 2018, for the 2025 and 2030 horizon years of this study.

Evergreen Community

The Evergreen Community is part of the Tremaine Dundas Secondary Plan, which is located in the northeast section of the City of Burlington and the northwest quadrant of the Dundas Street West at Tremaine Road intersection, consisting of approximately 150 hectares of which approximately 67 form the Evergreen Community. The Evergreen Community and two additional land parcels, forming the Secondary Plan Area, were considered as background development for our study. The proposed developments consist of 750 residential dwelling units, 1,500 square metres of retail use and 47,104 square metres of industrial/commercial/office space. The trip generation, distribution and traffic assignment are taken directly from the “Tremaine Dundas Secondary Plan Transportation Impact Study” completed by BA Group in June 2018, for the 2025 and 2030 horizon years of this study.

Existing Suez (previously GE) Lands Traffic Reassignment

The existing traffic volumes generated by the Suez Lands was redistributed along the proposed internal roadways using the distribution derived from TTS data (detailed in Section 5.4 of this report) and surveyed volume at the access (Zenon Drive). The traffic reassignment was completed for the 2031 horizon year, for both the Phase 2 and Phase 2A planned road networks.

Surrounding 407 Employment Lands

For the purpose of the traffic operations assessment completed within this Transportation Study, WSP assumed that all of the 407 Employment Lands surrounding the proposed development would be developed by the 2030 horizon year. The land use assumptions for the remaining 407 Employment Lands are summarized in **Table 6-2**.

Table 6-2 – Remaining 407 Employment Lands Land Uses by Phase

PHASE	SERVICE AREA EMPLOYMENT			GENERAL EMPLOYMENT	LIGHT EMPLOYMENT	TOTAL BY PHASE
	Service Uses	Retail Uses	Office Uses			
Phase 2	180,953 ft ²	113,096 ft ²	158,156 ft ²	1,412,915 ft ²	1,767,973 ft ²	3,633,093 ft ²
TOTAL	180,953 ft²	113,096 ft²	158,156 ft²	1,412,915 ft²	1,767,973 ft²	3,633,093 ft²

The surrounding 407 Employment Lands site generated trips were derived using the same methodology as the site generated trips for the 2030 horizon year, with the projected trips detailed in **Table 6-3**.

Table 6-3 – Surrounding 407 Employment Lands Trip Generation – Phase 2/2A (2030 Horizon)

LAND USE	TRIP GENERATION	GFA (SQ.FT)	VEHICLE TRIPS					
			Weekday AM Peak Hour			Weekday PM Peak Hour		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Service Area Employment	General office (ITE 10th Edition Manual)	158,156	219	30	249	43	197	240
	Mode Split Adjustment (14%)		31	4	35	6	28	34
	Internal Trip Reduction		0	0	0	11	34	45
	Sub-Total		188	26	214	26	135	161
	Shopping Centre (ITE 10th Edition Manual)	294,049	185	114	299	580	628	1208
	Internal Trip Reduction		0	0	0	34	11	45
	Pass-By Trip Reduction (ITE 3rd Edition Handbook)		0	0	0	198	198	396
	Sub-Total		185	114	299	348	419	767
Light Employment	General office (ITE 10th Edition Manual)	1,767,973	1831	250	2081	362	1649	2011
	Mode Split Adjustment (14%)		256	35	291	51	231	282
	Sub-Total		1575	215	1790	311	1418	1729
General Employment	Business Park (ITE 10th Edition Manual)	1,412,915	1578	278	1856	416	1185	1601
	Mode Split Adjustment (14%)		221	39	260	58	166	224
	Sub-Total		1357	239	1596	358	1019	1377
Surrounding 407 Employment Lands Primary Trips			3305	594	3899	1043	2991	4034

The trip distribution used for the surrounding 407 Employment Lands is similar to that used for the proposed development. Traffic was distributed along the boundary road network based on the proposed employment block, with various trip assignments used for Phase 2 and Phase 2A according to the planned roadway network.

A summary of the background developments applied to each study horizon year has been included in **Table 6-4**.

Table 6-4 – Background Developments per Horizon Year

BACKGROUND DEVELOPMENTS	HORIZON YEAR		NOTES
	2025	2030	
2390 Khalsa Gate	YES	YES	Same traffic volumes applied for both the 2025 and 2030 horizon years.
2385 & 2389 Khalsa Gate	YES	YES	Same traffic volumes applied for both the 2025 and 2030 horizon years.
ORC Lands	YES	YES	Different traffic volumes applied for the 2025 and 2030 horizon years based on the development phasing plan in the Transportation Study.
Oakville Green Life Science District	YES	YES	Different traffic volumes applied for the 2025 and 2030 horizon years based on the development phasing plan in the Transportation Study.
Erinoak Kids Centre for Treatment and Development	YES	YES	Same traffic volumes applied for both the 2025 and 2030 horizon years.
Halton Region Courthouse	YES	YES	Different traffic volumes applied for the 2025 and 2030 horizon years based on the development phasing plan in the Transportation Study.
Evergreen Community	YES	YES	Different traffic volumes applied for the 2025 and 2030 horizon years based on the development phasing plan in the Transportation Study.
Existing GE Lands Traffic Reassignment	NO	YES	Traffic reassignment under the 2030 horizon year along the proposed boundary road network. A different reassignment was completed for Phase 2 and Phase 2A based on the proposed roadway network.
Surrounding 407 Employment Lands	NO	YES	Traffic assignment under the 2030 horizon year along the proposed boundary road network. A different assignment was completed for Phase 2 and Phase 2A for some blocks based on the proposed roadway network.

Please refer to **Figure 6-1** to **Figure 6-4** for the total adjacent development background traffic volumes along the boundary road network for the Phase 1 (2025), Phase 2 (2030) and Phase 2A (2030) during the AM and PM Peak Hours, respectively.

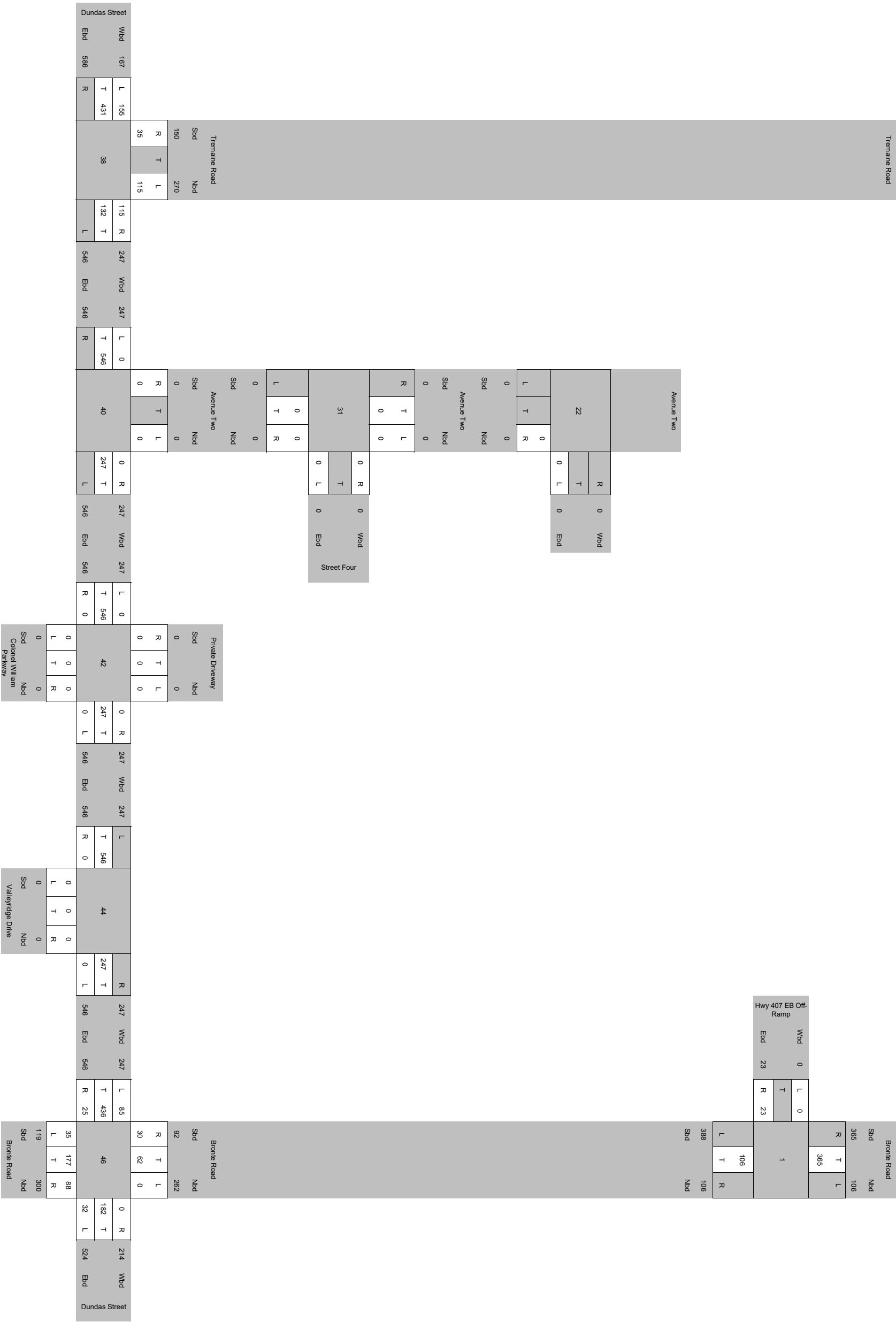


Figure 6-1
2025 Background Development Traffic Volumes - Phase 1 (2025) - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

1-459222_Traffic Model AM_20200822.docx

[illegible]

Figure 6-2
2025 Background Development Traffic Volumes - Phase 1 (2025) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



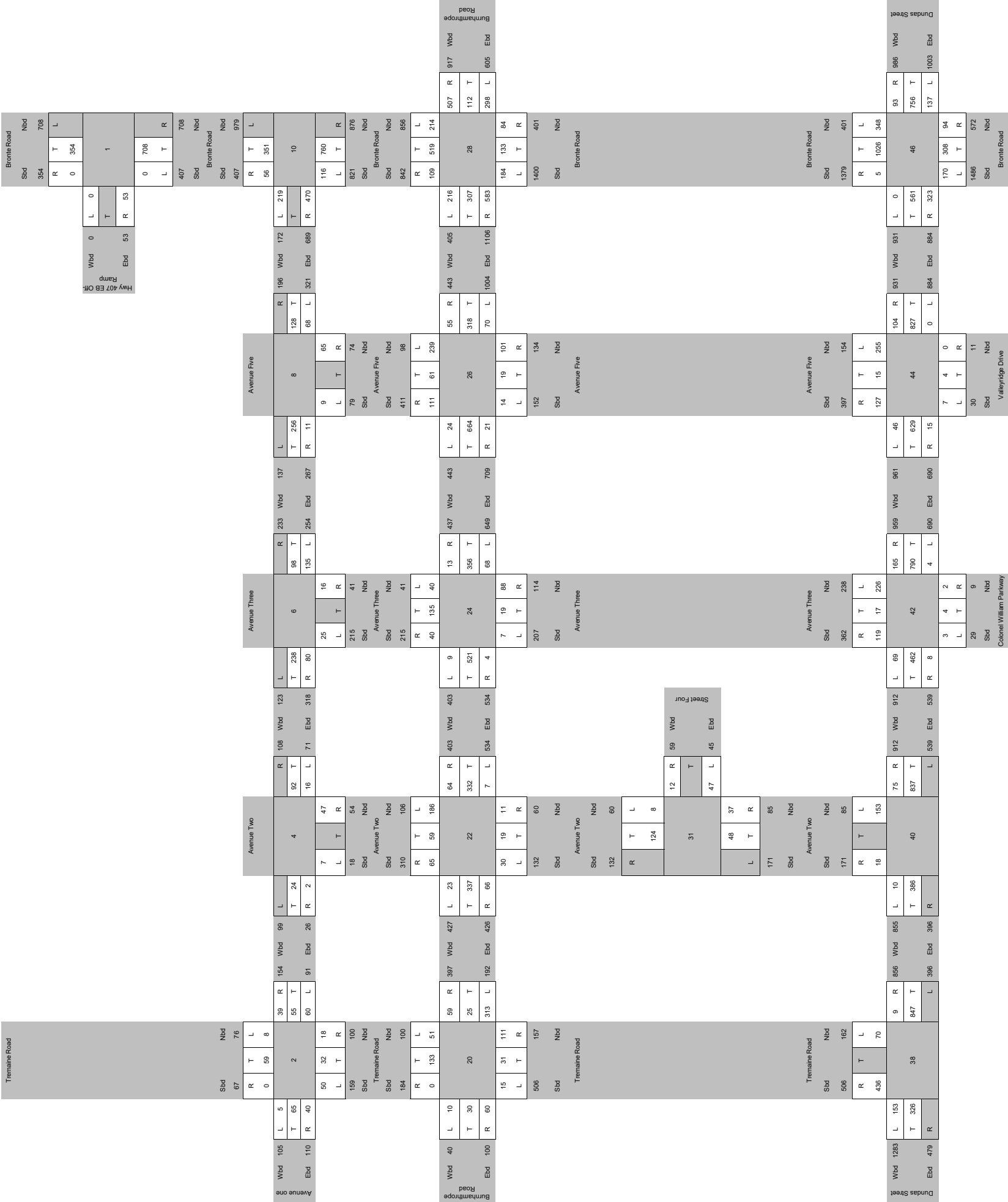


Figure 6-4
2030 Background Development Traffic Volumes - Phase 2 (2030) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Note: Volume may not be balanced between study intersections as per the proposed development block driveways within the subject lands.

Scale: NTS



6.2 CORRIDOR TRAFFIC GROWTH

6.2.1 FUTURE THROUGH TRAFFIC GROWTH (2025)

A through traffic growth rate of 3.0 percent per annum (linear) was applied to Tremaine Road as directed by Region staff, between 2020 and 2021. Subsequent to 2021, a growth rate of 4.0 percent per annum (linear) was applied to Tremaine Road as directed by Region staff. The traffic growth along Tremaine Road was distributed along Dundas Street West based on the existing trip distribution at the study intersection. **Figure 6-5** and **Figure 6-6** illustrate the traffic growth along the boundary road network from 2020 to 2025 for the weekday AM and PM peak hours, respectively.

6.2.2 FUTURE THROUGH TRAFFIC GROWTH (2030)

A through traffic growth rate of 4.0 percent per annum (linear) was applied to the 2025 base traffic volume along Tremaine Road (i.e. 2020 existing traffic volumes plus growth from 2020 to 2025), as directed by Region staff. The traffic growth along Tremaine Road was distributed along Dundas Street West based on the existing trip distribution at the study intersection. **Figure 6-7** and **Figure 6-8** illustrate the traffic growth along the boundary road network from 2025 to 2030 for the weekday AM and PM peak hours, respectively.

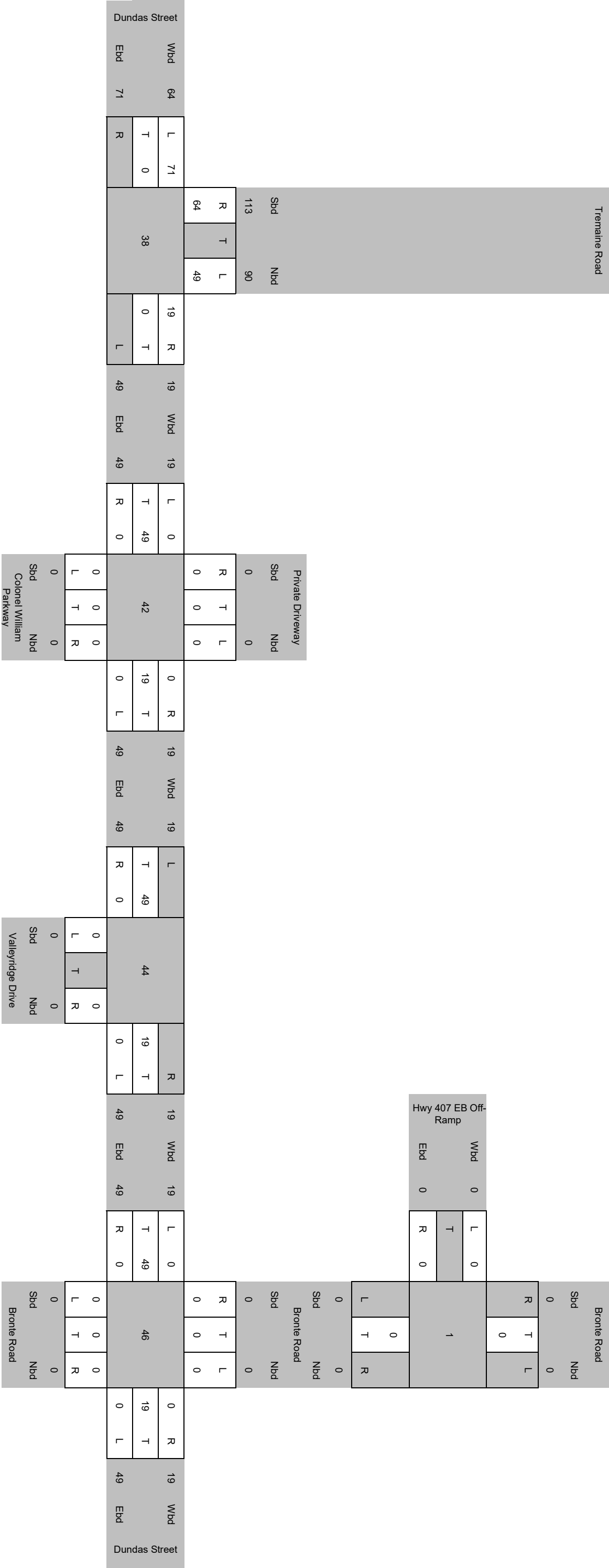
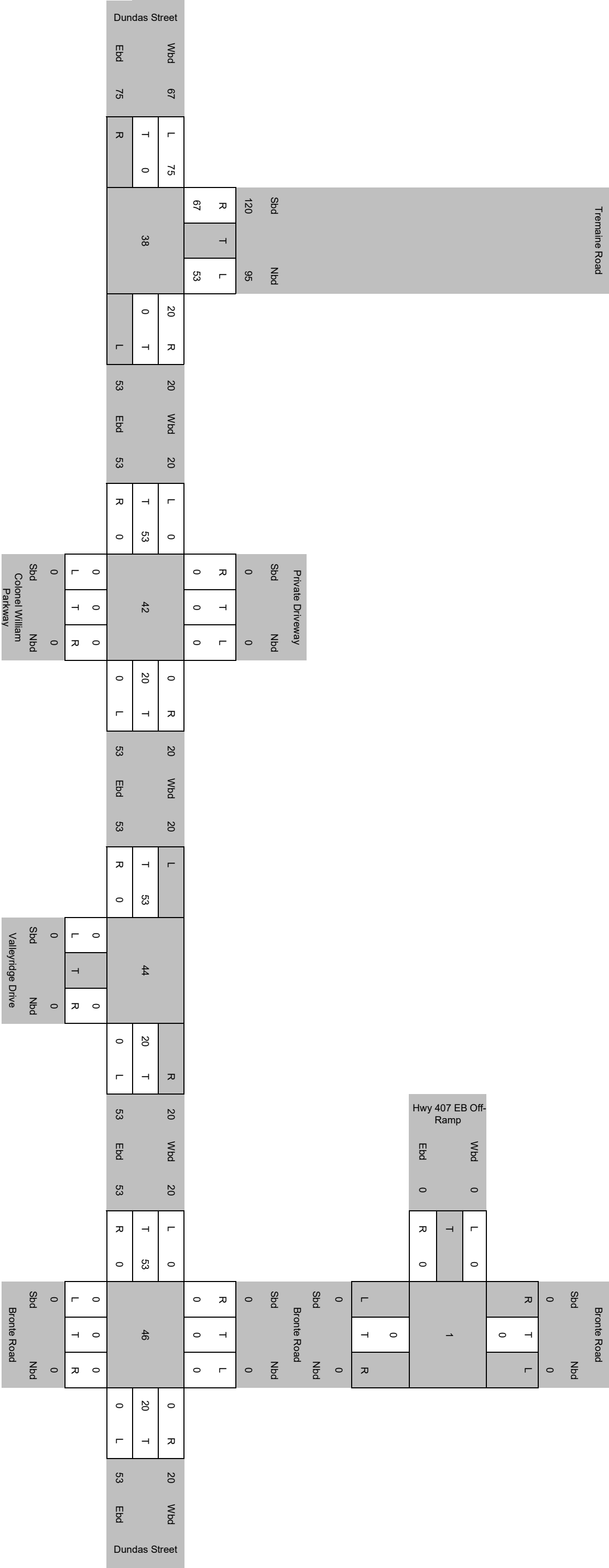


Figure 6-5
Through Traffic Growth Between 2020 and 2025 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

14-09222_Traffic Model AM_20200622.xlsx



Scale: NTS

Figure 6-7
Through Traffic Growth Between 2025 and 2030 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

6.3 FUTURE BACKGROUND TRAFFIC VOLUMES

6.3.1 2025 FUTURE BACKGROUND TRAFFIC VOLUMES

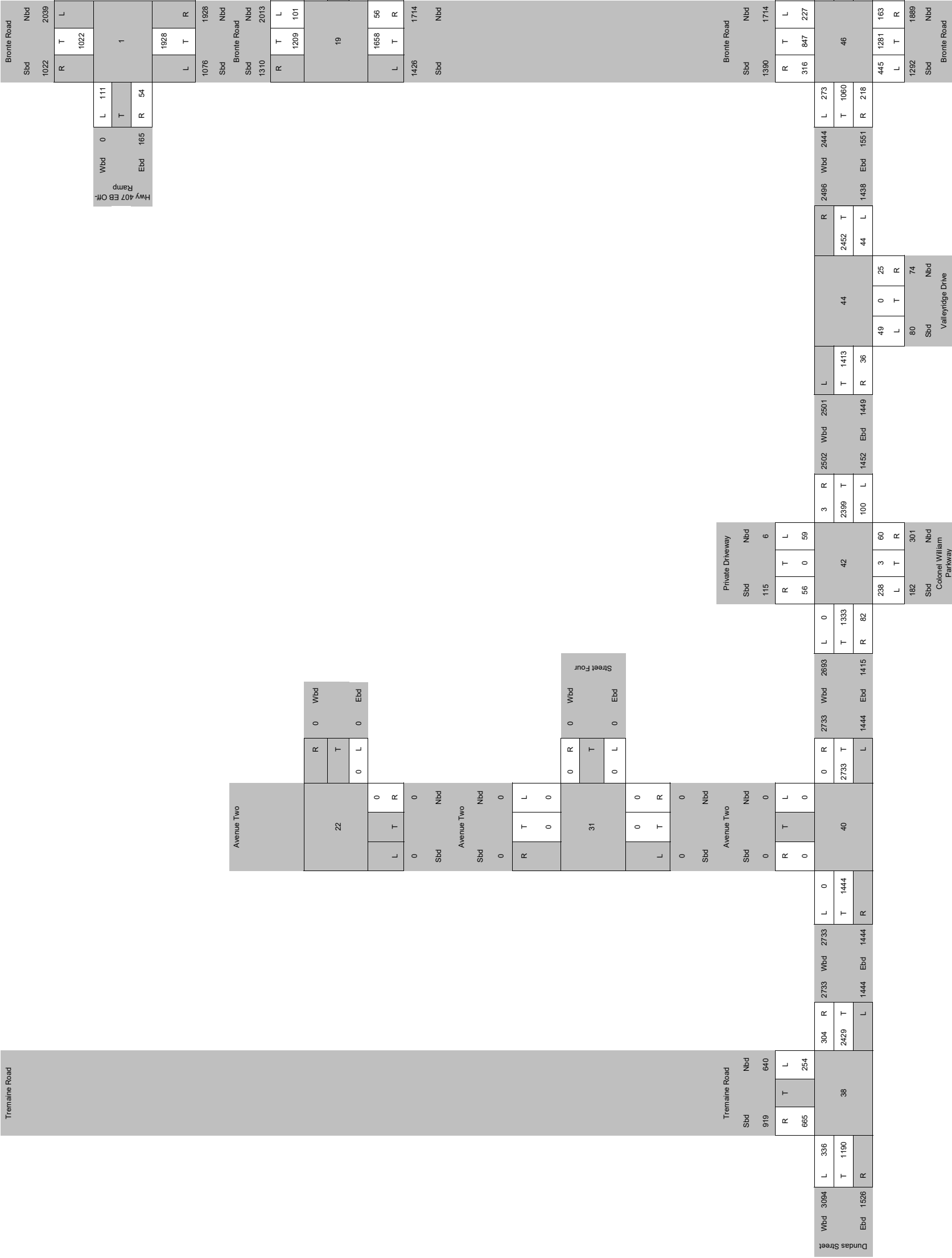
The 2025 future background traffic volumes were developed by superimposing the general through traffic growth derived between 2020 and 2025, as well as the background traffic volumes projected for the Phase 1 (2025) horizon year, to the 2020 existing traffic volumes. Please refer to **Figure 6-9** and **Figure 6-10** for the projected Phase 1 (2025) Future Background Traffic Volumes during the AM and PM peak hours, respectively.

6.3.2 2030 FUTURE BACKGROUND TRAFFIC VOLUMES

The Phase 2 (2030) future background traffic volumes were developed by superimposing the general through traffic growth derived between 2020 and 2025 and derived between 2025 and 2030, as well as the background traffic volumes projected for the Phase 2 (2030) horizon year, to the 2020 existing traffic volumes. Please refer to **Figure 6-11** and **Figure 6-12** for the projected Phase 2 (2030) Future Background Traffic Volumes during the AM and PM peak hours, respectively.

[illegible]

Tremaine Road



[illegible]

[illegible]

Scale: NTS



Note: Volume may not be balanced between study intersections as per the proposed development block driveways within the subject lands.

Figure 6-12
Future Background Traffic Volumes - Phase 2 (2030) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

14-09222_Traffic Model AM_2020 0622.xlsx

7 FUTURE TOTAL TRAFFIC CONDITIONS

7.1 FUTURE TOTAL TRAFFIC VOLUMES

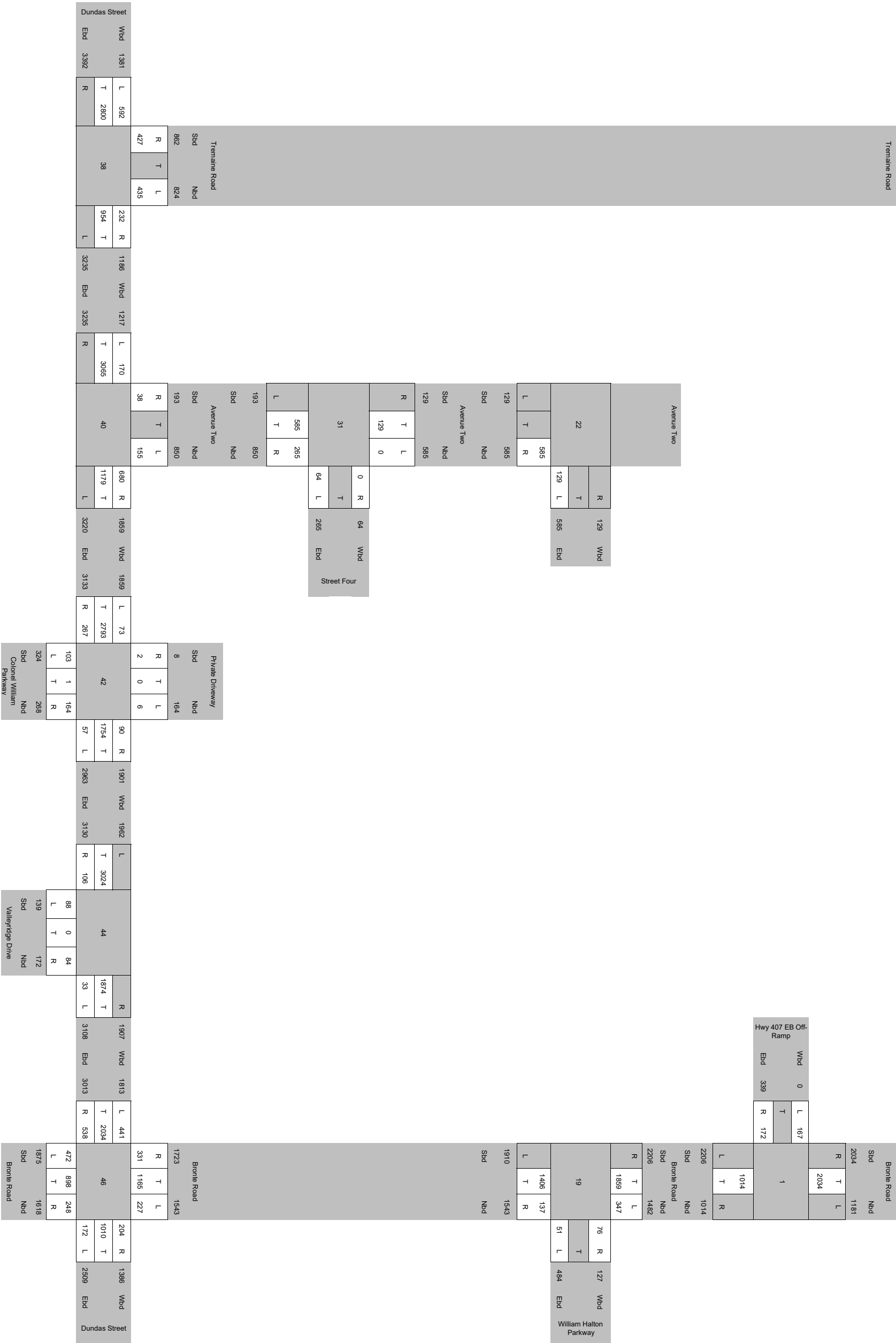
7.1.1 2025 FUTURE TOTAL TRAFFIC VOLUMES

The future total traffic conditions for the Phase 1 (2025) horizon year was estimated by superimposing the site generated traffic volumes onto the future background traffic volumes. The resulting future total traffic volumes have been illustrated in **Figure 7-1** and **Figure 7-2** for the AM and PM peak hours, respectively.

7.1.2 2030 FUTURE TOTAL TRAFFIC VOLUMES

The future total traffic conditions for the Phase 2 (2030) horizon year was estimated by superimposing the site generated traffic volumes onto the future background traffic volumes. The resulting future total traffic volumes have been illustrated in **Figure 7-3** and **Figure 7-4** for the AM and PM peak hours, respectively.

Additionally, as stated previously WSP completed a sensitivity analysis under the 2030 horizon year to determine the impact of removing the Avenue One creek crossings on traffic operations (detailed in Section 9.3). The removal of the creek crossings renders the study roadway non-continuous throughout the study area. The Phase 2A (2030) future total traffic volumes have been derived and illustrated in **Figure 7-5** and **Figure 7-6** for the AM and PM peak hours, respectively. All information with regards to the site generated trip assignment and background volumes specific to the Phase 2A scenario, used to derive future total volumes, have been provided in **Appendix E** for reference.



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336										0										0										400										400									
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2170										2773										2773										2752										2752									
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3246										2670										2670										2700										2700									
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2170										2773										2773										2752										2752									
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3246										2670										2670										2700										2700									
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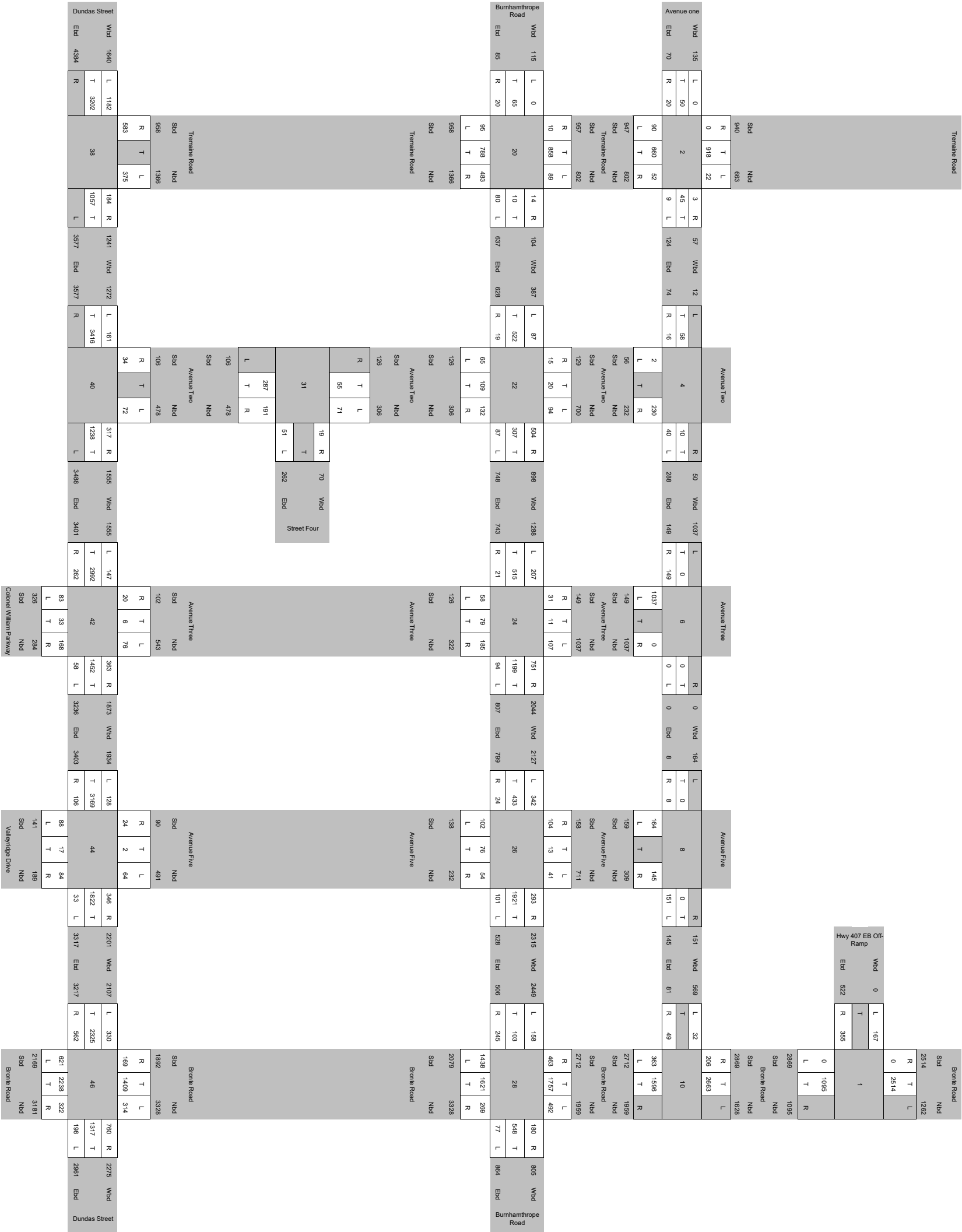
Figure 7-2
Future Total Traffic Volumes - Phase 1 (2025) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trenaire Road										Burnhamthorpe Road										Avenue one										Avenue Two										Avenue Three										Avenue Five										Brimley Road									
Sbd Nbd 940 662										Wbd 115 0 65 20										Wbd 135 0 50 20										R 0 871 69										R 4 31 74 105 Wbd 1125 196 6										R 8 83 23 676 Wbd 899 186 8										Sbd Nbd 2514 1262									
940										95 897 374										90 653 161										2 214 16 2										64 451 111 138										0 1095																			
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Trenaine Road										Bronte Road									
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Wbd										0									
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R										121									
Ebd										232									
Hwy 407 EB Off Ramp																			
Sbd										Nbd									
826										698									
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14																			
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55										T									
133										L									
12										63									
L										T									
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86										75									
Sbd										Nbd									
Trenaine Road										Bronte Road									
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1010										721									
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0										954									
56																			
70										R									
25										T									
368										L									
15										641									
L										T									
R										R									
1382										791									
Sbd										Nbd									
Trenaine Road										Bronte Road									
Sbd										Nbd									
1383										796									
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1202										181									
L										525									
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107										158									
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77										R									
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283										L									
195										Ebd									
340										Wbd									
Street Four																			
305										184									
Sbd										Nbd									
Avenue Two																			
Sbd										Nbd									
305										184									
R										T									
L										L									
268										37									
69										121									
168																			
69										T									
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483										L									
24																			
T										363									
R										68									
463										Wbd									
221										Ebd									
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70										R									
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R										60									
Ebd										100									
Wbd										40									
L										10									
507										R									
177										T									
298										L									
790										Ebd									
Burmthorpe Road																			
141										1922									
271										1796									
L										T									
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216										155									
Sbd										Nbd									
Avenue Five																			
27										27									
L										T									
R										R									
56										R									
501										T									
70										L									
1450										Ebd									
1552										R									
777																			
L										283									
627										Wbd									
599										L									
28																			
507										R									
892										Wbd									
Burmthorpe Road																			
141										1922									
271										1796									
L										T									
R										R									
2597										2151									
Sbd										Nbd									
Bronte Road																			
Sbd										Nbd									
2596										2151									
R										T									
L										L									
261										1987									
718																			
300										R									
2662										Wbd									
2100										T									
292										L									

Scale: NTS

Figure 7-4
Future Total Traffic Volumes - Phase 2 (2030) - Weekday PM Peak Hour



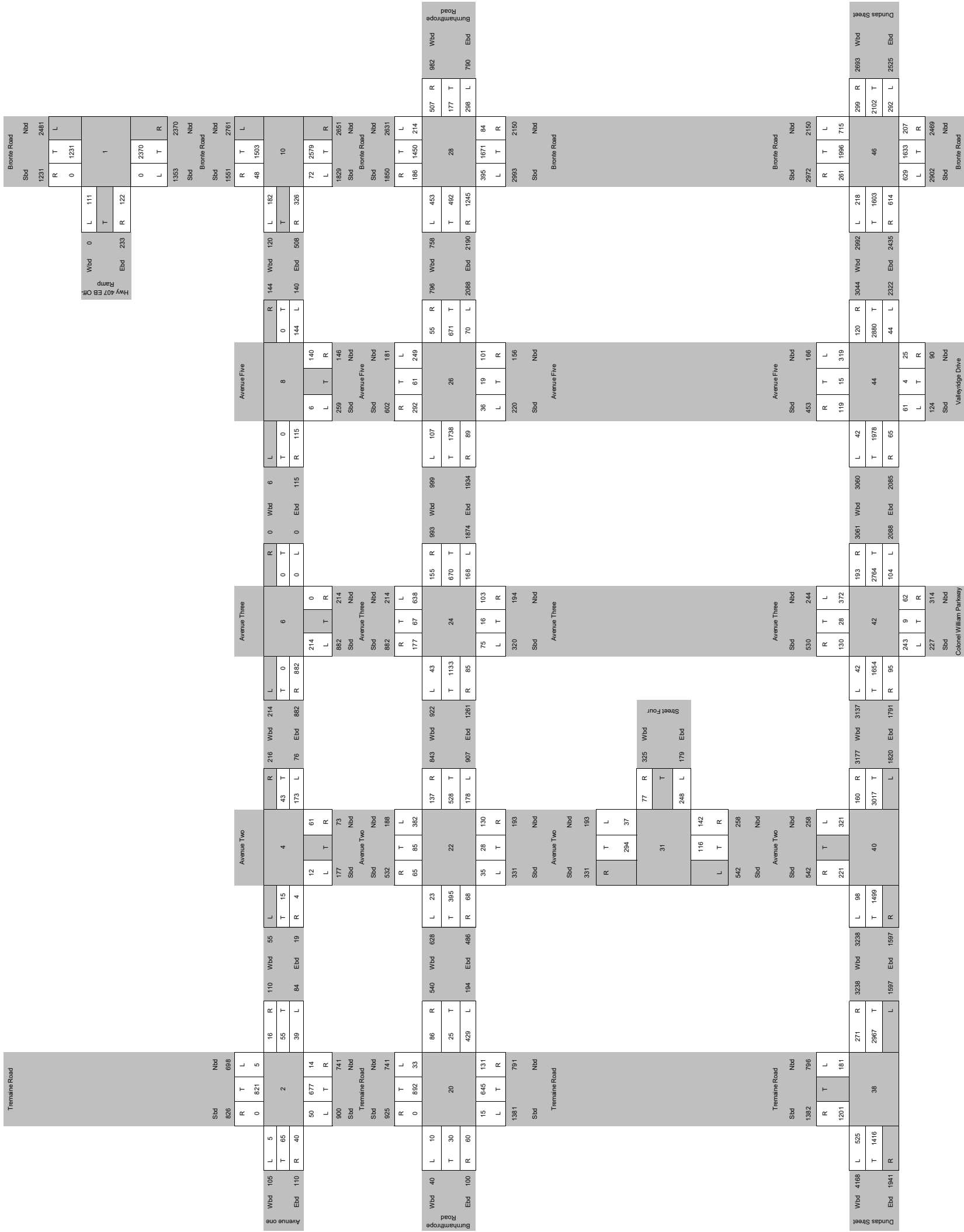


Figure 7-6
Future Total Traffic Volumes - Phase 2A (2030) - Weekday PM Peak Hour

7.2 INTERNAL INTERSECTIONS CONTROL AND CONFIGURATION

7.2.1 TRAFFIC SIGNAL WARRANTS

Based on the recommended lane configuration for the internal intersections under Phase 2 (see **Figure 5-2**), signal controls were recommended for the intersections of Burnhamthorpe Road at Avenue Two, Avenue Three and Avenue Five. For the remaining internal study intersections, WSP completed signal timing warrants using the Ontario Traffic Manual Book 12 methodology (Justification 7 – Projected Volumes). The proposed Phase 2 lane configuration was used as it considers full connectivity through the network, with Avenue One continuous between Tremaine Road and Bronte Road. Details of the signal warrants are provided in **Appendix F**. The signal warrant results are summarized in **Table 7-1**

Table 7-1 – Signal Warrant Summary

INTERSECTION	JUSTIFICATION 1 (MINIMUM VEHICULAR VOLUME) [150% SATISFACTION]		JUSTIFICATION 2 (DELAY TO CROSS TRAFFIC) [150% SATISFACTION]		SIGNAL WARRANTED
	JUSTIFICATION 1A	JUSTIFICATION 1B	JUSTIFICATION 2A	JUSTIFICATION 2B	
Avenue One at Avenue Two	19%	16%	15%	3%	Not Warranted
Avenue One at Avenue Three	67%	53%	54%	89%	Not Warranted
Avenue One at Avenue Five	56%	24%	51%	18%	Not Warranted
Avenue Two at Street Four	36%	40%	26%	70%	Not Warranted

As indicated in the table above, signals are not warranted for the remaining internal intersections assessed. Therefore, WSP completed the traffic operations analysis for the above listed intersections assuming stop-control, with the exception of Avenue One at Avenue Three.

Under stop-control for the Phase 2 (2030) Future Total conditions (with Avenue One under free-flow conditions), the intersection of Avenue One at Avenue Three is projected to operate as detailed in **Table 7-2** below. The Synchro analysis summary has been included in **Appendix F** along with the traffic signal warrants.

Table 7-2 – Avenue One at Avenue Three – Phase 2 Future Total Operations under Stop-Control

Intersection Name Movement	Intersection Type	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Avenue Three at Avenue One	Stop-Controlled	-	-	-	-	-	-
Eastbound Through		0.09	0	A	0.41	0	A
Eastbound Right		0.02	0	A	0.13	0	A
Westbound Left		0.02	8	A	0.19	11	B
Westbound Through		0.50	0	A	0.12	0	A
Northbound Left		1.11	133	F	0.36	38	E
Northbound Right		0.20	10	B	0.05	14	B

As per the above table, the study intersection is projected to operate with the northbound left-turn movement over capacity during the AM peak hour. Therefore, the study intersection was assessed as signalized and coded as such within the Synchro model in order for all turning movements to operate below capacity. The intersection operations under signal control have been detailed in Section 9.0 of this report, along with the remaining study intersections under the 2030 horizon year.

The remainder of the study intersections (to Dundas Street West, Tremaine Road and Bronte Road) were assessed as signalized due to the high volume of through traffic along the regional roads.

7.2.2 EXCLUSIVE TURNING LANE WARRANTS

The lane configurations for the seven (7) internal intersections were developed based on left-turn warrant and right-turn warrant criteria in the Geometric Design Standards for Ontario Highways, as well as the North Oakville Terms of Reference for Transportation Functional Design Studies.

Left-Turn Lane Warrants

According to the Section E.9 of the Geometric Design Standards for Ontario Highways, the left-turn lane requirements are determined based on 1) Volume warrants; and 2) Accident warrants. For future roadway intersections, only the volume warrants are used. For a roadway with a two-lane crossing section, such as the Avenues and Streets, volume warrant for a left-turn lane is determined on the basis of the design speed, and turning, advancing, and opposing design hour volumes at the subject intersection. For a roadway with a four-lane cross-section, such as Burnhamthorpe Road, volume warrant for a left-turn lane is determined based on turning, and opposing design hour volumes. The details of the left-turn lane warrants for the internal intersections were provided in **Appendix F**.

Right-Turn Lane Warrants

According to the Section E.7.2 of the Geometric Design Standards for Ontario Highways, the right-turn lane may be considered when right turning traffic volumes for the design hour is 60 vehicles per hour or more. The North Oakville Terms of Reference for Transportation Functional Design Studies also states that right-turn lanes at signalized intersections where the traffic volume of right-turning traffic will exceed ten percent of the approaching volume. Thus, right-turn lane is considered warranted for the internal intersections when both criteria are met. The details of the right-turn lane warrants for the internal intersections were provided in **Appendix F**.

8 PHASE 1 (2025) FUTURE TRAFFIC OPERATIONS

8.1 2025 FUTURE BACKGROUND TRAFFIC CONDITIONS

The traffic operations analysis for the study intersections under the 2025 future background traffic conditions is summarized in **Table 8-1**. Please refer back to **Figure 6-9** and **Figure 6-10** for the projected Phase 1 (2025) Future Background Traffic Volumes during the AM and PM peak hours, respectively. Please refer to **Appendix D** for the traffic operations assessment results. The traffic signal timings for the study intersections during the AM and PM peak hours have been adjusted to optimize the intersection operations, while the cycle lengths remain the same. WSP assessed traffic operations at the study intersections assuming all planned improvements as detailed in Section 5.2. The Dundas Street Widening west of Bronte Road was coded with three through lanes in each direction to include a High-Occupancy-Vehicle (HOV) lane with a lane utilization factor of 0.80 per the Halton Region guidelines, as illustrated in **Figure 5-1**.

As shown in **Table 8-1**, all study intersections are projected to operate below overall capacity during the AM and PM peak hours, with the exception of the intersections of Dundas Street West at Tremaine Road during the PM peak hour and Dundas Street West at Bronte Road during the study periods. Critical turning movements are projected at the intersection of Dundas Street West at Valleyridge Drive at the eastbound through movement during the AM peak hour (v/c of 0.88), as well as select turning movements at the intersections of Dundas Street West at Tremaine Road and Bronte Road.

In order to improve the 2025 future background traffic operations, WSP recommends the followings changes to the boundary road network and high-level changes to the signal timing plans for both the AM and PM peak hours:

- In order to improve operations at the intersection of Dundas Street West at Bronte Road, increase the cycle length to 140 seconds. In order to maintain a similar cycle length throughout the network (as under existing conditions), apply the increase to all intersections with the exception of the Bronte Road at Highway 407 Eastbound Off-Ramp intersection (as it is projected to operate at an acceptable level of service and does not share a similar cycle length under existing conditions).
- At the intersection of Dundas Street West at Tremaine Road
 - Modify the existing permissive southbound right-turn movement to provide a free channelized right-turn lane along with an additional receiving lane on Dundas Street West that would taper off.
- At the intersection of Dundas Street West at Bronte Road
 - Introduce a dual southbound left-turn movement.
 - Introduce an exclusive westbound right-turn lane.

With the above listed recommendations applied to the boundary road network, the traffic operations are projected to improve as detailed in **Table 8-1**. However, the intersection of Dundas Street West at Bronte Road is projected to remain over capacity overall during the AM peak hour. All turning movements are projected to operate below capacity with the exception the eastbound through, westbound left, and the southbound through movements at Dundas Street West and Bronte Road during the AM peak hour, and the southbound left movement at Dundas Street West and Bronte Road during the PM peak hour. Operations are projected to be improved with the applied recommendations.

The majority of turning movements projected to remain over capacity or under critical conditions under the 2025 future background traffic conditions (with applied recommendations) are located at the intersection of Dundas Street West at Bronte Road and associated with the peak direction of travel (i.e. eastbound during the AM peak hour and

westbound during the PM peak hour). The results indicate that there is insufficient capacity at the intersection to accommodate the forecasted corridor traffic growth and background developments. As there are no additional reasonable recommendations to be made to the study intersection, WSP assessed traffic operations under the Phase 1 (2025) future total conditions to determine the impact of site generated traffic on the study intersection operations.

8.2 PHASE 1 (2025) FUTURE TOTAL TRAFFIC CONDITIONS

The traffic operations analysis for the study intersections under the 2025 future total traffic volumes is summarized in **Table 8-1**. Please refer back to **Figure 7-1** and **Figure 7-2** for the projected Phase 1 (2025) Future Total Traffic Volumes during the AM and PM peak hours, respectively. Please refer to **Appendix D** for the traffic operations assessment results. The traffic signal timings for the study intersections during the AM and PM peak hours have been optimized per the addition of site generated traffic.

As shown in **Table 8-1**, all study intersections are projected to operate below overall capacity during the AM and PM peak hours, with the exception of the intersection of Dundas Street West at Bronte Road. Turning movements at the remaining intersections are projected to operate below capacity, with the exception of the westbound left movement at Avenue Two and Street Four projected at a v/c of 1.07 during the PM peak hour. Street Four was assessed assuming it would yield the only access to the surrounding development blocks (Blocks G3-2, C3-3 and C3-5). Further along the development application process additional accesses would be implemented for these blocks, which would alleviate traffic along Street Four and improve intersection operations. Therefore, the projected operations for the intersection of Street Four at Avenue Two detailed in **Table 8-1** represent the most conservative scenario. Furthermore, the study intersection is projected to operate below capacity under the 2030 horizon year once the remaining accesses to the study area are implemented.

It is WSP's opinion that the traffic operations at the intersection of Dundas Street West at Bronte Road would improve within the coming years based on anticipated changes in travel patterns. As the study intersection is projected to operate over capacity, drivers are anticipated to change their travel patterns and utilize surrounding intersections that are less congested, balancing traffic amongst intersections and ultimately improving traffic operations at the study intersection of Dundas Street West and Bronte Road. Further analyses, including a sensitivity analysis that considers reduced traffic volumes within the study area, have been completed for the 2030 horizon year as detailed in the following sections.

Table 8-1 – Intersection Levels of Service Under Phase 1 (2025) Future Background and Total Traffic Conditions

Intersection Name	Intersection Type	Phase 1 (2025) Future Background						Phase 1 (2025) Future Background with Recommendations						Phase 1 (2025) Future Total					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec.)		LOS	Delay (sec.)		LOS	Delay (sec.)		LOS	Delay (sec.)		LOS	Delay (sec.)		LOS	Delay (sec.)		LOS
		V/C			V/C			V/C			V/C			V/C			V/C		
Movement																			
Bronte Road at Hwy 407 EB Off-Ramp	Signalized	0.74	11	B	0.47	6	A							0.80	13	B	0.49	6	A
		0.39	35	C	0.36	37	D							0.33	32	C	0.37	38	D
		0.56	38	D	0.03	36	D							0.63	39	D	0.04	36	D
		0.28	4	A	0.49	4	A							0.30	5	A	0.50	4	A
		0.78	10	A	0.37	4	A							0.84	13	B	0.38	4	A
Dundas Street West at Tremaine Road	Signalized	0.77	17	B	1.05	46	D	0.76	16	B	0.76	19	B	0.80	14	B	0.80	12	B
		0.65	9	A	0.82	48	D	0.68	9	A	0.61	57	E	0.70	10	A	0.62	57	E
		0.78	11	B	0.39	9	A	0.76	10	B	0.32	3	A	0.81	12	B	0.34	3	A
		0.37	12	B	0.96	27	C	0.34	16	B	0.84	23	C	0.35	8	A	0.90	9	A
		0.15	25	C	0.25	20	C	0.15	52	D	0.23	19	B	0.15	17	B	0.24	5	A
Dundas Street West at Colonel William Parkway	Signalized	0.61	45	D	0.26	34	C	0.65	55	E	0.53	57	E	0.66	55	E	0.54	57	E
		0.27	41	D	1.31	200	F	0.26	1	A	0.42	1	A	0.26	0	A	0.42	1	A
		0.77	16	B	0.84	28	C	0.77	14	B	0.82	21	C	0.82	15	B	0.90	21	C
		0.22	6	A	0.00	0	A	0.21	5	A	0.00	0	A	0.41	11	B	0.00	0	A
		0.84	15	B	0.52	28	C	0.81	14	B	0.48	12	B	0.87	16	B	0.72	11	B
Dundas Street West at Valleyridge Drive	Signalized	0.18	11	B	0.05	40	D	0.17	10	A	0.05	5	A	0.18	10	B	0.07	1	A
		0.42	32	C	0.40	18	B	0.47	33	C	0.42	17	B	0.47	38	D	0.67	46	D
		0.38	10	A	0.81	25	C	0.37	6	A	0.77	19	B	0.59	8	A	0.89	22	C
		0.06	15	B	0.00	7	A	0.06	8	A	0.00	7	A	0.06	3	A	0.00	7	A
		0.45	53	D	0.80	59	E	0.46	61	E	0.85	74	E	0.64	67	E	0.87	76	E
Dundas Street West at Bronte Road	Signalized	0.00	48	D	0.01	36	D	0.00	56	E	0.01	44	D	0.00	55	D	0.01	43	D
		0.47	53	D	0.04	37	D	0.59	65	E	0.04	44	D	0.55	63	E	0.04	43	D
		0.04	48	D	0.19	38	D	0.05	56	E	0.20	46	D	0.04	55	E	0.19	45	D
		0.00	48	D	0.03	37	D	0.00	56	E	0.03	44	D	0.00	55	D	0.03	43	D
		0.82	12	B	0.68	7	A	0.80	16	B	0.66	7	A	0.87	20	B	0.73	8	A
Bronte Road at William Halton Parkway	Signalized	0.88	13	B	0.43	3	A	0.86	18	B	0.41	6	A	0.92	23	C	0.59	6	A
		0.07	7	A	0.02	4	A	0.08	6	A	0.02	7	A	0.08	8	A	0.05	6	A
		0.28	111	F	0.17	3	A	0.33	110	F	0.17	2	A	0.33	121	F	0.31	30	C
		0.38	3	A	0.68	7	A	0.38	5	A	0.66	5	A	0.57	10	B	0.73	8	A
		0.39	56	E	0.35	56	E	0.36	64	E	0.39	67	E	0.50	64	E	0.47	67	E
Dundas Street West at Bronte Road	Signalized	0.06	51	D	0.02	51	D	0.06	59	E	0.02	61	E	0.06	57	E	0.02	60	E
		1.22	78	E	1.12	76	E	1.13	89	F	0.98	67	E	1.22	100	F	1.22	82	F
		0.98	63	E	1.14	157	F	0.93	45	D	0.95	94	F	0.99	57	E	1.39	250	F
		1.15	109	F	0.75	59	E	1.24	150	F	0.68	55	E	1.27	162	F	0.83	66	E
		0.59	31	C	0.14	162	F	0.56	28	C	0.14	128	F	0.66	28	C	0.48	91	F
Dundas Street West at Bronte Road	Signalized	1.40	254	F	0.90	63	E	1.31	227	D	0.85	54	D	1.31	227	F	0.89	69	E
		0.63	36	D	1.09	89	F	1.31	44	D	0.94	55	D	1.31	50	F	0.99	65	E
								0.51	41	D	0.14	32	C	0.22	41	D	0.14	32	C
		0.98	108	F	1.03	103	F	0.66	64	E	0.87	74	E	1.19	171	F	1.05	114	F
		0.81	42	D	0.99	59	E	0.77	44	D	0.99	67	E	0.77	44	D	0.99	67	E
Bronte Road at William Halton Parkway	Signalized	0.28	31	C	0.18	26	C	0.30	34	C	0.20	31	C	0.30	34	C	0.20	31	C
		1.18	147	F	1.15	134	F	1.07	70	E	1.15	169	F	0.79	69	E	1.15	168	F
		1.05	83	F	0.76	42	D	1.07	100	F	0.88	66	E	1.14	126	F	0.89	67	E
		0.21	51	D	0.36	40	D	0.20	64	E	0.41	71	E	0.48	56	E	0.49	72	E
		0.72	15	B	0.80	26	C	0.72	20	B	0.77	24	C	0.73	20	B	0.81	24	C
Bronte Road at William Halton Parkway	Signalized	0.22	54	D	0.32	42	D	0.20	62	E	0.33	49	D	0.20	62	E	0.33	49	D
		0.05	53	D	0.84	64	E	0.05	61	E	0.79	67	E	0.05	61	E	0.79	67	E
		0.75	19	B	0.81	28	C	0.71	28	C	0.78	22	C	0.72	28	C	0.84	22	C
		0.74	37	D	0.58	25	C	0.75	41	D	0.53	25	C	0.76	43	D	0.59	37	D
		0.59	5	A	0.49	9	A	0.58	5	A	0.48	10	A	0.63	5	A	0.50	10	A

Intersection Name	Intersection Type	Phase 1 (2025) Future Background						Phase 1 (2025) Future Background with Recommendations						Phase 1 (2025) Future Total					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Movement																			
Dundas Street West at Avenue Two	Signalized																		
Eastbound Left																	0.80	9	A
Eastbound Through																	0.59	8	A
Westbound Through																	0.83	6	A
Westbound Right																	0.32	5	A
Southbound Left/Left-Right	Stop-Controlled																0.42	20	B
Southbound Right																	0.53	63	E
																	0.02	59	E
Avenue Two at Street Four	Stop-Controlled																		
Westbound Left																	0.16	16	C
Westbound Right																	0.00	0	A
Northbound Through																	0.34	0	A
Northbound Right																	0.16	0	A
Southbound Through/Left	Stop-Controlled																0.00	0	A

Note: V/C ratios noted in red indicates that the movement is considered “critical” per the Halton Region Transportation Impact Study Guidelines (January 2015) – V/C of 0.85 or over for through movements and 0.95 or over for exclusive turning movements.

9 PHASE 2 (2030) FUTURE TRAFFIC OPERATIONS

9.1 PHASE 2 (2030) FUTURE BACKGROUND TRAFFIC CONDITIONS

The traffic operations analysis for the study intersections under the Phase 2 (2030) future background traffic volumes is summarized in **Table 9-2**. Please refer back to **Figure 6-11** and **Figure 6-12** for the projected Phase 2 (2030) Future Background Traffic Volumes during the AM and PM peak hours, respectively. The Phase 2 (2030) future background traffic volumes do not include any site generated trips (i.e. it does not include trips generated by the Phase 1 development). Please refer to **Appendix D** for the traffic operations assessment results. The traffic signal timings for the study intersections during the AM and PM peak hours have been adjusted to optimize the intersection operations.

The boundary road network under the 2030 horizon year includes all roadway improvements as detailed in Section 5.2. All recommendations made as part of the 2025 future background traffic operations have been maintained, with the following additions:

- Bronte Road at Highway 407 EB Off-Ramp
 - The cycle length at the study intersection was increased to 140 seconds, the same cycle length are the remainders of the intersections.
 - The existing dual eastbound left-turn lane configuration is recommended to be modified to an eastbound left-turn lane and a shared eastbound left/right-turn lane to accommodate future background traffic growth under the 2030 horizon year.
- The lane configurations and control type for the internal study intersections (within the 407 Employment Lands) were coded as described in Section 7.2.

Please refer back to **Figure 5-2** for the lane configuration at the study intersections.

As shown in **Table 9-2**, all study intersections are projected to operate below overall capacity during the AM and PM peak hours, with the exception of the intersection of Dundas Street West at Bronte Road. Critical turning movements are projected at select study intersections. The majority of the critical turning movements are associated with the peak direction traffic along Dundas Street West (i.e. the eastbound direction during the AM peak hour, and the westbound direction during the PM peak hour).

WSP is of the opinion that the projected traffic operations under the 2030 future background conditions would operate with lower delay and better LOS than indicated in **Table 9-2** as commuters travelling through the study area would change their travel patterns over time to avoid areas of heavy congestion. The study methodology requested by the reviewing agencies for this transportation study is typical for smaller horizon years and when there are no significant changes in the transportation system; however, the 2030 horizon year is 10 years into the future compared to 2020 existing conditions (which were derived using the 2018 survey data). Therefore, changes in travel patterns accounting for the planned roadway network developed as part of the North Oakville Secondary Plan, as well as any decrease in traffic volumes due to the planned increase in transit facilities along Dundas Street West and Highway 407, are not captured by the study methodology.

As there are no additional recommendations to be made to the study intersections, WSP assessed traffic operations under the Phase 2 (2030) future total conditions to determine the impact of site generated traffic on the study intersection operations. As part of the 2030 future total conditions, WSP completed a sensitivity analysis to determine the required traffic volume reassignment that would allow the study area intersections to operate below capacity.

9.2 PHASE 2 (2030) FUTURE TOTAL TRAFFIC CONDITIONS

The traffic operations analysis for the study intersections under the Phase 2 (2030) future total traffic volumes is summarized in **Table 9-2**. Please refer back to **Figure 7-3** and **Figure 7-4** for the projected Phase 2 (2030) Future Total Traffic Volumes during the AM and PM peak hours, respectively. Please refer to **Appendix D** for the traffic operations assessment results. The traffic signal timings for the study intersections during the AM and PM peak hours have been adjusted to optimize the intersection operations.

As shown in **Table 9-2**, all study intersections are projected to operate below overall capacity during the AM and PM peak hours, with the exception of the intersections of Dundas Street West at Tremaine Road and at Colonel William Parkway during the PM peak hour, Bronte Road at Avenue One and at William Halton Parkway during the PM peak hour, and the intersection of Dundas Street West at Bronte Road during the study periods. The study intersections are projected to operate with similar LOS as under 2030 future background conditions. The majority of the critical turning movements are associated with the peak direction traffic along Dundas Street West (i.e. the eastbound direction during the AM peak hour, and the westbound direction during the PM peak hour). As stated previously, WSP is of the opinion that within the next 10 years to 2030, the commuters travel patterns and overall traffic volumes along the study roadways will change based on the congestion of the study area intersections, the planned road network to be developed as part of the North Oakville Secondary Plan, as well as transit improvements to the Dundas Street West and Highway 407 corridor.

Therefore, WSP completed a sensitivity analysis to determine the reduction in traffic volume required to achieve traffic operations below capacity under 2030 future total conditions. The traffic reduction was derived using the Dundas Street West at Bronte Road intersection volumes as a base. The traffic reduction along Bronte Road was distributed along William Halton Parkway and the Highway 407 ramps included within the study area, based on the Phase 2 (2030) future total conditions turning movements at the two study intersections. The traffic reduction along Dundas Street West was maintained along the corridor. The 10-year linear traffic growth between the 2020 existing conditions (derived from 2018 survey data) and the Phase 2 (2030) future total traffic volumes, as well as between 2020 existing conditions and the Phase 2 (2030) future total traffic volumes under this sensitivity analysis, have been detailed in **Table 9-1**.

Table 9-1 – Phase 2 (2030) Future Total Traffic Conditions – Traffic Reduction under Sensitivity Analysis

INTERSECTION	TURNING MOVEMENT	AM PEAK HOUR		PM PEAK HOUR	
		Forecasted 2030 FT Volume (Associated Growth*)	Derived 2030 FT Volume under sensitivity analysis (Associated Growth*)	Forecasted 2030 FT Volume (Associated Growth*)	Derived 2030 FT Volume under sensitivity analysis (Associated Growth*)
Dundas Street West at Bronte Road	SBT (Bronte Rd)	1409 (28%)	1300 (18%)	1997 (237%)	1300 (120%)
	NBT (Bronte Rd)	2238 (210%)	1450 (101%)	1633 (36%)	1300 (8%)
	EBT (Dundas St W)	2325 (56%)	1300 (-13%)	1599 (94%)	1150 (39%)
	WBT (Dundas St W)	1313 (130%)	1313 (130%)	2100 (75%)	1600 (33%)

Note: *The associated growth represents the 10-year linear growth between 2020 existing conditions traffic volumes at the noted 2030 FT traffic volume in question.

As shown in **Table 9-2**, under the sensitivity analysis scenario, all study intersections are projected to operate below overall capacity with the exception of the Dundas Street West at Bronte Road intersection during the AM and PM peak hour projected to operate at a v/c of 1.00. All turning movements are projected to operate below capacity, with the exception of the southbound left-turn movement at the aforementioned intersection during the PM peak hour, projected to operate at a v/c of 1.03. This turning movement is projected to remain over capacity due to the large volume of vehicles completing the turn during the PM peak hour.

Therefore, once the North Oakville roadway network is implemented, along with increased transit along the Dundas Street West and Highway 407 corridors, traffic volumes are anticipated to be redistributed between the various roadway and travel modes. Traffic volumes within the study areas are anticipated to reduce, and the study intersection operations are projected to be improved (as per the sensitivity analysis).

Table 9-2 – Intersection Levels of Service Under Phase 2 (2030) Future Background and Total Traffic Volumes

Intersection Name	Intersection Type	Phase 2 (2030) Future Background						Phase 2 (2030) Future Total						Phase 2 (2030) Future Total with Sensitivity Adjustment					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Bronte Road at Hwy 407 EB Off-Ramp	Signalized	0.85	17	B	0.52	7	A	0.92	22	C	0.54	5	A	0.89	21	C	0.53	4	A
		0.73	66	E	0.45	63	E	0.80	70	E	0.45	63	E	0.78	69	E	0.43	63	E
		Eastbound Left-Left/Right															0.43	63	E
		Eastbound Right	72	E	0.05	60	E	0.87	92	F	0.05	60	E	0.83	85	F	0.04	60	E
Northbound Through		0.28	2	A	0.53	4	A	0.29	2	A	0.55	0	A	0.22	2	A	0.54	1	A
		Southbound Through	14	B	0.40	3	A	0.93	20	B	0.41	3	A	0.90	16	B	0.23	3	A
Dundas Street West at Tremaine Road	Signalized	0.84	24	C	0.95	29	C	0.88	25	C	1.02	39	D	0.75	25	C	0.90	19	B
		Eastbound Left	50	D	0.61	50	D	0.87	45	D	0.66	51	D	0.87	45	D	0.68	53	D
		Eastbound Through	13	B	0.36	3	A	0.91	16	B	0.38	3	A	0.62	7	A	0.26	2	A
		Westbound Through	31	C	1.06	50	D	0.68	32	C	1.12	71	E	0.68	38	D	0.92	23	C
Westbound Right		0.15	26	C	0.23	7	A	0.17	30	C	0.23	9	A	0.17	38	D	0.23	16	B
		Southbound Left	58	E	0.44	51	D	0.63	60	E	0.44	49	D	0.63	60	E	0.44	58	E
Southbound Right		0.35	1	A	0.68	2	A	0.36	1	A	0.77	3	A	0.36	1	A	0.77	3	A
Dundas Street West at Colonel William Parkway/Avenue Three	Signalized	0.85	15	B	0.99	50	D	0.88	17	B	1.12	57	E	0.61	12	B	0.97	37	D
		Eastbound Left	6	A	0.55	47	D	0.53	11	B	0.57	49	D	0.53	19	B	0.57	49	D
		Eastbound Through	15	B	0.63	18	B	0.92	15	B	0.67	17	B	0.60	7	A	0.51	16	B
		Eastbound Right	9	A	0.06	1	A	0.18	9	A	0.06	1	A	0.16	2	A	0.06	1	A
		Westbound Left	54	D	0.53	35	D	0.48	46	D	0.57	39	D	0.41	20	B	0.41	21	C
		Westbound Through	6	A	1.08	70	E	0.49	9	A	1.09	72	E	0.49	6	A	0.94	35	D
		Westbound Right	5	A	0.14	21	C	0.25	16	B	0.22	20	B	0.25	6	A	0.21	24	C
		Northbound Left	63	E	0.84	72	E	0.54	63	E	0.85	74	E	0.54	63	E	0.85	74	E
		Northbound Through	57	E	0.02	44	D	0.17	57	E	0.03	44	D	0.17	57	E	0.03	44	D
		Northbound Right	64	E	0.04	44	D	0.54	63	E	0.04	44	D	0.54	63	E	0.04	44	D
		Southbound Left	36	D	0.77	56	E	0.64	73	E	1.14	142	F	0.64	81	F	0.99	93	F
		Southbound Through	36	D	0.03	37	D	0.04	68	E	0.06	39	D	0.04	74	E	0.05	36	D
		Southbound Right	56	E	0.24	38	D	0.01	56	E	0.25	42	D	0.01	56	E	0.23	41	D
Dundas Street West at Valleyridge Drive/Avenue Five	Signalized	0.93	31	C	0.84	22	C	0.96	35	C	0.89	25	C	0.69	22	C	0.76	20	C
		Eastbound Left	21	C	0.38	72	E	0.62	36	D	0.38	67	E	0.67	38	D	0.38	46	D
		Eastbound Through	39	D	0.59	14	B	1.05	46	D	0.68	15	B	0.74	20	B	0.54	12	B
		Eastbound Right	15	B	0.03	94	F	0.07	13	B	0.04	9	A	0.07	19	B	0.04	10	B
		Westbound Left	86	F	0.29	17	B	0.32	79	E	0.36	33	C	0.32	33	C	0.24	11	B
		Westbound Through	15	B	0.92	19	B	0.70	15	B	0.97	24	C	0.72	20	B	0.82	16	B
		Westbound Right	15	B	0.07	7	A	0.30	14	B	0.08	12	B	0.31	16	B	0.08	11	B
		Northbound Left	54	D	0.36	60	E	0.44	54	D	0.40	61	E	0.35	50	D	0.39	60	E
		Northbound Through/Right	60	E	0.07	65	E	0.17	59	E	0.07	65	E	0.15	58	E	0.07	65	E
		Southbound Left	66	E	0.72	67	E	0.53	68	E	0.80	69	E	0.38	52	D	0.70	62	E
		Southbound Through/Right	96	F	0.18	61	E	0.04	99	F	0.17	64	E	0.04	82	F	0.16	60	E

Intersection Name	Intersection Type	Phase 2 (2030) Future Background						Phase 2 (2030) Future Total						Phase 2 (2030) Future Total with Sensitivity Adjustment					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Dundas Street West at Bronte Road Eastbound Left Eastbound Through Eastbound Right Westbound Left Westbound Through Westbound Right Northbound Left Northbound Through Northbound Right Southbound Left Southbound Through Southbound Right	Signalized	1.20	93	F	1.22	85	F	1.36	126	F	1.54	120	F	1.00	57	E	1.00	62	E
		0.83	37	D	1.22	193	F	0.86	39	D	1.15	157	F	0.94	59	E	0.95	95	F
		1.28	165	F	0.96	68	E	1.25	154	F	0.96	56	E	0.95	49	D	0.94	72	E
		0.57	8	A	0.56	15	B	0.61	11	B	0.73	20	B	0.64	13	B	0.75	25	C
		1.30	213	F	1.36	230	F	1.39	251	F	1.77	408	F	0.96	92	F	0.97	85	F
		0.73	45	D	1.09	93	F	0.80	45	D	1.08	89	F	0.98	70	E	0.97	63	E
		0.85	49	D	0.34	34	C	1.02	80	F	0.40	34	C	0.98	63	E	0.43	40	D
		1.10	132	F	0.94	79	E	1.57	330	F	1.41	259	F	0.97	84	F	0.92	72	E
		0.99	63	E	0.97	63	E	1.30	187	F	1.02	76	E	0.97	66	E	0.94	63	E
		0.39	25	C	0.27	37	D	0.41	28	C	0.31	37	D	0.44	29	C	0.30	41	D
		1.48	281	F	1.06	91	F	1.30	187	F	1.52	280	F	0.51	20	B	1.03	77	E
		0.98	63	E	1.12	113	F	0.98	57	E	1.23	154	F	0.95	56	E	0.94	57	E
		0.17	62	E	0.38	44	D	0.17	57	E	0.37	38	D	0.21	50	D	0.35	45	D
Bronte Road at William Halton Parkway/Burnhamthorpe Road Eastbound Left Eastbound Through Eastbound Right Westbound Left Westbound Through Westbound Right Northbound Left Northbound Through Northbound Right Southbound Left Southbound Through Southbound Right	Signalized	0.79	39	D	0.91	44	D	0.96	49	D	1.12	60	E	0.93	47	D	0.94	46	D
		0.59	59	E	0.65	45	D	0.82	78	E	0.76	45	D	0.82	77	E	0.75	55	E
		0.08	50	D	0.69	56	E	0.11	41	D	0.80	54	D	0.11	41	D	0.77	67	E
		0.14	16	B	0.98	78	E	0.18	13	B	1.24	169	F	0.18	12	B	0.97	59	E
		0.42	57	E	0.98	96	F	0.32	51	D	1.22	178	F	0.31	50	D	0.92	90	F
		0.71	63	E	0.22	54	D	0.84	65	E	0.29	51	D	0.84	65	E	0.35	55	D
		0.23	36	D	0.96	82	F	0.22	34	C	0.97	83	F	0.21	32	C	0.93	74	E
		0.85	36	D	0.24	28	C	0.99	36	D	0.39	31	C	0.26	44	D	0.26	20	B
		0.71	34	C	0.70	25	C	0.90	40	D	0.73	27	C	0.65	32	C	0.62	18	B
		0.16	70	E	0.05	34	C	0.16	65	E	0.05	36	D	0.11	38	D	0.04	39	D
		0.80	70	E	0.43	63	E	0.93	69	E	0.56	63	E	0.81	61	E	0.45	57	E
		0.79	29	C	0.80	30	C	0.98	56	E	0.97	36	D	0.95	54	D	0.89	48	D
		0.16	23	C	0.08	2	A	0.30	48	D	0.12	6	A	0.30	50	D	0.13	15	B
Dundas Street West at Avenue Two Eastbound Left Eastbound Through Westbound Through Westbound Right Southbound Left/Left-Right Southbound Right	Signalized	0.88	7	A	0.85	14	B	0.89	10	A	0.93	25	C	0.63	9	A	0.80	18	B
		0.02	1	A	0.09	26	C	0.48	2	A	0.59	65	E	0.48	4	A	0.59	32	C
		0.88	7	A	0.42	3	A	0.90	7	A	0.43	6	A	0.63	5	A	0.30	6	A
		0.33	8	A	0.90	17	B	0.36	10	A	1.00	27	C	0.36	9	A	0.84	14	B
		0.10	14	B	0.05	7	A	0.18	31	C	0.12	10	B	0.18	29	C	0.11	8	A
Tremaine Road at Avenue One Eastbound Left Eastbound Through/Right Westbound Left Westbound Through/Right Northbound Left Northbound Through/Right Southbound Left Southbound Through/Right	Signalized	0.23	63	E	0.52	59	E	0.34	65	E	0.73	63	E	0.34	65	E	0.73	61	E
		0.00	68	E	0.09	57	E	0.02	64	E	0.55	57	E	0.02	64	E	0.54	55	D
		0.34	7	A	0.34	9	A	0.34	7	A	0.41	13	B	0.63	9	A	0.80	18	B
		0	0	A	0.03	27	C	0.00	0	A	0.02	23	C	0.48	4	A	0.59	32	C
		0.34	31	C	0.32	29	C	0.34	31	C	0.22	24	C	0.63	5	A	0.30	6	A

Intersection Name	Intersection Type	Phase 2 (2030) Future Background						Phase 2 (2030) Future Total						Phase 2 (2030) Future Total with Sensitivity Adjustment					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Tremaine Road at Burnhamthorpe Road	Signalized	0.45	11	B	0.61	16	B	0.51	12	B	0.68	17	B						
Eastbound Left		0.00	0	A	0.02	17	B	0.00	0	A	0.02	15	B						
Eastbound Through/Right		0.31	29	C	0.10	17	B	0.30	29	C	0.11	16	B						
Westbound Left		0.34	24	C	0.77	36	D	0.41	23	C	0.82	39	D						
Westbound Through/Right		0.05	24	C	0.08	26	C	0.05	20	B	0.09	18	B						
Northbound Left		0.23	10	A	0.06	8	A	0.24	9	A	0.08	9	A						
Northbound Through/Right		0.47	14	B	0.42	13	B	0.53	16	B	0.47	16	B						
Southbound Left		0.11	4	A	0.16	9	A	0.17	5	A	0.21	10	A						
Southbound Through/Right		0.36	4	A	0.50	10	A	0.36	4	A	0.8	11	B						
Bronte Road at Avenue One	Signalized	0.74	22	C	0.73	19	B	0.90	36	D	1.01	42	D	0.87	41	D	0.95	39	D
Eastbound Left		0.31	67	E	0.77	67	E	0.45	61	E	0.46	33	C	0.45	61	E	0.44	31	C
Eastbound Right		0.05	80	F	0.88	61	E	0.08	61	E	0.98	76	E	0.08	65	E	0.95	68	E
Northbound Left		0.80	75	E	0.20	59	E	0.93	83	F	0.66	78	E	0.93	90	F	0.77	89	F
Northbound Through		0.36	1	A	0.62	3	A	0.37	1	A	0.98	31	C	0.20	2	A	0.89	27	C
Southbound Through		0.77	21	C	0.51	20	B	0.95	37	D	0.78	40	D	0.47	34	C	0.47	34	C
Southbound Right		0.17	24	C	0.04	14	B	0.26	38	D	0.06	25	C	0.91	37	D	0.06	27	C
Avenue Three at Avenue One	Signalized	0.27	48	D	0.18	6	A	0.76	26	C	0.51	7	A						
Eastbound Through		0.06	5	A	0.17	3	A	0.14	7	A	0.52	6	A						
Eastbound Right		0.01	5	A	0.05	3	A	0.03	5	A	0.17	4	A						
Westbound Left		0.02	3	A	0.16	5	A	0.03	7	A	0.29	6	A						
Westbound Through		0.25	3	A	0.07	4	A	0.79	20	C	0.16	3	A						
Northbound Left		0.37	45	D	0.25	32	C	0.67	34	C	0.39	31	C						
Northbound Right		0.11	151	F	0.01	32	C	0.11	68	E	0.02	35	D						
Avenue Two at Burnhamthorpe Road	Signalized	0.16	19	B	0.28	18	B	0.23	17	B	0.31	20	C						
Eastbound Left		0.12	5	A	0.04	10	A	0.13	6	A	0.04	10	B						
Eastbound Through		0.12	5	A	0.16	10	B	0.15	6	A	0.18	11	B						
Eastbound Right		0.01	4	A	0.04	18	B	0.01	4	A	0.04	19	B						
Westbound Left		0.01	6	A	0.01	15	B	0.11	6	A	0.20	16	B						
Westbound Through		0.11	8	A	0.16	13	B	0.12	6	A	0.19	15	B						
Westbound Right		0.15	44	D	0.04	34	C	0.15	31	C	0.04	37	D						
Northbound Left		0.38	35	C	0.10	26	C	0.33	31	C	0.12	24	C						
Northbound Through		0.33	34	C	0.05	25	C	0.56	33	C	0.08	24	C						
Northbound Right		0.00	27	C	0.01	22	C	0.04	47	D	0.07	39	D						
Southbound Left		0.27	30	C	0.62	29	C	0.28	26	C	0.61	30	C						
Southbound Through		0.06	28	C	0.15	23	C	0.10	24	C	0.29	25	C						
Southbound Right		0.01	27	C	0.04	23	C	0.01	26	C	0.04	29	C						

Intersection Name	Intersection Type	Phase 2 (2030) Future Background				Phase 2 (2030) Future Total				Phase 2 (2030) Future Total with Sensitivity Adjustment			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Avenue Three at Burnhamthorpe Road Eastbound Left Eastbound Through/Right Westbound Left Westbound Through Westbound Right Northbound Left Northbound Through Northbound Right Southbound Left Southbound Through/Right	Signalized	0.30	15	B	0.29	13	B	0.49	18	B	0.50	15	B
		0.00	0	A	0.01	6	A	0.00	12	B	0.03	6	A
		0.14	13	B	0.23	7	A	0.20	13	B	0.47	9	A
		0.12	9	A	0.13	11	B	0.15	12	B	0.25	15	B
		0.23	9	A	0.16	11	B	0.44	16	B	0.25	13	B
		0.03	22	C	0.01	5	A	0.12	18	B	0.02	55	E
		0.00	27	C	0.03	22	C	0.20	26	C	0.36	24	C
		0.54	28	C	0.06	22	C	0.62	30	C	0.09	22	C
		0.03	45	D	0.06	36	D	0.03	44	D	0.14	25	C
		0.04	20	C	0.17	23	C	0.11	20	B	0.48	24	C
		0.04	20	C	0.49	24	C	0.07	19	B	0.59	26	C
		0.28	9	A	0.45	19	B	0.46	13	B	0.62	17	B
Avenue Five at Burnhamthorpe Road Eastbound Left Eastbound Through/Right Westbound Left Westbound Through Westbound Right Northbound Left Northbound Through Northbound Right Southbound Left Southbound Through Southbound Right	Signalized	0.20	2	A	0.04	13	B	0.34	7	A	0.10	12	B
		0.08	1	A	0.35	14	B	0.12	1	A	0.60	18	B
		0.12	2	A	0.18	11	B	0.14	5	A	0.37	18	B
		0.26	3	A	0.16	10	B	0.45	9	A	0.26	8	A
		0.18	5	A	0.03	18	B	0.21	9	A	0.03	15	B
		0.21	49	D	0.04	27	C	0.39	52	D	0.08	26	C
		0.48	52	D	0.04	26	C	0.61	56	E	0.06	26	C
		0.03	58	E	0.06	62	E	0.03	67	E	0.13	36	D
		0.36	33	C	0.8	29	C	0.36	35	C	0.68	26	C
		0.08	31	C	0.13	20	C	0.09	33	C	0.20	19	B
		0.01	59	E	0.07	22	C	0.03	20	C	0.08	15	B
		0.07	0	A	0.02	0	A	0.14	0	A	0.03	0	A
Avenue Two at Avenue One Eastbound Through/Right Westbound Through/Left Northbound Left Northbound Right	Stop-Controlled	0.04	6	A	0.01	1	A	0.06	6	A	0.05	3	A
		0.00	10	B	0.01	9	A	0.00	11	B	0.02	11	B
		0.01	9	A	0.04	9	A	0.11	10	A	0.06	9	A
		0.07	0	A	0.16	0	A	0.12	0	A	0.44	0	A
		0.05	8	A	0.05	8	A	0.07	8	A	0.09	10	A
		0.19	0	A	0.08	0	A	0.49	0	A	0.14	0	A
		0.03	13	B	0.02	13	B	0.33	34	D	0.09	24	C
		0.07	9	A	0.08	10	B	0.09	10	A	0.21	16	C
		0.01	10	A	0.06	10	A	0.10	12	B	0.48	17	C
		0.00	9	A	0.01	9	A	0.02	10	A	0.08	9	A
		0.08	0	A	0.03	0	A	0.15	0	A	0.06	0	A
		0.01	0	A	0.02	0	A	0.11	0	A	0.09	0	A
Avenue Two at Street Four Westbound Left Westbound Right Northbound Through Northbound Right Southbound Through/Left	Stop-Controlled	0.01	2	A	0.01	1	A	0.06	5	A	0.03	1	A
		0.07	0	A	0.16	0	A	0.12	0	A	0.44	0	A
		0.05	8	A	0.05	8	A	0.07	8	A	0.09	10	A
		0.19	0	A	0.08	0	A	0.49	0	A	0.14	0	A
		0.03	13	B	0.02	13	B	0.33	34	D	0.09	24	C
		0.07	9	A	0.08	10	B	0.09	10	A	0.21	16	C
		0.01	10	A	0.06	10	A	0.10	12	B	0.48	17	C
		0.00	9	A	0.01	9	A	0.02	10	A	0.08	9	A
		0.08	0	A	0.03	0	A	0.15	0	A	0.06	0	A
		0.01	0	A	0.02	0	A	0.11	0	A	0.09	0	A
		0.01	2	A	0.01	1	A	0.06	5	A	0.03	1	A
		0.01	2	A	0.01	1	A	0.06	5	A	0.03	1	A

Note: V/C ratios noted in **red** indicates that the movement is considered “critical” per the Halton Region Transportation Impact Study Guidelines (January 2015) – V/C of 0.85 or over for through movements and 0.95 or over for exclusive turning movements.

9.2.1 STORAGE LENGTH REQUIREMENTS

Based on the sensitivity analysis completed as part of the Phase 2 (2030) future total conditions, WSP completed a queueing analysis to derive storage length requirements for the internal roadway intersections, as well as the boundary road intersections projected to be modified by the proposed site accesses. Storage lengths have been estimated on the bases of the 95th percentile Synchro analysis, detailed in **Table 9-3** below.

Table 9-3 – Queuing Assessment and Proposed Turn Lane Storage Length Required

Intersection Name Movement	Intersection Type	95 th Percentile Queue Lengths (m)		Minimum Storage Length (Rounded to the nearest 5m)
		AM Peak Hour	PM Peak Hour	
Dundas Street West at Colonel William Parkway/Avenue Three	Signalized			
Eastbound Left		25	23	30
Eastbound Right		2	1	5
Westbound Left		9	15	20
Westbound Right		6	25	30
Northbound Left		37	92	95
Northbound Right		43	0	45
Southbound Left		36	146	150
Southbound Right		2	37	40
Dundas Street West at Valleyridge Drive/Avenue Five	Signalized			
Eastbound Left		43	12	45
Eastbound Right		13	2	15
Westbound Left		4	4	5
Westbound Right		34	2	35
Northbound Left		35	25	40
Southbound Left		17	60	65
Bronte Road at William Halton Parkway/Burnhamthorpe Road	Signalized			
Eastbound Left		44	99	100
Eastbound Right		15	239	240
Westbound Left		33	74	75
Westbound Right		30	125	130
Northbound Left		143	12	145
Northbound Right		16	8	20
Southbound Left		83	35	85
Southbound Right		36	10	40
Dundas Street West at Avenue Two	Signalized			
Eastbound Left		6	24	25
Westbound Right		22	4	25
Southbound Left		16	59	60
Southbound Right		10	65	70
Tremaine Road at Avenue One	Signalized			
Eastbound Left		0	3	5
Westbound Left		6	33	35
Northbound Left		14	12	15
Southbound Left		8	3	10
Tremaine Road at Burnhamthorpe Road	Signalized			
Eastbound Left		0	3	5
Northbound Left		20	6	25
Southbound Left		3	7	10

Intersection Name Movement	Intersection Type	95 th Percentile Queue Lengths (m)		Minimum Storage Length (Rounded to the nearest 5m)
		AM Peak Hour	PM Peak Hour	
Bronte Road at Avenue One	Signalized			
Eastbound Left		33	104	105
Northbound Left		184	47	185
Southbound Right		15	11	20
Avenue Three at Avenue One	Signalized			
Eastbound Right		2	9	10
Westbound Left		4	37	40
Northbound Left		41	14	45
Avenue Two at Burnhamthorpe Road	Signalized			
Eastbound Left		19	6	20
Eastbound Right		1	8	10
Westbound Left		15	26	30
Westbound Right		35	10	40
Northbound Left		17	8	20
Northbound Right		8	10	15
Southbound Left		9	34	35
Southbound Right		0	7	10
Avenue Three at Burnhamthorpe Road	Signalized			
Eastbound Left		0	4	5
Westbound Left		33	20	35
Westbound Right		43	8	45
Northbound Left		16	20	25
Northbound Right		6	17	20
Southbound Left	Signalized	7	31	35
Avenue Five at Burnhamthorpe Road				
Eastbound Left		12	12	15
Westbound Left		12	25	30
Westbound Right		24	6	25
Northbound Left		29	7	30
Northbound Right		14	14	15
Southbound Left		12	31	35
Southbound Right		3	5	10
Avenue Two at Avenue One	Stop-Controlled			
Northbound Left		0	0	0
Avenue Five at Avenue One	Stop-Controlled			
Northbound Left		10	2	15
Avenue Two at Street Four	Stop-Controlled			
Westbound Left		2	20	25
Northbound Right		0	0	0

9.3 PHASE 2A (2030) FUTURE TOTAL TRAFFIC OPERATIONS

WSP completed a traffic operations analysis of the study area intersections assuming that creek crossings would not be in place along Avenue One. Within this scenario Avenue One is segmented between Avenue Five and Avenue Three, as well as between Avenue two and Avenue Three. Please refer to **Figure 5-3** for the assumed boundary road network for Phase 2A (2030). Please refer back to **Figure 7-5 and Figure 7-6** for the projected Phase 2A (2030) Future Total Traffic Volumes during the AM and PM peak hours, respectively.

The Phase 2A (2030) future total traffic assessment assumes the same signal timing and boundary road recommendations as under the Phase 2 (2030) future total scenario (as detailed in Section 9.2) plus the following additional recommendations under Phase 2A:

- Burnhamthorpe Road at Bronte Road
 - Introduce a channelized eastbound right-turn lane onto Bronte Road, along with an additional receiving lane which would taper off.
- Avenue Three at Avenue One
 - Increase the cycle length from 70 seconds to 140 seconds during the AM peak hour.
- Avenue Five at Burnhamthorpe Road
 - Increase the cycle length from 70 seconds to 140 seconds during the PM peak hour.
- Avenue Three at Burnhamthorpe Road
 - Increase the cycle length from 70 seconds to 140 seconds during the PM peak hour.
 - The implementation of a dual southbound left-turn lane at the study intersection.
 - Introduce protected-permissive eastbound left-turn phase during the AM peak hour.
 - Introduce protected-permissive westbound left-turn phase during the PM peak hour.

The traffic operations analysis for the study intersections under the Phase 2A (2030) future total traffic conditions is summarized in **Table 9-5**. Please refer to **Appendix D** for the traffic operations assessment results. The traffic signal timings for the study intersections during the AM and PM peak hours have been adjusted to optimize the intersection operations.

As shown in **Table 9-5**, all study intersections are projected to operate below overall capacity during the AM and PM peak hours, with the exception of the intersections of Dundas Street West at Tremaine Road and Colonel William Parkway during the PM peak hour, Bronte Road at William Halton Parkway during the AM peak hour, and the intersection of Dundas Street West at Bronte Road during the study periods. Additionally, turning movements operating over capacity are also projected at the intersection of Dundas Street West at Valleyridge Drive during the AM peak hour, and Dundas Street West at Avenue Two during the PM peak hour. As stated in the previous scenario analysis, the majority of the critical turning movements are associated with the peak direction traffic along Dundas Street West (i.e. the eastbound direction during the AM peak hour, and the westbound direction during the PM peak hour).

As stated previously, WSP is of the opinion that within the next 10 years to 2030, the commuters travel patterns and overall traffic volumes along the study roadways will change based on the congestion of the study area intersections, the planned road network to be developed as part of the North Oakville Secondary Plan, as well as transit improvements to the Dundas Street West and Highway 407 corridors. Therefore, WSP completed a sensitivity analysis to determine the reduction in traffic volume required to achieve traffic operations below capacity under the Phase 2A (2030) future total conditions as detailed in **Table 9-4**.

Table 9-4 – Phase 2A (2030) Future Total Traffic Conditions – Traffic Reduction under Sensitivity Analysis

INTERSECTION	TURNING MOVEMENT	AM PEAK HOUR		PM PEAK HOUR	
		Forecasted 2030 FT Volume (Associated Growth*)	Derived 2030 FT Volume under sensitivity analysis (Associated Growth*)	Forecasted 2030 FT Volume (Associated Growth*)	Derived 2030 FT Volume under sensitivity analysis (Associated Growth*)
Dundas Street West at Bronte Road	SBT (Bronte Rd)	1409 (28%)	1150 (4%)	1996 (237%)	1300 (120%)
	NBT (Bronte Rd)	2238 (210%)	1600 (122%)	1633 (36%)	1350 (12%)
	EBT (Bronte Rd)	2325 (56%)	1350 (-10%)	1603 (94%)	1100 (33%)
	WBT (Dundas St W)	1317 (131%)	1317 (131%)	2102 (75%)	1500 (25%)

Note: *The associated growth represents the 10-year linear growth between 2020 existing conditions traffic volumes at the noted 2030 FT traffic volume in question.

As shown in **Table 9-5**, under the sensitivity analysis scenario, all turning movements are projected to operate below overall capacity, with the exception of the eastbound and northbound left-turn movements at the intersection of Bronte Road at Burnhamthorpe Road/William Halton Parkway during the AM peak hour and the southbound left-turn movement at the intersection of Dundas Street West at Bronte Road during the PM peak hour. All study intersections are projected to operate below capacity during the study periods with the exception of the intersections of Bronte Road at Burnhamthorpe Road/William Halton Parkway Road and Dundas Street West at Bronte Road during the AM peak hour. All intersection turning movements at the intersection of Dundas Street West and Bronte Road are projected to operate below capacity. The northbound left-turn movement at the intersection of Bronte Road at Burnhamthorpe Road is projected to operate above capacity during the AM peak hour due to the large volume of left-turning vehicles. This volume is significantly increased compared to the Phase 2 scenario since a portion of the proposed development and surrounding 407 Employment Lands blocks are now only accessible via Burnhamthorpe Road and Avenue Three due to the creek crossings removal. Long delays for this movements are one of the expected consequences of Avenue One not being a continuous roadway between Tremaine Road and Bronte Road (i.e. the delay would increase from 44 seconds to 168 seconds).

Based on the projected traffic operations at the study intersections under Phase 2A (2030) future total traffic conditions, the discontinuity of Avenue One within the study area warrants additional turning lane improvements at the intersections of Burnhamthorpe Road at Avenue Three and at Bronte Road (as detailed at the start of Section 9.3) and the changes in traffic pattern are projected to cause the intersection of Bronte Road at Burnhamthorpe Road to operate over capacity during the AM peak hour.

Intersection Name	Intersection Type	Phase 2A (2030) Future Total						Phase 2A (2030) Future Total with Sensitivity Adjustment					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Dundas Street West at Bronte Road	Signalized	1.41	139	F	1.36	118	F	1.02	59	E	1.00	63	E
Eastbound Left		1.00	63	E	1.22	186	F	0.97	78	E	0.95	96	F
Eastbound Through		1.40	222	F	1.09	101	F	0.98	61	E	0.90	67	E
Eastbound Right		0.69	17	B	0.78	28	C	0.64	10	B	0.75	25	C
Westbound Left		1.39	251	F	1.44	264	F	0.96	92	F	0.97	85	F
Westbound Through		0.84	49	D	1.14	117	F	0.96	65	E	0.91	54	D
Westbound Right		1.01	76	E	0.42	36	D	0.99	67	E	0.42	40	D
Northbound Left		1.89	473	F	1.34	225	F	0.97	84	F	0.92	72	E
Northbound Through		1.25	164	F	0.98	63	E	0.99	66	E	0.98	69	E
Northbound Right		0.40	27	C	0.30	36	D	0.42	26	C	0.30	41	D
Southbound Left		0.92	50	D	1.44	256	F	0.59	20	B	1.03	90	F
Southbound Through		0.81	44	D	1.18	128	F	0.84	53	D	0.94	64	E
Southbound Right		0.19	42	D	0.36	32	C	0.18	71	E	0.35	51	D
Bronte Road at William Halton Parkway/Burnhamthorpe Road	Signalized	1.18	100	F	0.93	37	D	1.14	78	E	0.96	37	D
Eastbound Left		0.96	108	F	0.97	64	E	1.04	131	F	0.94	55	D
Eastbound Through		0.11	40	D	0.77	50	D	0.11	36	D	0.69	47	D
Eastbound Right		0.15	0	A	0.78	3	A	0.15	0	A	0.78	3	A
Westbound Left		0.32	51	D	0.89	65	E	0.28	50	D	0.69	58	E
Westbound Through		0.84	65	E	0.28	51	D	0.84	65	E	0.55	63	E
Westbound Right		0.22	34	C	0.97	83	F	0.22	34	C	0.97	85	F
Northbound Left		1.63	317	F	0.73	34	C	1.30	168	F	0.76	53	D
Northbound Through		0.68	31	C	0.76	33	C	0.44	24	C	0.75	30	C
Northbound Right		0.16	54	D	0.06	36	D	0.11	20	C	0.04	106	F
Southbound Left		0.93	81	F	0.58	69	E	0.93	75	E	0.32	60	E
Southbound Through		0.96	51	D	0.75	32	C	0.98	66	E	0.42	31	C
Southbound Right		0.68	40	D	0.17	8	A	0.80	57	E	0.15	7	A
Dundas Street West at Avenue Two	Signalized	0.89	10	B	0.93	23	C	0.64	10	A	0.78	19	B
Eastbound Left		0.48	2	A	0.58	64	E	0.48	5	A	0.58	27	C
Eastbound Through		0.90	8	A	0.44	6	A	0.64	5	A	0.29	6	A
Westbound Through		0.36	9	A	1.01	25	C	0.36	9	A	0.81	15	B
Westbound Right		0.20	29	C	0.12	10	B	0.20	31	C	0.11	12	B
Southbound Left/Left-Right		0.36	64	E	0.74	62	E	0.36	63	E	0.74	62	E
Southbound Right		0.02	74	E	0.56	50	D	0.02	74	E	0.55	50	D
Tremaine Road at Avenue One	Signalized	0.36	7	A	0.34	9	A						
Eastbound Left		0.00	0	A	0.03	27	C						
Eastbound Through/Right		0.34	31	C	0.33	29	C						
Westbound Left		0.08	31	C	0.25	30	C						
Westbound Through/Right		0.28	32	C	0.26	30	C						
Northbound Left		0.22	6	A	0.11	8	A						
Northbound Through/Right		0.28	6	A	0.28	8	A						
Southbound Left		0.04	3	A	0.01	4	A						
Southbound Through/Right		0.36	4	A	0.34	5	A						

Intersection Name	Intersection Type	Phase 2A (2030) Future Total						Phase 2A (2030) Future Total with Sensitivity Adjustment					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Tremaine Road at Burnhamthorpe Road	Signalized	0.52	13	B	0.72	17	B						
Eastbound Left		0.00	0	A	0.02	14	B						
Eastbound Through/Right		0.29	28	C	0.09	14	B						
Westbound Left		0.47	30	C	0.87	30	C						
Westbound Through/Right		0.05	28	C	0.09	3	A						
Northbound Left		0.23	9	A	0.08	11	B						
Northbound Through/Right		0.53	17	B	0.51	18	B						
Southbound Left		0.38	8	A	0.14	10	B						
Southbound Through/Right		0.36	5	A	0.59	13	B						
Bronte Road at Avenue One	Signalized	0.73	17	B	0.73	16	B	0.68	18	B	0.65	16	B
Eastbound Left		0.31	65	E	0.73	68	E	0.31	65	E	0.73	68	E
Eastbound Right		0.03	62	E	0.92	84	F	0.03	62	E	0.81	67	E
Northbound Left		0.72	77	E	0.32	71	E	0.72	86	F	0.34	67	E
Northbound Through		0.37	2	A	0.66	5	A	0.24	2	A	0.59	5	A
Southbound Through		0.78	16	B	0.44	11	B	0.70	14	B	0.27	9	A
Southbound Right	Signalized	0.13	15	B	0.03	7	A	0.13	13	B	0.03	7	A
Avenue Three at Avenue One		0.66	24	C	0.56	17	B						
Eastbound Through													
Eastbound Right		0.09	48	D	0.55	13	B						
Westbound Left													
Westbound Through													
Northbound Left	Signalized	0.81	21	C	0.60	36	D						
Northbound Right													
Avenue Two at Burnhamthorpe Road		0.35	29	C	0.57	20	B						
Eastbound Left		0.12	6	A	0.06	15	B						
Eastbound Through		0.22	6	A	0.24	16	B						
Eastbound Right		0.01	4	A	0.04	26	C						
Westbound Left		0.15	9	A	0.39	16	B						
Westbound Through		0.13	8	A	0.31	13	B						
Westbound Right		0.31	64	E	0.09	33	C						
Northbound Left		0.34	32	C	0.08	19	B						
Northbound Through		0.42	32	C	0.04	19	B						
Northbound Right		0.08	55	D	0.08	36	D						
Southbound Left		0.53	33	C	0.83	27	C						
Southbound Through		0.08	29	C	0.14	12	B						
Southbound Right		0.01	26	C	0.04	6	A						

Intersection Name	Intersection Type	Phase 2A (2030) Future Total						Phase 2A (2030) Future Total with Sensitivity Adjustment					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Avenue Three at Burnhamthorpe Road	Signalized	0.64	26	C	0.78	42	D						
Eastbound Left		0.60	17	B	0.13	23	C						
Eastbound Through/Right		0.20	7	A	0.79	35	C						
Westbound Left		0.17	18	B	0.66	52	D						
Westbound Through		0.53	22	C	0.33	27	C						
Westbound Right		0.66	28	C	0.13	34	C						
Northbound Left		0.48	62	E	0.62	59	E						
Northbound Through		0.48	61	E	0.08	46	D						
Northbound Right		0.12	62	E	0.06	64	E						
Southbound Left		0.62	72	E	0.91	68	E						
Southbound Through/Right		0.06	50	D	0.29	34	C						
Avenue Five at Burnhamthorpe Road	Signalized	0.89	37	D	0.77	27	C						
Eastbound Left		0.78	56	E	0.21	11	B						
Eastbound Through/Right		0.16	4	A	0.73	15	B						
Westbound Left		0.20	14	B	0.71	53	D						
Westbound Through		0.99	43	D	0.26	10	A						
Westbound Right		0.28	18	B	0.04	11	B						
Northbound Left		0.65	58	E	0.14	47	D						
Northbound Through		0.36	48	D	0.05	47	D						
Northbound Right		0.03	63	E	0.23	49	D						
Southbound Left		0.28	28	C	0.93	95	F						
Southbound Through		0.06	26	C	0.17	51	D						
Southbound Right		0.07	34	C	0.18	78	E						
Avenue Two at Avenue One	Stop-Controlled												
Eastbound Through/Right		0.04	0	A	0.01	0	A						
Westbound Through/Left		0.03	6	A	0.11	6	A						
Northbound Left		0.00	9	A	0.02	12	B						
Northbound Right		0.23	10	A	0.06	9	A						
Avenue Five at Avenue One	Stop-Controlled												
Eastbound Through/Right		0.00	0	A	0.07	0	A						
Westbound Left		0.09	8	A	0.10	8	A						
Westbound Through		0.00	0	A	0.00	0	A						
Northbound Left		0.26	13	B	0.01	11	B						
Northbound Right		0.13	9	A	0.14	9	A						
Avenue Two at Street Four	Stop-Controlled												
Westbound Left		0.10	13	B	0.47	18	C						
Westbound Right		0.03	10	A	0.08	9	A						
Northbound Through		0.17	0	A	0.07	0	A						
Northbound Right		0.11	0	A	0.08	0	A						
Southbound Through/Left		0.07	5	A	0.03	1	A						

Note: V/C ratios noted in red indicates that the movement is considered “critical” per the Halton Region Transportation Impact Study Guidelines (January 2015) – V/C of 0.85 or over for through movements and 0.95 or over for exclusive turning movements.

9.4 TENDERING COSTS

Based on the recommendation to provide a continuous connector link through the 407 Employment Lands in Avenue One from a traffic perspective, WSP completed a high-level cost estimate of all roadway improvements associated with the Phase 2 (2030) future total conditions (detailed in Section 9.2 of this report).

WSP will provide a preliminary cost estimate for recommended roadway/intersection improvements, beyond those identified by the Region, at such time there is agreement on the proposed improvements. High-level cost estimates for the recommended improvements are provided below (with a +/- 25% range):

1. Addition of an exclusive westbound right-turn lane at the intersection of Dundas Street West and Bronte Road - \$270,400
2. Conversion of the existing single southbound left-turn lane to double left-turn lanes at the intersection of Dundas Street West and Bronte Road - \$45,500
3. Channelized southbound right-turn lane at the intersection of Dundas Street West and Tremaine Road with additional receiving lane at the west leg of the intersection - \$279,500
4. Conversion of existing two eastbound left-turn lanes to a left turn eastbound lane and shared left/right eastbound lane at the intersection of Bronte Road at the Hwy 407 Eastbound Off-Ramp - \$19,500 (assuming no road works)

The above cost estimates do not include property, utility relocation, engineering or traffic signal modifications at the site. Please refer to **Appendix G** for a breakdown for the above listed high-level cost estimates.

10 PROPOSED INTERNAL ROADWAY CROSS SECTIONS

As per the North Oakville Urban Design and Open Space Guidelines (2009), roadway cross sections are based on the intended land use for the study area. The aforementioned guidelines were used to determine Right-of-Way cross-sections for the proposed roadway network within the 407 Employment Lands, as detailed in **Table 10-1** below.

Table 10-1 Proposed Internal Roadway ROW

STREET NAME	RIGHT-OF-WAY WIDTH	CROSS SECTION
Burnhamthorpe Road	26.0 m	Minor Arterial/Transit Corridor
Avenue One (Between Tremaine Road and Avenue Five)	22.0 m	Avenue/Transit Corridor
Avenue One * (Between Avenue Five and Bronte Road)	26.0 m	Minor Arterial/Transit Corridor
Avenue Two	22.0 m	Avenue/Transit Corridor
Avenue Three	22.0 m	Avenue/Transit Corridor
Avenue Five	22.0 m	Avenue/Transit Corridor
Street Four	20.0 m	Local Road

Based on North Oakville Urban Design and Open Space Guidelines, November 23, 2009, Section 8- Employment.

*Avenue One requires a 26.0m ROW between Avenue Five and Bronte Road as the roadway is recommended to have two lanes in the westbound direction (one terminating as an exclusive westbound left-turn lane at its intersection with Avenue Five), in order to accommodate the dual northbound left-turn lane from Bronte Road onto Avenue One.

11 TRANSIT NETWORK

11.1 TOWN'S TRANSIT-FIRST PLANNING APPROACH

Transit is being promoted as an integral part of the transportation and land use plans for the North Oakville Secondary Plan areas. As part of the North Oakville West Secondary Plan (NOWSP) area, the proposed development is subject to the Town's Transit-First planning approach being promoted for North Oakville.

As a basic premise of the Transit-First planning approach, the transportation network and corridor designs reflect a desire for an increased reliance and priority on transit in the future. The early introduction of transit services and the need for transit to provide a viable travel alternative at all stages of development is a fundamental element of the transportation policies and network in North Oakville.

Transit-First's emphasis is aimed at capturing transit ridership prior to people in new development areas establishing travel habits that rely solely on the automobile.

Transit-First has the benefit of being environmentally friendly and supporting land use intensification and reduced roadway rights-of-way from the very onset of development, which promotes the fundamental objective of environmental sustainability.

11.2 TRANSIT SERVICE CONCEPT

11.2.1 INTER-REGIONAL TRANSIT CORRIDORS

The transit network and hierarchy of services in the Town's NOWSP reflect the anticipated intensity and mix of uses in corridors and utilize the continuous and connected grid network of planned roads. At the top of this hierarchy is the GO Rail service, meeting the needs of the inter-regional traveler. Currently focused primarily on the commuter trip to Toronto, increasing levels of service, including reverse flow trips, will make GO Rail an effective choice for a wider range of inter-regional travel, including midday trips, trips to the eastern GTA, as well as Burlington and Hamilton.

GO Transit is continually expanding its inter-regional bus network to serve demands, and expanded services in the Highway 407 and Highway 403 corridors will eventually lead to the development of bus rapid transit (BRT) services with high-frequency connections to the rest of the GTA.

In addition, there is a 407 GO bus service that currently serves a park and ride stop at the Highway 407 interchange with Bronte Road. In the future, the planned Highway 407 Transitway along the south side of the existing Highway 407 will provide high-frequency BRT adjacent to the property. As part of the development of the Highway 407 Transitway, a planned Transitway station is to be located in the southeast quadrant of Highway 407 and Bronte Road, in close proximity of the property. It is anticipated that GO Transit and Oakville Transit routes will serve this terminal.

11.2.2 TOWN SERVICES

Within Oakville, future transit services are designed to be implemented in two layers: corridor services, comprising Primary and Secondary Corridors, and Community Services. These transit services are intended to provide connections to terminals, major destinations, and neighbourhoods. This is intended to make travel by transit convenient and attractive and thus maximize the ability of residents and employees to use transit. Corridor services provide the basic grid of the service, including inter-municipal connections and connections to the inter-regional network of transit services. Primary and secondary corridors are distinguished by the level of service they offer.

Primary Transit Corridors

Primary Transit Corridor services provide high-frequency service connections within Oakville, as well as inter-municipal connections and connections to the inter-regional network of services. Transit service in the Primary Transit Corridors is ultimately expected to operate in the range of 2 to 5 minutes, with initial service frequencies of 3 to 10 minutes. To ensure that services in these Primary Corridors operate with minimum delay, additional infrastructure will be used to provide transit priority. This will include Reserved Bus Lanes (RBL) and High Occupancy Vehicle (HOV) lanes and transit priority measures at intersections, including possible signal priority measures and queue-jump lanes.

Dundas Street within the Town is identified as a Primary Transit Corridor and is identified in the Metrolinx 15-year plan as a potential rapid transit corridor. Dundas Street is envisioned to transform over time from the introduction of HOV lanes to RBLs, ultimately. In accordance with the Oakville Transit's current Service Design Standards, minimum peak service frequency is anticipated to be in the range of 10 to 20 minutes.

Secondary Transit Corridors

Secondary Transit Corridors are similar to the Primary Transit Corridors in that they provide a high level of service, operate on the grid network of streets and provide cross-boundary connections. Ultimately, Secondary Corridors are expected to have service levels in the 10 to 15-minute range.

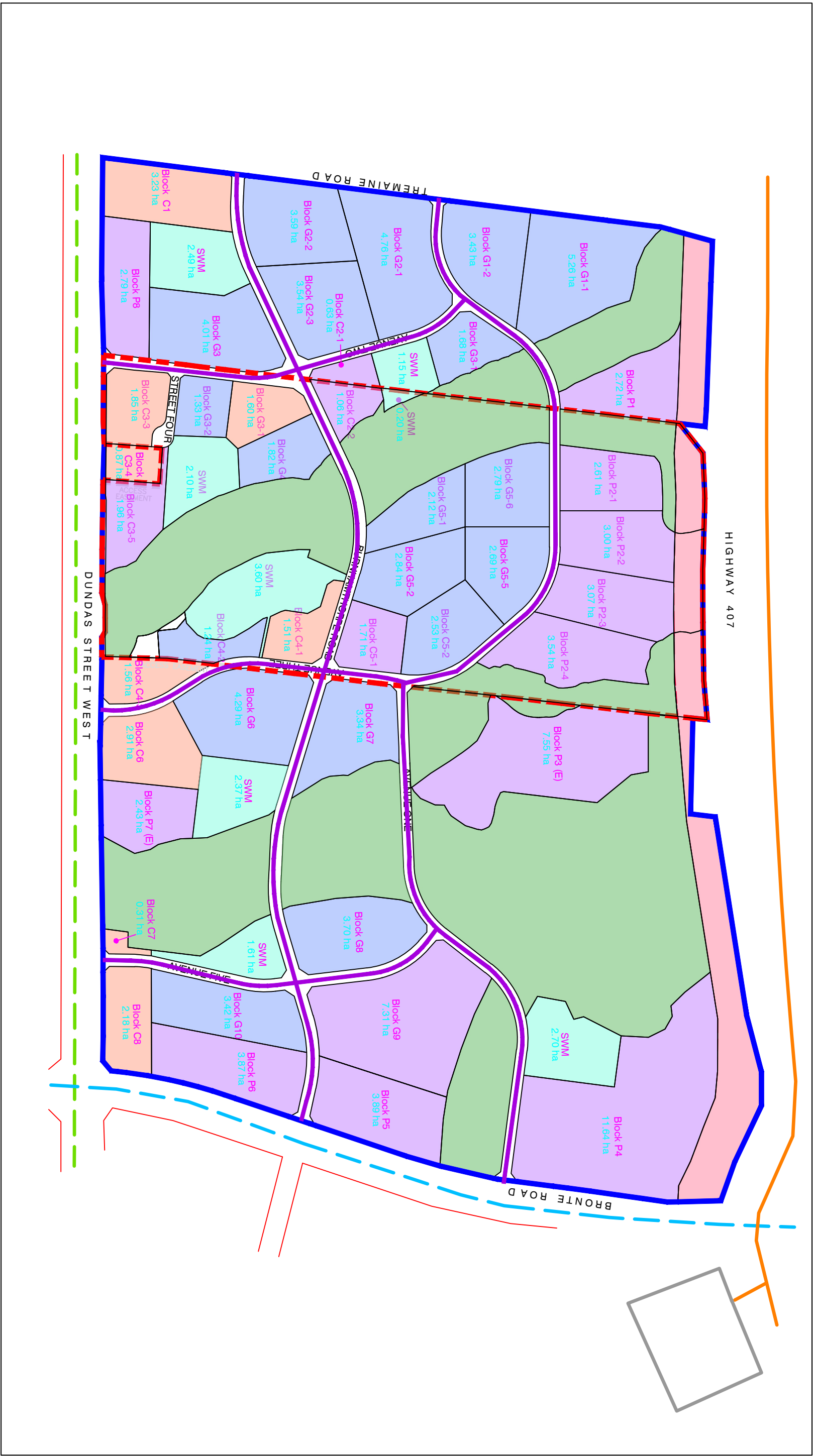
In the vicinity of the proposed development, Bronte Road and Burnhamthorpe Road, east of Bronte Road, are identified as Secondary Transit Corridors. In accordance with the Oakville Transit's current Service Design Standards, minimum peak service frequency is anticipated to be in the range of 20 to 40 minutes.

In addition to planned service levels, the Town's standard designs for transit streets - Arterials, Avenues and Connectors - have been developed specifically to accommodate the function and frequency of the transit service that is planned. Therefore, planned roadway facilities in these corridors appropriately reflect the anticipated transit types and service levels in the corridors.

Community Services

Community, or local, services are planned to operate on the interconnected and continuous grid network of planned roads. Local services provide the highest degree of local access. Routes are expected to operate at levels of service between 15 and 30 minutes. These routes are intended to provide direct access to lower demand areas, and are expected to operate on the network of arterial, avenue and connector roads. Riders will use these routes to access local destinations and as connections to the corridor routes for longer distance trips.

Within the subject property, Burnhamthorpe Road and Avenue One, between Bronte Road and Tremaine Road, and Avenue Two, Avenue Three and Avenue Five, between Dundas Street and Avenue One, are intended to accommodate Community Services in accordance with the NOWSP. In accordance with the Oakville Transit's current Service Design Standards, minimum peak service frequency is anticipated to be in the range of 20 to 60 minutes. The proposed transit services serving the subject property are shown in **Figure 11-1**.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

NTS



-
- Community Service
- Primary Transit Service Corridor
- Secondary Transit Service Corridor
- Inter-Regional Transit Service Corridor
- Potential Highway 407 Transit Terminal
- 407 West Area Employment Lands
- Subject Property

Figure 11-1
Transit Corridors

11.3 TRANSIT INFRASTRUCTURE REQUIREMENTS

The proposed avenue roadways within the subject property are to be designed in accordance with the Town's Standard right-of-way for an Avenue/Transit Corridor (22.0 m ROW) - Employment Area, as detailed in Section 10.0. The Town standard is designed to accommodate transit service, and comprises a 3.75m travel lane and a 2.5m curb-side parking lane in each direction, for a total pavement width of 12.5m.

It is anticipated that on-street parking will be prohibited in proximity of intersections to accommodate transit stops.

Intersection curb radii are to be designed to accommodate transit vehicles, as well as heavy trucks, while recognizing objectives related to increased walking and cycling and safety. Consistent with the Oakville Transit Service Guidelines, no additional transit infrastructure improvements or enhancements (beyond the planned Dundas Street HOV/BRT) are deemed to be necessary in the Study Area.

The road network in the 407 West Employment Lands area is consistent with the road network planned for the NOWSP area, and reflects the principles of continuity and connectivity of roads, which is a key element in implementing efficient and effective transit services in the NOWSP area.

As a general guideline, roadway infrastructure requirements for the hierarchy of transit services in and adjacent to the subject property are considered for implementation, as outlined in **Table 11-1**.

Table 11-1 – Typical Service and Technology Levels

TRANSIT SERVICE TYPE	COMBINED HEADWAY*	ROAD INFRASTRUCTURE REQUIREMENT
Community Service	15 to 30 minutes	Not typically
Secondary Transit Corridor	10 to 15 minutes	Transit priorities at congested areas
Primary Transit Corridor	3 to 10 minutes 2 to 5 minutes	HOV lanes Reserved Bus Lanes
Inter-regional Transit Corridor	less than 3 minutes	Separate ROW

* Combined headway is defined as the average time between all scheduled bus services in the corridor.

At service levels consistent with the current Oakville Transit Service Design Standards, transit infrastructure improvements or enhancements are not warranted for the roadways in or adjacent to the subject property. As previously identified, Dundas Street is envisioned to transform over time from the introduction of HOV lanes to Reserved Bus Lanes in its ultimate configuration.

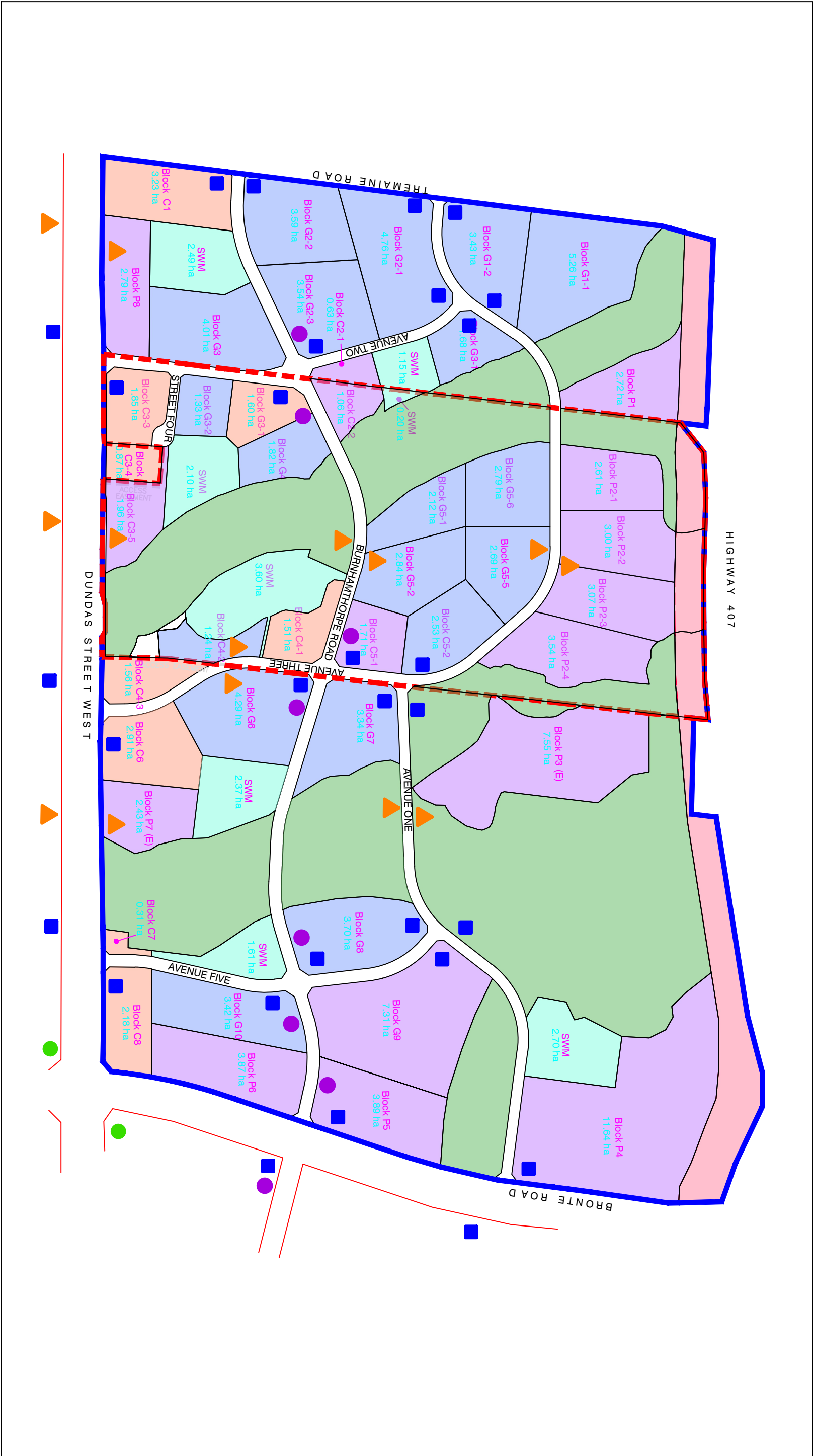
11.4 BUS STOPS AND PASSENGER AMENITIES

Passenger amenities are to be based upon the needs and volumes of passengers at each stop type and location in accordance with the approved Oakville Transit Service Design Standards and direction provided by the Town's North Oakville Secondary Plan, Transit Plan, August 2009.

Passenger amenities are to be placed with consideration to the pedestrian circulation and an unobstructed landing pad to ensure that ramps can be deployed for accessibility at stops.

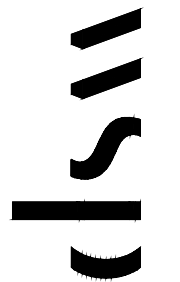
In accordance with the North Oakville Secondary Plan Transit Plan guidelines, bus stops are to be located so that all employees are generally within 400 metres walking distance of a bus stop. To achieve this goal, bus stops are to have a maximum spacing of approximately 250 metres along a transit route.

Figure 11-2 shows the proposed location of bus stops, by type within the subject property and adjacent lands in the NOWSP area. The location of bus stops is generally consistent with the objective of achieving a maximum spacing of 250m along transit routes. The bus stop types shown in have been established based on the Town's bus stop types and warrants for bus stop amenities, as presented in the North Oakville Secondary Plan Transit Plan.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

NTS



- Stop A Far-Side
- Stop A Near-Side
- Stop D Mid-Block
- Transit Node

- 407 West Area Employment Lands
- Subject Property

Figure 11-2
Transit Stop Locations
Lazy Pat Farms Property Transportation Study

Table 11-2 presents the warrants for the proposed bus stop locations within the subject property and adjacent lands in the NOWSP area.

Where appropriate, consideration has been given to locating bus stops on the near side of intersections to minimize interference to roadway operations when traffic is heavy on the far side of the intersection. With near-side bus stop locations, buses can service passengers while stopped at a red light and drivers will have an opportunity to look for on-coming traffic, including other buses that may have passengers loading and unloading. Relative to near-side stop locations, far-side stop locations may increase the potential for rear-end accidents, since drivers often do not anticipate buses stopping after having just proceeded through the intersection. Where there is potential for high volumes of right-turn traffic at an intersection and/or for multi-lane roads where there is sufficient opportunity for vehicles to pass a stopped bus without substantial impedence, a far-side stop location may be preferred due to the improved driver sightlines that this typically creates.

The Street Four roadway is not proposed to have transit facilities implemented along the route. Additionally, no transit stops are planned at the intersection of Street Four at Avenue Two as the intersection is located between transit stops to the north and south along Avenue Two, meeting the 400m spacing requirement between the proposed employment lands and transit facilities, previously mentioned.

Table 11-2 - Warrants for Bus Stop Locations and Passenger Amenities

		Boarding/Transfer	Mobility Needs	Activity	Exposure	Wait Time	Request	Total	Stop Type	Intersection Location
Dundas Street	intersection with Bronte Rd	10	0	0	3	0	0	13	Transit Node	Near-side
	intersection with Avenue	10	0	0	3	0	0	13	Stop A	Near-side
	mid-block	0	0	0	3	0	0	3	Stop D	Mid-block
Bronte Road	intersection with Dundas St	10	0	0	3	2	0	15	Transit Node	Far-side
	intersection with Burnhamthorpe Rd	10	0	0	3	2	0	15	Stop A	Near-side
	intersection with Avenue	10	0	0	3	2	0	15	Stop A	Near-side
Burnhamthorpe Road	mid-block	0	0	0	3	2	0	5	Stop D	Mid-block
	intersection with Bronte Rd	10	0	0	3	2	0	15	Stop A	Far-side
	intersection with Tremaine Rd	10	0	0	3	2	0	15	Stop A	Near-side
Tremaine Road	intersection with Avenue	10	0	0	3	2	0	15	Stop A	Far-side
	mid-block	0	0	0	3	2	0	5	Stop D	Mid-block
Avenues	intersection with Dundas St	10	0	0	3	2	0	15	Stop A	Far-side
	intersection with Burnhamthorpe Rd	10	0	0	3	2	0	15	Stop A	Near-side
	intersection with Avenue	10	0	0	3	2	0	15	Stop A	Near-side
Avenues	mid-block	0	0	0	3	2	0	5	Stop D	Mid-block
	intersection with Dundas St	10	0	0	0	2	0	12	Stop A	Far-side
	intersection with Bronte Rd	10	0	0	0	2	0	12	Stop A	Far-side
Avenues	intersection with Tremaine Rd	10	0	0	0	2	0	12	Stop A	Near-side
	intersection with Burnhamthorpe Rd	10	0	0	0	2	0	12	Stop A	Near-side
	intersection with Avenue	10	0	0	0	2	0	12	Stop A	Near-side
Avenues	mid-block	0	0	0	0	2	0	2	Stop D	Mid-block

In addition to these important considerations, the proposed locations also take into account the anticipated primary flow of passenger transfers at the proposed locations and the desire to locate stops in the same quadrant of the intersection to reduce walking distances for passengers that are transferring between routes.

It is noted that the different treatment between Burnhamthorpe Road and Avenue One is based on different expectations with respect to potential function and character of the roads, traffic volumes, and turning movements. As a continuous roadway connection across North Oakville, Burnhamthorpe Road is expected to serve a regional function, in addition to supporting area development. This, in part, is expected to result in higher traffic volumes and intersection turning movements along Burnhamthorpe Road relative to Avenue One. Based on this expectation, it is considered desirable to plan for far-side bus stop locations, so potential high volumes of right-turn movements will not be obstructed by stopped transit vehicles.

Sufficient right-of-way is to be provided at all stop locations to accommodate the required bus stop amenities.

11.5 TRANSIT MARKET POTENTIAL

Figure 11-2 above illustrates the transit service coverage within the subject property and adjacent lands in the NOWSP area, based on the anticipated transit corridors and proposed bus stop locations. It is evident from the figure that the vast majority of future employees within the subject property and adjacent lands in the NOWSP area will be within a convenient and comfortable walk of transit service.

Based on trip generation completed for the subject lands and surrounding remainder of the 407 Employment Lands, WSP derived projected transit trips for the study area. The transit trips were derived using the projected mode split for the 2030 horizon year as per the Town of Oakville Switching Gears Transportation Master Plan (February 2013), projecting a transit mode split of 20%, and using the existing auto-driver mode split of 64% per the 2016 TTS Data.

Using the above noted methodology, approximately 2,000 transit trips during both the AM and PM peak hours are projected to be generated from the 407 Employment Lands and subject property. Therefore, implementation of transit within the NOWSP at the level illustrated in **Figure 11-2** is projected to be beneficial in accommodating transit trips and encourage commuters that would otherwise be expected to use private automobiles for travel.

11.6 IMPLEMENTATION

It is anticipated that local transit service can be provided to the subject property either as extensions of existing routes or through the creation of new routes, in accordance with existing Oakville Transit Service Design Standards. The determination of future transit routing and service levels would be at the discretion of Oakville Transit.

It is anticipated that services will be phased in over time, so that initial services are convenient and timely, but cost-effective to deliver. As previously noted, the subject property is served by Oakville Transit Route 33. This route currently loops around Colonel William Parkway and Bronte Road at the west tip of the route. It is possible that this existing transit route could be modified and extended to the subject property (at least initially) as a way to introduce service at levels similar to the existing Route 33 service frequencies. These initial transit services could then be intensified as demand grows to establish regularly scheduled local routes consistent with the NOWSP policies and Oakville Transit Service Design Standards.

Actual service levels and the number of buses required will be dependent on available resources, service standards and policies at the time of implementation, and matching service levels with demand. Any details with respect to availability of transit capacity, passenger counts, delays on transit operations, the need for relocation of existing facilities, and so forth, would be established later in the planning process. It is anticipated that transit implementation will be reviewed in more detail and the appropriate services will be implemented by Oakville Transit, based on the Oakville Transit Service Design Guidelines, when appropriate.

12 ACTIVE TRANSPORTATION NETWORK

The Town of Oakville Active Transportation Master Plan (ATMP), November 2017, recommends a convenient and continuous pedestrian and cycling network that minimizes risk to users and is integrated with other facilities (Regional, bordering municipalities, transit, end of trip, etc.). The ATMP is in line with the North Oakville Trails Plan, May 2013, with a cycling/trail system designed specifically for the communities north of Dundas Street, including the NOWSP area.

The North Oakville Trails Plan has five objectives:

Provide Connections between Neighbourhoods and Different Land Uses, and Provide Links to Schools and Parks: The Plan will assist in making connections between land uses, such as residential and employment areas. The network should include limited connections through the Natural Heritage System. It should also create connections to the developed lands south of Dundas Street.

Support Connections to Major Transit Stations and Transportation Hubs: The Plan should support north Oakville's transit-first approach. It will assist in promoting connections to transit stations and transportation hubs, and reduce the demand for parking requirements. These areas will provide adequate provision of bicycle storage facilities to encourage the use of the trails plan network.

Suitable for a Variety of Users: The Plan will provide a level of comfort, safety, and interest to encourage walking and cycling from a variety of users.

Encourage Alternative Modes of Transportation: The Plan will decrease the dependence on the private automobile and encourage cycling and walking as a mode of utilitarian transportation. The Plan will provide additional opportunities to active transportation users to travel throughout north Oakville.

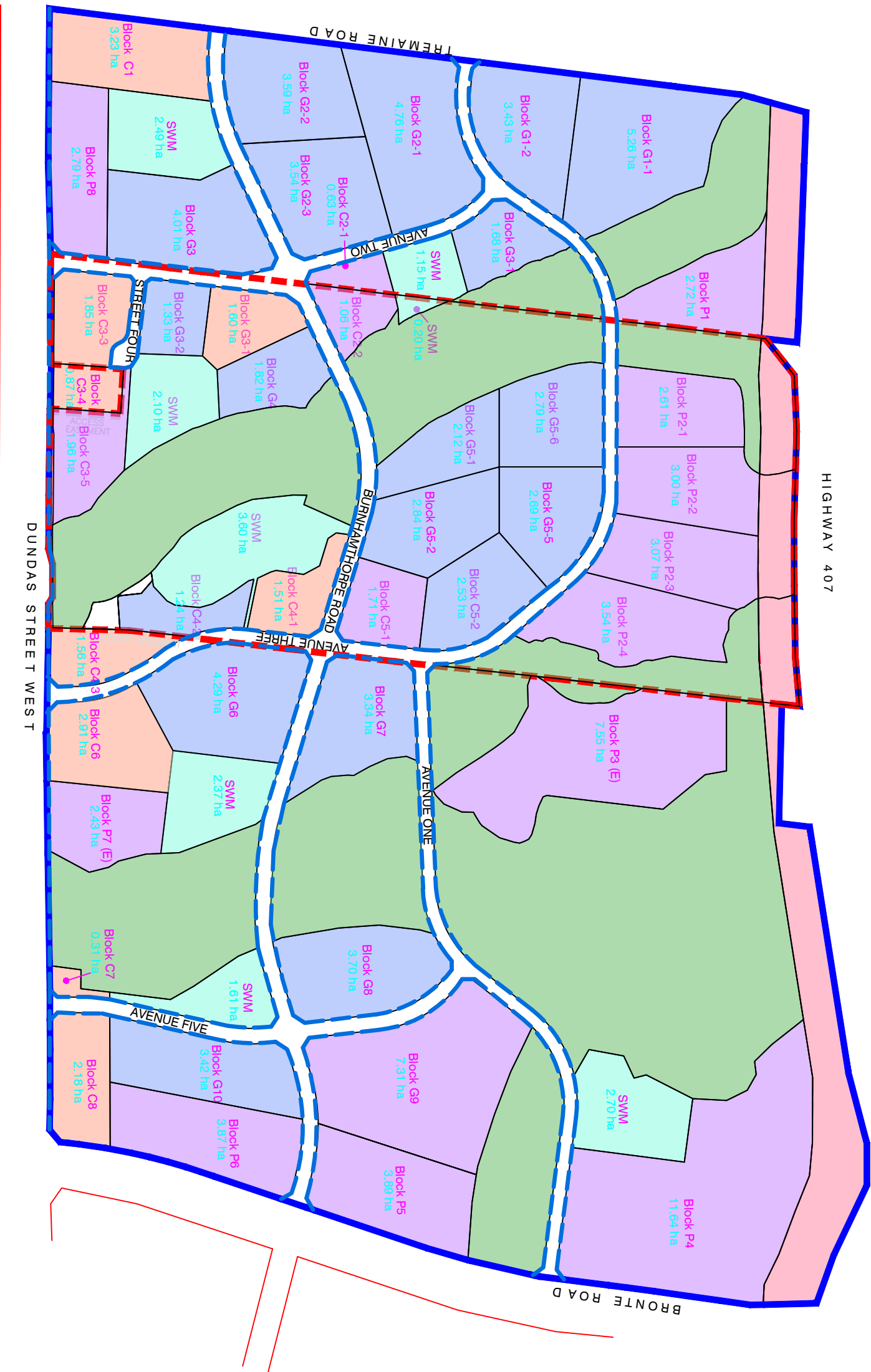
Limit the Impacts to the Natural Heritage System: The Plan will provide a cohesive system of links and connections that will discourage the creation of unauthorized trails within the Natural Heritage System.

With these objectives in mind and based on the proposed network of pedestrian and cycling facilities in the ATMP and North Oakville Trails Plan, a Pedestrian Circulation Plan and Cycling and Trails Network is proposed for the subject property and adjacent lands in the NOWSP area.

12.1 PEDESTRIAN CIRCULATION PLAN

The Pedestrian Circulation Plan is shown in **Figure 12-1**. The proposed plan provides an extensive, fully connected network of sidewalks throughout the planned employment area, comprising 1.5m-wide sidewalks on both sides of all Avenues within the subject property and adjacent lands in the NOWSP area. The sidewalks are proposed to be provided and located in accordance with the Town's typical cross-section for each roadway, as detailed in Section 10.0.

It is anticipated that marked pedestrian crossings will be provided at signalized intersections within the subject property and adjacent lands in the NOWSP area. Where applicable, pedestrian crossings are to be designed and implemented in accordance with Town or Region engineering design practices.



Source: Bentall-Concept-180717-INTERNAL.dwg, February 08, 2019

NTS



----- Pedestrian Circulation Path

407 West Area Employment Lands
Subject Property

Figure 12-1
Pedestrian Circulation Plan
Lazy Pat Farms Property Transportation Study

12.2 CYCLING FACILITIES

The Cycling and Trails Network is shown in **Figure 12-2**. Bicycles are designated as a vehicle under the Highway Traffic Act (HTA) and as such are required to obey all of the same rules and regulations as automobiles when being operated on a public roadway. The cycling routes proposed as part of the Town's North Oakville Trail Plans network comprise several facility types, each with its own set of minimum design parameters. These are generally consistent with the Ministry of Transportation (MTO) and the Transportation Association of Canada (TAC) guidelines for the design of on-road facilities and standards for signing the on-road cycling system.

The cycling component of the Town's North Oakville Trails Plan network for the 407 West Employment Lands consists of multi-use trails and signed bike routes. For roadways labelled as Regional Bicycle Facility in the North Oakville Trails Plan, the type of bicycle facility was determined per the Halton Region Active Transportation Master Plan as follows:

- Bike lanes on Bronte Road, along with multi-use trail located within the boulevard;
- Bike lanes on Dundas Street, along with multi-use trail located within the boulevard; and
- Bike lanes on Tremaine Road, along with multi-use trail located within the boulevard.

Within the subject property and adjacent lands within the NOWSP area, all bicycle facilities are proposed to be on-road signed bicycle routes.

The purpose of designating a signed only bicycle route is to promote a road for cycling because it is deemed to be well suited for cycling; it may provide an important connection between destinations, or it is a preferred route identified by cyclists. In the case of signed on-road bicycle routes, the travel lane is shared by motorists and cyclists. These are roads where traffic volumes and vehicle speeds are relatively low. Under these conditions, cyclists can share the road with motor vehicles and there is no need to create a designated space for cyclists. Bicycle route marker signs located at intersections and at regular intervals aid users with wayfinding.

The right-of-way planned for the proposed Burnhamthorpe Road extension between Bronte Road and Tremaine Road (as detailed in Section 10.0) is based on the North Oakville Urban Design and Open Space Guidelines (2009) and accommodates bike lanes. However, the ATMP (2017) proposes on-road signed bicycle routes along the aforementioned section of Burnhamthorpe Road. As such, WSP assumed that on-road signed bicycle routes are proposed along all internal study roadways within the 407 Employment Lands. The proposed bicycle facilities provide connections to the existing and planned bicycle facilities located along the boundary road network.

It is anticipated that bicycle facilities crossing the Regional boundary roads will be provided at signalized intersections, and where applicable, these crossings are to be designed and implemented in accordance with recommendations of the Town's Active Transportation Master Plan, 2017, and North Oakville Trails Plan, 2013. The type of on-road bicycle facility proposed within the study area in the North Oakville Trails Plan, May 2013 is described as Signed Bicycle Routes.

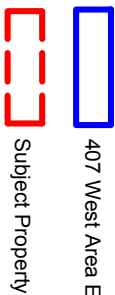
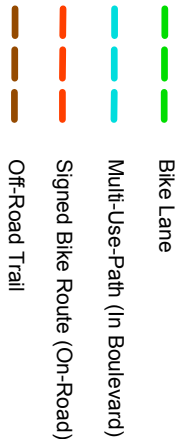


Figure 12-2
Active Transportation Master Plan Cycling and
Trail Network
Lazy Pat Farms Property Transportation Study

12.3 OFF-ROAD TRAILS

The development proposal outlines the proposed natural heritage and open space system based on the Town's North Oakville Trails Plan and NOWSP Transportation Plan. The central open space system and adjacent stormwater management will accommodate pedestrian trails and passive recreational uses, integrated with the adjacent employment development. As shown in **Figure 12-2**, off-road trails are proposed around the Zenon Woodlot/Core area, located east to the subject property, as detailed in the ATMP.

Off-Road Trails are soft surface pathways used primarily by pedestrians, although cycling is not restricted. Off-Road trails will be typically 2.1 – 2.4 metres wide, with a compacted limestone screenings surface, and asphalt paving on slopes greater than 5 percent. Signage should be provided for recreational cyclists and pedestrians. Major trails within the NHS will not receive regular winter maintenance.

13 SUMMARY AND CONCLUSIONS

This Transportation Impact Study addresses the impacts of the proposed phased development (located in the 407 West Employment Area) on the boundary roadway intersections in the vicinity of the property. The subject property is located mid-block between Bronte Road and Tremaine Road, and bounded by Dundas Street West to the south.

The proposed development is expected to generate the following number of vehicle trips under the 2025 and 2030 horizon years:

- 2025 Horizon Year
 - AM Peak Hour – 850 inbound trips and 193 outbound trips
 - PM Peak Hour – 335 inbound trips and 841 outbound trips
- 2030 Horizon Year
 - AM Peak Hour – 1697 inbound trips and 320 outbound trips
 - PM Peak Hour – 536 inbound trips and 1538 outbound trips

Under the 2025 horizon year, the majority of the study intersections are projected to operate below capacity, with the exception of Dundas Street West at Bronte Road projected to operate over capacity during the study periods. Under the 2030 horizon year, the majority of the study intersections are projected to operate below capacity as well. Select intersections and turning movements are projected to operate above capacity. However, WSP is of the opinion that the projected traffic operations under the 2030 horizon years would operate with lower delay and better LOS as commuters travelling through the study area would change their travel patterns over time to avoid areas of heavy congestion.

The study methodology requested by the reviewing agencies is typical for shorter horizon years and when there are no significant changes in the transportation system; however, the 2030 horizon year is 10 years into the future compared to 2020 existing conditions (derived based on 2018 survey data). Therefore, changes in travel patterns accounting for the planned roadway network connections developed as part of the North Oakville Secondary Plan, as well as any decrease in traffic volumes caused to the planned increase in transit facilities along Dundas Street West and Highway 407, are not captured by the study methodology. As such, WSP completed a sensitivity analysis to determine the traffic volume reduction within the study area that would achieve optimized traffic operations for the study intersections, as detailed within Section 9.0 of this report. Results show that, per the sensitivity analysis, study intersections are projected to operate at acceptable levels of service under the Phase 2 (2030) future total conditions.

For the scenario where Avenue One would not have creek crossings (Phase 2A), the study intersection of Bronte Road at William Halton Parkway/Burnhamthorpe Road is projected to operate over capacity due to the changes in traffic patterns created by removing the crossings.

As part of the traffic operations assessment, various road improvements have been identified as being needed to accommodate the forecasted growth in background traffic, unrelated to the property. These include:

- Addition of a westbound exclusive right-turn lane and conversion of the existing single southbound left-turn lane to dual left-turn lanes at the Dundas Street West and Bronte Road intersection for the 2025 horizon year.
- Channelization of the southbound right-turn lane configuration, with the southbound right-turn traffic operating under free flow operations at the Dundas Street West and Tremaine Road intersection for the 2025 horizon year.
- Conversion of the existing two eastbound left-turn lanes to a left-turn eastbound lane and a shared left/right-turn eastbound lane at the Bronte Road and Highway 407 Eastbound Off-Ramp intersection for the 2030 horizon year.

In addition to the above-listed recommendations, additional roadway improvements have been recommended for the scenario where Avenue One is not continuous (Phase 2A):

- Conversion of the single southbound left-turn lane to dual left-turn lanes at the intersection of Avenue Three at Burnhamthorpe Road.
- Conversion of the exclusive eastbound right-turn lane to a channelized turning lane operating under free flow conditions at the intersection of Bronte Road at Burnhamthorpe Road.

A network of transit, cycling and pedestrian facilities is planned for the subject property, with connections to future planned facilities within the rest of the NOWSP area and the Town. Facilities are intended to be located and designed in accordance with Town guidelines and standards.

Based on the study findings, it is concluded that the boundary road network could accommodate the additional traffic generated by the proposed development should changes in traffic patterns associated with the implementation of the North Oakville roadway network, and the reduction in traffic volumes associated with increased transit facilities along the Dundas Street West, Highway 407 and the 407 Employment Lands, yield a reduction in traffic volumes equivalent to the sensitivity analysis completed within this study for the study area intersections.

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APPENDIX

A

APRIL 2020

COMMENTS AND
CORRESPONDANCE

From: Kammah, Nawfal
Sent: July 9, 2020 1:59 PM
To: Clarke Robinson, Rebekah
Subject: FW: 24T-11001, Z.1333.01, Quadreal - Comment Response Table (Transportation)

From: Dalrymple, Melissa <Melissa.Dalrymple@halton.ca>
Sent: Friday, June 19, 2020 9:30 AM
To: Tannahill, Rebecca <Rebecca.Tannahill@wsp.com>
Cc: Krusto, Matt <Matt.Krusto@halton.ca>; Clackett, Robert <Robert.Clackett@halton.ca>
Subject: 24T-11001, Z.1333.01, Quadreal - Comment Response Table (Transportation)

Good morning Rebecca,

Based on our review, we can provide the following clarification:

WSP: The existing base 2018 traffic volumes were confirmed with the Region in the TOR at the start of the study. The typical process for a TIS is to use the data that was available at the time of preparing the TIS and not updating it each time another year passes during the process of addressing comments. Furthermore, updating the base year traffic from 2018 to 2020 would not impact the future traffic forecast and resulting recommendations as we would use the same growth rates. It is our opinion that that the base year traffic volumes does not need to be updated.

Halton: 2 years have passed and we are asking for growth rates to be applied, not new counts. It is an easy ask to ensure a TIS submitted mid-year 2020 uses 2020 as the base year.

WSP:

WSP proposes to update the traffic forecast to 2025 and 2030. The forecasted years would be consistent with the Region's TIS guidelines (5 and 10 years from the date of the TIS or in this case from the date of the response to comments). As mentioned in the above response, it is our opinion that that the base year traffic volumes does not need to be updated.

Halton: ok for years 2025 and 2030. Base year counts must be 2020 as noted above.

WSP:

As mentioned in the above responses, WSP proposes to update the traffic forecast to 2025 and 2030 and it is our opinion that that the base year traffic volumes does not need to be updated. The analysis results of 2025 background and 2025 total traffic (with Phase 1 development) conditions would change as a result of the revised horizon year and capital works timing as the 2018 TIS did not include the Dundas Street and Tremaine Road widening in the 2021 analysis for Phase 1. The analysis results of 2030 background and 2030 total traffic is anticipated to be similar to the 2031 conditions reported in the 2031 TIS with the exception that the traffic growth will be applied for one year less and the site pass-by trips in the PM peak hour will be correctly accounted for.

We propose to include a response to comments report with relevant traffic volume figures, proposed lane configuration figures, Synchro results and appendices, etc., not a full TIS resubmission.

Halton: Due to the duration of the development file life, various submissions and correspondence over the years, a full TIS resubmission is required.

Thanks,

Matt

Matt Krusto

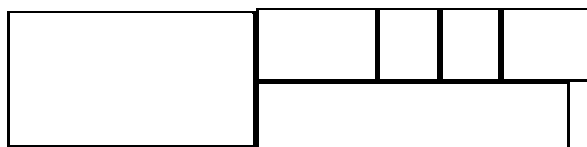
Transportation Planning Coordinator

Infrastructure Planning & Policy

Public Works

Halton Region

905-825-6000, ext. 7225 | 1-866-442-5866



From: Tannahill, Rebecca [<mailto:Rebecca.Tannahill@wsp.com>]

Sent: Tuesday, June 16, 2020 2:38 PM

To: Dalrymple, Melissa <Melissa.Dalrymple@halton.ca>

Cc: Clackett, Robert <Robert.Clackett@halton.ca>; Krusto, Matt <Matt.Krusto@halton.ca>; Karapalevski, Tommy <Tommy.Karapalevski@wsp.com>; Lukezic, Dave <David.Lukezic@wsp.com>; Kelly, Craig <Craig.Kelly@wsp.com>

Subject: RE: 24T-11001, Z.1333.01, Quadreal - Comment Response Table (Transportation)

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If you are unsure or need assistance please contact the IT Service Desk.

Hi Melissa,

There are a couple of items that require further clarification. Please see below.

Comment: Horizon Year Selection: Either confirm year 2017 traffic volumes were used as base year volumes (as discussed & agreed upon with Halton Region) or, adjust horizon years to 2022 and 2032 in order to comply with the Halton's TIS Guidelines;

WSP: The existing traffic volumes used in the study are based on surveys commissioned at the intersections in December of 2018, which were then modified at select turning movements based on correspondence with Region's staff (using historical traffic volumes from 2017). The above noted procedure, as well as the confirmation of study horizon years to 2021 (Phase 1 full build-out) and 2031

(10-year past full build-out), was discussed and approved by Region staff as part of our Terms of Reference (TOR) correspondence. The email from the Region dated December 7, 2018 confirmed the horizon years for the study, while the email dated January 15, 2019 confirmed the adjusted 2018 traffic volumes for the study.

Halton: Noted. Please ensure growth rates are applied (if/where appropriate) to previous turning movement counts to get accurate 2020 base year traffic volumes.

WSP: The existing base 2018 traffic volumes were confirmed with the Region in the TOR at the start of the study. The typical process for a TIS is to use the data that was available at the time of preparing the TIS and not updating it each time another year passes during the process of addressing comments. Furthermore, updating the base year traffic from 2018 to 2020 would not impact the future traffic forecast and resulting recommendations as we would use the same growth rates. It is our opinion that the base year traffic volumes does not need to be updated.

Comment: Future Background Conditions: Conduct analyses for future background traffic scenarios including the Dundas Street West widening and additional intersection improvements, in order to assess: the impacts of the site-generated traffic on the road network; and the effectiveness of any recommended improvements. Furthermore, remedial measures should be recommended for any movements with high v/c ratios, LOS, or delays;

WSP: WSP will assess the following 4 intersections along Dundas Street under 2021 future background conditions with recommendations assuming the Dundas Street Widening is in place per the comment:

- Dundas Street at Tremaine Road
- Dundas Street at Colonel William Parkway
- Dundas Street at Valleyridge Drive
- Dundas Street at Bronte Road

A comparison of this new analysis with the forecasted traffic operations of 2021 future total conditions with the widening will also be completed in order to identify the impacts of the proposed development on the four intersections.

Halton: Noted and agreed. Please adjust all analysis years in the updated study, starting with 2020 as the base analysis year.

WSP:

WSP proposes to update the traffic forecast to 2025 and 2030. The forecasted years would be consistent with the Region's TIS guidelines (5 and 10 years from the date of the TIS or in this case from the date of the response to comments). As mentioned in the above response, it is our opinion that the base year traffic volumes does not need to be updated.

Comment: Halton's Capital Implementation Plan (2017 – 2031):

WSP: Acknowledged

Halton: WSP must use the updated capital works timings in the revised TIS, as outlined below.

Halton's updated comments as of June 2020:

-Dundas Street Widening - 4 to 6 lanes from Tremaine Road to Bronte Road – Q2 2022 to Q4 2024
-Dundas Street Widening - 4 to 6 lanes from Tremaine Road to Appleby Line – Q3 2020 to Q3 2023
-Bronte Road - Widening - 4 to 6 lanes from Speers Road to Derry Road -- 2025 to 2027
-William Halton Parkway - 2 to 4 Lanes Widening from Old Bronte Road to Hospital Gate -- Q2 2023 to Q4 2023
-William Halton Parkway -- 4 lanes from Third Line to Neyagawa Boulevard -- Q3 2020 to Q3 2023
-Tremaine Road -- 2 to 4 lane widening from Dundas Street to Lower Base Line -- start of construction 2024

Please ensure growth rates are applied (if/where appropriate) to previous turning movement counts, to get accurate 2020 base year traffic volumes. Also, please adjust all analysis years accordingly, starting with 2020 as the base analysis year.

Any future TIS submission will likely require an additional peer review and an additional round of comments.

WSP:

As mentioned in the above responses, WSP proposes to update the traffic forecast to 2025 and 2030 and it is our opinion that that the base year traffic volumes does not need to be updated. The analysis results of 2025 background and 2025 total traffic (with Phase 1 development) conditions would change as a result of the revised horizon year and capital works timing as the 2018 TIS did not include the Dundas Street and Tremaine Road widening in the 2021 analysis for Phase 1. The analysis results of 2030 background and 2030 total traffic is anticipated to be similar to the 2031 conditions reported in the 2031 TIS with the exception that the traffic growth will be applied for one year less and the site pass-by trips in the PM peak hour will be correctly accounted for.

We propose to include a response to comments report with relevant traffic volume figures, proposed lane configuration figures, Synchro results and appendices, etc., not a full TIS resubmission.

Rebecca Tannahill, MES PL., MCIP, RPP
Senior Planner, PLAUD
T 289-982-4378
C 416-402-1237

***New phone number**

From: Dalrymple, Melissa <Melissa.Dalrymple@halton.ca>
Sent: Tuesday, June 09, 2020 4:51 PM
To: Tannahill, Rebecca <Rebecca.Tannahill@wsp.com>
Cc: Clackett, Robert <Robert.Clackett@halton.ca>; Krusto, Matt <Matt.Krusto@halton.ca>; Karapalevski, Tommy <Tommy.Karapalevski@wsp.com>
Subject: FW: 24T-11001, Z.1333.01, Quadreal - Comment Response Table (Transportation)

Good afternoon Rebecca,

The attached comment response table has been reviewed and is generally acceptable subject to the minor comments below:

Land Dedication:

Dundas Street Right-of-Way Requirements: Acknowledged.

Transportation Impact Study:

Comment: Horizon Year Selection: Either confirm year 2017 traffic volumes were used as base year volumes (as discussed & agreed upon with Halton Region) or, adjust horizon years to 2022 and 2032 in order to comply with the Halton's TIS Guidelines;

WSP: The existing traffic volumes used in the study are based on surveys commissioned at the intersections in December of 2018, which were then modified at select turning movements based on correspondence with Region's staff (using historical traffic volumes from 2017). The above noted procedure, as well as the confirmation of study horizon years to 2021 (Phase 1 full build-out) and 2031 (10-year past full build-out), was discussed and approved by Region staff as part of our Terms of Reference (TOR) correspondence. The email from the Region dated December 7, 2018 confirmed the horizon years for the study, while the email dated January 15, 2019 confirmed the adjusted 2018 traffic volumes for the study.

Halton: Noted. Please ensure growth rates are applied (if/where appropriate) to previous turning movement counts to get accurate 2020 base year traffic volumes.

Comment: Saturation Flows and Peak Hour Factors: WSP should not adjust the saturation flows determined by Synchro to avoid misrepresenting existing intersection operations, and instead should revise the future operational analysis using PHFs obtained from existing counts, or use the Synchro default value of 0.92. Alternatively, the use of a PHF of 1.00 should be discussed and approved by Regional staff;

WSP: Saturation flow rates were modified for the eastbound left-turn at the intersection of Dundas Street at Bronte Road based on surveyed traffic data, for the purpose of calibrating the Synchro model. This is a common procedure applied when the Synchro model predicts movements at an intersection operating over capacity under existing conditions, indicating that existing volumes are not able to travel through the intersection. The volume-to-capacity (v/c) ratio at the select turning movement was calibrated to show it operating at capacity (v/c of 1.0), which does not allocate any available capacity to the movement. WSP confirmed with the Region on January 15, 2020 that if we find that particular movements operate over capacity under existing conditions after we complete the existing Synchro analysis we would complete field observations as per Halton's TIS guidelines. Accordingly, WSP believes that the intersection was calibrated appropriately and suggests not revising the approach in which this was carried over to future conditions.

The Peak Hour Factors of 1.0 were used under all future conditions as a general planning exercise in order to assess the results over the entire hour rather than for a peak 15-minute interval. The use of a PHF of 1.0 under future conditions is the recommended practice accepted by various municipalities (e.g. Peel Region).

It should be noted that a PHF of 1.0 was applied to all intersection turning movements as part of the initial 2011 TIS for the subject lands, the 2013 updated TIS (which provided responses to municipal

comments) and the August 2014 formal response to a peer review of the second submission by CIMA. Halton Region in June of 2018 provided written comments to the Town of Oakville. In these comments, they indicate they are generally satisfied with the August 2014 response report based on a second peer review in September 2015 by CIMA conducted on behalf of both the Town and Region. As part of the 2011 and 2013 studies, a PHF of 1.0 was applied to both existing and future conditions, and for future conditions in the 2014 report (existing was not assessed), as opposed to only future conditions as completed in the 2018 TIS report.

Accordingly, WSP followed a similar methodology in the 2018 study to the previous submissions with which CIMA and the Region were generally satisfied.

Halton: Noted, agreed.

Comment: Analysis Periods: Include analysis for the Saturday peak hour due to its high trip generation (combination of service, retail and office uses);

WSP: Per the 2018 Transportation Study, the overall trip generation for the 407 Employment Lands (i.e. 2031 trip generation) was projected to be 2,017 trips during the AM peak hour and 2,248 trips during the PM peak hour. After review of the trip generation used in the study, WSP noticed that the pass-by trips were mistakenly calculated and underestimated for the PM peak hour. A correct recalculation of the pass-by trips (as 34% of the trip generation) for the commercial lands yields an updated trip generation of 2,074 trips during the PM peak hour for the 2031 horizon year. It is WSP's opinion that the 2018 study does not updating as it provides a more conservative analysis.

WSP completed a trip generation for the Saturday peak hour, which shows that the development would generate a total of 1,107 trips. This represents 53% of the PM peak hour tip generation. Accordingly, it is WSP's opinion that the Saturday peak hour does not need to be modelled as the PM peak hour yields a more conservative assessment. It should be noted that the Saturday peak hour was not assessed as part of the initial 2011 TIS for the subject lands, the 2013 updated TIS (which provided responses to municipal comments) and the August 2014 formal response to a peer review of the second submission by CIMA. Accordingly, when updating the study, WSP followed a similar methodology and did not include the Saturday peak hour. The AM and PM peak hours of analysis were confirmed with Region staff as part of the TOR correspondence. None of the Region's responses on the TOR between December 7, 2018 and January 15, 2019 suggested that Saturday peak hour analysis would be required.

The updated Trip Generation Table for 2031 future conditions (including the Saturday Peak hour) has been included

Notes: Please note that the General Office Trip generation for the Saturday peak hour of generator is based on the ITE 9th Edition Manual in the absence of trip generation rates within the ITE 10th Edition Manual. Additionally, the trip generation for Business Park for the Saturday peak hour is based on the ratio of PM to Saturday trip generation for General Office, which was then applied to the PM peak hour trip generation for Business Park to derive Saturday volumes. This was done as there are no Saturday peak hour of generator for Business Park in either ITE 9th or 10th Edition Manuals.

Halton: Noted, agreed.

Comment: Lane Configuration Diagrams: Confirm that all lane configuration diagrams and Synchro reports are consistent with one another and update them accordingly (example: Figure 5-1 vs. synchro sheets);

WSP: Based on a review of the lane configuration figures and Synchro sheets, the following minor discrepancies were identified:

- The northbound movement at the intersection of William Halton Parkway at Bronte Road was coded as two-through lanes in Synchro rather than one through and one shared through/right-turn lane. However, as the northbound right-turn volumes were coded into the Synchro model, the results would not change should the model be re-run as the right-turning volumes were considered in the analysis. Should the model be updated, only the arrow diagram on the Synchro result sheets would be updated, which is not deemed to be necessary.
- The eastbound approach lane configuration of two through lanes and one shared through/right-turn lane was not illustrated at the intersection of Dundas Street and Valleyridge Drive in Figure 5-1. However, the configuration was properly coded in the Synchro model.

An updated version of Figure 5-1 showing the eastbound approach configuration at the intersection of Dundas Street and Valleyridge Drive is provided

Halton: Noted.

Comment: Background Developments: Include additional area background developments in the background traffic forecasts and revise the analyses accordingly (example: 2478, 2486 & 2490 Old Bronte Road, update analysis to include current Evergreen Development plan (proposed Street A at Dundas Street));

WSP: All background developments were confirmed with Region and Town staff in the TOR at the start of the study. The Region and Town provided their comments on which background developments to include in the study on December 7, 2018. Additionally, we used the latest version of the Evergreen Development Plan that was available at the time of the analysis.

The typical process for a TIS is to include background developments and associated studies that are available at the time of preparing the TIS and not updating it each time a new development or an updated study for a development becomes available. The TIS included background developments in compliance with the agreed upon TOR and it is our opinion that that the study does not need to be updated to include additional ones.

Halton: Noted, agreed.

Comment: Future Through Traffic Growth: Apply an appropriate through traffic growth rate to all corridors under review, or that clarification / rationale be provided as to why only growth rate was applied to Tremaine Road (including any correspondence with Regional Staff approving this approach);

WSP: The Region specifically requested WSP to use a 3% annual growth rate for Tremaine Road, as well as no growth rates applied to the remaining roadways, on December 7, 2018 as part of the TOR correspondence. The growth rates provided by the Region were based on the Halton's EMME model.

Halton: Noted, agreed.

Comment: 2021 Future Total Conditions with Widening: Conduct an analysis using 2022 Future Total volumes with the Dundas Street West widening and recommend remedial measures for any movements with high v/c ratios, LOS, or delays;

WSP: Based on the review of traffic along the boundary road network for the 2022 horizon year (which is a growth of 3% for one additional year along Tremaine Road), there would be a negligible addition of trips compared to the 2021 horizon year (with maximum of 13 trips in one direction of the roadway). As such, it is WSP's opinion that the review of the 2022 future total conditions with widening will yield similar results to that of the 2021 horizon year completed within the study, and is not deemed necessary.

Halton: Noted, agreed.

Comment: Future Background Conditions: Conduct analyses for future background traffic scenarios including the Dundas Street West widening and additional intersection improvements, in order to assess: the impacts of the site-generated traffic on the road network; and the effectiveness of any recommended improvements. Furthermore, remedial measures should be recommended for any movements with high v/c ratios, LOS, or delays;

WSP: WSP will assess the following 4 intersections along Dundas Street under 2021 future background conditions with recommendations assuming the Dundas Street Widening is in place per the comment:

- Dundas Street at Tremaine Road
- Dundas Street at Colonel William Parkway
- Dundas Street at Valleyridge Drive
- Dundas Street at Bronte Road

A comparison of this new analysis with the forecasted traffic operations of 2021 future total conditions with the widening will also be completed in order to identify the impacts of the proposed development on the four intersections.

Halton: Noted and agreed. Please adjust all analysis years in the updated study, starting with 2020 as the base analysis year.

Comment: Redistribution of Traffic Volumes / Sensitivity Analysis: WSP should provide additional justification to support the assumptions used in the sensitivity analysis, in particular relating to the quantitative changes in travel patterns;

WSP: A sensitivity analysis was completed to improve traffic operations as part of the August 2014 formal response to a peer review of the second submission by CIMA. As part of this sensitivity analysis, traffic volumes were reduced by modifying growth rates along select corridors (e.g. 4% to -28% along Dundas Street Eastbound between 2006 and 2031 for the AM peak hour, etc.), for which the study states is in line with the EMMIE model at the time of analysis. Additionally, Synchro parameters were modified to improve traffic operations (e.g. lost time adjustment increased to -4, as well as lane utilization factor changes) and background traffic volumes were reassigned.

Based on the previously completed analysis, WSP applied a similar methodology as part of the 2018 report with which CIMA and the Region were generally satisfied. However, WSP only modified forecasted traffic volumes as part of the sensitivity analysis and maintained all Synchro parameters similar to the projected 2031 future total conditions. As noted in our study, the traffic volume reduction for the 2018 study is because we used the traditional TIS approach, which does not account for redistribution of traffic once a link reaches its capacity. It is our opinion that further quantifying the changes in travel pattern is not necessary.

Halton: Noted, agreed.

Comment: Operational Impacts Resulting from Site Traffic: WSP should explore further recommendations or improvements at the intersection of Dundas Street West and Bronte Road to address the increase in delay due to the impact of the proposed development.

WSP: As part of the study, WSP completed a review of all study intersections and provided remedial measures to improve projected traffic operations. The intersection of Dundas Street and Bronte Road was assessed assuming three through lanes along Bronte Road and Dundas Street, as well as auxiliary turning lanes for both directions on all approaches (including dual left-turn lanes on the northbound and southbound approaches). Based on the proposed lane configuration at the intersection, no additional physical improvements could be recommended without impacting adjacent development lands. Additionally, the intersection cycle length was recommended at 140 seconds, and is not recommended to be increased as a longer cycle length can increase delay. Overall, no additional recommendations could be made to the study intersection.

Halton: Noted.

Comment: Halton's Capital Implementation Plan (2017 – 2031):

WSP: Acknowledged

Halton: WSP must use the updated capital works timings in the revised TIS, as outlined below.

Halton's updated comments as of June 2020:

- Dundas Street Widening - 4 to 6 lanes from Tremaine Road to Bronte Road – Q2 2022 to Q4 2024
- Dundas Street Widening - 4 to 6 lanes from Tremaine Road to Appleby Line – Q3 2020 to Q3 2023
- Bronte Road - Widening - 4 to 6 lanes from Speers Road to Derry Road -- 2025 to 2027
- William Halton Parkway - 2 to 4 Lanes Widening from Old Bronte Road to Hospital Gate -- Q2 2023 to Q4 2023
- William Halton Parkway -- 4 lanes from Third Line to Neyagawa Boulevard -- Q3 2020 to Q3 2023
- Tremaine Road -- 2 to 4 lane widening from Dundas Street to Lower Base Line -- start of construction 2024

Please ensure growth rates are applied (if/where appropriate) to previous turning movement counts, to get accurate 2020 base year traffic volumes. Also, please adjust all analysis years accordingly, starting with 2020 as the base analysis year.

Any future TIS submission will likely require an additional peer review and an additional round of comments.

Please advise if you have any comments or questions.

Thank you
Melissa

Melissa Dalrymple
Senior Planner

Planning Services
Legislative & Planning Services
Halton Region
905-825-6000, ext. 7209 | 1-866-442-5866

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APPENDIX

B TMC AND SURVEYS

APPENDIX

Intersection: Dundas Street at Tremaine Road

Surveyed Counts - 20181211									
AM	Tremaine Road								
	Sbd		Nbd						
	760		512						
	R	T	L						
Dundas Street	Wbd	1243	L	422	38		90	877	Wbd
			T	2153			787		
	Ebd	2575	R					2457	Ebd
Total Volume: 4212									

Surveyed Counts - 20181211

PM	Tremaine Road					2146	Wbd	
	Sbd		Nbd		38			
	504		398					
	R	T	L					
Dundas Street	Wbd	2400	L	222	176	R	1109	Ebd
			T	1035		T		
			R			L		
	Ebd	1257						

Intersection: Dundas Street at Colonel William Parkway

Surveyed Counts - 20181211															
AM	Zenon Drive														
	Sbd		Nbd												
	8		164												
	R		T		L										
Dundas Street	Wbd		908		L	73	42		90						
	T		2036		T	2036			837						
	R								T						
	Ebd		2368						L						
Total Volume: 3594															
					69	L	1	T	164	R		90	R	984	Wbd
					316	Sbd	234	Nbd				57	L	2206	Ebd
					Colonel William Parkway										

Surveyed Counts - 20181211

PM	Zenon Drive								
	Sbd		Nbd						
	1115		6						
	R	T	L						
	56	0	59						
Dundas Street	Wbd	2106	42			3	R	1915	Wbd
	T	998				1812	T		
	R	82				100	L	1117	Ebd
	Ebd					1080			
			238	L	3	60	R		
			182	Sbd	Colonel William Parkway		301	Nbd	

Region Counts - 20170527

AM	Tremaine Road									
	Sbd		Nbd							
	513		343							
	R	T	L							
Dundas Street	Wbd	1122	L	250	38	93	R	910	Wbd	
			T	2584			817	T		
	Ebd	2834	R					L	2792	Ebd
Total Volume: 4257										

Region Counts - 20170527

PM	Tremaine Road																	
	Sbd		Nbd															
	462		420															
	R		T		L													
Dundas Street	Wbld		2360		L		256		38		164		R		2141		Wbld	
	T		1188		T		1977				T		1267		Ebd			
	R																	
	Ebd		1444															

Region Counts - 20170601

AM	Zenon Drive									
	Sbd		Nbd							
	9		135							
	R	2	T	1	L	6				
Dundas Street	Wbd	787	42			67	R	850	Wbd	
		L				66		T	715	T
		T				1985				
	Ebd	2235	R	184			68	L	2173	Ebd
			70	L		2	T		182	R
				253	Sbd			254	Nbd	
				Colonel William Parkway						

Region Counts - 20170601

PM	Zenon Drive								
	Sbd		Nbd						
	165		10						
	R	T	L						
	97	4	64						
Dundas Street	Wbd	2203	42			8	R	1983	Wbd
		L				0			
		T				959	1833	T	
	Ebd	1041				R	82	142	L
		273	2	69					
		L	T	R					
		228 Sbd		344 Nbd					
		Colonel William Parkway							

Intersection: Dundas Street at Tremaine Road

Adjusted WSP counts based on Region's comments											
AM	Tremaine Road										
	Sbd		Nbd								
	550		435								
	R		T		L						
Dundas Street	Wbld	1097	L	345	38			90	R	877	Wbld
	T	2215	T	787				T			
	Ebd	2560	R						L	2455	Ebd
	Total Volume: 3987										

Adjusted WSP counts based on Region's comments

PM	Tremaine Road					2146	Wbd
	Sbd		Nbd		38		
	504		398				
	R	T	L				
Dundas Street	Wbd	2400	L	222	1109	Ebd	
			T	1035			
			R				
	Ebd	1257					

Intersection: Dundas Street at Colonel William Parkway

Adjusted WSP counts based on Region's comments										
AM	Zenon Drive									
	Sbd		Nbd							
	8		164							
	R		T		L					
Dundas Street	Wbld		908		42		90		984	
	T		837							
	Ebd		2368		57		L		2206	
	R		259				Ebd			
					69		1		164	
					L		T		R	
					316		Sbd		234	
					Colonel William Parkway		Nbd			

Adjusted WSP counts based on Region's comments

PM	Zenon Drive										
	Sbd		Nbd								
	1115		6								
	R	T	L								
Dundas Street	Wbd	2106					3	R	1915	Wbd	
			L	0							
			T	998						1812	T
	Ebd	1080	R	82						100	L
			238	L	3	60	R				
			182	Sbd	Colonel William Parkway		301	Nbd			

Intersection: Dundas Street at Valleyridge Drive

Surveyed Counts - 20181211									
AM									
		Sbd	Nbd				Sbd	Nbd	
		0	0				0	0	
Dundas Street	Wbd	1045	T 1995	44		1024 Wbd	991	T	
	Ebd	2093	R 98				33	L	2079 Ebd
		54	L		84	R			
		131		138					
		Sbd	Nbd				Sbd	Nbd	
		Valleyridge Drive							
Total Volume:							3255		

Region Counts - 20170602									
AM									
		Sbd	Nbd				Sbd	Nbd	
		0	0				0	0	
Dundas Street	W/bd	785	T 2505		778 W/bd				
	E/bd	2529	R 24			757	T 21	L 2570	E/bd
		28	L 65	R			45	Sbd 93	Nbd
									Valleyridge Drive
Total Volume: 3400									

Adjusted WSP counts based on Region's comments									
AM									
		Sbd	Nbd				Sbd	Nbd	
		0	0				0	0	
Dundas Street	Wbd	1045	T 2275			1024 Wbd			
	Ebd	2373	R 98				991 T	33 L	2359 Ebd
		54	L		84	R			
		131		138		Sbd		Nbd	
						Valleyridge Drive			
Total Volume: 3535									

Surveyed Counts - 20181211

Surveyed Counts - 20181211									
PM									
		Sbd	Nbd				Sbd	Nbd	
		0	0				0	0	
Dundas Street	Wbd	1914	T 1078		1909 Wbd				
	Ebd	1114	R 36			1865	T 44	L 1103	Ebd
		49	L 25	R			80	Sbd 74	Nbd
									Valleyridge Drive
Total Volume: 3097									

Region Counts - 20170602									
PM									
		Sbd	Nbd				Sbd	Nbd	
		0	0				0	0	
Dundas Street	Wbd	1908	T 1152		1944 Wbd				
	Ebd	1187	R 35			1865	T 79	L 1207	Ebd
		43	L 55	R			114	Sbd 98	Nbd
									Valleyridge Drive
Total Volume: 3229									

Adjusted WSP counts based on Region's comments									
PM									
		Sbd	Nbd				Sbd	Nbd	
		0	0				0	0	
Dundas Street	Wbd	1914	T 1078		1909 Wbd				
	Ebd	1114	R 36			1865 T	44 L	1103 Ebd	
		49	L	25	R				
		80		74	Sbd	Nbd			
		Valleyridge Drive							
Total Volume: 3097									

Intersection: Dundas Street at Bronte Road

Surveyed Counts - 20181211									
AM									
		Bronte Road							
		Sbd	Nbd				Sbd	Nbd	
		1504	1251				1504	1251	
Dundas Street	Wbd	924	L 326	46	T 1103	L 227	204	R 910	Wbd
	Ebd	2264	T 1480						
			R 458				140	L	
							184	L	
							160	R	
							1701	Sbd	
							1065	Nbd	
Total Volume: 5743									

Region Counts - 20170623									
AM									
		Bronte Road		Sbd	Nbd				
			1373	1308	1373				1308
Dundas Street	Wbd	1096	L 261		206 R 969 Wbd				
	Ebd	1907	T 1217			605	T 158	L 1573	Ebd
		429	R 356				123		
							1592	L 1320	R
									Nbd
Total Volume: 5569									

Adjusted WSP counts based on Region's comments									
Bronte Road									
		Sbd	T	Nbd			Sbd	T	Nbd
		1504		1251			1504		1251
Dundas Street	Wbd	930	L 326		204 R 910 Wbd				
	Ebd	2264	T 1480			566	T 140	L 1867	Ebd
		458	R 190				160		
							1701	L 1071	R
									Nbd
Total Volume: 5749									

Surveyed Counts - 20181211

Surveyed Counts - 20181211									
PM									
		Bronte Road							
		Sbd	Nbd				Sbd	Nbd	
		1075	1582				1075	1582	
Dundas Street	Wbd	1807	L 218		160 R 1506 Wbd				
			T 771			1191	T		
	Ebd	1167	R 178			155	L	1111	Ebd
							113		
							925	L 1677	R
									Nbd
Total Volume: 5425									

Region Counts - 20170623									
PM									
		Bronte Road					Bronte Road		
		Sbd	Nbd		Sbd	Nbd			
		1097	1934		1097	1934			
Dundas Street	Wbd	1966	L 232		215 R 1496 Wbd				
	Ebd	1553	T 1135			1143	T 138	L 1505	Ebd
		186	R 614				145		
							987	L 2246	R
									Nbd
Total Volume: 6392									

Adjusted WSP counts based on Region's comments									
PM									
		Bronte Road							
		Sbd	Nbd				Sbd	Nbd	
		1075	1582				1075	1582	
Dundas Street	Wbd	1857	L 218	46	160	R	1506	Wbd	
			T 820		1191	T	1160	Ebd	
	Ebd	1216	R 178		155	L			
							113		
					410	1204			
					L	T	R		
					925	1727			
					Sbd	Nbd			
Total Volume: 5524									

Intersection: Bronte Road at Highway 407 EB Off-Ramp

Surveyed Counts - 20181211

AM	Bronte Road					Hwy 407 EB On-Ramp	
	Sbd 1847		Nbd 1141			Wbd 0	
	R	T 1847	L			R	
	1					T	
Hwy 407 EB Off-Ramp	Wbd 0		1		Ebd 0		
	Ebd 283		974		L		
	L 167	T	R				
	R 116						
1963 Sbd		L	T	974 Nbd			

Total Volume: 3104

Surveyed Counts - 20181211

PM		Bronte Road				Hwy 407 EB On-Ramp	
		Sbd 1060	1		Nbd 1918		
Wbd 0	L 111	R	T 1060	L	R	0	Wbd
Ebd 158	T	1			T	0	Ebd
	R 47	L	1807	R	L		
		1107 Sbd		1807 Nbd			

Total Volume: 3025

Region Counts - 20171113

AM		Bronte Road				Hwy 407 EB On-Ramp	
		Sbd 945		Nbd 738			
		R	T 945	L			
				R	0 Wbd		
Hwy 407 EB Off-Ramp		Wbd 0	L 144	1			
			T				T
		Ebd 248	R 104				L
		L	594 T	R			
		1049 Sbd	594 Nbd				

Total Volume: 1787

Region Counts - 20171113

PM	Bronte Road				Hwy 407 EB On-Ramp
	Sbd	Nbd		0 Wbd	
	624	780			
	R	T	L		
	1				
	L	708	R		0
	652	Sbd	708	Nbd	0 Ebd
					Hwy 407 EB Off-Ramp
					0 Wbd
					0 Ebd

Total Volume: 1432

Intersection: Bronte Road at Highway 407 EB Off-Ramp

Adjusted WSP counts based on Region's comments

[illegible]

Total Volume: 2753

Adjusted WSP counts based on Region's comments

[illegible]

Total Volume: 2543

Dundas St @ Tremaine Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region

Site #: 0000002955

Intersection: Dundas St & Tremaine Rd

TFR File #: 4

Count date: 27-Apr-2017

Weather conditions:

Clear/Dry

Person(s) who counted:

Diane

Armando

** Signalized Intersection **

Major Road: Dundas St runs W/E

North Leg Total: 856

North Entering: 513

North Peds: 0

Peds Cross: $\times$

Heavys 12

2

14

Trucks 3

1

4

Cars 290

205

495

Totals 305

208

Heavys 7

Trucks 6

Cars 330

Totals 343

East Leg Total: 3702

East Entering: 910

East Peds: 0

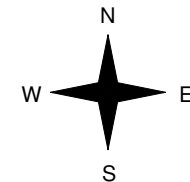
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
53	49	1020	1122



Dundas St

Heavys	Trucks	Cars	Totals
7	5	238	250
43	26	2515	2584
50	31	2753	



Tremaine Rd

Cars	Trucks	Heavys	Totals
92	1	0	93
730	46	41	817
822	47	41	



Dundas St



Cars	Trucks	Heavys	Totals
2720	27	45	2792

Peds Cross: $\times$

West Peds: 0

West Entering: 2834

West Leg Total: 3956

Comments

Dundas St @ Tremaine Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region

Site #: 0000002955

Intersection: Dundas St & Tremaine Rd

TFR File #: 4

Count date: 27-Apr-2017

Weather conditions:

Clear/Dry

Person(s) who counted:

Diane

Armando

** Signalized Intersection **

Major Road: Dundas St runs W/E

North Leg Total: 882

North Entering: 462

North Peds: 0

Peds Cross: $\times$

	Heavys	Trucks	Cars	Totals
North	1	11	371	383
East	0	1	78	79
South	1	12	449	462
West	1	4	415	420

	Heavys	Trucks	Cars	Totals
North	1	4	415	420
East	1	1	0	2
South	0	50	19	59
West	163	1	0	164

East Leg Total: 3408

East Entering: 2141

East Peds: 0

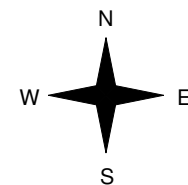
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
20	61	2279	2360



Dundas St

Heavys	Trucks	Cars	Totals
1	3	252	256
28	18	1142	1188
29	21	1394	1444



Tremaine Rd

Cars	Trucks	Heavys	Totals
163	1	0	164
1908	50	19	1977
2071	51	19	2141

Dundas St



Cars	Trucks	Heavys	Totals
1220	19	28	1267

Peds Cross: $\times$

West Peds: 0

West Entering: 1444

West Leg Total: 3804

Comments

Dundas St W @ Zenon Dr

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region

Site #: 0000002956

Intersection: Dundas St W & Zenon Dr

TFR File #: 1

Count date: 1-May-2017

Weather conditions:

Rain

Person(s) who counted:

Diane

Armando

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 144

North Entering: 9

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	0	0	3	3
Trucks	0	0	0	0
Cars	2	1	3	6
Totals	2	1	6	



Heavys 0

Trucks 0

Cars 135

Totals 135

East Leg Total: 3023

East Entering: 850

East Peds: 2

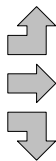
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
30	46	711	787

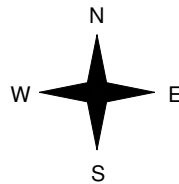


Dundas St W

Heavys	Trucks	Cars	Totals
0	0	66	66
27	22	1936	1985
2	1	181	184
29	23	2183	



Colonel William Pkwy



Cars	Trucks	Heavys	Totals
67	0	0	67
641	44	30	715
54	14	0	68
762	58	30	

Dundas St W



Cars	Trucks	Heavys	Totals
2114	29	30	2173

Peds Cross: $\nlessgtr$

West Peds: 0

West Entering: 2235

West Leg Total: 3022

Cars	236
Trucks	15
Heavys	2
Totals	253



Cars	68	2	175	245
Trucks	2	0	7	9
Heavys	0	0	0	0
Totals	70	2	182	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 254

South Leg Total: 507

Comments

Dundas St W @ Zenon Dr

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region

Site #: 0000002956

Intersection: Dundas St W & Zenon Dr

TFR File #: 1

Count date: 1-May-2017

Weather conditions:

Rain

Person(s) who counted:

Diane

Armando

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 175

North Entering: 165

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	1	0	2	3
Trucks	0	0	1	1
Cars	96	4	61	161
Totals	97	4	64	

Heavys 0

Trucks 1

Cars 9

Totals 10

East Leg Total: 3075

East Entering: 1983

East Peds: 0

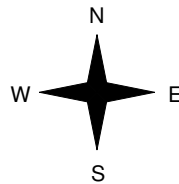
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
5	31	2167	2203



Dundas St W

Heavys	Trucks	Cars	Totals
0	0	0	0
18	6	935	959
0	0	82	82
18	6	1017	



Colonel William Pkwy



Cars	Trucks	Heavys	Totals
7	1	0	8
1800	29	4	1833
142	0	0	142
1949	30	4	

Dundas St W



Cars	Trucks	Heavys	Totals
1063	9	20	1092

Peds Cross: $\nlessgtr$

West Peds: 0

West Entering: 1041

West Leg Total: 3244

Cars	228	Cars	271	2	67	340
Trucks	0	Trucks	2	0	2	4
Heavys	0	Heavys	0	0	0	0
Totals	228	Totals	273	2	69	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 344

South Leg Total: 572

Comments

Dundas St W @ Valleyridge Dr

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Halton Region

Site #: 0000002957

Intersection: Dundas St & Valleyridge Dr

TFR File #: 2

Count date: 2-May-2017

Weather conditions:

Rain

Person(s) who counted:

Diane

Armando

**** Signalized Intersection ****

Major Road: Dundas St runs W/E

East Leg Total: 3348

East Entering: 778

East Peds: 0

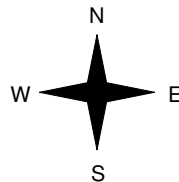
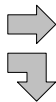
Peds Cross: X

Heavys	Trucks	Cars	Totals
26	42	717	785



Dundas St

Heavys	Trucks	Cars	Totals
40	25	2440	2505
1	0	23	24
41	25	2463	



Valleyridge Dr

Cars	Trucks	Heavys	Totals
692	39	26	757
19	2	0	21
711	41	26	



Dundas St

Cars	Trucks	Heavys	Totals
2503	27	40	2570

Dundas St

Peds Cross: X
West Peds: 1
West Entering: 2529
West Leg Total: 3314

Cars	Trucks	Heavys	Totals
42	2	1	45



Cars	Trucks	Heavys	Totals
25	3	0	28
63	2	0	65
88	5	0	

Peds Cross: X
South Peds: 2
South Entering: 93
South Leg Total: 138

Comments

Dundas St W @ Valleyridge Dr

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Halton Region

Site #: 0000002957

Intersection: Dundas St & Valleyridge Dr

TFR File #: 2

Count date: 2-May-2017

Weather conditions:

Rain

Person(s) who counted:

Diane

Armando

**** Signalized Intersection ****

Major Road: Dundas St runs W/E

East Leg Total: 3151

East Entering: 1944

East Peds: 0

Peds Cross: X

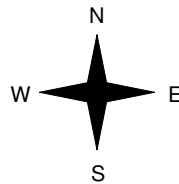
Heavys	Trucks	Cars	Totals
13	19	1876	1908



Dundas St

Heavys	Trucks	Cars	Totals
13	7	1132	1152

0	0	35	35
13	7	1167	



Valleyridge Dr

Cars	Trucks	Heavys	Totals
1833	19	13	1865



78	0	1	79
1911	19	14	

Dundas St

Cars	Trucks	Heavys	Totals
1186	8	13	1207

Peds Cross: X
West Peds: 0
West Entering: 1187
West Leg Total: 3095

Cars	113
Trucks	0
Heavys	1
Totals	114



Cars	43	54	97
Trucks	0	1	1
Heavys	0	0	0
Totals	43	55	

Peds Cross: X
South Peds: 0
South Entering: 98
South Leg Total: 212

Comments

Dundas St W @ Regional Rd 25

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region

Site #: 0000002958

Intersection: Dundas St W & Regional Rd 25

TFR File #: 1

Count date: 23-May-2017

Weather conditions:

Clear/Dry

Person(s) who counted:

Diane

Armando

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 2681

North Entering: 1373

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	8	31	2	41
Trucks	14	31	10	55
Cars	113	943	221	1277
Totals	135	1005	233	

Heavys 41

Trucks 22

Cars 1245

Totals 1308

East Leg Total: 2542

East Entering: 969

East Peds: 2

Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
57	51	988	1096

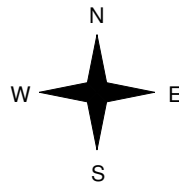


Dundas St W

Heavys	Trucks	Cars	Totals
9	4	248	261
36	18	1163	1217
22	3	404	429
67	25	1815	



Regional Rd 25



Cars	Trucks	Heavys	Totals
198	5	3	206
533	36	36	605
127	8	23	158
858	49	62	

Dundas St W



Cars	Trucks	Heavys	Totals
1487	34	52	1573

Peds Cross: $\nlessgtr$

West Peds: 0

West Entering: 1907

West Leg Total: 3003

Cars 1474

Trucks 42

Heavys 76

Totals 1592



Cars	342	799	103	1244
Trucks	1	13	6	20
Heavys	13	29	14	56
Totals	356	841	123	

Peds Cross: $\nlessgtr$

South Peds: 0

South Entering: 1320

South Leg Total: 2912

Comments

Dundas St W @ Regional Rd 25

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Halton Region

Site #: 0000002958

Intersection: Dundas St W & Regional Rd 25

TFR File #: 1

Count date: 23-May-2017

Weather conditions:

Clear/Dry

Person(s) who counted:

Diane

Armando

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 3031

North Entering: 1097

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	5	32	0	37
Trucks	1	10	1	12
Cars	203	621	224	1048
Totals	209	663	225	

Heavys 26

Trucks 17

Cars 1891

Totals 1934

East Leg Total: 3001

East Entering: 1496

East Peds: 3

Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
21	27	1918	1966

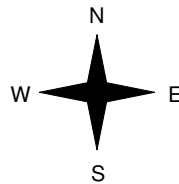


Dundas St W

Heavys	Trucks	Cars	Totals
4	4	224	232
19	16	1100	1135
2	3	181	186
25	23	1505	



Regional Rd 25



Cars	Trucks	Heavys	Totals
209	6	0	215
1108	21	14	1143
125	4	9	138
1442	31	23	

Dundas St W



Cars	Trucks	Heavys	Totals
1454	21	30	1505

Peds Cross: $\nlessgtr$

West Peds: 2

West Entering: 1553

West Leg Total: 3519

Cars	927	Cars	607	1458	130	2195
Trucks	17	Trucks	5	7	4	16
Heavys	43	Heavys	2	22	11	35
Totals	987	Totals	614	1487	145	



Peds Cross: $\nlessgtr$

South Peds: 9

South Entering: 2246

South Leg Total: 3233

Comments

Regional Rd 25 @ Hwy 407 EB Off Ramp

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region

Site #: 0000002893

Intersection: Regional Rd 25 & Hwy 407 EB Off F

TFR File #: 1

Count date: 13-Nov-2017

Weather conditions:

Overcast/Dry

Person(s) who counted:

Rick W

** Non-Signalized Intersection **

Major Road: Regional Rd 25 runs N/S

North Leg Total: 1683

North Entering: 945

North Peds: 0

Peds Cross: 

Heavys	0	42	42
Trucks	0	54	54
Cars	0	849	849
Totals	0	945	



Heavys	31
Trucks	30
Cars	677
Totals	738

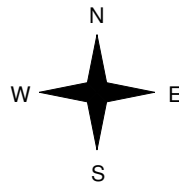
Heavys	Trucks	Cars	Totals
0	0	0	0



Regional Rd 25



Hwy 407 EB Off Ramp



Heavys	Trucks	Cars	Totals
12	10	122	144
1	7	96	104
13	17	218	



Regional Rd 25

Peds Cross: 

West Peds: 0

West Entering: 248

West Leg Total: 248

Cars	945
Trucks	61
Heavys	43
Totals	1049



Cars	0	555	555
Trucks	0	20	20
Heavys	0	19	19
Totals	0	594	

Peds Cross: 

South Peds: 0

South Entering: 594

South Leg Total: 1643

Comments

Regional Rd 25 @ Hwy 407 EB Off Ramp

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 15:45:00

To: 16:45:00

Municipality: Halton Region

Site #: 0000002893

Intersection: Regional Rd 25 & Hwy 407 EB Off F

TFR File #: 1

Count date: 13-Nov-2017

Weather conditions:

Overcast/Dry

Person(s) who counted:

Rick W

** Non-Signalized Intersection **

Major Road: Regional Rd 25 runs N/S

North Leg Total: 1404

North Entering: 624

North Peds: 1

Peds Cross: 

Heavys 0 65

Trucks 0 72

Cars 0 487

Totals 0 624

65

72

487

↑

Heavys 75

Trucks 56

Cars 649

Totals 780

Heavys Trucks Cars Totals

0 0 0 0



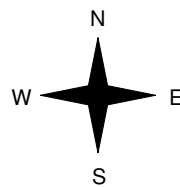
Hwy 407 EB Off Ramp

Heavys Trucks Cars Totals

12 8 52 72

2 0 26 28

14 8 78



Regional Rd 25

Peds Cross: 

West Peds: 0

West Entering: 100

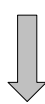
West Leg Total: 100

Cars 513

Trucks 72

Heavys 67

Totals 652



Cars 0 597

Trucks 0 48

Heavys 0 63

Totals 0 708

597

48

63

Peds Cross: 

South Peds: 0

South Entering: 708

South Leg Total: 1360

Comments

Accu-Traffic Inc

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Oakville

Site #: 1816200001

Intersection: Dundas St W & Tremaine Rd

TFR File #: 1

Count date: 11-Dec-18

Weather conditions:

Person counted:

Person prepared:

Person checked:

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 1272

North Entering: 760

North Peds: 0

Peds Cross: 

Heavys	2	1	3
Trucks	0	0	0
Cars	454	303	757
Totals	456	304	

Heavys	8
Trucks	2
Cars	502
Totals	512

East Leg Total: 3334

East Entering: 877

East Peds: 0

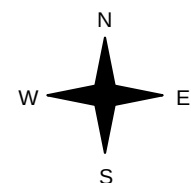
Peds Cross: 

Heavys	Trucks	Cars	Totals
88	12	1143	1243



Dundas St W

Heavys	Trucks	Cars	Totals
4	2	416	422
44	16	2093	2153
48	18	2509	



Tremaine Rd

Cars	Trucks	Heavys	Totals
86	0	4	90
689	12	86	787
775	12	90	



Dundas St W



Cars	Trucks	Heavys	Totals
2396	16	45	2457

Peds Cross: 

West Peds: 1

West Entering: 2575

West Leg Total: 3818

Comments

Accu-Traffic Inc

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Oakville
Site #: 1816200001
Intersection: Dundas St W & Tremaine Rd
TFR File #: 1
Count date: 11-Dec-18

Weather conditions:

Person counted:
Person prepared:
Person checked:

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 902
 North Entering: 504
 North Peds: 0
 Peds Cross: 

Heavys	12	0	12
Trucks	4	0	4
Cars	414	74	488
Totals	430	74	



Heavys	6
Trucks	0
Cars	392
Totals	398

East Leg Total: 3255
 East Entering: 2146
 East Peds: 0
 Peds Cross: 

Heavys	Trucks	Cars	Totals
59	16	2325	2400



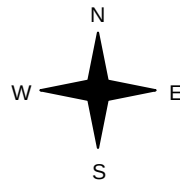
Tremaine Rd



Cars	Trucks	Heavys	Totals
173	0	3	176
1911	12	47	1970
2084	12	50	



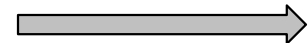
Dundas St W



Heavys	Trucks	Cars	Totals
3	0	219	222
20	9	1006	1035
23	9	1225	



Dundas St W



Cars	Trucks	Heavys	Totals
1080	9	20	1109

Peds Cross: 
 West Peds: 0
 West Entering: 1257
 West Leg Total: 3657

Comments

Accu-Traffic Inc

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Oakville
Site #: 1816200002
Intersection: Dundas St W & Colonel William Pk
TFR File #: 1
Count date: 11-Dec-18

Weather conditions:

Person counted:
Person prepared:
Person checked:

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 172
 North Entering: 8
 North Peds: 3
 Peds Cross: 

	Heavys	Trucks	Cars	Totals
North	0	0	1	1
East	0	0	0	0
South	2	0	5	7
Totals	2	0	6	



	Heavys	Trucks	Cars	Totals
North	1	0	163	164
East	0	0	0	0
South	0	0	0	0
Totals	1	0	163	164

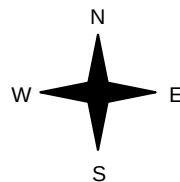
East Leg Total: 3190
 East Entering: 984
 East Peds: 3
 Peds Cross: 

Heavys	Trucks	Cars	Totals
83	18	807	908



Dundas St W

Heavys	Trucks	Cars	Totals
1	0	72	73
47	20	1969	2036
3	1	255	259
51	21	2296	



Zenon Dr



Cars	Trucks	Heavys	Totals
90	0	0	90
738	18	81	837
52	0	5	57
880	18	86	

Dundas St W



Cars	Trucks	Heavys	Totals
2128	20	58	2206

Peds Cross: 
 West Peds: 2
 West Entering: 2368
 West Leg Total: 3276

	Cars	Trucks	Heavys	Totals
West	307	1	8	316
East	67	0	2	69
Totals	374	1	10	385



	Cars	Trucks	Heavys	Totals
West	67	0	2	69
East	1	0	0	1
Totals	68	0	2	70

Peds Cross: 
 South Peds: 0
 South Entering: 234
 South Leg Total: 550

Comments

Accu-Traffic Inc

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 18:00:00	One Hour Peak From: 16:15:00 To: 17:15:00
Municipality: Oakville Site #: 1816200002 Intersection: Dundas St W & Colonel William Pk TFR File #: 1 Count date: 11-Dec-18	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **	Major Road: Dundas St W runs W/E	

North Leg Total: 121 North Entering: 115 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> Heavys 0 0 1 Trucks 0 0 0 Cars 56 0 58 Totals 56 0 59 </td> <td style="padding: 2px; text-align: center;"> 1 0 114 59 </td> </tr> </table>	Heavys 0 0 1 Trucks 0 0 0 Cars 56 0 58 Totals 56 0 59	1 0 114 59	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> Heavys 0 Trucks 0 Cars 6 Totals 6 </td> <td style="padding: 2px; text-align: center;"> 0 0 6 6 </td> </tr> </table>	Heavys 0 Trucks 0 Cars 6 Totals 6	0 0 6 6	East Leg Total: 3032 East Entering: 1915 East Peds: 2 Peds Cross:
Heavys 0 0 1 Trucks 0 0 0 Cars 56 0 58 Totals 56 0 59	1 0 114 59						
Heavys 0 Trucks 0 Cars 6 Totals 6	0 0 6 6						

Heavys	Trucks	Cars	Totals
48	13	2045	2106

Dundas St W

Heavys	Trucks	Cars	Totals
0	0	0	0
19	8	971	998
2	1	79	82
21	9	1050	

N
S
E
W

Zenon Dr

Cars	Trucks	Heavys	Totals
3	0	0	3
1760	13	39	1812
100	0	0	100
1863	13	39	

Dundas St W

Cars	Trucks	Heavys	Totals
1085	8	24	1117

Colonel William Pkwy

Peds Cross: West Peds: 1 West Entering: 1080 West Leg Total: 3186	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> Cars 179 Trucks 1 Heavys 2 Totals 182 </td> <td style="padding: 2px; text-align: center;"> 179 1 2 182 </td> </tr> </table>	Cars 179 Trucks 1 Heavys 2 Totals 182	179 1 2 182	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> Cars 229 3 56 Trucks 0 0 0 Heavys 9 0 4 Totals 238 3 60 </td> <td style="padding: 2px; text-align: center;"> 288 0 13 60 </td> </tr> </table>	Cars 229 3 56 Trucks 0 0 0 Heavys 9 0 4 Totals 238 3 60	288 0 13 60	Peds Cross: South Peds: 0 South Entering: 301 South Leg Total: 483
Cars 179 Trucks 1 Heavys 2 Totals 182	179 1 2 182						
Cars 229 3 56 Trucks 0 0 0 Heavys 9 0 4 Totals 238 3 60	288 0 13 60						

Comments

Accu-Traffic Inc

Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 8:00:00 To: 9:00:00
Municipality: Oakville Site #: 1816200003 Intersection: Dundas St W & Valleyridge Dr TFR File #: 1 Count date: 11-Dec-18	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **	Major Road: Dundas St W runs W/E	
East Leg Total: 3103 East Entering: 1024 East Peds: 1 Peds Cross: 8		
Heavys Trucks Cars Totals 101 19 925 1045 ← Dundas St W Heavys Trucks Cars Totals 55 21 1919 1995 → Dundas St W Heavys Trucks Cars Totals 5 0 93 98 ↓ Valleyridge Dr Heavys Trucks Cars Totals 60 21 2012 → Dundas St W Heavys Trucks Cars Totals 874 19 98 991 ← Dundas St W Heavys Trucks Cars Totals 32 0 1 33 → Dundas St W Heavys Trucks Cars Totals 906 19 99 Heavys Trucks Cars Totals 1999 21 59 2079 Peds Cross: 8 West Peds: 2 West Entering: 2093 West Leg Total: 3138 Cars 125 Trucks 0 Heavys 6 Totals 131 Cars 51 Trucks 0 Heavys 3 Totals 54 Cars 80 Trucks 0 Heavys 4 Totals 84 Cars 131 Trucks 0 Heavys 7 Totals 84 Peds Cross: 8 South Peds: 0 South Entering: 138 South Leg Total: 269 Comments		

Accu-Traffic Inc

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 18:00:00	One Hour Peak From: 16:15:00 To: 17:15:00																																																																
Municipality: Oakville Site #: 1816200003 Intersection: Dundas St W & Valleyridge Dr TFR File #: 1 Count date: 11-Dec-18	Weather conditions: Person counted: Person prepared: Person checked:																																																																	
** Signalized Intersection **	Major Road: Dundas St W runs W/E																																																																	
East Leg Total: 3012 East Entering: 1909 East Peds: 0 Peds Cross: X																																																																		
<table style="margin-bottom: 10px;"> <thead> <tr> <th>Heavys</th> <th>Trucks</th> <th>Cars</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>13</td> <td>1861</td> <td>1914</td> </tr> </tbody> </table> Dundas St W N W E S <table style="margin-bottom: 10px;"> <thead> <tr> <th>Cars</th> <th>Trucks</th> <th>Heavys</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>1812</td> <td>13</td> <td>40</td> <td>1865</td> </tr> <tr> <td>43</td> <td>0</td> <td>1</td> <td>44</td> </tr> <tr> <td style="border-top: 1px solid black;">1855</td> <td style="border-top: 1px solid black;">13</td> <td style="border-top: 1px solid black;">41</td> <td></td> </tr> </tbody> </table> Dundas St W <table style="margin-bottom: 10px;"> <thead> <tr> <th>Heavys</th> <th>Trucks</th> <th>Cars</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>8</td> <td>1046</td> <td>1078</td> </tr> <tr> <td>1</td> <td>0</td> <td>35</td> <td>36</td> </tr> <tr> <td style="border-top: 1px solid black;">25</td> <td style="border-top: 1px solid black;">8</td> <td style="border-top: 1px solid black;">1081</td> <td></td> </tr> </tbody> </table> Valleyridge Dr <table style="margin-bottom: 10px;"> <thead> <tr> <th>Cars</th> <th>Trucks</th> <th>Heavys</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>78</td> <td>0</td> <td>2</td> <td>80</td> </tr> </tbody> </table> <table style="margin-bottom: 10px;"> <thead> <tr> <th>Cars</th> <th>Trucks</th> <th>Heavys</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <td>49</td> <td>0</td> <td>0</td> <td>49</td> </tr> <tr> <td>25</td> <td>0</td> <td>0</td> <td>25</td> </tr> <tr> <td style="border-top: 1px solid black;">74</td> <td style="border-top: 1px solid black;">0</td> <td style="border-top: 1px solid black;">0</td> <td></td> </tr> </tbody> </table>			Heavys	Trucks	Cars	Totals	40	13	1861	1914	Cars	Trucks	Heavys	Totals	1812	13	40	1865	43	0	1	44	1855	13	41		Heavys	Trucks	Cars	Totals	24	8	1046	1078	1	0	35	36	25	8	1081		Cars	Trucks	Heavys	Totals	78	0	2	80	Cars	Trucks	Heavys	Totals	49	0	0	49	25	0	0	25	74	0	0	
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25	0	0	25																																																															
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Comments

Accu-Traffic Inc

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Oakville
Site #: 1816200004
Intersection: Dundas St W & Bronte Rd
TFR File #: 1
Count date: 11-Dec-18

Weather conditions:

Person counted:
Person prepared:
Person checked:

** Signalized Intersection **

Major Road: Dundas St W runs W/E

North Leg Total: 2755
 North Entering: 1504
 North Peds: 0
 Peds Cross: 

	Heavys	Trucks	Cars	Totals
8	53	8	69	
3	21	2	26	
163	1029	217	1409	
Totals	174	1103	227	



	Heavys	Trucks	Cars	Totals
53	13			
		1185		
Totals	1251			

East Leg Total: 2777
 East Entering: 910
 East Peds: 0
 Peds Cross: 

Heavys	Trucks	Cars	Totals
93	14	817	924

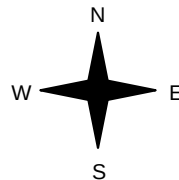


Dundas St W

Heavys	Trucks	Cars	Totals
5	4	317	326
30	12	1438	1480
12	3	443	458
47	19	2198	



Bronte Rd



Cars	Trucks	Heavys	Totals
194	1	9	204
498	9	59	566
111	5	24	140
803	15	92	

Dundas St W



Cars	Trucks	Heavys	Totals
1803	18	46	1867

Peds Cross: 
 West Peds: 0
 West Entering: 2264
 West Leg Total: 3188

	Cars	Trucks	Heavys	Totals
1583	29	89	1701	



	Cars	Trucks	Heavys	Totals
156	2	26	184	
674	8	39	721	
148	4	8	160	
978	14	73		

Peds Cross: 
 South Peds: 2
 South Entering: 1065
 South Leg Total: 2766

Comments

Accu-Traffic Inc

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 18:00:00	One Hour Peak From: 16:30:00 To: 17:30:00
Municipality: Oakville Site #: 1816200004 Intersection: Dundas St W & Bronte Rd TFR File #: 1 Count date: 11-Dec-18	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **	Major Road: Dundas St W runs W/E	

North Leg Total: 2657 North Entering: 1075 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>4</td><td>19</td><td>3</td></tr> <tr><td>Trucks</td><td>1</td><td>2</td><td>1</td></tr> <tr><td>Cars</td><td>251</td><td>571</td><td>223</td></tr> <tr><td>Totals</td><td>256</td><td>592</td><td>227</td></tr> </table> </td> <td style="padding: 2px; text-align: center;"> 1045 </td> </tr> </table>	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>4</td><td>19</td><td>3</td></tr> <tr><td>Trucks</td><td>1</td><td>2</td><td>1</td></tr> <tr><td>Cars</td><td>251</td><td>571</td><td>223</td></tr> <tr><td>Totals</td><td>256</td><td>592</td><td>227</td></tr> </table>	Heavys	4	19	3	Trucks	1	2	1	Cars	251	571	223	Totals	256	592	227	1045	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>29</td></tr> <tr><td>Trucks</td><td>13</td></tr> <tr><td>Cars</td><td>1540</td></tr> <tr><td>Totals</td><td>1582</td></tr> </table> </td> <td style="padding: 2px; text-align: center;"> 1582 </td> </tr> </table>	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>29</td></tr> <tr><td>Trucks</td><td>13</td></tr> <tr><td>Cars</td><td>1540</td></tr> <tr><td>Totals</td><td>1582</td></tr> </table>	Heavys	29	Trucks	13	Cars	1540	Totals	1582	1582	East Leg Total: 2617 East Entering: 1506 East Peds: 0 Peds Cross:
<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>4</td><td>19</td><td>3</td></tr> <tr><td>Trucks</td><td>1</td><td>2</td><td>1</td></tr> <tr><td>Cars</td><td>251</td><td>571</td><td>223</td></tr> <tr><td>Totals</td><td>256</td><td>592</td><td>227</td></tr> </table>	Heavys	4	19	3	Trucks	1	2	1	Cars	251	571	223	Totals	256	592	227	1045														
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Bronte Rd

Dundas St W

<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>2</td><td>3</td><td>213</td></tr> <tr><td>Trucks</td><td>15</td><td>5</td><td>751</td></tr> <tr><td>Cars</td><td>3</td><td>0</td><td>175</td></tr> <tr><td>Totals</td><td>20</td><td>8</td><td>1139</td></tr> </table> </td> <td style="padding: 2px; text-align: center;"> 218 771 178 </td> </tr> </table>	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>2</td><td>3</td><td>213</td></tr> <tr><td>Trucks</td><td>15</td><td>5</td><td>751</td></tr> <tr><td>Cars</td><td>3</td><td>0</td><td>175</td></tr> <tr><td>Totals</td><td>20</td><td>8</td><td>1139</td></tr> </table>	Heavys	2	3	213	Trucks	15	5	751	Cars	3	0	175	Totals	20	8	1139	218 771 178	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>895</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Heavys</td><td>27</td></tr> <tr><td>Totals</td><td>925</td></tr> </table> </td> <td style="padding: 2px; text-align: center;"> 1623 11 43 </td> </tr> </table>	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>895</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Heavys</td><td>27</td></tr> <tr><td>Totals</td><td>925</td></tr> </table>	Cars	895	Trucks	3	Heavys	27	Totals	925	1623 11 43	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>352</td><td>1173</td><td>98</td></tr> <tr><td>Trucks</td><td>1</td><td>7</td><td>3</td></tr> <tr><td>Heavys</td><td>7</td><td>24</td><td>12</td></tr> <tr><td>Totals</td><td>360</td><td>1204</td><td>113</td></tr> </table> </td> <td style="padding: 2px; text-align: center;"> 1623 11 43 </td> </tr> </table>	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>352</td><td>1173</td><td>98</td></tr> <tr><td>Trucks</td><td>1</td><td>7</td><td>3</td></tr> <tr><td>Heavys</td><td>7</td><td>24</td><td>12</td></tr> <tr><td>Totals</td><td>360</td><td>1204</td><td>113</td></tr> </table>	Cars	352	1173	98	Trucks	1	7	3	Heavys	7	24	12	Totals	360	1204	113	1623 11 43	Peds Cross: South Peds: 4 South Entering: 1677 South Leg Total: 2602
<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>2</td><td>3</td><td>213</td></tr> <tr><td>Trucks</td><td>15</td><td>5</td><td>751</td></tr> <tr><td>Cars</td><td>3</td><td>0</td><td>175</td></tr> <tr><td>Totals</td><td>20</td><td>8</td><td>1139</td></tr> </table>	Heavys	2	3	213	Trucks	15	5	751	Cars	3	0	175	Totals	20	8	1139	218 771 178																																
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Comments

Accu-Traffic Inc

Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 7:30:00 To: 8:30:00
Municipality: Oakville Site #: 1816200005 Intersection: Bronte Rd & HWY 407 EB off Ram TFR File #: 1 Count date: 11-Dec-18	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **	Major Road: Bronte Rd runs N/S	

North Leg Total: 2988 North Entering: 1847 North Peds: 0 Peds Cross:	<table style="margin: auto;"> <tr><td>Heavys</td><td>0</td><td>79</td><td>0</td><td>79</td></tr> <tr><td>Trucks</td><td>0</td><td>24</td><td>0</td><td>24</td></tr> <tr><td>Cars</td><td>0</td><td>1744</td><td>0</td><td>1744</td></tr> <tr><td>Totals</td><td>0</td><td>1847</td><td>0</td><td></td></tr> </table>	Heavys	0	79	0	79	Trucks	0	24	0	24	Cars	0	1744	0	1744	Totals	0	1847	0		 <table style="margin: auto;"> <tr><td>Heavys</td><td>68</td></tr> <tr><td>Trucks</td><td>13</td></tr> <tr><td>Cars</td><td>1060</td></tr> <tr><td>Totals</td><td>1141</td></tr> </table>	Heavys	68	Trucks	13	Cars	1060	Totals	1141	East Leg Total: 390 East Entering: 0 East Peds: 0 Peds Cross:
Heavys	0	79	0	79																											
Trucks	0	24	0	24																											
Cars	0	1744	0	1744																											
Totals	0	1847	0																												
Heavys	68																														
Trucks	13																														
Cars	1060																														
Totals	1141																														

Heavys	Trucks	Cars	Totals
0	0	0	0

HWY 407 EB off Ramp

Heavys	Trucks	Cars	Totals
14	2	151	167
0	0	0	0
1	1	114	116
15	3	265	

N
S
E
W

Bronte Rd

Cars	Trucks	Heavys	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

HWY 407 EB on Ramp

Cars	Trucks	Heavys	Totals
382	0	8	390

Peds Cross: West Peds: 0 West Entering: 283 West Leg Total: 283	<table style="margin: auto;"> <tr><td>Cars</td><td>1858</td></tr> <tr><td>Trucks</td><td>25</td></tr> <tr><td>Heavys</td><td>80</td></tr> <tr><td>Totals</td><td>1963</td></tr> </table>	Cars	1858	Trucks	25	Heavys	80	Totals	1963	 <table style="margin: auto;"> <tr><td>Cars</td><td>0</td><td>909</td><td>382</td><td>1291</td></tr> <tr><td>Trucks</td><td>0</td><td>11</td><td>0</td><td>11</td></tr> <tr><td>Heavys</td><td>0</td><td>54</td><td>8</td><td>62</td></tr> <tr><td>Totals</td><td>0</td><td>974</td><td>390</td><td></td></tr> </table>	Cars	0	909	382	1291	Trucks	0	11	0	11	Heavys	0	54	8	62	Totals	0	974	390		Peds Cross: South Peds: 0 South Entering: 1364 South Leg Total: 3327
Cars	1858																														
Trucks	25																														
Heavys	80																														
Totals	1963																														
Cars	0	909	382	1291																											
Trucks	0	11	0	11																											
Heavys	0	54	8	62																											
Totals	0	974	390																												

Comments

Accu-Traffic Inc

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Oakville
Site #: 1816200005
Intersection: Bronte Rd & HWY 407 EB off Ram
TFR File #: 1
Count date: 11-Dec-18

Weather conditions:

Person counted:
Person prepared:
Person checked:

** Signalized Intersection **

Major Road: Bronte Rd runs N/S

North Leg Total: 2978

North Entering: 1060

North Peds: 0

Peds Cross: 

	Heavys	Trucks	Cars	Totals
North	0	20	0	20
Trucks	0	2	0	2
Cars	0	1038	0	1038
Totals	0	1060	0	



	Heavys	Trucks	Cars	Totals
South	29	13	1876	1918
Trucks				
Cars				
Totals				

East Leg Total: 140

East Entering: 0

East Peds: 0

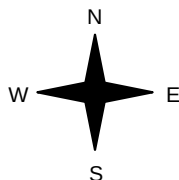
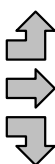
Peds Cross: 

Heavys	Trucks	Cars	Totals
0	0	0	0



HWY 407 EB off Ramp

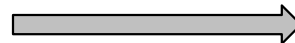
Heavys	Trucks	Cars	Totals
3	0	108	111
0	0	0	0
1	0	46	47
4	0	154	



Cars	Trucks	Heavys	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	



HWY 407 EB on Ramp



Cars	Trucks	Heavys	Totals
136	2	2	140

Peds Cross: 

West Peds: 0

West Entering: 158

West Leg Total: 158

	Cars	Trucks	Heavys	Totals
West	1084	2	21	1107
Trucks				
Heavys				
Totals				



	Cars	Trucks	Heavys	Totals
South	0	13	0	13
Trucks	0	2	0	2
Heavys	0	26	2	28
Totals	0	1807	140	

Peds Cross: 

South Peds: 0

South Entering: 1947

South Leg Total: 3054

Comments

Eastbound Left Turn Survey

0:05

Intersection: Dundas Street at Bronte Road - AM Peak

Movement: Eastbound Left

Date: Jan 31, 2019

TIME			Departures				
			Protected Phase		Permissive Phase		
From	To	Cycle	During Green	Sneakers (during amber and all- red)	During Green	Sneakers (during amber and all- red)	comment
7:30	7:35	1	0	0	3	1	No advance green arrow
		2	2	0	8	1	
		3	3	3	4	1	
7:35	7:40	1	3	3	4	3	
		2	4	2	8	2	
7:40	7:45	1	3	3	0	2	
		2	4	2	4	1	
7:45	7:50	1	4	1	2	2	
		2	4	2	1	2	
7:50	7:55	1	2	3	0	2	
		2	4	2	9	2	
7:55	8:00	1	4	3	0	1	
		2	4	2	2	2	
8:00	8:05	1	4	2	13	1	
		2	3	4	1	2	
8:05	8:10	1	3	2	0	2	
		2	3	3	3	2	
8:10	8:15	1	3	3	5	1	
		2	3	2	1	0	
		3	0	1	0	2	
8:15	8:20	1	3	1	2	0	
		2	3	3	1	2	
8:20	8:25	1	4	1	1	0	
		2	3	1	2	1	
8:25	8:30	1	2	1	0	1	
		2	3	0	0	1	
Total							

Eastbound Left Turn Survey

0:05

Intersection: Dundas Street at Bronte Road - PM Peak

Movement: Eastbound Left

Date: Jan 31, 2019

TIME			Departures				comment
			Protected Phase		Permissive Phase		
From	To	Cycle	During Green	Sneakers (during amber and all- red)	During Green	Sneakers (during amber and all- red)	
16:30	16:35	1	0	0	0	1	No advance green arrow
		2	3	0	0	0	
		3	3	1	0	1	
16:35	16:40	1	3	0	0	0	
		2	2	1	1	2	
16:40	16:45	1	1	1	0	2	
		2	3	2	0	2	
16:45	16:50	1	3	2	0	2	
		2	3	3	2	3	
16:50	16:55	1	2	1	1	3	
		2	3	3	3	3	
16:55	17:00	1	4	3	1	3	
		2	4	3	0	1	
17:00	17:05	1	4	2	2	2	
		2	3	2	1	1	
17:05	17:10	1	4	2	1	1	
		2	4	3	1	0	
		3	4	1	1	1	
17:10	17:15	1	3	2	0	0	
		2	2	0	0	2	
17:15	17:20	1	3	3	1	1	
		2	4	0	0	2	
17:20	17:25	1	4	2	2	2	
		2	4	4	1	3	
17:25	17:30	1	3	3	0	2	
		2	3	2	2	1	
Total							

Eastbound Left Turn Survey

0:05

Intersection: Dundas Street at Tremaine Road - PM Peak

Movement: Eastbound Left

Date: Jan 31, 2019

TIME			Departures				
			Protected Phase		Permissive Phase		
From	To	Cycle	During Green	Sneakers (during amber and all- red)	During Green	Sneakers (during amber and all- red)	comment
16:15	16:20	1	0	0	1	2	No advance green arrow
		2	3	3	4	1	
		3	0	0	4	2	
16:20	16:25	1	3	1	0	2	No advance green arrow
		2	3	1	0	1	
16:25	16:30	1	4	1	0	2	
		2	3	2	0	2	No advance green arrow
16:30	16:35	1	3	2	0	2	
		2	2	2	0	2	
16:35	16:40	1	2	3	0	2	No advance green arrow
		2	3	2	8	2	
16:40	16:45	1	0	0	2	2	
		2	4	2	15	2	No advance green arrow
16:45	16:50	1	3	2	0	2	
		2	3	0	0	2	
16:50	16:55	1	3	0	3	3	No advance green arrow
		2	4	1	3	2	
16:55	17:00	1	3	1	1	0	
		2	3	2	1	1	No advance green arrow
17:00	17:05	1	2	2	3	3	
		2	2	2	5	2	
17:05	17:10	1	2	2	3	2	No advance green arrow
		2	2	2	2	2	
		3	2	2	0	2	
17:10	17:15	1	3	3	0	4	No advance green arrow
		2	2	3	7	3	
Total							

Calibration

AM Peak Hour:

Eastbound Left-Turn at Intersection of Dundas Street West at Bronte Road

From Special Surveys completed after the TMCs, specifically for Calibration:

Vehicles proceeding during protected phase:	128	54%
Vehicles proceeding during permissive phase:	111	46%

From TMC:

Total Vehicles turning Left: 326

Assuming that the distribution of protected and permissive vehicles is similar, we can apply the distribution derived from the special surveys to the TMC and derive the following

Protected:	176
Permissive	150

From Synchro Prior to Calibration for the subject movement:

Prot-Perm V/C:	1.06	
Prot V/C (assuming no turns allowed during Permissive Phase):	1.7	(derived by changing the type of left-turn from perm+protected to only protected)

Derived Capacities from Synchro Model Prior to Calibration:

Overall Capacity:	308
Protect Turn Capacity	192
Permissive Turn Capa	116

Calculation of Calibration Factors:

In order to calibrate the model we determine the relation between the capacity derived by Synchro and the capacity that we know exists, and apply it to the saturation Flow

Capacity that we know at least exists:	Capacity Derived By Synchro:	Calibration Factors:
For Protec 176	For Protected: 192	For Protected: 0.92
For Permis 150	For Permissive: 116	For Permissive: 1.29

These factors will be applied to the saturation flows (both permissive and protected) that are in the synchro file

Sat Flow (protected): 1772	Calibrated Sat Flow (protected): 1630
Sat Flow (permissive) 377	Calibrated Sat Flow (permissive) 486

PM Peak Hour:

Eastbound Left-Turn at Intersection of Dundas Street West at Bronte Road

From Special Surveys completed after the TMCs, specifically for Calibration:

Vehicles proceeding during protected phase:	125	67%
Vehicles proceeding during permissive phase:	61	33%

From TMC:

Total Vehicles turning Left: 218

Assuming that the distribution of protected and permissive vehicles is similar, we can apply the distribution derived from the special surveys to the TMC and derive the following

Protected:	146
Permissive	72

From Synchro Prior to Calibration for the subject movement:

Prot-Perm V/C:	1.07	
Prot V/C (assuming no turns allowed during Permissive Phase):	1.51	(derived by changing the type of left-turn from perm+protected to only protected)

Derived Capacities from Synchro Model Prior to Calibration:

Overall Capacity:	204
Protect Turn Capacity	144
Permissive Turn Capa	60

Calculation of Calibration Factors:

In order to calibrate the model we determine the relation between the capacity derived by Synchro and the capacity that we know exists, and apply it to the saturation Flow

Capacity that we know at least exists:		Capacity Derived By Synchro:	Calibration Factors:
For Protec	146	For Protected: 144	For Protected: 1.01
For Permis	72	For Permissive: 60	For Permissive: 1.2

These factors will be applied to the saturation flows (both permissive and protected) that are in the synchro file

Sat Flow (protected):	1789	Calibrated Sat Flow (protected):	1807
Sat Flow (permissive)	198	Calibrated Sat Flow (permissive)	238

Eastbound Left-Turn at Intersection of Dundas Street West at Tremaine Road

From Special Surveys completed after the TMCs, specifically for Calibration:

Vehicles proceeding during protected phase:	105	48%
Vehicles proceeding during permissive phase:	114	52%

From TMC:

Total Vehicles turning Left: 235

Assuming that the distribution of protected and permissive vehicles is similar, we can apply the distribution derived from the special surveys to the TMC and derive the following

Protected:	113
Permissive	122

From Synchro Prior to Calibration for the subject movement:

Prot-Perm V/C:	1.09	
Prot V/C (assuming no turns allowed during Permissive Phase):	1.51	(derived by changing the type of left-turn from perm+protected to only protected)

Derived Capacities from Synchro Model Prior to Calibration:

Overall Capacity:	216
Protect Turn Capacity	156
Permissive Turn Capa	60

Calculation of Calibration Factors:

In order to calibrate the model we determine the relation between the capacity derived by Synchro and the capacity that we know exists, and apply it to the saturation Flow

Capacity that we know at least exists:		Capacity Derived By Synchro:	Calibration Factors:
For Protec	113	For Protected: 156	For Protected: 0.72
For Permis	122	For Permissive: 60	For Permissive: 2.03

These factors will be applied to the saturation flows (both permissive and protected) that are in the synchro file

Sat Flow (protected):	1807	Calibrated Sat Flow (protected):	1301
Sat Flow (permissive)	110	Calibrated Sat Flow (permissive)	223

APPENDIX

C LOS DEFINITIONS



APPENDIX

Levels of Service – Highway Capacity Manual

Signalized Intersections

Level of Service	Stopped Delay per Vehicle (sec)	Expected delay to Minor Street traffic from the Major Street
A	< 10	Most vehicles arrive during the green phase and do not stop; traffic progression is extremely favourable.
B	10.1 - 20.0	More vehicles stop than for LOS A; traffic progression is good.
C	20.1 - 35.0	Individual cycle failures may appear and the number of vehicles stopping is significant; traffic progression is fair.
D	35.1 - 55.0	Individual cycle failures are noticeable and many vehicles stop; traffic progression is unfavourable.
E	55.1 - 80.0	Individual cycle failures are frequent; traffic progression is poor; acceptable delay is at its limit.
F	> 80	Many individual cycle failures; arrival flow rate exceeds capacity; delay is unacceptable to most drivers.

Source: Highway Capacity Manual, HCM2000

HIGHWAY LOS Signalized 12-09-18

Levels of Service – Highway Capacity Manual

Unsignalized Intersection

Level of Service	Average Control Delays (s/veh)	Expected delay to Minor Street traffic from the Major Street
A	0 - 10	Little or no delay.
B	> 10 – 15	Short traffic delay.
C	> 15 – 25	Average traffic delay.
D	> 25 – 35	Long traffic delay.
E	> 35 – 50	Very long traffic delay.
F	> 50	Extreme delay encountered with queuing, which may cause severe congestion affecting other traffic movements in the intersection.

Source: Highway Capacity Manual, HCM 2000

UNSIGNALIZED LOS 12-09-18

APPENDIX

D SYNCHRO RESULTS

APPENDIX

APPENDIX

***D-1** EXISTING CONDITIONS*

APPENDIX

2020 Existing AM

HCM Signalized Intersection Capacity Analysis
1: Bronte Rd & 407 Off Ramp

<2020 Existing> AM Peak Hour
06/23/2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	116	0	895	1575	0
Future Volume (vph)	167	116	0	895	1575	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3219	1601		4902	3444	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3219	1601		4902	3444	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	196	136	0	1053	1853	0
RTOR Reduction (vph)	0	11	0	0	0	0
Lane Group Flow (vph)	196	125	0	1053	1853	0
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	12.9	12.9		60.1	60.1	
Effective Green, g (s)	12.9	12.9		60.1	60.1	
Actuated g/C Ratio	0.15	0.15		0.71	0.71	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	488	242		3466	2435	
v/s Ratio Prot	0.06			0.21	c0.54	
v/s Ratio Perm		c0.08				
v/c Ratio	0.40	0.52		0.30	0.76	
Uniform Delay, d1	32.6	33.2		4.6	7.9	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	2.5		0.2	2.3	
Delay (s)	33.3	35.6		4.9	10.2	
Level of Service	C	D		A	B	
Approach Delay (s)	34.3			4.9	10.2	
Approach LOS	C			A	B	
Intersection Summary						
HCM 2000 Control Delay			10.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			85.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			60.7%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2020 Existing> AM Peak Hour
06/23/2020

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	366	2215	787	95	255	328
Future Volume (vph)	366	2215	787	95	255	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1807	3544	3259	1570	1825	1611
Flt Permitted	0.21	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	401	3544	3259	1570	1825	1611
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	416	2517	894	108	290	373
RTOR Reduction (vph)	0	0	0	49	0	299
Lane Group Flow (vph)	416	2517	894	59	290	74
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2			6		8
Actuated Green, G (s)	82.3	82.3	55.1	55.1	23.7	23.7
Effective Green, g (s)	82.3	82.3	55.1	55.1	23.7	23.7
Actuated g/C Ratio	0.69	0.69	0.46	0.46	0.20	0.20
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	2.5
Lane Grp Cap (vph)	546	2430	1496	720	360	318
v/s Ratio Prot	0.15	c0.71	0.27		c0.16	
v/s Ratio Perm	0.37			0.04		0.05
v/c Ratio	0.76	1.04	0.60	0.08	0.81	0.23
Uniform Delay, d1	13.8	18.9	24.2	18.2	46.0	40.5
Progression Factor	1.00	1.00	0.67	0.74	1.00	1.00
Incremental Delay, d2	6.2	28.3	1.7	0.2	12.0	0.3
Delay (s)	20.1	47.2	18.0	13.8	58.0	40.8
Level of Service	C	D	B	B	E	D
Approach Delay (s)		43.3	17.5		48.3	
Approach LOS		D	B		D	
Intersection Summary						
HCM 2000 Control Delay			38.4		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			87.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
42: Colonel William Pkwy/Private Driveway & Dundas St W

<2020 Existing> AM Peak Hour
06/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	2051	259	57	842	90	69	1	164	6	0	2
Future Volume (vph)	73	2051	259	57	842	90	69	1	164	6	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3544	1588	1674	3259	1562	1768	1921	1493	1555	1610	
Flt Permitted	0.30	1.00	1.00	0.05	1.00	1.00	0.76	1.00	1.00	0.76	1.00	
Satd. Flow (perm)	571	3544	1588	84	3259	1562	1408	1921	1493	1239	1610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	2159	273	60	886	95	73	1	173	6	0	2
RTOR Reduction (vph)	0	0	62	0	0	28	0	0	103	0	2	0
Lane Group Flow (vph)	77	2159	212	60	886	67	73	1	70	6	0	0
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	4	0	0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	89.2	84.0	84.0	90.0	84.4	84.4	13.0	13.0	13.0	13.0	13.0	
Effective Green, g (s)	89.2	84.0	84.0	90.0	84.4	84.4	13.0	13.0	13.0	13.0	13.0	
Actuated g/C Ratio	0.74	0.70	0.70	0.75	0.70	0.70	0.11	0.11	0.11	0.11	0.11	
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)	477	2480	1111	137	2292	1098	152	208	161	134	174	
v/s Ratio Prot	0.01	c0.61		c0.02	0.27			0.00			0.00	
v/s Ratio Perm	0.11		0.13	0.31		0.04	c0.05		0.05	0.00		
v/c Ratio	0.16	0.87	0.19	0.44	0.39	0.06	0.48	0.00	0.43	0.04	0.00	
Uniform Delay, d1	4.3	13.8	6.2	20.8	7.3	5.5	50.3	47.7	50.0	47.9	47.7	
Progression Factor	0.54	0.48	0.02	1.61	0.89	1.13	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.1	0.1	2.2	0.5	0.1	2.8	0.0	2.2	0.1	0.0	
Delay (s)	2.3	7.8	0.2	35.7	6.9	6.3	53.1	47.7	52.2	48.0	47.7	
Level of Service	A	A	A	D	A	A	D	D	D	D	D	
Approach Delay (s)		6.8			8.5			52.5			47.9	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			10.3									
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			94.0%									
Analysis Period (min)			15									
c Critical Lane Group												

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	2290	98	33	996	54	84
Future Volume (vph)	2290	98	33	996	54	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		4.0	7.0	7.0	7.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5010		1772	4670	1718	1535
Flt Permitted	1.00		0.04	1.00	0.95	1.00
Satd. Flow (perm)	5010		83	4670	1718	1535
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2411	103	35	1048	57	88
RTOR Reduction (vph)	2	0	0	0	0	79
Lane Group Flow (vph)	2512	0	35	1048	57	9
Confl. Peds. (#/hr)					2	1
Heavy Vehicles (%)	4%	5%	3%	12%	6%	5%
Bus Blockages (#/hr)	0	6	0	2	0	0
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	86.4		94.2	94.2	11.8	11.8
Effective Green, g (s)	86.4		94.2	94.2	11.8	11.8
Actuated g/C Ratio	0.72		0.79	0.79	0.10	0.10
Clearance Time (s)	7.0		4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0		3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3607		118	3665	168	150
v/s Ratio Prot	c0.50		0.01	c0.22		
v/s Ratio Perm			0.22		c0.03	0.01
v/c Ratio	0.70		0.30	0.29	0.34	0.06
Uniform Delay, d1	9.4		8.8	3.6	50.5	49.1
Progression Factor	0.13		3.92	0.22	1.00	1.00
Incremental Delay, d2	0.7		1.2	0.2	2.5	0.3
Delay (s)	2.0		35.6	1.0	53.0	49.4
Level of Service	A		D	A	D	D
Approach Delay (s)	2.0			2.1	50.8	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			3.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			67.0%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
46: Bronte Rd & Dundas St W

<2020 Existing> AM Peak Hour
06/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 			 	
Traffic Volume (vph)	326	1495	458	140	571	204	190	721	160	227	1103	174
Future Volume (vph)	326	1495	458	140	571	204	190	721	160	227	1103	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1772	5092	1563	1508	4573		3079	3411	1512	1755	3411	1541
Flt Permitted	0.23	1.00	1.00	0.10	1.00		0.95	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	437	5092	1563	163	4573		3079	3411	1512	412	3411	1541
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	351	1608	492	151	614	219	204	775	172	244	1186	187
RTOR Reduction (vph)	0	0	138	0	54	0	0	0	87	0	0	75
Lane Group Flow (vph)	351	1608	354	151	779	0	204	775	85	244	1186	112
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	21%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Actuated Green, G (s)	51.0	41.0	41.0	47.0	39.0		11.2	40.0	40.0	46.8	37.8	37.8
Effective Green, g (s)	51.0	41.0	41.0	47.0	39.0		11.2	40.0	40.0	46.8	37.8	37.8
Actuated g/C Ratio	0.42	0.34	0.34	0.39	0.32		0.09	0.33	0.33	0.39	0.31	0.31
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0		2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	296	1739	534	153	1486		287	1137	504	261	1074	485
v/s Ratio Prot	c0.10	0.32		0.07	0.17		0.07	0.23		c0.07	c0.35	
v/s Ratio Perm	c0.40		0.23	0.32					0.06	0.29		0.07
v/c Ratio	1.19	0.92	0.66	0.99	0.52		0.71	0.68	0.17	0.93	1.10	0.23
Uniform Delay, d1	29.6	38.0	33.6	29.7	33.0		52.8	34.5	28.2	31.1	41.1	30.4
Progression Factor	1.65	1.38	1.76	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	106.2	7.7	4.8	68.2	1.3		7.5	1.8	0.2	38.2	60.7	0.3
Delay (s)	155.0	60.2	63.9	97.9	34.3		60.3	36.4	28.5	69.3	101.8	30.7
Level of Service	F	E	E	F	C		E	D	C	E	F	C
Approach Delay (s)		74.5			44.0			39.4			88.6	
Approach LOS		E			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			66.9			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			92.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

2020 Existing PM

HCM Signalized Intersection Capacity Analysis
1: Bronte Rd & 407 Off Ramp

<2020 Existing> PM Peak Hour
06/23/2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	47	0	1555	830	0
Future Volume (vph)	111	47	0	1555	830	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3541	1633		5245	3650	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3541	1633		5245	3650	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	116	49	0	1620	865	0
RTOR Reduction (vph)	0	45	0	0	0	0
Lane Group Flow (vph)	116	4	0	1620	865	0
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	7.7	7.7		65.3	65.3	
Effective Green, g (s)	7.7	7.7		65.3	65.3	
Actuated g/C Ratio	0.09	0.09		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	320	147		4029	2804	
v/s Ratio Prot	c0.03			c0.31	0.24	
v/s Ratio Perm		0.00				
v/c Ratio	0.36	0.03		0.40	0.31	
Uniform Delay, d1	36.3	35.2		3.3	3.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.3	0.3	
Delay (s)	37.3	35.4		3.6	3.3	
Level of Service	D	D		A	A	
Approach Delay (s)	36.7			3.6	3.3	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			5.6		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.40			
Actuated Cycle Length (s)			85.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			45.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2020 Existing> PM Peak Hour
06/23/2020

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	235	1035	1970	187	79	456
Future Volume (vph)	235	1035	1970	187	79	456
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1807	3544	3544	1601	1825	1570
Flt Permitted	0.06	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	114	3544	3544	1601	1825	1570
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1089	2074	197	83	480
RTOR Reduction (vph)	0	0	0	48	0	138
Lane Group Flow (vph)	247	1089	2074	149	83	342
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2			6		8
Actuated Green, G (s)	79.0	79.0	63.0	63.0	27.0	27.0
Effective Green, g (s)	79.0	79.0	63.0	63.0	27.0	27.0
Actuated g/C Ratio	0.66	0.66	0.52	0.52	0.22	0.22
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	2.5
Lane Grp Cap (vph)	244	2333	1860	840	410	353
v/s Ratio Prot	c0.10	0.31	c0.59		0.05	
v/s Ratio Perm	0.57			0.09		c0.22
v/c Ratio	1.01	0.47	1.12	0.18	0.20	0.97
Uniform Delay, d1	41.3	10.1	28.5	14.9	37.8	46.1
Progression Factor	1.00	1.00	0.96	0.72	1.00	1.00
Incremental Delay, d2	60.8	0.7	57.0	0.3	0.2	39.2
Delay (s)	102.1	10.8	84.4	11.0	37.9	85.3
Level of Service	F	B	F	B	D	F
Approach Delay (s)		27.7	78.0		78.3	
Approach LOS		C	E		E	
Intersection Summary						
HCM 2000 Control Delay			61.9		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.06			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			94.4%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
42: Colonel William Pkwy/Private Driveway & Dundas St W

<2020 Existing> PM Peak Hour
06/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1003	82	100	1823	3	238	3	60	59	0	56
Future Volume (vph)	0	1003	82	100	1823	3	238	3	60	59	0	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3544	1558	1825	3544	1620	1753	1921	1505	1786	1612	
Flt Permitted		1.00	1.00	0.19	1.00	1.00	0.72	1.00	1.00	0.76	1.00	
Satd. Flow (perm)		3544	1558	366	3544	1620	1326	1921	1505	1421	1612	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1056	86	105	1919	3	251	3	63	62	0	59
RTOR Reduction (vph)	0	0	38	0	0	1	0	0	48	0	45	0
Lane Group Flow (vph)	0	1056	48	105	1919	2	251	3	15	62	14	0
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)		66.8	66.8	78.8	78.8	78.8	27.8	27.8	27.8	27.8	27.8	
Effective Green, g (s)		66.8	66.8	78.8	78.8	78.8	27.8	27.8	27.8	27.8	27.8	
Actuated g/C Ratio		0.56	0.56	0.66	0.66	0.66	0.23	0.23	0.23	0.23	0.23	
Clearance Time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)		1972	867	337	2327	1063	307	445	348	329	373	
v/s Ratio Prot		0.30		0.02	c0.54			0.00			0.01	
v/s Ratio Perm			0.03	0.18		0.00	c0.19		0.01	0.04		
v/c Ratio		0.54	0.06	0.31	0.82	0.00	0.82	0.01	0.04	0.19	0.04	
Uniform Delay, d1		16.8	12.2	9.8	15.4	7.1	43.7	35.5	35.8	37.0	35.7	
Progression Factor		0.65	0.30	0.49	0.44	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	0.1	0.5	3.1	0.0	15.8	0.0	0.1	0.1	0.0	
Delay (s)		11.8	3.8	5.3	9.9	7.1	59.5	35.5	35.8	37.1	35.7	
Level of Service		B	A	A	A	A	E	D	D	D	D	
Approach Delay (s)		11.2			9.7			54.6			36.5	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			15.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			17.4		
Intersection Capacity Utilization			90.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1083	36	44	1876	49	25
Future Volume (vph)	1083	36	44	1876	49	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0		4.0	7.0	7.0	7.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5067		1789	5078	1825	1633
Flt Permitted	1.00		0.20	1.00	0.95	1.00
Satd. Flow (perm)	5067		383	5078	1825	1633
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1165	39	47	2017	53	27
RTOR Reduction (vph)	2	0	0	0	0	25
Lane Group Flow (vph)	1202	0	47	2017	53	2
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%
Bus Blockages (#/hr)	0	4	0	2	0	0
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	87.5		96.6	96.6	9.4	9.4
Effective Green, g (s)	87.5		96.6	96.6	9.4	9.4
Actuated g/C Ratio	0.73		0.80	0.80	0.08	0.08
Clearance Time (s)	7.0		4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0		3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3694		368	4087	142	127
v/s Ratio Prot	0.24		0.01	c0.40		
v/s Ratio Perm			0.10		c0.03	0.00
v/c Ratio	0.33		0.13	0.49	0.37	0.02
Uniform Delay, d1	5.8		2.6	3.8	52.5	51.0
Progression Factor	2.64		0.82	0.75	1.00	1.00
Incremental Delay, d2	0.2		0.1	0.3	3.4	0.1
Delay (s)	15.5		2.2	3.1	55.9	51.1
Level of Service	B		A	A	E	D
Approach Delay (s)	15.5			3.1	54.3	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			8.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.50			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			56.2%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Bronte Rd & Dundas St W

<2020 Existing> PM Peak Hour
06/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	825	178	155	1202	160	410	1204	113	227	592	256
Future Volume (vph)	218	825	178	155	1202	160	410	1204	113	227	592	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	5092	1563	1755	5040		3471	3544	1445	1789	3510	1601
Flt Permitted	0.11	1.00	1.00	0.23	1.00		0.95	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	204	5092	1563	425	5040		3471	3544	1445	204	3510	1601
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	225	851	184	160	1239	165	423	1241	116	234	610	264
RTOR Reduction (vph)	0	0	127	0	15	0	0	0	73	0	0	108
Lane Group Flow (vph)	225	851	57	160	1389	0	423	1241	43	234	610	156
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Actuated Green, G (s)	45.0	37.0	37.0	45.0	37.0		16.0	40.0	40.0	50.0	37.0	37.0
Effective Green, g (s)	45.0	37.0	37.0	45.0	37.0		16.0	40.0	40.0	50.0	37.0	37.0
Actuated g/C Ratio	0.38	0.31	0.31	0.38	0.31		0.13	0.33	0.33	0.42	0.31	0.31
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0		2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	182	1570	481	248	1554		462	1181	481	256	1082	493
v/s Ratio Prot	c0.08	0.17		0.04	0.28		c0.12	c0.35		0.10	0.17	
v/s Ratio Perm	c0.38		0.04	0.20					0.03	0.28		0.10
v/c Ratio	1.24	0.54	0.12	0.65	0.89		0.92	1.05	0.09	0.91	0.56	0.32
Uniform Delay, d1	31.3	34.5	29.8	26.4	39.6		51.3	40.0	27.5	31.9	34.7	31.8
Progression Factor	2.31	0.33	0.12	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	143.6	1.3	0.5	5.0	8.3		22.7	40.6	0.1	34.0	0.8	0.5
Delay (s)	215.7	12.8	4.2	31.4	48.0		74.0	80.6	27.6	65.9	35.6	32.3
Level of Service	F	B	A	C	D		E	F	C	E	D	C
Approach Delay (s)		47.8			46.3			75.6			41.2	
Approach LOS		D			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			54.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			103.1%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

2020 Existing Calibrated AM

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2020 Existing Cal.> AM Peak Hour
06/23/2020

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (vph)	366	2215	787	95	255	328
Future Volume (vph)	366	2215	787	95	255	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1807	3544	3259	1570	1825	1611
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	381	3544	3259	1570	1825	1611
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	416	2517	894	108	290	373
RTOR Reduction (vph)	0	0	0	49	0	287
Lane Group Flow (vph)	416	2517	894	59	290	86
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2			6		8
Actuated Green, G (s)	82.3	82.3	54.6	54.6	23.7	23.7
Effective Green, g (s)	83.3	86.3	58.6	58.6	27.7	27.7
Actuated g/C Ratio	0.69	0.72	0.49	0.49	0.23	0.23
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	2.5
Lane Grp Cap (vph)	557	2548	1591	766	421	371
v/s Ratio Prot	0.15	c0.71	0.27		c0.16	
v/s Ratio Perm	0.36			0.04		0.05
v/c Ratio	0.75	0.99	0.56	0.08	0.69	0.23
Uniform Delay, d1	15.3	16.3	21.6	16.3	42.2	37.5
Progression Factor	1.00	1.00	0.64	0.83	1.00	1.00
Incremental Delay, d2	5.4	15.2	1.4	0.2	4.3	0.2
Delay (s)	20.8	31.5	15.2	13.7	46.5	37.7
Level of Service	C	C	B	B	D	D
Approach Delay (s)		30.0	15.1		41.6	
Approach LOS		C	B		D	
Intersection Summary						
HCM 2000 Control Delay			28.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			82.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
46: Bronte Rd & Dundas St W

<2020 Existing Cal.> AM Peak Hour
06/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 			 	
Traffic Volume (vph)	326	1495	458	140	571	204	190	721	160	227	1103	174
Future Volume (vph)	326	1495	458	140	571	204	190	721	160	227	1103	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	5092	1563	1508	4573		3079	3411	1512	1755	3411	1541
Flt Permitted	0.20	1.00	1.00	0.11	1.00		0.95	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	486	5092	1563	172	4573		3079	3411	1512	353	3411	1541
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	351	1608	492	151	614	219	204	775	172	244	1186	187
RTOR Reduction (vph)	0	0	122	0	54	0	0	0	93	0	0	92
Lane Group Flow (vph)	351	1608	370	151	779	0	204	775	79	244	1186	95
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	21%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Actuated Green, G (s)	53.0	41.0	41.0	44.0	36.0		8.0	40.0	40.0	50.0	41.0	41.0
Effective Green, g (s)	54.0	44.0	44.0	46.0	39.0		9.0	43.0	43.0	52.0	44.0	44.0
Actuated g/C Ratio	0.45	0.37	0.37	0.38	0.32		0.08	0.36	0.36	0.43	0.37	0.37
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0		2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	352	1867	573	166	1486		230	1222	541	269	1250	565
v/s Ratio Prot	c0.12	0.32		0.07	0.17		0.07	0.23		c0.08	c0.35	
v/s Ratio Perm	c0.33		0.24	0.28					0.05	0.32		0.06
v/c Ratio	1.00	0.86	0.65	0.91	0.52		0.89	0.63	0.15	0.91	0.95	0.17
Uniform Delay, d1	28.9	35.2	31.5	29.5	33.0		55.0	32.0	26.1	26.5	36.9	25.7
Progression Factor	1.69	1.40	1.74	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.2	4.1	4.1	44.0	1.3		30.8	1.2	0.2	31.4	14.9	0.2
Delay (s)	89.2	53.4	59.0	73.5	34.3		85.8	33.2	26.2	57.9	51.8	25.8
Level of Service	F	D	E	E	C		F	C	C	E	D	C
Approach Delay (s)		59.6			40.3			41.5			49.7	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			50.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			87.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

2020 Existing Calibrated PM

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2020 Existing Cal.> PM Peak Hour
06/23/2020

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		 	 			
Traffic Volume (vph)	235	1035	1970	187	79	456
Future Volume (vph)	235	1035	1970	187	79	456
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1301	3544	3544	1601	1825	1570
Flt Permitted	0.06	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	223	3544	3544	1601	1825	1570
Peak-hour factor, PHF	0.95	0.95	0.97	0.97	0.95	0.95
Adj. Flow (vph)	247	1089	2031	193	83	480
RTOR Reduction (vph)	0	0	0	48	0	109
Lane Group Flow (vph)	247	1089	2031	145	83	371
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2			6		8
Actuated Green, G (s)	79.4	79.4	65.5	65.5	26.6	26.6
Effective Green, g (s)	80.4	83.4	69.5	69.5	30.6	30.6
Actuated g/C Ratio	0.67	0.70	0.58	0.58	0.26	0.26
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	2.5
Lane Grp Cap (vph)	247	2463	2052	927	465	400
v/s Ratio Prot	c0.09	0.31	0.57		0.05	
v/s Ratio Perm	c0.58			0.09		c0.24
v/c Ratio	1.00	0.44	0.99	0.16	0.18	0.93
Uniform Delay, d1	29.9	8.1	24.9	11.7	34.9	43.6
Progression Factor	1.00	1.00	1.10	0.90	1.00	1.00
Incremental Delay, d2	57.3	0.6	13.1	0.2	0.1	27.4
Delay (s)	87.2	8.6	40.6	10.8	35.0	71.0
Level of Service	F	A	D	B	D	E
Approach Delay (s)		23.2	38.0		65.7	
Approach LOS		C	D		E	
Intersection Summary						
HCM 2000 Control Delay			37.0		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.98			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			89.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
46: Bronte Rd & Dundas St W

<2020 Existing Cal.> PM Peak Hour
06/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 			 	
Traffic Volume (vph)	218	825	178	155	1202	160	410	1204	113	227	592	256
Future Volume (vph)	218	825	178	155	1202	160	410	1204	113	227	592	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	5092	1563	1755	5040		3471	3544	1445	1789	3510	1601
Flt Permitted	0.11	1.00	1.00	0.23	1.00		0.95	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	238	5092	1563	416	5040		3471	3544	1445	197	3510	1601
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	225	851	184	160	1239	165	423	1241	116	234	610	264
RTOR Reduction (vph)	0	0	124	0	14	0	0	0	69	0	0	110
Lane Group Flow (vph)	225	851	60	160	1390	0	423	1241	47	234	610	154
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Bus Blockages (#/hr)	0	0	2	0	0	2	0	0	0	0	0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Actuated Green, G (s)	46.0	37.0	37.0	44.0	36.0		15.8	42.0	42.0	48.2	37.2	37.2
Effective Green, g (s)	48.0	39.0	39.0	46.0	38.0		16.8	44.0	44.0	50.2	39.2	39.2
Actuated g/C Ratio	0.40	0.32	0.32	0.38	0.32		0.14	0.37	0.37	0.42	0.33	0.33
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0		2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	225	1654	507	259	1596		485	1299	529	241	1146	522
v/s Ratio Prot	c0.08	0.17		0.05	0.28		c0.12	c0.35		c0.10	0.17	
v/s Ratio Perm	c0.32		0.04	0.19					0.03	0.31		0.10
v/c Ratio	1.00	0.51	0.12	0.62	0.87		0.87	0.96	0.09	0.97	0.53	0.30
Uniform Delay, d1	29.7	32.8	28.4	25.8	38.7		50.5	37.0	24.9	32.8	32.9	30.1
Progression Factor	2.31	0.33	0.11	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	59.1	1.1	0.5	3.7	6.8		15.6	15.5	0.1	49.6	0.6	0.4
Delay (s)	127.7	11.9	3.6	29.5	45.5		66.2	52.6	25.0	82.4	33.5	30.5
Level of Service	F	B	A	C	D		E	D	C	F	C	C
Approach Delay (s)		31.3			43.8			54.0			43.1	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			44.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			99.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

APPENDIX

D-2 *2025 HORIZON YEAR*

APPENDIX

2025 Phase 1 Future Background AM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2025 Phase 1 FB> AM Peak Hour

06/29/2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	139	0	1001	1940	0
Future Volume (vph)	167	139	0	1001	1940	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3219	1575		4902	3444	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3219	1575		4902	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	139	0	1001	1940	0
RTOR Reduction (vph)	0	23	0	0	0	0
Lane Group Flow (vph)	167	116	0	1001	1940	0
Confl. Peds. (#/hr)		2	1			1
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.3	11.3		61.7	61.7	
Effective Green, g (s)	11.3	11.3		61.7	61.7	
Actuated g/C Ratio	0.13	0.13		0.73	0.73	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	427	209		3558	2499	
v/s Ratio Prot	0.05			0.20	c0.56	
v/s Ratio Perm		c0.07				
v/c Ratio	0.39	0.56		0.28	0.78	
Uniform Delay, d1	33.7	34.5		4.0	7.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	3.9		0.2	2.4	
Delay (s)	34.5	38.4		4.2	9.8	
Level of Service	C	D		A	A	
Approach Delay (s)	36.3			4.2	9.8	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay		10.5		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.74				
Actuated Cycle Length (s)		85.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		72.5%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

28: Bronte Rd & William Halton Parkway

<2025 Phase 1 FB> AM Peak Hour

06/29/2020

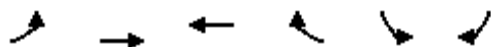
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	51	76	1376	137	347	1732
Future Volume (vph)	51	76	1376	137	347	1732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		4.0	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3471	1601	3530		1789	3579
Flt Permitted	0.95	1.00	1.00		0.08	1.00
Satd. Flow (perm)	3471	1601	3530		156	3579
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	51	76	1376	137	347	1732
RTOR Reduction (vph)	0	71	5	0	0	0
Lane Group Flow (vph)	51	5	1508	0	347	1732
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	8.0	8.0	68.8		98.0	98.0
Effective Green, g (s)	8.0	8.0	68.8		98.0	98.0
Actuated g/C Ratio	0.07	0.07	0.57		0.82	0.82
Clearance Time (s)	7.0	7.0	7.0		4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	231	106	2023		470	2922
v/s Ratio Prot	c0.01		0.43		c0.15	0.48
v/s Ratio Perm		0.00			c0.45	
v/c Ratio	0.22	0.05	0.75		0.74	0.59
Uniform Delay, d1	53.0	52.4	19.1		30.5	3.9
Progression Factor	1.00	1.00	0.93		1.00	1.00
Incremental Delay, d2	0.5	0.2	1.4		6.0	0.9
Delay (s)	53.5	52.6	19.2		36.5	4.8
Level of Service	D	D	B		D	A
Approach Delay (s)	53.0		19.2			10.1
Approach LOS	D		B			B
Intersection Summary						
HCM 2000 Control Delay			15.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			85.0%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

38: Dundas Street West/Dundas St W & Tremaine Rd

<2025 Phase 1 FB> AM Peak Hour

06/29/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	592	2646	919	229	419	427
Future Volume (vph)	592	2646	919	229	419	427
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1611
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	796	4476	4117	1570	3541	1611
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	592	2646	919	229	419	427
RTOR Reduction (vph)	0	0	0	90	0	344
Lane Group Flow (vph)	592	2646	919	139	419	83
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2			6		8
Actuated Green, G (s)	86.6	86.6	68.8	68.8	19.4	19.4
Effective Green, g (s)	87.6	90.6	72.8	72.8	23.4	23.4
Actuated g/C Ratio	0.73	0.75	0.61	0.61	0.19	0.19
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	2.5
Lane Grp Cap (vph)	915	3379	2497	952	690	314
v/s Ratio Prot	0.08	c0.59	0.22		c0.12	
v/s Ratio Perm	0.39			0.09		0.05
v/c Ratio	0.65	0.78	0.37	0.15	0.61	0.27
Uniform Delay, d1	7.0	8.8	12.0	10.2	44.1	41.0
Progression Factor	1.00	1.00	0.95	2.42	1.00	1.00
Incremental Delay, d2	1.6	1.9	0.4	0.3	1.3	0.3
Delay (s)	8.6	10.7	11.8	25.0	45.4	41.3
Level of Service	A	B	B	C	D	D
Approach Delay (s)		10.3	14.4		43.3	
Approach LOS		B	B		D	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Private Driveway & Dundas St W

<2025 Phase 1 FB> AM Peak Hour

06/29/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	73	2646	259	57	1108	90	69	1	164	6	0	2
Future Volume (vph)	73	2646	259	57	1108	90	69	1	164	6	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1806	4476	1601	1674	4117	1575	1768	1921	1517	1555	1610	
Flt Permitted	0.20	1.00	1.00	0.05	1.00	1.00	0.76	1.00	1.00	0.76	1.00	
Satd. Flow (perm)	373	4476	1601	84	4117	1575	1408	1921	1517	1239	1610	
Peak-hour factor, PHF	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. Flow (vph)	73	2646	259	57	1108	90	69	1	164	6	0	2
RTOR Reduction (vph)	0	0	62	0	0	27	0	0	86	0	2	0
Lane Group Flow (vph)	73	2646	198	57	1108	63	69	1	78	6	0	0
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	89.1	84.0	84.0	89.9	84.4	84.4	13.1	13.1	13.1	13.1	13.1	
Effective Green, g (s)	89.1	84.0	84.0	89.9	84.4	84.4	13.1	13.1	13.1	13.1	13.1	
Actuated g/C Ratio	0.74	0.70	0.70	0.75	0.70	0.70	0.11	0.11	0.11	0.11	0.11	
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)	337	3133	1120	135	2895	1107	153	209	165	135	175	
v/s Ratio Prot	0.01	c0.59		c0.02	0.27			0.00			0.00	
v/s Ratio Perm	0.15		0.12	0.30		0.04	0.05		c0.05	0.00		
v/c Ratio	0.22	0.84	0.18	0.42	0.38	0.06	0.45	0.00	0.47	0.04	0.00	
Uniform Delay, d1	4.3	13.2	6.2	18.6	7.2	5.5	50.1	47.6	50.2	47.8	47.6	
Progression Factor	1.21	0.96	1.61	1.59	1.33	2.73	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	2.0	0.2	2.0	0.4	0.1	2.5	0.0	2.5	0.0	0.0	
Delay (s)	5.3	14.7	10.1	31.5	10.0	15.1	52.6	47.7	52.7	47.9	47.6	
Level of Service	A	B	B	C	A	B	D	D	D	D	D	
Approach Delay (s)		14.1			11.3			52.6			47.8	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			15.4			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			88.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr & Dundas St W

<2025 Phase 1 FB> AM Peak Hour

06/29/2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↓	↑↑↑	↓	↑
Traffic Volume (vph)	2885	98	33	1262	54	84
Future Volume (vph)	2885	98	33	1262	54	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	*0.80	1.00	1.00	*0.80	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4433	1555	1772	4117	1718	1535
Flt Permitted	1.00	1.00	0.04	1.00	0.95	1.00
Satd. Flow (perm)	4433	1555	80	4117	1718	1535
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2885	98	33	1262	54	84
RTOR Reduction (vph)	0	15	0	0	0	77
Lane Group Flow (vph)	2885	83	33	1262	54	7
Confl. Peds. (#/hr)					2	1
Heavy Vehicles (%)	4%	5%	3%	12%	6%	5%
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Actuated Green, G (s)	88.7	88.7	96.4	96.4	9.6	9.6
Effective Green, g (s)	88.7	88.7	96.4	96.4	9.6	9.6
Actuated g/C Ratio	0.74	0.74	0.80	0.80	0.08	0.08
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3276	1149	116	3307	137	122
v/s Ratio Prot	c0.65		0.01	c0.31		
v/s Ratio Perm		0.05	0.22		c0.03	0.00
v/c Ratio	0.88	0.07	0.28	0.38	0.39	0.06
Uniform Delay, d1	11.7	4.3	19.9	3.3	52.4	51.0
Progression Factor	0.87	1.66	5.54	0.76	1.00	1.00
Incremental Delay, d2	2.4	0.1	1.1	0.3	3.9	0.4
Delay (s)	12.6	7.2	111.1	2.8	56.3	51.4
Level of Service	B	A	F	A	E	D
Approach Delay (s)	12.4			5.6	53.3	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			11.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.82			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			76.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2025 Phase 1 FB> AM Peak Hour

06/29/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 			 	
Traffic Volume (vph)	411	1980	483	172	772	204	225	898	248	227	1165	204
Future Volume (vph)	411	1980	483	172	772	204	225	898	248	227	1165	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1563	913	4596		3079	3411	1512	1755	3411	1541
Flt Permitted	0.15	1.00	1.00	0.11	1.00		0.95	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	486	4476	1563	104	4596		3079	3411	1512	200	3411	1541
Peak-hour factor, PHF	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. Flow (vph)	411	1980	483	172	772	204	225	898	248	227	1165	204
RTOR Reduction (vph)	0	0	127	0	40	0	0	0	109	0	0	98
Lane Group Flow (vph)	411	1980	356	172	936	0	225	898	139	227	1165	106
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	100%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Actuated Green, G (s)	58.0	43.0	43.0	47.0	36.0		8.0	36.0	36.0	44.0	36.0	36.0
Effective Green, g (s)	59.0	46.0	46.0	49.0	39.0		9.0	39.0	39.0	46.0	39.0	39.0
Actuated g/C Ratio	0.49	0.38	0.38	0.41	0.32		0.08	0.32	0.32	0.38	0.32	0.32
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	3.0	6.0		2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	420	1715	599	123	1493		230	1108	491	193	1108	500
v/s Ratio Prot	c0.15	0.44		c0.14	0.20		0.07	0.26		c0.09	0.34	
v/s Ratio Perm	0.33		0.23	c0.43					0.09	c0.36		0.07
v/c Ratio	0.98	1.15	0.59	1.40	0.63		0.98	0.81	0.28	1.18	1.05	0.21
Uniform Delay, d1	24.8	37.0	29.5	33.4	34.3		55.4	37.1	30.1	29.8	40.5	29.4
Progression Factor	1.47	0.95	0.98	1.00	1.00		1.00	1.00	1.00	1.09	1.08	1.73
Incremental Delay, d2	26.8	73.6	2.4	220.9	2.0		52.6	4.8	0.4	115.1	39.4	0.2
Delay (s)	63.2	108.9	31.4	254.4	36.3		108.0	41.9	30.5	147.4	83.4	51.2
Level of Service	E	F	C	F	D		F	D	C	F	F	D
Approach Delay (s)		89.3			69.0			50.7			88.4	
Approach LOS		F			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			78.2			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.22									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			99.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

2025 Phase 1 Future Background PM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2025 Phase 1 FB> PM Peak Hour

06/25/2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	54	0	1928	1022	0
Future Volume (vph)	111	54	0	1928	1022	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3437	1601		5142	3579	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3437	1601		5142	3579	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	54	0	1928	1022	0
RTOR Reduction (vph)	0	49	0	0	0	0
Lane Group Flow (vph)	111	5	0	1928	1022	0
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	7.6	7.6		65.4	65.4	
Effective Green, g (s)	7.6	7.6		65.4	65.4	
Actuated g/C Ratio	0.09	0.09		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	307	143		3956	2753	
v/s Ratio Prot	c0.03			c0.37	0.29	
v/s Ratio Perm		0.00				
v/c Ratio	0.36	0.03		0.49	0.37	
Uniform Delay, d1	36.4	35.3		3.6	3.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.1		0.4	0.4	
Delay (s)	37.4	35.5		4.0	3.5	
Level of Service	D	D		A	A	
Approach Delay (s)	36.8			4.0	3.5	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			5.6		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			85.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			52.3%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

28: Bronte Rd & William Halton Parkway

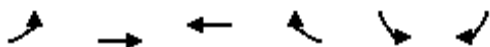
<2025 Phase 1 FB> PM Peak Hour

06/25/2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	217	355	1658	56	101	1209
Future Volume (vph)	217	355	1658	56	101	1209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		4.0	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3471	1601	3561		1789	3579
Flt Permitted	0.95	1.00	1.00		0.06	1.00
Satd. Flow (perm)	3471	1601	3561		105	3579
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	217	355	1658	56	101	1209
RTOR Reduction (vph)	0	98	2	0	0	0
Lane Group Flow (vph)	217	257	1712	0	101	1209
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	23.1	23.1	71.7		82.9	82.9
Effective Green, g (s)	23.1	23.1	71.7		82.9	82.9
Actuated g/C Ratio	0.19	0.19	0.60		0.69	0.69
Clearance Time (s)	7.0	7.0	7.0		4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	668	308	2127		173	2472
v/s Ratio Prot	0.06		c0.48		0.03	c0.34
v/s Ratio Perm		c0.16			0.37	
v/c Ratio	0.32	0.84	0.81		0.58	0.49
Uniform Delay, d1	41.7	46.6	18.7		20.1	8.7
Progression Factor	1.00	1.00	1.47		1.00	1.00
Incremental Delay, d2	0.3	17.5	0.3		4.9	0.7
Delay (s)	42.0	64.1	27.8		25.1	9.4
Level of Service	D	E	C		C	A
Approach Delay (s)	55.7		27.8			10.6
Approach LOS	E		C			B
Intersection Summary						
HCM 2000 Control Delay			26.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			81.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2025 Phase 1 FB> PM Peak Hour
06/25/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	336	1190	2429	304	254	665
Future Volume (vph)	336	1190	2429	304	254	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.06	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	217	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	336	1190	2429	304	254	665
RTOR Reduction (vph)	0	0	0	80	0	99
Lane Group Flow (vph)	336	1190	2429	224	254	566
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		8	
Permitted Phases	2			6		8
Actuated Green, G (s)	77.0	77.0	64.1	64.1	29.0	29.0
Effective Green, g (s)	78.0	81.0	68.1	68.1	33.0	33.0
Actuated g/C Ratio	0.65	0.68	0.57	0.57	0.28	0.28
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	2.5
Lane Grp Cap (vph)	412	3021	2540	908	973	431
v/s Ratio Prot	c0.07	0.27	c0.54		0.07	
v/s Ratio Perm	0.46			0.14		c0.36
v/c Ratio	0.82	0.39	0.96	0.25	0.26	1.31
Uniform Delay, d1	36.3	8.6	24.5	13.1	34.0	43.5
Progression Factor	1.00	1.00	0.80	1.52	1.00	1.00
Incremental Delay, d2	11.8	0.4	7.1	0.4	0.1	156.4
Delay (s)	48.1	9.0	26.7	20.3	34.1	199.9
Level of Service	D	A	C	C	C	F
Approach Delay (s)		17.6	26.0		154.1	
Approach LOS		B	C		F	
Intersection Summary						
HCM 2000 Control Delay			46.3		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.05			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			94.8%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Private Driveway & Dundas St W

<2025 Phase 1 FB> PM Peak Hour

06/25/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	0	1333	82	100	2399	3	238	3	60	59	0	56
Future Volume (vph)	0	1333	82	100	2399	3	238	3	60	59	0	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor		*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4476	1570	1825	4476	1633	1753	1921	1505	1786	1612	
Flt Permitted		1.00	1.00	0.11	1.00	1.00	0.72	1.00	1.00	0.76	1.00	
Satd. Flow (perm)		4476	1570	220	4476	1633	1330	1921	1505	1421	1612	
Peak-hour factor, PHF	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. Flow (vph)	0	1333	82	100	2399	3	238	3	60	59	0	56
RTOR Reduction (vph)	0	0	35	0	0	1	0	0	47	0	43	0
Lane Group Flow (vph)	0	1333	47	100	2399	2	238	3	13	59	13	0
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)		68.2	68.2	79.8	79.8	79.8	26.8	26.8	26.8	26.8	26.8	
Effective Green, g (s)		68.2	68.2	79.8	79.8	79.8	26.8	26.8	26.8	26.8	26.8	
Actuated g/C Ratio		0.57	0.57	0.66	0.66	0.66	0.22	0.22	0.22	0.22	0.22	
Clearance Time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)		2543	892	247	2976	1085	297	429	336	317	360	
v/s Ratio Prot		0.30		0.03	c0.54			0.00			0.01	
v/s Ratio Perm			0.03	0.24		0.00	c0.18		0.01	0.04		
v/c Ratio		0.52	0.05	0.40	0.81	0.00	0.80	0.01	0.04	0.19	0.03	
Uniform Delay, d1		15.9	11.5	9.7	14.5	6.7	44.1	36.2	36.5	37.8	36.5	
Progression Factor		1.70	3.44	1.79	1.60	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7	0.1	0.8	1.9	0.0	14.7	0.0	0.1	0.1	0.0	
Delay (s)		27.8	39.8	18.2	25.1	6.7	58.8	36.3	36.6	37.9	36.5	
Level of Service		C	D	B	C	A	E	D	D	D	D	
Approach Delay (s)		28.5			24.8			54.1			37.2	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			28.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				17.4		
Intersection Capacity Utilization			86.3%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr & Dundas St W

<2025 Phase 1 FB> PM Peak Hour

06/25/2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↓	↑↑↑	↓	↑
Traffic Volume (vph)	1413	36	44	2452	49	25
Future Volume (vph)	1413	36	44	2452	49	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	*0.80	1.00	1.00	*0.80	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4476	1585	1789	4476	1825	1633
Flt Permitted	1.00	1.00	0.12	1.00	0.95	1.00
Satd. Flow (perm)	4476	1585	235	4476	1825	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1413	36	44	2452	49	25
RTOR Reduction (vph)	0	10	0	0	0	23
Lane Group Flow (vph)	1413	26	44	2452	49	2
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Actuated Green, G (s)	87.8	87.8	96.8	96.8	9.2	9.2
Effective Green, g (s)	87.8	87.8	96.8	96.8	9.2	9.2
Actuated g/C Ratio	0.73	0.73	0.81	0.81	0.08	0.08
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3274	1159	254	3610	139	125
v/s Ratio Prot	0.32		0.01	c0.55		
v/s Ratio Perm		0.02	0.13		c0.03	0.00
v/c Ratio	0.43	0.02	0.17	0.68	0.35	0.02
Uniform Delay, d1	6.3	4.4	3.1	5.0	52.6	51.2
Progression Factor	0.45	0.92	0.86	1.37	1.00	1.00
Incremental Delay, d2	0.4	0.0	0.1	0.3	3.2	0.1
Delay (s)	3.2	4.1	2.7	7.1	55.8	51.3
Level of Service	A	A	A	A	E	D
Approach Delay (s)	3.2			7.0	54.3	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			6.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			67.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2025 Phase 1 FB> PM Peak Hour

06/25/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	1060	218	227	1683	160	445	1281	163	227	847	316
Future Volume (vph)	273	1060	218	227	1683	160	445	1281	163	227	847	316
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1575	1755	5066		3471	3544	1445	1789	3510	1601
Flt Permitted	0.11	1.00	1.00	0.10	1.00		0.95	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	238	4476	1575	189	5066		3471	3544	1445	204	3510	1601
Peak-hour factor, PHF	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. Flow (vph)	273	1060	218	227	1683	160	445	1281	163	227	847	316
RTOR Reduction (vph)	0	0	149	0	9	0	0	0	69	0	0	135
Lane Group Flow (vph)	273	1060	69	227	1834	0	445	1281	94	227	847	181
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Actuated Green, G (s)	46.0	36.0	36.0	50.0	38.0		14.0	42.0	42.0	44.0	36.0	36.0
Effective Green, g (s)	48.0	38.0	38.0	52.0	40.0		15.0	44.0	44.0	46.0	38.0	38.0
Actuated g/C Ratio	0.40	0.32	0.32	0.43	0.33		0.12	0.37	0.37	0.38	0.32	0.32
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0		2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	239	1417	498	251	1688		433	1299	529	197	1111	506
v/s Ratio Prot	c0.10	0.24		c0.10	c0.36		c0.13	0.36		c0.09	0.24	
v/s Ratio Perm	0.35		0.04	0.29					0.07	c0.36		0.11
v/c Ratio	1.14	0.75	0.14	0.90	1.09		1.03	0.99	0.18	1.15	0.76	0.36
Uniform Delay, d1	30.1	36.7	29.3	30.6	40.0		52.5	37.7	25.7	31.1	36.9	31.6
Progression Factor	1.87	1.52	5.50	1.00	1.00		1.00	1.00	1.00	0.84	1.04	1.24
Incremental Delay, d2	100.4	3.4	0.5	32.5	49.4		50.5	21.5	0.2	108.2	3.0	0.5
Delay (s)	156.7	59.2	161.7	63.1	89.4		103.0	59.2	26.0	134.3	41.5	39.9
Level of Service	F	E	F	E	F		F	E	C	F	D	D
Approach Delay (s)		90.8			86.5			66.7			56.3	
Approach LOS		F			F			E			E	
Intersection Summary												
HCM 2000 Control Delay			76.0			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			114.2%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

***2025 Phase 1 Future
Background with
Recommendations AM***

HCM Signalized Intersection Capacity Analysis <2025 Phase 1 FB w Recom> AM Peak Hour

28: Bronte Rd & William Halton Parkway

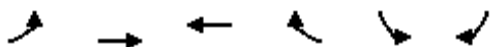
06-29-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	51	76	1376	137	347	1732
Future Volume (vph)	51	76	1376	137	347	1732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		4.0	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3471	1601	3530		1789	3579
Flt Permitted	0.95	1.00	1.00		0.09	1.00
Satd. Flow (perm)	3471	1601	3530		172	3579
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	51	76	1376	137	347	1732
RTOR Reduction (vph)	0	71	4	0	0	0
Lane Group Flow (vph)	51	5	1509	0	347	1732
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	10.1	10.1	84.3		115.9	115.9
Effective Green, g (s)	10.1	10.1	84.3		115.9	115.9
Actuated g/C Ratio	0.07	0.07	0.60		0.83	0.83
Clearance Time (s)	7.0	7.0	7.0		4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	250	115	2125		461	2962
v/s Ratio Prot	c0.01		0.43		c0.15	0.48
v/s Ratio Perm		0.00			c0.47	
v/c Ratio	0.20	0.05	0.71		0.75	0.58
Uniform Delay, d1	61.2	60.5	19.4		34.3	4.0
Progression Factor	1.00	1.00	1.39		1.00	1.00
Incremental Delay, d2	0.4	0.2	1.3		6.8	0.9
Delay (s)	61.6	60.6	28.3		41.1	4.9
Level of Service	E	E	C		D	A
Approach Delay (s)	61.0		28.3			10.9
Approach LOS	E		C			B
Intersection Summary						
HCM 2000 Control Delay			19.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			85.0%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2025 Phase 1 FB w Recom> AM Peak Hour

38: Dundas Street West/Dundas St W & Tremaine Rd

06-29-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	592	2646	919	229	419	427
Future Volume (vph)	592	2646	919	229	419	427
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1613
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	832	4476	4117	1570	3541	1613
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	592	2646	919	229	419	427
RTOR Reduction (vph)	0	0	0	78	0	0
Lane Group Flow (vph)	592	2646	919	151	419	427
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases	2			6		Free
Actuated Green, G (s)	104.6	104.6	88.5	88.5	21.4	140.0
Effective Green, g (s)	105.6	108.6	92.5	92.5	25.4	140.0
Actuated g/C Ratio	0.75	0.78	0.66	0.66	0.18	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	877	3472	2720	1037	642	1613
v/s Ratio Prot	0.06	c0.59	0.22		c0.12	
v/s Ratio Perm	0.45			0.10		0.26
v/c Ratio	0.68	0.76	0.34	0.15	0.65	0.26
Uniform Delay, d1	6.6	8.6	10.4	8.9	53.2	0.0
Progression Factor	1.00	1.00	1.46	5.79	1.00	1.00
Incremental Delay, d2	2.1	1.6	0.3	0.3	2.1	0.4
Delay (s)	8.7	10.2	15.5	51.9	55.3	0.4
Level of Service	A	B	B	D	E	A
Approach Delay (s)		10.0	22.8		27.6	
Approach LOS		A	C		C	

Intersection Summary

HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis <2025 Phase 1 FB w Recom> AM Peak Hour

42: Colonel William Pkwy/Private Driveway & Dundas St W

06-29-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	73	2646	259	57	1108	90	69	1	164	6	0	2
Future Volume (vph)	73	2646	259	57	1108	90	69	1	164	6	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1806	4476	1601	1674	4117	1570	1768	1921	1517	1554	1610	
Flt Permitted	0.20	1.00	1.00	0.04	1.00	1.00	0.76	1.00	1.00	0.76	1.00	
Satd. Flow (perm)	374	4476	1601	69	4117	1570	1408	1921	1517	1239	1610	
Peak-hour factor, PHF	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. Flow (vph)	73	2646	259	57	1108	90	69	1	164	6	0	2
RTOR Reduction (vph)	0	0	56	0	0	24	0	0	68	0	2	0
Lane Group Flow (vph)	73	2646	203	57	1108	66	69	1	96	6	0	0
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	107.1	101.6	101.6	107.9	102.0	102.0	15.1	15.1	15.1	15.1	15.1	
Effective Green, g (s)	107.1	101.6	101.6	107.9	102.0	102.0	15.1	15.1	15.1	15.1	15.1	
Actuated g/C Ratio	0.76	0.73	0.73	0.77	0.73	0.73	0.11	0.11	0.11	0.11	0.11	
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)	342	3248	1161	120	2999	1143	151	207	163	133	173	
v/s Ratio Prot	0.01	c0.59		c0.02	0.27			0.00			0.00	
v/s Ratio Perm	0.15		0.13	0.34		0.04	0.05		c0.06	0.00		
v/c Ratio	0.21	0.81	0.17	0.47	0.37	0.06	0.46	0.00	0.59	0.05	0.00	
Uniform Delay, d1	4.2	12.9	6.0	21.0	7.1	5.4	58.6	55.7	59.5	56.0	55.7	
Progression Factor	1.21	0.97	1.57	1.45	0.75	1.45	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	1.6	0.2	2.8	0.3	0.1	2.6	0.0	5.9	0.1	0.0	
Delay (s)	5.2	14.1	9.7	33.1	5.7	7.9	61.2	55.8	65.4	56.0	55.7	
Level of Service	A	B	A	C	A	A	E	E	E	E	E	
Approach Delay (s)		13.5			7.1			64.1			56.0	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay			14.4			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			88.5%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis <2025 Phase 1 FB w Recom> AM Peak Hour

44: Valleyridge Dr & Dundas St W

06-29-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↓	↑↑↑	↓	↑
Traffic Volume (vph)	2885	98	33	1262	54	84
Future Volume (vph)	2885	98	33	1262	54	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	*0.80	1.00	1.00	*0.80	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4433	1555	1772	4117	1717	1535
Flt Permitted	1.00	1.00	0.04	1.00	0.95	1.00
Satd. Flow (perm)	4433	1555	68	4117	1717	1535
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2885	98	33	1262	54	84
RTOR Reduction (vph)	0	8	0	0	0	77
Lane Group Flow (vph)	2885	90	33	1262	54	7
Confl. Peds. (#/hr)					2	1
Heavy Vehicles (%)	4%	5%	3%	12%	6%	5%
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Actuated Green, G (s)	106.2	106.2	113.9	113.9	12.1	12.1
Effective Green, g (s)	106.2	106.2	113.9	113.9	12.1	12.1
Actuated g/C Ratio	0.76	0.76	0.81	0.81	0.09	0.09
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3362	1179	100	3349	148	132
v/s Ratio Prot	c0.65		0.01	c0.31		
v/s Ratio Perm		0.06	0.26		c0.03	0.00
v/c Ratio	0.86	0.08	0.33	0.38	0.36	0.06
Uniform Delay, d1	11.7	4.3	21.3	3.5	60.3	58.7
Progression Factor	1.37	1.47	5.08	1.47	1.00	1.00
Incremental Delay, d2	2.1	0.1	1.7	0.3	3.2	0.4
Delay (s)	18.1	6.4	110.0	5.4	63.5	59.1
Level of Service	B	A	F	A	E	E
Approach Delay (s)	17.7			8.1	60.8	
Approach LOS	B			A	E	
Intersection Summary						
HCM 2000 Control Delay			16.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			76.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2025 Phase 1 FB w Recom> AM Peak Hour

46: Bronte Rd & Dundas St W

06-29-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 		 	 	
Traffic Volume (vph)	411	1980	483	172	772	204	225	898	248	227	1165	204
Future Volume (vph)	411	1980	483	172	772	204	225	898	248	227	1165	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	7.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1563	913	4683	1555	3079	3411	1512	3404	3411	1541
Flt Permitted	0.20	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	486	4476	1563	100	4683	1555	3079	3411	1512	3404	3411	1541
Peak-hour factor, PHF	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. Flow (vph)	411	1980	483	172	772	204	225	898	248	227	1165	204
RTOR Reduction (vph)	0	0	172	0	0	116	0	0	93	0	0	106
Lane Group Flow (vph)	411	1980	311	172	772	88	225	898	155	227	1165	98
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	100%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	66.0	47.0	47.0	52.4	37.4	37.4	14.5	45.1	45.1	10.9	41.5	41.5
Effective Green, g (s)	67.0	50.0	50.0	54.4	40.4	37.4	15.5	48.1	48.1	11.9	44.5	44.5
Actuated g/C Ratio	0.48	0.36	0.36	0.39	0.29	0.27	0.11	0.34	0.34	0.09	0.32	0.32
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	3.0	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	441	1598	558	131	1351	415	340	1171	519	289	1084	489
v/s Ratio Prot	0.17	c0.44		c0.15	0.16		c0.07	0.26		c0.07	c0.34	
v/s Ratio Perm	0.28		0.20	0.36		0.06			0.10			0.06
v/c Ratio	0.93	1.24	0.56	1.31	0.57	0.21	0.66	0.77	0.30	0.79	1.07	0.20
Uniform Delay, d1	27.6	45.0	36.1	41.9	42.4	39.9	59.7	41.0	33.6	62.8	47.8	34.8
Progression Factor	1.01	0.87	0.73	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.10	1.83
Incremental Delay, d2	17.0	110.6	2.1	184.8	1.8	1.2	4.3	3.3	0.4	10.7	47.6	0.2
Delay (s)	45.0	149.8	28.4	226.7	44.2	41.0	64.0	44.2	34.0	70.1	100.0	64.0
Level of Service	D	F	C	F	D	D	E	D	C	E	F	E
Approach Delay (s)		114.4			71.0			45.6			91.1	
Approach LOS		F			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			88.5									F
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			99.7%									F
Analysis Period (min)			15									
c Critical Lane Group												

***2025 Phase 1 Future
Background with
Recommendations PM***

HCM Signalized Intersection Capacity Analysis <2021 Phase 1 FB w Recom> PM Peak Hour

28: Bronte Rd & William Halton Parkway

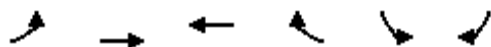
06-29-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	217	355	1658	56	101	1209
Future Volume (vph)	217	355	1658	56	101	1209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		4.0	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3471	1601	3561		1789	3579
Flt Permitted	0.95	1.00	1.00		0.06	1.00
Satd. Flow (perm)	3471	1601	3561		113	3579
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	217	355	1658	56	101	1209
RTOR Reduction (vph)	0	112	1	0	0	0
Lane Group Flow (vph)	217	243	1713	0	101	1209
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	26.9	26.9	85.9		99.1	99.1
Effective Green, g (s)	26.9	26.9	85.9		99.1	99.1
Actuated g/C Ratio	0.19	0.19	0.61		0.71	0.71
Clearance Time (s)	7.0	7.0	7.0		4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	666	307	2184		190	2533
v/s Ratio Prot	0.06		c0.48		0.03	c0.34
v/s Ratio Perm		c0.15			0.34	
v/c Ratio	0.33	0.79	0.78		0.53	0.48
Uniform Delay, d1	48.7	53.9	20.1		21.6	9.0
Progression Factor	1.00	1.00	1.04		1.00	1.00
Incremental Delay, d2	0.3	13.0	1.2		2.8	0.6
Delay (s)	49.0	66.8	22.1		24.5	9.7
Level of Service	D	E	C		C	A
Approach Delay (s)	60.1		22.1			10.8
Approach LOS	E		C			B
Intersection Summary						
HCM 2000 Control Delay			24.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			81.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2021 Phase 1 FB w Recom> PM Peak Hour

38: Dundas Street West/Dundas St W & Tremaine Rd

06-29-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↱	↑↑↑	↑↑↑	↰	↰↱	↰
Traffic Volume (vph)	336	1190	2429	304	254	665
Future Volume (vph)	336	1190	2429	304	254	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	336	1190	2429	304	254	665
RTOR Reduction (vph)	0	0	0	69	0	0
Lane Group Flow (vph)	336	1190	2429	235	254	665
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	21.1	111.1	86.0	86.0	14.9	140.0
Effective Green, g (s)	22.1	115.1	90.0	90.0	18.9	140.0
Actuated g/C Ratio	0.16	0.82	0.64	0.64	0.13	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	553	3679	2877	1029	478	1570
v/s Ratio Prot	c0.10	0.27	c0.54		c0.07	
v/s Ratio Perm				0.15		0.42
v/c Ratio	0.61	0.32	0.84	0.23	0.53	0.42
Uniform Delay, d1	54.9	3.0	19.5	10.5	56.4	0.0
Progression Factor	1.00	1.00	1.05	1.81	1.00	1.00
Incremental Delay, d2	1.9	0.2	2.1	0.3	0.9	0.8
Delay (s)	56.8	3.3	22.6	19.3	57.3	0.8
Level of Service	E	A	C	B	E	A
Approach Delay (s)		15.0	22.2		16.4	
Approach LOS		B	C		B	
Intersection Summary						
HCM 2000 Control Delay			19.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			74.9%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2021 Phase 1 FB w Recom> PM Peak Hour
42: Colonel William Pkwy/Private Driveway & Dundas St W 06-29-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	0	1333	82	100	2399	3	238	3	60	59	0	56
Future Volume (vph)	0	1333	82	100	2399	3	238	3	60	59	0	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor		*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4476	1570	1825	4476	1633	1753	1921	1504	1785	1611	
Flt Permitted		1.00	1.00	0.12	1.00	1.00	0.72	1.00	1.00	0.76	1.00	
Satd. Flow (perm)		4476	1570	235	4476	1633	1329	1921	1504	1420	1611	
Peak-hour factor, PHF	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. Flow (vph)	0	1333	82	100	2399	3	238	3	60	59	0	56
RTOR Reduction (vph)	0	0	31	0	0	1	0	0	47	0	44	0
Lane Group Flow (vph)	0	1333	51	100	2399	2	238	3	13	59	12	0
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)		86.5	86.5	97.1	97.1	97.1	29.5	29.5	29.5	29.5	29.5	
Effective Green, g (s)		86.5	86.5	97.1	97.1	97.1	29.5	29.5	29.5	29.5	29.5	
Actuated g/C Ratio		0.62	0.62	0.69	0.69	0.69	0.21	0.21	0.21	0.21	0.21	
Clearance Time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)		2765	970	237	3104	1132	280	404	316	299	339	
v/s Ratio Prot		0.30		0.02	c0.54			0.00			0.01	
v/s Ratio Perm			0.03	0.27		0.00	c0.18		0.01	0.04		
v/c Ratio		0.48	0.05	0.42	0.77	0.00	0.85	0.01	0.04	0.20	0.03	
Uniform Delay, d1		14.6	10.6	9.3	14.2	6.6	53.1	43.7	44.0	45.5	43.9	
Progression Factor		0.76	0.47	1.67	1.24	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.6	0.1	0.9	1.5	0.0	21.2	0.0	0.1	0.1	0.0	
Delay (s)		11.7	5.0	16.5	19.1	6.6	74.3	43.7	44.0	45.6	43.9	
Level of Service		B	A	B	B	A	E	D	D	D	D	
Approach Delay (s)		11.3			18.9			68.0			44.8	
Approach LOS		B			B			E			D	
Intersection Summary												
HCM 2000 Control Delay			20.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			86.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2021 Phase 1 FB w Recom> PM Peak Hour

44: Valleyridge Dr & Dundas St W

06-29-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↓	↑↑↑	↓	↑
Traffic Volume (vph)	1413	36	44	2452	49	25
Future Volume (vph)	1413	36	44	2452	49	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	*0.80	1.00	1.00	*0.80	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4476	1585	1789	4476	1825	1633
Flt Permitted	1.00	1.00	0.13	1.00	0.95	1.00
Satd. Flow (perm)	4476	1585	241	4476	1825	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1413	36	44	2452	49	25
RTOR Reduction (vph)	0	8	0	0	0	23
Lane Group Flow (vph)	1413	28	44	2452	49	2
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Actuated Green, G (s)	107.4	107.4	116.4	116.4	9.6	9.6
Effective Green, g (s)	107.4	107.4	116.4	116.4	9.6	9.6
Actuated g/C Ratio	0.77	0.77	0.83	0.83	0.07	0.07
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3433	1215	255	3721	125	111
v/s Ratio Prot	0.32		0.01	c0.55		
v/s Ratio Perm		0.02	0.14		c0.03	0.00
v/c Ratio	0.41	0.02	0.17	0.66	0.39	0.02
Uniform Delay, d1	5.5	3.9	2.7	4.4	62.4	60.8
Progression Factor	0.95	1.76	0.48	1.12	1.00	1.00
Incremental Delay, d2	0.3	0.0	0.2	0.5	4.2	0.1
Delay (s)	5.6	6.8	1.5	5.4	66.6	60.9
Level of Service	A	A	A	A	E	E
Approach Delay (s)	5.7			5.3	64.7	
Approach LOS	A			A	E	
Intersection Summary						
HCM 2000 Control Delay			6.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			67.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2021 Phase 1 FB w Recom> PM Peak Hour

46: Bronte Rd & Dundas St W

06-29-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 		 	 	
Traffic Volume (vph)	273	1060	218	227	1683	160	445	1281	163	227	847	316
Future Volume (vph)	273	1060	218	227	1683	160	445	1281	163	227	847	316
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1574	1755	5142	1570	3471	3544	1445	3471	3510	1601
Flt Permitted	0.08	1.00	1.00	0.11	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4476	1574	200	5142	1570	3471	3544	1445	3471	3510	1601
Peak-hour factor, PHF	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. Flow (vph)	273	1060	218	227	1683	160	445	1281	163	227	847	316
RTOR Reduction (vph)	0	0	142	0	0	81	0	0	60	0	0	138
Lane Group Flow (vph)	273	1060	76	227	1683	79	445	1281	103	227	847	178
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	62.1	47.1	47.1	61.9	47.0	47.0	19.6	49.0	49.0	7.0	36.4	36.4
Effective Green, g (s)	64.1	49.1	49.1	63.9	49.0	49.0	20.6	51.0	51.0	8.0	38.4	38.4
Actuated g/C Ratio	0.46	0.35	0.35	0.46	0.35	0.35	0.15	0.36	0.36	0.06	0.27	0.27
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	288	1569	552	267	1799	549	510	1291	526	198	962	439
v/s Ratio Prot	c0.11	0.24		0.10	c0.33		c0.13	c0.36		c0.07	0.24	
v/s Ratio Perm	0.33		0.05	0.29		0.05			0.07			0.11
v/c Ratio	0.95	0.68	0.14	0.85	0.94	0.14	0.87	0.99	0.20	1.15	0.88	0.41
Uniform Delay, d1	35.6	38.7	31.0	31.9	44.0	31.1	58.4	44.3	30.5	66.0	48.6	41.5
Progression Factor	1.58	1.37	4.11	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.17	1.69
Incremental Delay, d2	37.5	2.2	0.5	21.7	10.6	0.5	15.0	23.1	0.3	106.5	9.0	0.8
Delay (s)	93.9	55.4	128.0	53.6	54.6	31.7	73.5	67.4	30.7	168.7	65.9	71.0
Level of Service	F	E	F	D	D	C	E	E	C	F	E	E
Approach Delay (s)		72.3			52.7			65.7			83.8	
Approach LOS		E			D			E			F	
Intersection Summary												
HCM 2000 Control Delay			66.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			104.5%				ICU Level of Service			G		
Analysis Period (min)			15									

c Critical Lane Group

2025 Phase 1 Future Total AM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2025 Phase 1 FT> AM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	172	0	1014	2034	0
Future Volume (vph)	167	172	0	1014	2034	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3219	1576		4902	3444	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3219	1576		4902	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	172	0	1014	2034	0
RTOR Reduction (vph)	0	14	0	0	0	0
Lane Group Flow (vph)	167	158	0	1014	2034	0
Confl. Peds. (#/hr)		2	1			1
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	13.5	13.5		59.5	59.5	
Effective Green, g (s)	13.5	13.5		59.5	59.5	
Actuated g/C Ratio	0.16	0.16		0.70	0.70	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	511	250		3431	2410	
v/s Ratio Prot	0.05			0.21	0.59	
v/s Ratio Perm		0.10				
v/c Ratio	0.33	0.63		0.30	0.84	
Uniform Delay, d1	31.7	33.4		4.8	9.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	5.7		0.2	3.8	
Delay (s)	32.2	39.2		5.0	13.2	
Level of Service	C	D		A	B	
Approach Delay (s)	35.7			5.0	13.2	
Approach LOS	D			A	B	
Intersection Summary						
HCM 2000 Control Delay		13.0		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.80				
Actuated Cycle Length (s)		85.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		77.1%		ICU Level of Service		D
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

28: Bronte Rd & William Halton Parkway

<2025 Phase 1 FT> AM Peak Hour

07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	51	76	1406	137	347	1859
Future Volume (vph)	51	76	1406	137	347	1859
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		4.0	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3471	1601	3531		1789	3579
Flt Permitted	0.95	1.00	1.00		0.09	1.00
Satd. Flow (perm)	3471	1601	3531		161	3579
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	51	76	1406	137	347	1859
RTOR Reduction (vph)	0	71	4	0	0	0
Lane Group Flow (vph)	51	5	1539	0	347	1859
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	10.1	10.1	84.3		115.9	115.9
Effective Green, g (s)	10.1	10.1	84.3		115.9	115.9
Actuated g/C Ratio	0.07	0.07	0.60		0.83	0.83
Clearance Time (s)	7.0	7.0	7.0		4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	250	115	2126		454	2962
v/s Ratio Prot	c0.01		0.44		c0.15	0.52
v/s Ratio Perm		0.00			c0.48	
v/c Ratio	0.20	0.05	0.72		0.76	0.63
Uniform Delay, d1	61.2	60.5	19.6		35.8	4.3
Progression Factor	1.00	1.00	1.36		1.00	1.00
Incremental Delay, d2	0.4	0.2	1.3		7.5	1.0
Delay (s)	61.6	60.6	28.1		43.3	5.3
Level of Service	E	E	C		D	A
Approach Delay (s)	61.0		28.1			11.3
Approach LOS	E		C			B
Intersection Summary						
HCM 2000 Control Delay			19.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			85.8%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

31: Avenue Two & Street Four

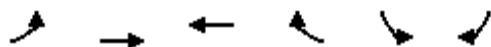
<2025 Phase 1 FT> AM Peak Hour

07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	64	0	585	265	0	129
Future Volume (Veh/h)	64	0	585	265	0	129
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	64	0	585	265	0	129
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			180			
pX, platoon unblocked						
vC, conflicting volume	714	585			850	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	714	585			850	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	100			100	
cM capacity (veh/h)	398	511			788	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	64	0	585	265	129	
Volume Left	64	0	0	0	0	
Volume Right	0	0	0	265	0	
cSH	398	1700	1700	1700	788	
Volume to Capacity	0.16	0.00	0.34	0.16	0.00	
Queue Length 95th (m)	4.3	0.0	0.0	0.0	0.0	
Control Delay (s)	15.8	0.0	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	15.8		0.0		0.0	
Approach LOS	C					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			41.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2025 Phase 1 FT> AM Peak Hour
07-07-2020



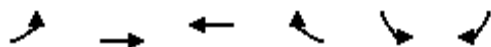
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	592	2800	954	232	435	427
Future Volume (vph)	592	2800	954	232	435	427
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1613
Flt Permitted	0.21	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	788	4476	4117	1570	3541	1613
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	592	2800	954	232	435	427
RTOR Reduction (vph)	0	0	0	80	0	0
Lane Group Flow (vph)	592	2800	954	152	435	427
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases	2			6		Free
Actuated Green, G (s)	104.0	104.0	87.7	87.7	22.0	140.0
Effective Green, g (s)	105.0	108.0	91.7	91.7	26.0	140.0
Actuated g/C Ratio	0.75	0.77	0.66	0.66	0.19	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	849	3452	2696	1028	657	1613
v/s Ratio Prot	0.07	c0.63	0.23		c0.12	
v/s Ratio Perm	0.46			0.10		0.26
v/c Ratio	0.70	0.81	0.35	0.15	0.66	0.26
Uniform Delay, d1	7.1	9.8	10.8	9.2	52.9	0.0
Progression Factor	1.00	1.00	0.71	1.81	1.00	1.00
Incremental Delay, d2	2.5	2.2	0.4	0.3	2.3	0.4
Delay (s)	9.6	12.0	8.0	17.0	55.2	0.4
Level of Service	A	B	A	B	E	A
Approach Delay (s)		11.5	9.8		28.0	
Approach LOS		B	A		C	
Intersection Summary						
HCM 2000 Control Delay			13.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			73.6%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue Two

<2025 Phase 1 FT> AM Peak Hour

07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	170	3065	1179	680	155	38
Future Volume (vph)	170	3065	1179	680	155	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3471	1457
Flt Permitted	0.19	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	353	4520	4520	1601	3471	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	3065	1179	680	155	38
RTOR Reduction (vph)	0	0	0	126	2	31
Lane Group Flow (vph)	170	3065	1179	554	157	3
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	114.0	114.0	114.0	114.0	12.0	12.0
Effective Green, g (s)	114.0	114.0	114.0	114.0	12.0	12.0
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.09	0.09
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	287	3680	3680	1303	297	124
v/s Ratio Prot		c0.68	0.26		c0.05	
v/s Ratio Perm	0.48			0.35		0.00
v/c Ratio	0.59	0.83	0.32	0.42	0.53	0.02
Uniform Delay, d1	4.7	7.5	3.3	3.7	61.3	58.6
Progression Factor	0.50	0.55	1.31	5.12	1.00	1.00
Incremental Delay, d2	5.5	1.5	0.2	0.8	1.7	0.1
Delay (s)	7.8	5.6	4.5	19.8	63.0	58.7
Level of Service	A	A	A	B	E	E
Approach Delay (s)		5.7	10.1		62.2	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Private Driveway & Dundas St W

<2025 Phase 1 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	73	2793	267	57	1754	90	103	1	164	6	0	2
Future Volume (vph)	73	2793	267	57	1754	90	103	1	164	6	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1807	4476	1601	1674	4117	1570	1768	1921	1517	1554	1610	
Flt Permitted	0.08	1.00	1.00	0.04	1.00	1.00	0.76	1.00	1.00	0.76	1.00	
Satd. Flow (perm)	145	4476	1601	70	4117	1570	1408	1921	1517	1239	1610	
Peak-hour factor, PHF	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. Flow (vph)	73	2793	267	57	1754	90	103	1	164	6	0	2
RTOR Reduction (vph)	0	0	56	0	0	23	0	0	67	0	2	0
Lane Group Flow (vph)	73	2793	211	57	1754	67	103	1	97	6	0	0
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	106.1	100.5	100.5	106.7	100.8	100.8	16.2	16.2	16.2	16.2	16.2	
Effective Green, g (s)	106.1	100.5	100.5	106.7	100.8	100.8	16.2	16.2	16.2	16.2	16.2	
Actuated g/C Ratio	0.76	0.72	0.72	0.76	0.72	0.72	0.12	0.12	0.12	0.12	0.12	
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)	176	3213	1149	120	2964	1130	162	222	175	143	186	
v/s Ratio Prot	0.02	c0.62		c0.02	0.43			0.00			0.00	
v/s Ratio Perm	0.30		0.13	0.34		0.04	c0.07		0.06	0.00		
v/c Ratio	0.41	0.87	0.18	0.47	0.59	0.06	0.64	0.00	0.55	0.04	0.00	
Uniform Delay, d1	6.6	14.8	6.4	25.7	9.6	5.7	59.1	54.8	58.5	55.0	54.7	
Progression Factor	1.49	0.91	1.57	1.38	0.72	0.54	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	2.0	0.2	2.5	0.7	0.1	8.3	0.0	4.1	0.0	0.0	
Delay (s)	10.5	15.5	10.3	37.9	7.6	3.2	67.4	54.8	62.6	55.0	54.7	
Level of Service	B	B	B	D	A	A	E	D	E	E	D	
Approach Delay (s)		14.9			8.3			64.4			55.0	
Approach LOS		B			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			15.1				HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)		17.4			
Intersection Capacity Utilization			91.3%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr & Dundas St W

<2025 Phase 1 FT> AM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↓	↑↑↑	↓	↑
Traffic Volume (vph)	3024	106	33	1874	88	84
Future Volume (vph)	3024	106	33	1874	88	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	*0.80	1.00	1.00	*0.80	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4433	1555	1772	4117	1717	1535
Flt Permitted	1.00	1.00	0.04	1.00	0.95	1.00
Satd. Flow (perm)	4433	1555	69	4117	1717	1535
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	3024	106	33	1874	88	84
RTOR Reduction (vph)	0	9	0	0	0	75
Lane Group Flow (vph)	3024	97	33	1874	88	9
Confl. Peds. (#/hr)					2	1
Heavy Vehicles (%)	4%	5%	3%	12%	6%	5%
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Actuated Green, G (s)	103.7	103.7	111.5	111.5	14.5	14.5
Effective Green, g (s)	103.7	103.7	111.5	111.5	14.5	14.5
Actuated g/C Ratio	0.74	0.74	0.80	0.80	0.10	0.10
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3283	1151	101	3278	177	158
v/s Ratio Prot	c0.68		0.01	c0.46		
v/s Ratio Perm		0.06	0.25		c0.05	0.01
v/c Ratio	0.92	0.08	0.33	0.57	0.50	0.06
Uniform Delay, d1	14.8	5.0	29.9	5.3	59.3	56.6
Progression Factor	1.32	1.52	4.01	1.86	1.00	1.00
Incremental Delay, d2	3.4	0.1	1.1	0.4	4.5	0.3
Delay (s)	23.0	7.7	121.0	10.4	63.8	56.9
Level of Service	C	A	F	B	E	E
Approach Delay (s)	22.5			12.3	60.4	
Approach LOS	C			B	E	
Intersection Summary						
HCM 2000 Control Delay			20.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			79.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2025 Phase 1 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 		 	 	
Traffic Volume (vph)	441	2034	538	172	1010	204	472	898	248	227	1165	331
Future Volume (vph)	441	2034	538	172	1010	204	472	898	248	227	1165	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	7.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1563	913	4683	1555	3079	3411	1512	3404	3411	1541
Flt Permitted	0.11	1.00	1.00	0.11	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	486	4476	1563	101	4683	1555	3079	3411	1512	3404	3411	1541
Peak-hour factor, PHF	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. Flow (vph)	441	2034	538	172	1010	204	472	898	248	227	1165	331
RTOR Reduction (vph)	0	0	172	0	0	115	0	0	93	0	0	109
Lane Group Flow (vph)	441	2034	366	172	1010	89	472	898	155	227	1165	222
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	100%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	66.0	47.0	47.0	52.0	37.0	37.0	17.0	45.1	45.1	10.9	39.0	39.0
Effective Green, g (s)	67.0	50.0	50.0	54.0	40.0	37.0	18.0	48.1	48.1	11.9	42.0	42.0
Actuated g/C Ratio	0.48	0.36	0.36	0.39	0.29	0.26	0.13	0.34	0.34	0.09	0.30	0.30
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	3.0	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	445	1598	558	131	1338	410	395	1171	519	289	1023	462
v/s Ratio Prot	c0.18	c0.45		c0.15	0.22		c0.15	0.26		0.07	c0.34	
v/s Ratio Perm	0.29		0.23	0.35		0.06			0.10			0.14
v/c Ratio	0.99	1.27	0.66	1.31	0.75	0.22	1.19	0.77	0.30	0.79	1.14	0.48
Uniform Delay, d1	30.3	45.0	37.8	41.8	45.5	40.2	61.0	41.0	33.6	62.8	49.0	40.1
Progression Factor	1.03	0.82	0.66	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.09	1.38
Incremental Delay, d2	25.9	125.0	2.6	184.8	4.0	1.2	110.0	3.3	0.4	10.2	72.3	0.9
Delay (s)	57.2	162.0	27.7	226.6	49.5	41.4	171.0	44.2	34.0	69.3	125.8	56.2
Level of Service	E	F	C	F	D	D	F	D	C	E	F	E
Approach Delay (s)		122.7			70.3			79.6			105.0	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			100.4				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.22									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			107.8%				ICU Level of Service			G		
Analysis Period (min)			15									

c Critical Lane Group

2025 Phase 1 Future Total PM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2025 Phase 1 FT> PM Peak Hour

06-29-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	68	0	1987	1061	0
Future Volume (vph)	111	68	0	1987	1061	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3437	1601		5142	3579	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3437	1601		5142	3579	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	68	0	1987	1061	0
RTOR Reduction (vph)	0	62	0	0	0	0
Lane Group Flow (vph)	111	6	0	1987	1061	0
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	7.4	7.4		65.6	65.6	
Effective Green, g (s)	7.4	7.4		65.6	65.6	
Actuated g/C Ratio	0.09	0.09		0.77	0.77	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	299	139		3968	2762	
v/s Ratio Prot	c0.03			c0.39	0.30	
v/s Ratio Perm		0.00				
v/c Ratio	0.37	0.04		0.50	0.38	
Uniform Delay, d1	36.6	35.6		3.6	3.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.2		0.5	0.4	
Delay (s)	37.7	35.7		4.1	3.6	
Level of Service	D	D		A	A	
Approach Delay (s)	36.9			4.1	3.6	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			5.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.49			
Actuated Cycle Length (s)			85.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			53.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

28: Bronte Rd & William Halton Parkway

<2025 Phase 1 FT> PM Peak Hour

06-29-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	217	355	1785	56	101	1262
Future Volume (vph)	217	355	1785	56	101	1262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		4.0	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3471	1601	3562		1789	3579
Flt Permitted	0.95	1.00	1.00		0.04	1.00
Satd. Flow (perm)	3471	1601	3562		84	3579
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	217	355	1785	56	101	1262
RTOR Reduction (vph)	0	111	1	0	0	0
Lane Group Flow (vph)	217	244	1840	0	101	1262
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	26.9	26.9	85.9		99.1	99.1
Effective Green, g (s)	26.9	26.9	85.9		99.1	99.1
Actuated g/C Ratio	0.19	0.19	0.61		0.71	0.71
Clearance Time (s)	7.0	7.0	7.0		4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	666	307	2185		171	2533
v/s Ratio Prot	0.06		c0.52		c0.04	0.35
v/s Ratio Perm		c0.15			0.38	
v/c Ratio	0.33	0.79	0.84		0.59	0.50
Uniform Delay, d1	48.7	53.9	21.6		32.0	9.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	13.1	0.4		5.4	0.7
Delay (s)	49.0	67.0	21.9		37.4	9.9
Level of Service	D	E	C		D	A
Approach Delay (s)	60.2		21.9			12.0
Approach LOS	E		C			B
Intersection Summary						
HCM 2000 Control Delay			24.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.81			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			84.8%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

31: Avenue Two & Street Four

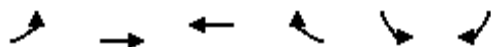
<2025 Phase 1 FT> PM Peak Hour

06-29-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	312	0	307	156	0	637
Future Volume (Veh/h)	312	0	307	156	0	637
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	312	0	307	156	0	637
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			168			
pX, platoon unblocked						
vC, conflicting volume	944	307			463	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	944	307			463	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	100			100	
cM capacity (veh/h)	291	733			1098	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	312	0	307	156	637	
Volume Left	312	0	0	0	0	
Volume Right	0	0	0	156	0	
cSH	291	1700	1700	1700	1098	
Volume to Capacity	1.07	0.00	0.18	0.09	0.00	
Queue Length 95th (m)	92.8	0.0	0.0	0.0	0.0	
Control Delay (s)	112.5	0.0	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	112.5		0.0		0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			24.9			
Intersection Capacity Utilization			57.5%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2025 Phase 1 FT> PM Peak Hour
06-29-2020



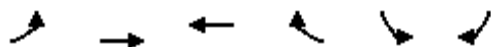
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	336	1254	2581	320	261	665
Future Volume (vph)	336	1254	2581	320	261	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	336	1254	2581	320	261	665
RTOR Reduction (vph)	0	0	0	68	0	0
Lane Group Flow (vph)	336	1254	2581	252	261	665
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	20.8	110.8	86.0	86.0	15.2	140.0
Effective Green, g (s)	21.8	114.8	90.0	90.0	19.2	140.0
Actuated g/C Ratio	0.16	0.82	0.64	0.64	0.14	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	545	3670	2877	1029	485	1570
v/s Ratio Prot	c0.10	0.28	c0.58		c0.07	
v/s Ratio Perm				0.16		0.42
v/c Ratio	0.62	0.34	0.90	0.24	0.54	0.42
Uniform Delay, d1	55.2	3.2	21.1	10.6	56.3	0.0
Progression Factor	1.00	1.00	0.36	0.48	1.00	1.00
Incremental Delay, d2	2.1	0.3	1.7	0.2	0.9	0.8
Delay (s)	57.3	3.4	9.3	5.2	57.2	0.8
Level of Service	E	A	A	A	E	A
Approach Delay (s)		14.8	8.9		16.7	
Approach LOS		B	A		B	
Intersection Summary						
HCM 2000 Control Delay			11.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			77.8%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue Two

<2025 Phase 1 FT> PM Peak Hour

06-29-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	108	1407	2662	355	710	239
Future Volume (vph)	108	1407	2662	355	710	239
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3468	1457
Flt Permitted	0.05	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	86	4520	4520	1601	3468	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	108	1407	2662	355	710	239
RTOR Reduction (vph)	0	0	0	105	2	67
Lane Group Flow (vph)	108	1407	2662	250	732	148
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	94.5	94.5	83.5	83.5	31.5	31.5
Effective Green, g (s)	94.5	94.5	83.5	83.5	31.5	31.5
Actuated g/C Ratio	0.68	0.68	0.60	0.60	0.22	0.22
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	143	3051	2695	954	780	327
v/s Ratio Prot	c0.04	0.31	c0.59		c0.21	
v/s Ratio Perm	0.47			0.16		0.10
v/c Ratio	0.76	0.46	0.99	0.26	0.94	0.45
Uniform Delay, d1	40.4	10.7	27.7	13.5	53.3	46.8
Progression Factor	1.31	0.92	1.01	1.59	1.00	1.00
Incremental Delay, d2	19.3	0.5	10.0	0.3	18.8	1.0
Delay (s)	72.2	10.4	38.1	21.9	72.1	47.8
Level of Service	E	B	D	C	E	D
Approach Delay (s)		14.8	36.2		66.6	
Approach LOS		B	D		E	

Intersection Summary

HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Private Driveway & Dundas St W

<2025 Phase 1 FT> PM Peak Hour

06-29-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	0	1972	116	100	2670	3	251	3	60	59	0	56
Future Volume (vph)	0	1972	116	100	2670	3	251	3	60	59	0	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Lane Util. Factor		*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4476	1570	1825	4476	1633	1753	1921	1504	1785	1611	
Flt Permitted		1.00	1.00	0.04	1.00	1.00	0.72	1.00	1.00	0.76	1.00	
Satd. Flow (perm)		4476	1570	86	4476	1633	1329	1921	1504	1420	1611	
Peak-hour factor, PHF	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. Flow (vph)	0	1972	116	100	2670	3	251	3	60	59	0	56
RTOR Reduction (vph)	0	0	45	0	0	1	0	0	47	0	44	0
Lane Group Flow (vph)	0	1972	71	100	2670	2	251	3	13	59	12	0
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)		85.1	85.1	96.1	96.1	96.1	30.5	30.5	30.5	30.5	30.5	
Effective Green, g (s)		85.1	85.1	96.1	96.1	96.1	30.5	30.5	30.5	30.5	30.5	
Actuated g/C Ratio		0.61	0.61	0.69	0.69	0.69	0.22	0.22	0.22	0.22	0.22	
Clearance Time (s)		6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	
Lane Grp Cap (vph)		2720	954	145	3072	1120	289	418	327	309	350	
v/s Ratio Prot		0.44		0.03	c0.60			0.00			0.01	
v/s Ratio Perm			0.04	0.43		0.00	c0.19		0.01	0.04		
v/c Ratio		0.72	0.07	0.69	0.87	0.00	0.87	0.01	0.04	0.19	0.03	
Uniform Delay, d1		19.2	11.3	27.2	17.1	6.9	52.8	42.9	43.2	44.7	43.1	
Progression Factor		0.52	0.04	1.37	1.13	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.4	0.1	9.2	2.6	0.0	23.5	0.0	0.1	0.1	0.0	
Delay (s)		11.4	0.6	46.4	21.9	6.9	76.3	42.9	43.3	44.8	43.2	
Level of Service		B	A	D	C	A	E	D	D	D	D	
Approach Delay (s)		10.8			22.8			69.6			44.0	
Approach LOS		B			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			21.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				17.4		
Intersection Capacity Utilization			92.2%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr & Dundas St W

<2025 Phase 1 FT> PM Peak Hour

06-29-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↓	↑↑↑	↓	↑
Traffic Volume (vph)	2019	69	44	2708	64	25
Future Volume (vph)	2019	69	44	2708	64	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	*0.80	1.00	1.00	*0.80	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4476	1585	1789	4476	1825	1633
Flt Permitted	1.00	1.00	0.05	1.00	0.95	1.00
Satd. Flow (perm)	4476	1585	98	4476	1825	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2019	69	44	2708	64	25
RTOR Reduction (vph)	0	14	0	0	0	23
Lane Group Flow (vph)	2019	55	44	2708	64	2
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Actuated Green, G (s)	106.3	106.3	115.5	115.5	10.5	10.5
Effective Green, g (s)	106.3	106.3	115.5	115.5	10.5	10.5
Actuated g/C Ratio	0.76	0.76	0.82	0.82	0.08	0.08
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0	3.0	6.0	5.0	5.0
Lane Grp Cap (vph)	3398	1203	143	3692	136	122
v/s Ratio Prot	0.45		0.01	c0.60		
v/s Ratio Perm		0.03	0.24		c0.04	0.00
v/c Ratio	0.59	0.05	0.31	0.73	0.47	0.02
Uniform Delay, d1	7.4	4.2	6.0	5.4	62.1	60.0
Progression Factor	0.75	1.38	4.97	1.38	1.00	1.00
Incremental Delay, d2	0.5	0.1	0.4	0.5	5.3	0.1
Delay (s)	6.1	5.8	30.4	8.0	67.4	60.1
Level of Service	A	A	C	A	E	E
Approach Delay (s)	6.1			8.3	65.3	
Approach LOS	A			A	E	
Intersection Summary						
HCM 2000 Control Delay			8.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			72.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2025 Phase 1 FT> PM Peak Hour

06-29-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 		 	 	
Traffic Volume (vph)	400	1296	461	227	1783	160	548	1281	163	227	847	369
Future Volume (vph)	400	1296	461	227	1783	160	548	1281	163	227	847	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1574	1755	5142	1570	3471	3544	1445	3471	3510	1601
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4476	1574	154	5142	1570	3471	3544	1445	3471	3510	1601
Peak-hour factor, PHF	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. Flow (vph)	400	1296	461	227	1783	160	548	1281	163	227	847	369
RTOR Reduction (vph)	0	0	197	0	0	81	0	0	60	0	0	156
Lane Group Flow (vph)	400	1296	264	227	1783	79	548	1281	103	227	847	213
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	61.8	46.8	46.8	62.2	47.0	47.0	20.0	49.0	49.0	7.0	36.0	36.0
Effective Green, g (s)	63.8	48.8	48.8	64.2	49.0	49.0	21.0	51.0	51.0	8.0	38.0	38.0
Actuated g/C Ratio	0.46	0.35	0.35	0.46	0.35	0.35	0.15	0.36	0.36	0.06	0.27	0.27
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	287	1560	548	255	1799	549	520	1291	526	198	952	434
v/s Ratio Prot	c0.16	0.29		0.10	0.35		c0.16	c0.36		c0.07	0.24	
v/s Ratio Perm	c0.47		0.17	0.30		0.05			0.07			0.13
v/c Ratio	1.39	0.83	0.48	0.89	0.99	0.14	1.05	0.99	0.20	1.15	0.89	0.49
Uniform Delay, d1	37.6	41.8	35.7	39.9	45.3	31.1	59.5	44.3	30.5	66.0	49.0	42.9
Progression Factor	1.48	1.46	2.47	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.17	1.66
Incremental Delay, d2	194.4	4.6	2.6	29.5	19.2	0.5	54.4	23.1	0.3	106.1	9.7	1.1
Delay (s)	250.0	65.5	90.7	69.4	64.5	31.7	113.9	67.4	30.7	167.9	67.1	72.3
Level of Service	F	E	F	E	E	C	F	E	C	F	E	E
Approach Delay (s)		105.1			62.6			77.2			84.3	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			82.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.22									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			113.5%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

APPENDIX

D-3 *2030 HORIZON YEAR*

APPENDIX

2030 Phase 2 Future Background AM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	287	0	1072	2361	0
Future Volume (vph)	167	287	0	1072	2361	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.93	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3178	1457		4902	3444	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3178	1457		4902	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	287	0	1072	2361	0
RTOR Reduction (vph)	15	15	0	0	0	0
Lane Group Flow (vph)	293	131	0	1072	2361	0
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	17.6	17.6		110.4	110.4	
Effective Green, g (s)	17.6	17.6		110.4	110.4	
Actuated g/C Ratio	0.13	0.13		0.79	0.79	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	399	183		3865	2715	
v/s Ratio Prot	c0.09			0.22	c0.69	
v/s Ratio Perm		0.09				
v/c Ratio	0.73	0.72		0.28	0.87	
Uniform Delay, d1	59.0	58.8		4.0	10.0	
Progression Factor	1.00	1.00		0.50	1.00	
Incremental Delay, d2	7.3	13.4		0.2	4.1	
Delay (s)	66.3	72.2		2.2	14.1	
Level of Service	E	E		A	B	
Approach Delay (s)	68.2			2.2	14.1	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay		17.1		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.85				
Actuated Cycle Length (s)		140.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		87.1%		ICU Level of Service		E
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Tremaine Rd & Avenue One

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	50	20	12	45	6	90	651	75	46	861	0
Future Volume (vph)	0	50	20	12	45	6	90	651	75	46	861	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.98		1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803		1789	1850		1789	3523		1789	3579	
Flt Permitted		1.00		0.71	1.00		0.33	1.00		0.38	1.00	
Satd. Flow (perm)		1803		1340	1850		620	3523		708	3579	
Peak-hour factor, PHF	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. Flow (vph)	0	50	20	12	45	6	90	651	75	46	861	0
RTOR Reduction (vph)	0	18	0	0	5	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	52	0	12	46	0	90	720	0	46	861	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Effective Green, g (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Actuated g/C Ratio		0.09		0.09	0.09		0.71	0.71		0.71	0.71	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		154		114	158		442	2516		505	2556	
v/s Ratio Prot		c0.03			0.02			0.20			c0.24	
v/s Ratio Perm				0.01			0.15			0.06		
v/c Ratio		0.34		0.11	0.29		0.20	0.29		0.09	0.34	
Uniform Delay, d1		30.1		29.5	30.0		3.3	3.6		3.1	3.8	
Progression Factor		1.00		0.98	0.96		1.41	1.37		1.00	1.00	
Incremental Delay, d2		1.3		0.4	1.0		0.9	0.3		0.4	0.4	
Delay (s)		31.4		29.5	29.7		5.6	5.2		3.4	4.1	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		31.4			29.7			5.2			4.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.5					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		70.0					Sum of lost time (s)		14.0			
Intersection Capacity Utilization		58.0%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Avenue Two & Avenue One

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↘	↗
Traffic Volume (veh/h)	111	10	62	17	1	11
Future Volume (Veh/h)	111	10	62	17	1	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	111	10	62	17	1	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			121	257		116
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			121	257		116
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			96	100		99
cM capacity (veh/h)			1467	701		936
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	121	79	1	11		
Volume Left	0	62	1	0		
Volume Right	10	0	0	11		
cSH	1700	1467	701	936		
Volume to Capacity	0.07	0.04	0.00	0.01		
Queue Length 95th (m)	0.0	1.0	0.0	0.3		
Control Delay (s)	0.0	6.0	10.1	8.9		
Lane LOS	A		B	A		
Approach Delay (s)	0.0	6.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization	24.1%		ICU Level of Service		A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Avenue Three & Avenue One

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↘	↑	↘	↑
Traffic Volume (vph)	76	16	13	299	101	178
Future Volume (vph)	76	16	13	299	101	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1883	1601	1789	1883	1789	1601
Flt Permitted	1.00	1.00	0.71	1.00	0.95	1.00
Satd. Flow (perm)	1883	1601	1333	1883	1789	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	76	16	13	299	101	178
RTOR Reduction (vph)	0	6	0	0	0	151
Lane Group Flow (vph)	76	10	13	299	101	27
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	45.3	45.3	45.3	45.3	10.7	10.7
Effective Green, g (s)	45.3	45.3	45.3	45.3	10.7	10.7
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.15	0.15
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1218	1036	862	1218	273	244
v/s Ratio Prot	0.04			c0.16	c0.06	
v/s Ratio Perm		0.01	0.01			0.02
v/c Ratio	0.06	0.01	0.02	0.25	0.37	0.11
Uniform Delay, d1	4.5	4.4	4.4	5.2	26.6	25.6
Progression Factor	0.98	1.15	0.63	0.47	1.65	5.90
Incremental Delay, d2	0.1	0.0	0.0	0.4	0.8	0.2
Delay (s)	4.5	5.1	2.8	2.8	44.8	150.9
Level of Service	A	A	A	A	D	F
Approach Delay (s)	4.6			2.8	112.5	
Approach LOS	A			A	F	
Intersection Summary						
HCM 2000 Control Delay			47.9		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.27			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			35.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

8: Avenue Five & Avenue One

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↘	↱	↘	↗
Traffic Volume (veh/h)	111	10	70	320	15	70
Future Volume (Veh/h)	111	10	70	320	15	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	111	10	70	320	15	70
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			121		576	116
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			121		576	116
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		97	93
cM capacity (veh/h)			1467		456	936
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	121	70	320	15	70	
Volume Left	0	70	0	15	0	
Volume Right	10	0	0	0	70	
cSH	1700	1467	1700	456	936	
Volume to Capacity	0.07	0.05	0.19	0.03	0.07	
Queue Length 95th (m)	0.0	1.1	0.0	0.8	1.8	
Control Delay (s)	0.0	7.6	0.0	13.2	9.2	
Lane LOS		A		B	A	
Approach Delay (s)	0.0	1.4		9.9		
Approach LOS				A		
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			26.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	40	78	543	1545	2383	265
Future Volume (vph)	40	78	543	1545	2383	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	78	543	1545	2383	265
RTOR Reduction (vph)	0	72	0	0	0	105
Lane Group Flow (vph)	40	6	543	1545	2383	160
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	10.3	10.3	27.4	115.7	84.3	84.3
Effective Green, g (s)	10.3	10.3	27.4	115.7	84.3	84.3
Actuated g/C Ratio	0.07	0.07	0.20	0.83	0.60	0.60
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	131	117	679	4249	3096	964
v/s Ratio Prot	c0.02		c0.16	0.30	c0.46	
v/s Ratio Perm		0.00				0.10
v/c Ratio	0.31	0.05	0.80	0.36	0.77	0.17
Uniform Delay, d1	61.5	60.3	53.7	3.0	20.7	12.3
Progression Factor	1.08	1.33	1.30	0.31	0.98	1.96
Incremental Delay, d2	1.3	0.2	5.0	0.2	1.0	0.2
Delay (s)	67.4	80.4	74.5	1.1	21.2	24.2
Level of Service	E	F	E	A	C	C
Approach Delay (s)	76.0			20.2	21.5	
Approach LOS	E			C	C	
Intersection Summary						
HCM 2000 Control Delay			22.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			84.9%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

20: Tremaine Rd & Burnhamthorpe Road

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	65	20	53	10	5	95	811	317	32	861	10
Future Volume (vph)	0	65	20	53	10	5	95	811	317	32	861	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.95		1.00	0.96		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817		1789	1789		1789	3428		1789	3572	
Flt Permitted		1.00		0.70	1.00		0.32	1.00		0.23	1.00	
Satd. Flow (perm)		1817		1322	1789		605	3428		436	3572	
Peak-hour factor, PHF	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. Flow (vph)	0	65	20	53	10	5	95	811	317	32	861	10
RTOR Reduction (vph)	0	18	0	0	4	0	0	32	0	0	1	0
Lane Group Flow (vph)	0	67	0	53	11	0	95	1096	0	32	870	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.3		8.3	8.3		47.7	47.7		47.7	47.7	
Effective Green, g (s)		8.3		8.3	8.3		47.7	47.7		47.7	47.7	
Actuated g/C Ratio		0.12		0.12	0.12		0.68	0.68		0.68	0.68	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		215		156	212		412	2335		297	2434	
v/s Ratio Prot		0.04			0.01			c0.32			0.24	
v/s Ratio Perm				c0.04			0.16			0.07		
v/c Ratio		0.31		0.34	0.05		0.23	0.47		0.11	0.36	
Uniform Delay, d1		28.2		28.3	27.4		4.2	5.2		3.8	4.7	
Progression Factor		1.00		0.79	0.86		2.09	2.66		0.89	0.84	
Incremental Delay, d2		0.8		1.3	0.1		0.8	0.4		0.7	0.4	
Delay (s)		29.1		23.6	23.6		9.7	14.3		4.1	4.4	
Level of Service		C		C	C		A	B		A	A	
Approach Delay (s)		29.1			23.6			14.0			4.4	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			11.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			68.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

22: Avenue two & Burnhamthorpe Road

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	304	14	8	272	245	64	75	3	43	14	15
Future Volume (vph)	87	304	14	8	272	245	64	75	3	43	14	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.58	1.00	1.00	0.57	1.00	1.00	0.75	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1100	3579	1601	1067	3579	1601	1410	1883	1601	1334	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	87	304	14	8	272	245	64	75	3	43	14	15
RTOR Reduction (vph)	0	0	4	0	0	78	0	0	3	0	0	13
Lane Group Flow (vph)	87	304	10	8	272	167	64	75	0	43	14	2
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	47.6	47.6	47.6	47.6	47.6	47.6	8.4	8.4	8.4	8.4	8.4	8.4
Effective Green, g (s)	47.6	47.6	47.6	47.6	47.6	47.6	8.4	8.4	8.4	8.4	8.4	8.4
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	748	2433	1088	725	2433	1088	169	225	192	160	225	192
v/s Ratio Prot		0.08			0.08			0.04			0.01	
v/s Ratio Perm	0.08		0.01	0.01		c0.10	c0.05		0.00	0.03		0.00
v/c Ratio	0.12	0.12	0.01	0.01	0.11	0.15	0.38	0.33	0.00	0.27	0.06	0.01
Uniform Delay, d1	3.9	3.9	3.6	3.6	3.9	4.0	28.4	28.2	27.1	28.0	27.3	27.1
Progression Factor	1.25	1.23	1.00	1.71	1.91	10.96	1.17	1.16	1.00	1.02	1.03	1.00
Incremental Delay, d2	0.3	0.1	0.0	0.0	0.1	0.3	1.4	0.9	0.0	0.9	0.1	0.0
Delay (s)	5.2	4.9	3.6	6.2	7.5	44.2	34.5	33.7	27.1	29.4	28.4	27.2
Level of Service	A	A	A	A	A	D	C	C	C	C	C	C
Approach Delay (s)		4.9			24.6			33.9			28.7	
Approach LOS		A			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.19									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			49.3%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Avenue Three & Burnhamthorpe Road

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	300	6	77	518	51	1	184	49	8	15	0
Future Volume (vph)	0	300	6	77	518	51	1	184	49	8	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3568		1789	3579	1601	1789	1883	1601	1789	1883	
Flt Permitted		1.00		0.57	1.00	1.00	0.75	1.00	1.00	0.64	1.00	
Satd. Flow (perm)		3568		1065	3579	1601	1408	1883	1601	1208	1883	
Peak-hour factor, PHF	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. Flow (vph)	0	300	6	77	518	51	1	184	49	8	15	0
RTOR Reduction (vph)	0	1	0	0	0	19	0	0	40	0	0	0
Lane Group Flow (vph)	0	305	0	77	518	32	1	184	9	8	15	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)		43.3		43.3	43.3	43.3	12.7	12.7	12.7	12.7	12.7	
Effective Green, g (s)		43.3		43.3	43.3	43.3	12.7	12.7	12.7	12.7	12.7	
Actuated g/C Ratio		0.62		0.62	0.62	0.62	0.18	0.18	0.18	0.18	0.18	
Clearance Time (s)		7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2207		658	2213	990	255	341	290	219	341	
v/s Ratio Prot		0.09			c0.14			c0.10			0.01	
v/s Ratio Perm				0.07		0.02	0.00		0.01	0.01		
v/c Ratio		0.14		0.12	0.23	0.03	0.00	0.54	0.03	0.04	0.04	
Uniform Delay, d1		5.6		5.5	6.0	5.2	23.5	26.0	23.6	23.6	23.6	
Progression Factor		2.23		1.52	1.54	4.23	1.15	1.00	1.92	0.86	0.85	
Incremental Delay, d2		0.1		0.4	0.2	0.1	0.0	1.6	0.0	0.1	0.1	
Delay (s)		12.5		8.7	9.4	22.0	27.0	27.7	45.2	20.4	20.1	
Level of Service		B		A	A	C	C	C	D	C	C	
Approach Delay (s)		12.5			10.3			31.4			20.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			49.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

26: Avenue Five & Burnhamthorpe Road

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	214	11	101	687	278	25	76	54	40	12	17
Future Volume (vph)	124	214	11	101	687	278	25	76	54	40	12	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3552		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.37	1.00		0.61	1.00	1.00	0.75	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	691	3552		1151	3579	1601	1412	1883	1601	1333	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	124	214	11	101	687	278	25	76	54	40	12	17
RTOR Reduction (vph)	0	1	0	0	0	62	0	0	49	0	0	16
Lane Group Flow (vph)	124	224	0	101	687	216	25	76	5	40	12	1
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	114.2	114.2		102.7	102.7	102.7	11.8	11.8	11.8	11.8	11.8	11.8
Effective Green, g (s)	114.2	114.2		102.7	102.7	102.7	11.8	11.8	11.8	11.8	11.8	11.8
Actuated g/C Ratio	0.82	0.82		0.73	0.73	0.73	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	622	2897		844	2625	1174	119	158	134	112	158	134
v/s Ratio Prot	c0.01	0.06			c0.19			c0.04			0.01	
v/s Ratio Perm	0.15			0.09		0.13	0.02		0.00	0.03		0.00
v/c Ratio	0.20	0.08		0.12	0.26	0.18	0.21	0.48	0.03	0.36	0.08	0.01
Uniform Delay, d1	2.7	2.5		5.4	6.1	5.7	59.8	61.2	58.9	60.5	59.1	58.8
Progression Factor	0.68	0.22		0.40	0.46	0.88	0.81	0.82	0.98	0.51	0.53	1.00
Incremental Delay, d2	0.2	0.1		0.2	0.2	0.3	0.9	2.2	0.1	1.6	0.2	0.0
Delay (s)	2.0	0.6		2.4	3.0	5.3	49.4	52.2	57.9	32.6	31.4	58.8
Level of Service	A	A		A	A	A	D	D	E	C	C	E
Approach Delay (s)		1.1			3.6			53.7			38.8	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			9.3									A
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			140.0									18.0
Intersection Capacity Utilization			49.7%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

<2030 Phase 2 FB> AM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	65	114	77	346	180	671	1801	269	492	1786	183
Future Volume (vph)	107	65	114	77	346	180	671	1801	269	492	1786	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.29	1.00	1.00	0.71	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	552	3579	1601	1369	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	107	65	114	77	346	180	671	1801	269	492	1786	183
RTOR Reduction (vph)	0	0	17	0	0	65	0	0	139	0	0	71
Lane Group Flow (vph)	107	65	97	77	346	115	671	1801	130	492	1786	112
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	pm+ov	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	8	8	1	5	2	Perm	1	6	Perm
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	30.0	30.0	61.8	19.0	19.0	43.2	31.8	67.8	67.8	24.2	60.2	60.2
Effective Green, g (s)	30.0	30.0	61.8	19.0	19.0	43.2	31.8	67.8	67.8	24.2	60.2	60.2
Actuated g/C Ratio	0.21	0.21	0.44	0.14	0.14	0.31	0.23	0.48	0.48	0.17	0.43	0.43
Clearance Time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	180	766	706	185	485	503	788	2540	790	612	2255	688
v/s Ratio Prot	c0.03	0.02	0.03		c0.10	0.04	c0.19	0.34		0.14	c0.34	
v/s Ratio Perm	0.10		0.03	0.06		0.03			0.08			0.07
v/c Ratio	0.59	0.08	0.14	0.42	0.71	0.23	0.85	0.71	0.16	0.80	0.79	0.16
Uniform Delay, d1	46.4	44.0	23.2	55.4	57.9	36.0	51.8	28.4	20.2	55.6	34.5	24.5
Progression Factor	1.15	1.13	0.69	1.00	1.00	1.00	0.63	1.19	3.44	1.17	0.77	0.92
Incremental Delay, d2	5.2	0.0	0.1	1.5	4.9	0.2	3.4	0.6	0.2	5.0	1.9	0.3
Delay (s)	58.6	49.9	16.2	56.9	62.8	36.2	36.2	34.3	69.8	69.8	28.6	22.9
Level of Service	E	D	B	E	E	D	D	C	E	E	C	C
Approach Delay (s)		39.7			54.1			38.3			36.4	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay		39.2			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.79										
Actuated Cycle Length (s)		140.0			Sum of lost time (s)			22.0				
Intersection Capacity Utilization		91.2%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

31: Avenue two & Street Four

<2030 Phase 2 FB> AM Peak Hour

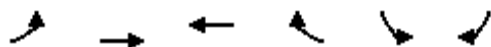
07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	3	139	22	8	28
Future Volume (Veh/h)	8	3	139	22	8	28
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	3	139	22	8	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	183	139			161	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	183	139			161	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			99	
cM capacity (veh/h)	802	909			1418	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	8	3	139	22	36	
Volume Left	8	0	0	0	8	
Volume Right	0	3	0	22	0	
cSH	802	909	1700	1700	1418	
Volume to Capacity	0.01	0.00	0.08	0.01	0.01	
Queue Length 95th (m)	0.2	0.1	0.0	0.0	0.1	
Control Delay (s)	9.5	9.0	0.0	0.0	1.7	
Lane LOS	A	A			A	
Approach Delay (s)	9.4		0.0		1.7	
Approach LOS	A					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			18.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

38: Dundas Street West/Dundas St W & Tremaine Rd

<2030 Phase 2 FB> AM Peak Hour
07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↱	↑↑↑	↑↑↑	↰	↰↱	↰
Traffic Volume (vph)	1039	3038	1024	184	375	559
Future Volume (vph)	1039	3038	1024	184	375	559
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1613
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4117	1570	3541	1613
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1039	3038	1024	184	375	559
RTOR Reduction (vph)	0	0	0	82	0	0
Lane Group Flow (vph)	1039	3038	1024	102	375	559
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	46.9	106.3	55.4	55.4	19.7	140.0
Effective Green, g (s)	47.9	110.3	59.4	59.4	23.7	140.0
Actuated g/C Ratio	0.34	0.79	0.42	0.42	0.17	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	1199	3526	1746	666	599	1613
v/s Ratio Prot	0.30	c0.68	0.25		c0.11	
v/s Ratio Perm				0.07		0.35
v/c Ratio	0.87	0.86	0.59	0.15	0.63	0.35
Uniform Delay, d1	43.1	9.8	30.9	24.8	54.0	0.0
Progression Factor	1.00	1.00	0.96	1.04	1.04	1.00
Incremental Delay, d2	6.8	3.0	1.4	0.5	1.7	0.6
Delay (s)	49.9	12.8	31.2	26.3	57.7	0.6
Level of Service	D	B	C	C	E	A
Approach Delay (s)		22.3	30.5		23.5	
Approach LOS		C	C		C	
Intersection Summary						
HCM 2000 Control Delay			24.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			76.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue two

<2030 Phase 2 FB> AM Peak Hour
07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	3408	1237	156	34	2
Future Volume (vph)	5	3408	1237	156	34	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3471	1457
Flt Permitted	0.17	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	317	4520	4520	1601	3471	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	3408	1237	156	34	2
RTOR Reduction (vph)	0	0	0	28	0	2
Lane Group Flow (vph)	5	3408	1237	128	34	0
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	120.0	120.0	114.6	114.6	6.0	6.0
Effective Green, g (s)	120.0	120.0	114.6	114.6	6.0	6.0
Actuated g/C Ratio	0.86	0.86	0.82	0.82	0.04	0.04
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	3874	3699	1310	148	62
v/s Ratio Prot	0.00	c0.75	0.27		c0.01	
v/s Ratio Perm	0.01			0.08		0.00
v/c Ratio	0.02	0.88	0.33	0.10	0.23	0.00
Uniform Delay, d1	1.6	5.8	3.2	2.5	64.8	64.1
Progression Factor	0.40	0.80	2.34	5.50	0.96	1.06
Incremental Delay, d2	0.0	1.8	0.2	0.1	0.8	0.0
Delay (s)	0.7	6.5	7.7	13.9	63.3	67.9
Level of Service	A	A	A	B	E	E
Approach Delay (s)		6.5	8.4		63.5	
Approach LOS		A	A		E	

Intersection Summary

HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Avenue Three & Dundas St W

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	139	2954	262	58	1296	266	78	21	168	56	4	19
Future Volume (vph)	139	2954	262	58	1296	266	78	21	168	56	4	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1601	1674	4117	1570	1768	1921	1517	1555	1921	1610
Flt Permitted	0.15	1.00	1.00	0.04	1.00	1.00	0.76	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	280	4476	1601	70	4117	1570	1405	1921	1517	1217	1921	1610
Peak-hour factor, PHF	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. Flow (vph)	139	2954	262	58	1296	266	78	21	168	56	4	19
RTOR Reduction (vph)	0	0	50	0	0	75	0	0	81	0	0	17
Lane Group Flow (vph)	139	2954	212	58	1296	191	78	21	87	56	4	2
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	109.3	101.9	101.9	106.3	100.4	100.4	14.8	14.8	14.8	14.8	14.8	14.8
Effective Green, g (s)	109.3	101.9	101.9	106.3	100.4	100.4	14.8	14.8	14.8	14.8	14.8	14.8
Actuated g/C Ratio	0.78	0.73	0.73	0.76	0.72	0.72	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	0.2
Lane Grp Cap (vph)	299	3257	1165	120	2952	1125	148	203	160	128	203	170
v/s Ratio Prot	c0.02	c0.66		0.02	0.31			0.01			0.00	
v/s Ratio Perm	0.34		0.13	0.34		0.12	0.06		c0.06	0.05		0.00
v/c Ratio	0.46	0.91	0.18	0.48	0.44	0.17	0.53	0.10	0.54	0.44	0.02	0.01
Uniform Delay, d1	4.5	15.3	6.0	29.3	8.2	6.4	59.3	56.6	59.4	58.7	56.1	56.1
Progression Factor	1.18	0.83	1.46	1.77	0.63	0.75	1.00	1.00	1.00	0.60	0.64	1.00
Incremental Delay, d2	0.4	2.7	0.2	2.5	0.4	0.3	3.8	0.3	4.1	0.9	0.0	0.0
Delay (s)	5.8	15.3	8.9	54.3	5.5	5.1	63.1	56.9	63.5	36.2	35.8	56.1
Level of Service	A	B	A	D	A	A	E	E	E	D	D	E
Approach Delay (s)		14.4			7.2			62.9			41.0	
Approach LOS		B			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			15.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			17.4		
Intersection Capacity Utilization			94.7%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		 		
Traffic Volume (vph)	128	3116	101	33	1586	269	71	17	84	51	2	24
Future Volume (vph)	128	3116	101	33	1586	269	71	17	84	51	2	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	4391	1633	1772	4117	1601	1722	1609		3471	1623	
Flt Permitted	0.09	1.00	1.00	0.04	1.00	1.00	0.54	1.00		0.95	1.00	
Satd. Flow (perm)	157	4391	1633	82	4117	1601	980	1609		3471	1623	
Peak-hour factor, PHF	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. Flow (vph)	128	3116	101	33	1586	269	71	17	84	51	2	24
RTOR Reduction (vph)	0	0	29	0	0	44	0	76	0	0	22	0
Lane Group Flow (vph)	128	3116	72	33	1586	225	71	25	0	51	4	0
Heavy Vehicles (%)	4%	5%	0%	3%	12%	2%	6%	2%	5%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	104.6	96.7	96.7	94.4	90.5	90.5	20.8	12.6		4.8	9.2	
Effective Green, g (s)	104.6	96.7	96.7	94.4	90.5	90.5	20.8	12.6		4.8	9.2	
Actuated g/C Ratio	0.75	0.69	0.69	0.67	0.65	0.65	0.15	0.09		0.03	0.07	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	232	3032	1127	102	2661	1034	189	144		119	106	
v/s Ratio Prot	c0.04	c0.71		0.01	0.39		c0.02	0.02		0.01	0.00	
v/s Ratio Perm	0.37		0.04	0.21		0.14	c0.03					
v/c Ratio	0.55	1.03	0.06	0.32	0.60	0.22	0.38	0.17		0.43	0.03	
Uniform Delay, d1	10.6	21.6	7.0	34.8	14.2	10.2	53.0	58.9		66.3	61.2	
Progression Factor	1.78	0.87	2.15	2.44	1.00	1.42	1.00	1.00		0.96	1.57	
Incremental Delay, d2	1.6	20.0	0.1	1.2	0.6	0.3	1.3	1.2		2.5	0.1	
Delay (s)	20.5	38.9	15.1	86.1	14.9	14.7	54.2	60.0		65.8	96.2	
Level of Service	C	D	B	F	B	B	D	E		E	F	
Approach Delay (s)		37.5			16.2			57.6			76.0	
Approach LOS		D			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			31.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			90.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2 FB> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	2286	535	198	1117	602	508	1809	322	287	1334	169
Future Volume (vph)	330	2286	535	198	1117	602	508	1809	322	287	1334	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1569	1508	4683	1555	3079	4902	1512	3404	4902	1541
Flt Permitted	0.10	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	486	4476	1569	145	4683	1555	3079	4902	1512	3404	4902	1541
Peak-hour factor, PHF	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. Flow (vph)	330	2286	535	198	1117	602	508	1809	322	287	1334	169
RTOR Reduction (vph)	0	0	27	0	0	75	0	0	51	0	0	53
Lane Group Flow (vph)	330	2286	508	198	1117	527	508	1809	271	287	1334	116
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	21%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	66.0	53.0	73.0	51.7	42.7	49.7	20.0	49.0	58.0	7.0	36.0	55.3
Effective Green, g (s)	67.0	56.0	79.0	53.7	45.7	55.7	21.0	52.0	64.0	8.0	39.0	61.3
Actuated g/C Ratio	0.48	0.40	0.56	0.38	0.33	0.40	0.15	0.37	0.46	0.06	0.28	0.44
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	2.5	2.5	4.0	2.5	2.5	4.0	2.5
Lane Grp Cap (vph)	398	1790	885	152	1528	618	461	1820	691	194	1365	674
v/s Ratio Prot	0.12	c0.51	0.09	c0.09	0.24	0.06	c0.16	c0.37	0.03	c0.08	0.27	0.03
v/s Ratio Perm	0.28		0.23	0.40		0.28			0.15			0.05
v/c Ratio	0.83	1.28	0.57	1.30	0.73	0.85	1.10	0.99	0.39	1.48	0.98	0.17
Uniform Delay, d1	27.5	42.0	19.7	37.1	41.7	38.4	59.5	43.8	25.1	66.0	50.1	23.9
Progression Factor	1.17	0.92	0.38	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.96	2.58
Incremental Delay, d2	4.4	126.1	0.2	175.7	3.1	10.8	72.6	19.6	0.3	233.2	14.7	0.1
Delay (s)	36.6	164.9	7.6	212.8	44.8	49.2	132.1	63.4	25.4	280.9	62.9	61.7
Level of Service	D	F	A	F	D	D	F	E	C	F	E	E
Approach Delay (s)		124.7			63.6			72.0			97.8	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			92.6				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.20									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			111.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

2030 Phase 2 Future Background PM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	100	0	2263	1184	0
Future Volume (vph)	111	100	0	2263	1184	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.96	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3370	1457		5142	3579	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3370	1457		5142	3579	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	100	0	2263	1184	0
RTOR Reduction (vph)	22	61	0	0	0	0
Lane Group Flow (vph)	123	5	0	2263	1184	0
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.4	11.4		116.6	116.6	
Effective Green, g (s)	11.4	11.4		116.6	116.6	
Actuated g/C Ratio	0.08	0.08		0.83	0.83	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	274	118		4282	2980	
v/s Ratio Prot	c0.04			c0.44	0.33	
v/s Ratio Perm		0.00				
v/c Ratio	0.45	0.05		0.53	0.40	
Uniform Delay, d1	61.3	59.3		3.5	2.9	
Progression Factor	1.00	1.00		1.04	1.00	
Incremental Delay, d2	1.6	0.2		0.4	0.4	
Delay (s)	62.9	59.5		4.0	3.3	
Level of Service	E	E		A	A	
Approach Delay (s)	61.8			4.0	3.3	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay			7.1		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			58.7%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Tremaine Rd & Avenue One

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	65	40	60	55	39	50	624	18	8	807	0
Future Volume (vph)	5	65	40	60	55	39	50	624	18	8	807	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.94		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1776		1789	1766		1789	3563		1789	3579	
Flt Permitted	0.70	1.00		0.69	1.00		0.35	1.00		0.41	1.00	
Satd. Flow (perm)	1311	1776		1298	1766		653	3563		768	3579	
Peak-hour factor, PHF	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. Flow (vph)	5	65	40	60	55	39	50	624	18	8	807	0
RTOR Reduction (vph)	0	35	0	0	34	0	0	2	0	0	0	0
Lane Group Flow (vph)	5	70	0	60	60	0	50	640	0	8	807	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.5	8.5		8.5	8.5		47.5	47.5		47.5	47.5	
Effective Green, g (s)	8.5	8.5		8.5	8.5		47.5	47.5		47.5	47.5	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.68	0.68		0.68	0.68	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	159	215		157	214		443	2417		521	2428	
v/s Ratio Prot		0.04			0.03			0.18			c0.23	
v/s Ratio Perm	0.00			c0.05			0.08			0.01		
v/c Ratio	0.03	0.32		0.38	0.28		0.11	0.26		0.02	0.33	
Uniform Delay, d1	27.1	28.1		28.3	28.0		3.9	4.4		3.7	4.7	
Progression Factor	1.00	1.00		1.00	0.99		1.56	1.42		1.00	1.00	
Incremental Delay, d2	0.1	0.9		1.6	0.7		0.5	0.3		0.1	0.4	
Delay (s)	27.2	29.0		29.8	28.4		6.6	6.5		3.7	5.0	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		28.9			28.9			6.5			5.0	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		9.2										
HCM 2000 Level of Service												
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		70.0										
Sum of lost time (s)												
Intersection Capacity Utilization		58.1%										
ICU Level of Service												
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 4: Avenue Two & Avenue One

<2030 Phase 2 FB> PM Peak Hour
07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↖	↗
Traffic Volume (veh/h)	24	2	16	92	7	47
Future Volume (Veh/h)	24	2	16	92	7	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	2	16	92	7	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			26		149	25
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			26		149	25
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	96
cM capacity (veh/h)			1588		835	1051
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	26	108	7	47		
Volume Left	0	16	7	0		
Volume Right	2	0	0	47		
cSH	1700	1588	835	1051		
Volume to Capacity	0.02	0.01	0.01	0.04		
Queue Length 95th (m)	0.0	0.2	0.2	1.1		
Control Delay (s)	0.0	1.1	9.4	8.6		
Lane LOS		A	A	A		
Approach Delay (s)	0.0	1.1	8.7			
Approach LOS			A			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			22.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Avenue Three & Avenue One

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	238	80	135	98	25	16
Future Volume (vph)	238	80	135	98	25	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1883	1601	1789	1883	1789	1601
Flt Permitted	1.00	1.00	0.61	1.00	0.95	1.00
Satd. Flow (perm)	1883	1601	1150	1883	1789	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	238	80	135	98	25	16
RTOR Reduction (vph)	0	21	0	0	0	15
Lane Group Flow (vph)	238	59	135	98	25	1
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	52.0	52.0	52.0	52.0	4.0	4.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	4.0	4.0
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.06	0.06
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1398	1189	854	1398	102	91
v/s Ratio Prot	c0.13			0.05	c0.01	
v/s Ratio Perm		0.04	0.12			0.00
v/c Ratio	0.17	0.05	0.16	0.07	0.25	0.01
Uniform Delay, d1	2.6	2.4	2.6	2.4	31.6	31.1
Progression Factor	1.07	1.16	1.79	1.56	0.96	1.04
Incremental Delay, d2	0.3	0.1	0.4	0.1	1.3	0.0
Delay (s)	3.1	2.9	5.1	3.9	31.7	32.3
Level of Service	A	A	A	A	C	C
Approach Delay (s)	3.0			4.6	31.9	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			5.6		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.18			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			46.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 8: Avenue Five & Avenue One

<2030 Phase 2 FB> PM Peak Hour
07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↱	↰	↱
Traffic Volume (veh/h)	256	11	68	128	9	65
Future Volume (Veh/h)	256	11	68	128	9	65
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	256	11	68	128	9	65
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			267		526	262
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			267		526	262
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		98	92
cM capacity (veh/h)			1297		486	777
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	267	68	128	9	65	
Volume Left	0	68	0	9	0	
Volume Right	11	0	0	0	65	
cSH	1700	1297	1700	486	777	
Volume to Capacity	0.16	0.05	0.08	0.02	0.08	
Queue Length 95th (m)	0.0	1.3	0.0	0.4	2.1	
Control Delay (s)	0.0	7.9	0.0	12.6	10.1	
Lane LOS		A		B	B	
Approach Delay (s)	0.0	2.8		10.4		
Approach LOS				B		
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			31.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2 FB> PM Peak Hour
07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	219	470	116	2342	1426	56
Future Volume (vph)	219	470	116	2342	1426	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	4.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	219	470	116	2342	1426	56
RTOR Reduction (vph)	0	5	0	0	0	26
Lane Group Flow (vph)	219	465	116	2342	1426	30
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	22.4	46.2	23.8	103.6	75.8	75.8
Effective Green, g (s)	22.4	46.2	23.8	103.6	75.8	75.8
Actuated g/C Ratio	0.16	0.33	0.17	0.74	0.54	0.54
Clearance Time (s)	7.0	4.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	528	590	3805	2784	866
v/s Ratio Prot	0.12	c0.15	0.03	c0.46	0.28	
v/s Ratio Perm		0.14				0.02
v/c Ratio	0.77	0.88	0.20	0.62	0.51	0.04
Uniform Delay, d1	56.3	44.3	49.9	8.7	20.4	15.0
Progression Factor	0.99	1.02	1.18	0.33	0.93	0.92
Incremental Delay, d2	11.6	15.7	0.1	0.5	0.6	0.1
Delay (s)	67.3	60.8	58.8	3.4	19.6	13.8
Level of Service	E	E	E	A	B	B
Approach Delay (s)	62.9			6.0	19.4	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay	18.8			HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio	0.73					
Actuated Cycle Length (s)	140.0			Sum of lost time (s)		18.0
Intersection Capacity Utilization	69.1%			ICU Level of Service		C
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
20: Tremaine Rd & Burnhamthorpe Road

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	60	313	25	59	15	623	111	51	881	0
Future Volume (vph)	10	30	60	313	25	59	15	623	111	51	881	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.89		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1695		1789	1685		1789	3497		1789	3579	
Flt Permitted	0.70	1.00		0.70	1.00		0.27	1.00		0.34	1.00	
Satd. Flow (perm)	1323	1695		1316	1685		511	3497		645	3579	
Peak-hour factor, PHF	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. Flow (vph)	10	30	60	313	25	59	15	623	111	51	881	0
RTOR Reduction (vph)	0	35	0	0	41	0	0	17	0	0	0	0
Lane Group Flow (vph)	10	55	0	313	43	0	15	717	0	51	881	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.8	21.8		21.8	21.8		34.2	34.2		34.2	34.2	
Effective Green, g (s)	21.8	21.8		21.8	21.8		34.2	34.2		34.2	34.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.49	0.49		0.49	0.49	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	412	527		409	524		249	1708		315	1748	
v/s Ratio Prot		0.03			0.03			0.20			c0.25	
v/s Ratio Perm	0.01			c0.24			0.03			0.08		
v/c Ratio	0.02	0.10		0.77	0.08		0.06	0.42		0.16	0.50	
Uniform Delay, d1	16.7	17.2		21.8	17.0		9.4	11.5		9.9	12.1	
Progression Factor	1.00	1.00		1.29	1.50		0.78	1.06		0.75	0.74	
Incremental Delay, d2	0.0	0.1		8.3	0.1		0.4	0.7		1.1	1.0	
Delay (s)	16.7	17.2		36.3	25.6		7.7	12.9		8.6	10.0	
Level of Service	B	B		D	C		A	B		A	A	
Approach Delay (s)		17.2			34.1			12.8			9.9	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			15.6			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			74.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

22: Avenue two & Burnhamthorpe Road

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	337	66	7	332	64	30	19	11	186	59	65
Future Volume (vph)	23	337	66	7	332	64	30	19	11	186	59	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.55	1.00	1.00	0.55	1.00	1.00	0.72	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1039	3579	1601	1034	3579	1601	1353	1883	1601	1403	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	23	337	66	7	332	64	30	19	11	186	59	65
RTOR Reduction (vph)	0	0	27	0	0	27	0	0	9	0	0	51
Lane Group Flow (vph)	23	337	39	7	332	37	30	19	2	186	59	14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	40.9	40.9	40.9	40.9	40.9	40.9	15.1	15.1	15.1	15.1	15.1	15.1
Effective Green, g (s)	40.9	40.9	40.9	40.9	40.9	40.9	15.1	15.1	15.1	15.1	15.1	15.1
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.58	0.58	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	607	2091	935	604	2091	935	291	406	345	302	406	345
v/s Ratio Prot		c0.09			0.09			0.01			0.03	
v/s Ratio Perm	0.02		0.02	0.01		0.02	0.02		0.00	c0.13		0.01
v/c Ratio	0.04	0.16	0.04	0.01	0.16	0.04	0.10	0.05	0.01	0.62	0.15	0.04
Uniform Delay, d1	6.2	6.7	6.2	6.1	6.7	6.2	22.0	21.7	21.6	24.8	22.2	21.7
Progression Factor	1.54	1.48	2.84	2.37	1.93	5.50	1.15	1.17	1.00	1.00	1.01	1.04
Incremental Delay, d2	0.1	0.2	0.1	0.0	0.2	0.1	0.2	0.0	0.0	3.7	0.2	0.0
Delay (s)	9.6	10.1	17.7	14.5	13.0	34.1	25.5	25.4	21.6	28.6	22.6	22.6
Level of Service	A	B	B	B	B	C	C	C	C	C	C	C
Approach Delay (s)		11.2			16.4			24.8			26.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			17.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			47.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Avenue Three & Burnhamthorpe Road

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	521	4	68	356	13	7	19	88	40	135	40
Future Volume (vph)	9	521	4	68	356	13	7	19	88	40	135	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3574		1789	3579	1601	1789	1883	1601	1789	1819	
Flt Permitted	0.54	1.00		0.46	1.00	1.00	0.65	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	1015	3574		861	3579	1601	1218	1883	1601	1403	1819	
Peak-hour factor, PHF	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. Flow (vph)	9	521	4	68	356	13	7	19	88	40	135	40
RTOR Reduction (vph)	0	0	0	0	0	5	0	0	73	0	21	0
Lane Group Flow (vph)	9	525	0	68	356	8	7	19	15	40	154	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	43.9	43.9		43.9	43.9	43.9	12.1	12.1	12.1	12.1	12.1	
Effective Green, g (s)	43.9	43.9		43.9	43.9	43.9	12.1	12.1	12.1	12.1	12.1	
Actuated g/C Ratio	0.63	0.63		0.63	0.63	0.63	0.17	0.17	0.17	0.17	0.17	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	636	2241		539	2244	1004	210	325	276	242	314	
v/s Ratio Prot		c0.15			0.10			0.01			c0.08	
v/s Ratio Perm	0.01			0.08		0.01	0.01		0.01	0.03		
v/c Ratio	0.01	0.23		0.13	0.16	0.01	0.03	0.06	0.06	0.17	0.49	
Uniform Delay, d1	4.9	5.7		5.3	5.4	4.9	24.1	24.2	24.2	24.7	26.2	
Progression Factor	1.21	1.19		2.01	2.04	1.00	0.90	0.91	1.47	0.90	0.87	
Incremental Delay, d2	0.0	0.2		0.5	0.2	0.0	0.1	0.1	0.1	0.3	1.2	
Delay (s)	6.0	7.0		11.1	11.2	4.9	21.6	22.2	35.7	22.6	24.0	
Level of Service	A	A		B	B	A	C	C	D	C	C	
Approach Delay (s)		7.0			11.0			32.6			23.7	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			13.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			49.9%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
26: Avenue Five & Burnhamthorpe Road

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	664	21	70	318	55	14	19	101	239	61	111
Future Volume (vph)	24	664	21	70	318	55	14	19	101	239	61	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3562		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.56	1.00		0.38	1.00	1.00	0.72	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	1053	3562		719	3579	1601	1351	1883	1601	1403	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	24	664	21	70	318	55	14	19	101	239	61	111
RTOR Reduction (vph)	0	2	0	0	0	25	0	0	76	0	0	83
Lane Group Flow (vph)	24	683	0	70	318	30	14	19	25	239	61	28
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	38.4	38.4		38.4	38.4	38.4	17.6	17.6	17.6	17.6	17.6	17.6
Effective Green, g (s)	38.4	38.4		38.4	38.4	38.4	17.6	17.6	17.6	17.6	17.6	17.6
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	577	1954		394	1963	878	339	473	402	352	473	402
v/s Ratio Prot		c0.19			0.09			0.01			0.03	
v/s Ratio Perm	0.02			0.10		0.02	0.01		0.02	c0.17		0.02
v/c Ratio	0.04	0.35		0.18	0.16	0.03	0.04	0.04	0.06	0.68	0.13	0.07
Uniform Delay, d1	7.3	8.8		7.9	7.8	7.3	19.8	19.8	19.9	23.6	20.3	20.0
Progression Factor	1.74	1.52		1.29	1.29	2.47	1.34	1.32	3.10	1.00	0.99	1.12
Incremental Delay, d2	0.1	0.5		1.0	0.2	0.1	0.1	0.0	0.1	5.1	0.1	0.1
Delay (s)	12.8	13.9		11.2	10.3	18.1	26.6	26.2	61.9	28.8	20.1	22.4
Level of Service	B	B		B	B	B	C	C	E	C	C	C
Approach Delay (s)		13.9			11.4			53.1			25.8	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			19.2									
HCM 2000 Level of Service										B		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			70.0							14.0		
Intersection Capacity Utilization			64.8%								C	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

<2030 Phase 2 FB> PM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	307	583	298	112	507	184	1715	84	214	1594	109
Future Volume (vph)	216	307	583	298	112	507	184	1715	84	214	1594	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.68	1.00	1.00	0.35	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1283	3579	1601	679	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	216	307	583	298	112	507	184	1715	84	214	1594	109
RTOR Reduction (vph)	0	0	41	0	0	68	0	0	35	0	0	49
Lane Group Flow (vph)	216	307	542	298	112	439	184	1715	49	214	1594	60
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	31.1	17.3	48.5	35.5	19.5	39.2	31.2	65.0	81.0	19.7	53.5	67.3
Effective Green, g (s)	31.1	17.3	48.5	35.5	19.5	39.2	31.2	65.0	81.0	19.7	53.5	67.3
Actuated g/C Ratio	0.22	0.12	0.35	0.25	0.14	0.28	0.22	0.46	0.58	0.14	0.38	0.48
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	442	554	303	498	457	773	2435	944	498	2004	769
v/s Ratio Prot	0.06	0.09	c0.22	c0.11	0.03	0.14	0.05	0.33	0.01	0.06	c0.30	0.01
v/s Ratio Perm	0.08		0.12	c0.14		0.13			0.02			0.03
v/c Ratio	0.65	0.69	0.98	0.98	0.22	0.96	0.24	0.70	0.05	0.43	0.80	0.08
Uniform Delay, d1	48.2	58.8	45.3	48.8	53.5	49.7	44.6	29.9	12.8	55.0	38.4	19.6
Progression Factor	0.84	0.87	1.02	1.00	1.00	1.00	0.62	0.83	2.67	1.13	0.71	0.10
Incremental Delay, d2	4.1	4.5	31.9	46.9	0.2	32.2	0.1	0.7	0.0	0.5	2.9	0.0
Delay (s)	44.7	56.0	78.1	95.7	53.8	81.8	27.8	25.4	34.2	62.9	30.2	2.0
Level of Service	D	E	E	F	D	F	C	C	C	E	C	A
Approach Delay (s)		65.4			82.9			26.0			32.2	
Approach LOS		E			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			44.2									D
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			140.0									22.0
Intersection Capacity Utilization			95.9%									F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

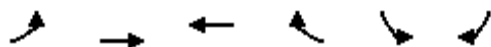
31: Avenue two & Street Four

<2030 Phase 2 FB> PM Peak Hour
07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	47	12	48	37	8	124
Future Volume (Veh/h)	47	12	48	37	8	124
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	47	12	48	37	8	124
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	188	48			85	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188	48			85	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			99	
cM capacity (veh/h)	797	1021			1512	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	47	12	48	37	132	
Volume Left	47	0	0	0	8	
Volume Right	0	12	0	37	0	
cSH	797	1021	1700	1700	1512	
Volume to Capacity	0.06	0.01	0.03	0.02	0.01	
Queue Length 95th (m)	1.4	0.3	0.0	0.0	0.1	
Control Delay (s)	9.8	8.6	0.0	0.0	0.5	
Lane LOS	A	A			A	
Approach Delay (s)	9.6		0.0		0.5	
Approach LOS	A					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			23.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

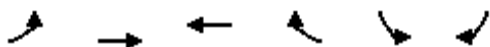
<2030 Phase 2 FB> PM Peak Hour
07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	→	←←	→
Traffic Volume (vph)	483	1361	2817	271	181	1074
Future Volume (vph)	483	1361	2817	271	181	1074
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	483	1361	2817	271	181	1074
RTOR Reduction (vph)	0	0	0	53	0	0
Lane Group Flow (vph)	483	1361	2817	218	181	1074
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	30.7	113.7	79.0	79.0	12.3	140.0
Effective Green, g (s)	31.7	117.7	83.0	83.0	16.3	140.0
Actuated g/C Ratio	0.23	0.84	0.59	0.59	0.12	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	793	3763	2653	949	412	1570
v/s Ratio Prot	0.14	0.30	c0.63		0.05	
v/s Ratio Perm				0.14		c0.68
v/c Ratio	0.61	0.36	1.06	0.23	0.44	0.68
Uniform Delay, d1	48.6	2.6	28.5	13.4	57.6	0.0
Progression Factor	1.00	1.00	0.60	0.47	0.88	1.00
Incremental Delay, d2	1.3	0.3	32.3	0.3	0.5	2.1
Delay (s)	49.9	2.8	49.5	6.6	50.9	2.1
Level of Service	D	A	D	A	D	A
Approach Delay (s)		15.2	45.7		9.2	
Approach LOS		B	D		A	
Intersection Summary						
HCM 2000 Control Delay			29.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.95			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			86.5%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
40: Dundas St W & Avenue two

<2030 Phase 2 FB> PM Peak Hour
07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	1532	3069	75	153	18
Future Volume (vph)	10	1532	3069	75	153	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3475	1457
Flt Permitted	0.04	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	69	4520	4520	1601	3475	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	1532	3069	75	153	18
RTOR Reduction (vph)	0	0	0	11	1	1
Lane Group Flow (vph)	10	1532	3069	64	154	15
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	114.1	114.1	105.9	105.9	11.9	16.1
Effective Green, g (s)	114.1	114.1	105.9	105.9	11.9	16.1
Actuated g/C Ratio	0.81	0.81	0.76	0.76	0.09	0.12
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	107	3683	3419	1211	295	167
v/s Ratio Prot	0.00	c0.34	c0.68		c0.04	0.00
v/s Ratio Perm	0.07			0.04		0.01
v/c Ratio	0.09	0.42	0.90	0.05	0.52	0.09
Uniform Delay, d1	26.6	3.6	12.9	4.3	61.3	55.4
Progression Factor	0.96	0.85	1.23	1.55	0.93	1.02
Incremental Delay, d2	0.4	0.3	1.2	0.0	1.7	0.2
Delay (s)	25.8	3.4	17.1	6.7	58.7	56.5
Level of Service	C	A	B	A	E	E
Approach Delay (s)		3.5	16.9		58.5	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Avenue Three & Dundas St W

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	69	1497	90	104	2688	168	241	7	62	285	17	175
Future Volume (vph)	69	1497	90	104	2688	168	241	7	62	285	17	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	4476	1570	1825	4476	1633	1753	1921	1504	1787	1921	1611
Flt Permitted	0.05	1.00	1.00	0.08	1.00	1.00	0.75	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	103	4476	1570	150	4476	1633	1377	1921	1504	1246	1921	1611
Peak-hour factor, PHF	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. Flow (vph)	69	1497	90	104	2688	168	241	7	62	285	17	175
RTOR Reduction (vph)	0	0	42	0	0	40	0	0	49	0	0	65
Lane Group Flow (vph)	69	1497	48	104	2688	128	241	7	13	285	17	110
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	79.9	74.5	74.5	86.7	77.9	77.9	29.3	29.3	29.3	39.3	39.3	39.3
Effective Green, g (s)	79.9	74.5	74.5	86.7	77.9	77.9	29.3	29.3	29.3	39.3	39.3	39.3
Actuated g/C Ratio	0.57	0.53	0.53	0.62	0.56	0.56	0.21	0.21	0.21	0.28	0.28	0.28
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	3.0	0.2	0.2
Lane Grp Cap (vph)	125	2381	835	198	2490	908	288	402	314	372	539	452
v/s Ratio Prot	0.02	0.33		c0.03	c0.60			0.00		c0.03	0.01	
v/s Ratio Perm	0.29		0.03	0.29		0.08	c0.18		0.01	0.18		0.07
v/c Ratio	0.55	0.63	0.06	0.53	1.08	0.14	0.84	0.02	0.04	0.77	0.03	0.24
Uniform Delay, d1	31.8	23.0	15.8	16.8	31.0	14.9	53.1	43.9	44.1	46.7	36.5	38.9
Progression Factor	1.36	0.72	0.06	2.04	0.96	1.39	1.00	1.00	1.00	1.01	1.02	0.97
Incremental Delay, d2	3.9	1.2	0.1	1.3	40.2	0.2	19.0	0.0	0.1	9.1	0.0	0.1
Delay (s)	47.3	17.8	1.1	35.4	70.1	20.9	72.1	43.9	44.2	56.0	37.3	37.7
Level of Service	D	B	A	D	E	C	E	D	D	E	D	D
Approach Delay (s)		18.2			66.1			65.9			48.6	
Approach LOS		B			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			49.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			21.4			
Intersection Capacity Utilization			94.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		 	 	
Traffic Volume (vph)	46	1744	51	44	2778	104	56	4	25	255	15	127
Future Volume (vph)	46	1744	51	44	2778	104	56	4	25	255	15	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	4476	1601	1772	4611	1633	1789	1668		3471	1631	
Flt Permitted	0.04	1.00	1.00	0.07	1.00	1.00	0.67	1.00		0.95	1.00	
Satd. Flow (perm)	81	4476	1601	130	4611	1633	1255	1668		3471	1631	
Peak-hour factor, PHF	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. Flow (vph)	46	1744	51	44	2778	104	56	4	25	255	15	127
RTOR Reduction (vph)	0	0	18	0	0	32	0	24	0	0	115	0
Lane Group Flow (vph)	46	1744	33	44	2778	72	56	5	0	255	27	0
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%	2%	2%	0%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	97.3	91.9	91.9	97.3	91.9	91.9	14.1	6.4		14.3	13.0	
Effective Green, g (s)	97.3	91.9	91.9	97.3	91.9	91.9	14.1	6.4		14.3	13.0	
Actuated g/C Ratio	0.69	0.66	0.66	0.69	0.66	0.66	0.10	0.05		0.10	0.09	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	121	2938	1050	153	3026	1071	155	76		354	151	
v/s Ratio Prot	c0.01	0.39		0.01	c0.60		0.02	0.00		c0.07	0.02	
v/s Ratio Perm	0.25		0.02	0.19		0.04	c0.02					
v/c Ratio	0.38	0.59	0.03	0.29	0.92	0.07	0.36	0.07		0.72	0.18	
Uniform Delay, d1	31.2	13.5	8.4	9.8	20.8	8.6	58.4	63.9		60.9	58.6	
Progression Factor	2.25	0.95	11.13	1.71	0.84	0.76	1.00	1.00		0.98	1.03	
Incremental Delay, d2	1.6	0.7	0.0	0.3	1.7	0.0	1.4	0.8		7.0	0.6	
Delay (s)	71.7	13.6	94.0	17.0	19.2	6.6	59.9	64.7		66.8	60.7	
Level of Service	E	B	F	B	B	A	E	E		E	E	
Approach Delay (s)		17.3			18.7			61.5			64.6	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			22.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			84.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2 FB> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	1418	501	292	2033	253	580	1512	207	575	1618	261
Future Volume (vph)	218	1418	501	292	2033	253	580	1512	207	575	1618	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	2.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1584	1755	5142	1570	3471	5092	1445	3471	5043	1601
Flt Permitted	0.09	1.00	1.00	0.08	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4476	1584	154	5142	1570	3471	5092	1445	3471	5043	1601
Peak-hour factor, PHF	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. Flow (vph)	218	1418	501	292	2033	253	580	1512	207	575	1618	261
RTOR Reduction (vph)	0	0	46	0	0	60	0	0	87	0	0	89
Lane Group Flow (vph)	218	1418	455	292	2033	193	580	1512	120	575	1618	172
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	51.0	44.0	68.0	60.0	49.0	49.0	24.0	41.0	41.0	21.0	38.0	38.0
Effective Green, g (s)	53.0	46.0	72.0	61.0	51.0	51.0	25.0	43.0	43.0	22.0	40.0	40.0
Actuated g/C Ratio	0.38	0.33	0.51	0.44	0.36	0.36	0.18	0.31	0.31	0.16	0.29	0.29
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	179	1470	814	215	1873	571	619	1563	443	545	1440	457
v/s Ratio Prot	0.07	0.32	c0.10	c0.13	0.40		0.17	0.30		c0.17	c0.32	
v/s Ratio Perm	0.39		0.18	c0.46		0.12			0.08			0.11
v/c Ratio	1.22	0.96	0.56	1.36	1.09	0.34	0.94	0.97	0.27	1.06	1.12	0.38
Uniform Delay, d1	40.9	46.2	23.2	42.0	44.5	32.3	56.7	47.8	36.7	59.0	50.0	40.0
Progression Factor	1.46	1.15	0.63	1.00	1.00	1.00	1.00	1.00	1.00	0.80	1.04	1.10
Incremental Delay, d2	133.0	14.6	0.6	188.3	48.2	1.6	21.7	15.6	0.5	43.9	61.1	0.4
Delay (s)	192.5	67.7	15.3	230.3	92.7	33.9	78.5	63.4	37.1	90.8	113.0	44.4
Level of Service	F	E	B	F	F	C	E	E	D	F	F	D
Approach Delay (s)		68.2			102.5			64.9			100.5	
Approach LOS		E			F			E			F	
Intersection Summary												
HCM 2000 Control Delay			85.1									F
HCM 2000 Volume to Capacity ratio			1.22									
Actuated Cycle Length (s)			140.0									16.0
Intersection Capacity Utilization			114.2%									H
Analysis Period (min)			15									
c Critical Lane Group												

2030 Phase 2 Future Total AM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	355	0	1095	2514	0
Future Volume (vph)	167	355	0	1095	2514	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.92	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3171	1457		4902	3444	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3171	1457		4902	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	355	0	1095	2514	0
RTOR Reduction (vph)	11	11	0	0	0	0
Lane Group Flow (vph)	334	166	0	1095	2514	0
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	18.4	18.4		109.6	109.6	
Effective Green, g (s)	18.4	18.4		109.6	109.6	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	416	191		3837	2696	
v/s Ratio Prot	0.11			0.22	c0.73	
v/s Ratio Perm		c0.11				
v/c Ratio	0.80	0.87		0.29	0.93	
Uniform Delay, d1	59.0	59.6		4.3	12.2	
Progression Factor	1.00	1.00		0.38	1.00	
Incremental Delay, d2	11.2	32.2		0.2	7.4	
Delay (s)	70.3	91.8		1.8	19.6	
Level of Service	E	F		A	B	
Approach Delay (s)	77.6			1.8	19.6	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay		22.2		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.92				
Actuated Cycle Length (s)		140.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		94.1%		ICU Level of Service		F
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Tremaine Rd & Avenue One

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	50	20	24	45	9	90	653	161	69	871	0
Future Volume (vph)	0	50	20	24	45	9	90	653	161	69	871	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.97		1.00	0.97		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803		1789	1836		1789	3472		1789	3579	
Flt Permitted		1.00		0.71	1.00		0.33	1.00		0.34	1.00	
Satd. Flow (perm)		1803		1340	1836		613	3472		649	3579	
Peak-hour factor, PHF	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. Flow (vph)	0	50	20	24	45	9	90	653	161	69	871	0
RTOR Reduction (vph)	0	18	0	0	8	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	52	0	24	46	0	90	799	0	69	871	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Effective Green, g (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Actuated g/C Ratio		0.09		0.09	0.09		0.71	0.71		0.71	0.71	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		154		114	157		437	2480		463	2556	
v/s Ratio Prot		c0.03			0.02			0.23			c0.24	
v/s Ratio Perm				0.02			0.15			0.11		
v/c Ratio		0.34		0.21	0.29		0.21	0.32		0.15	0.34	
Uniform Delay, d1		30.1		29.8	30.0		3.3	3.7		3.2	3.8	
Progression Factor		1.00		1.00	1.00		1.50	1.51		1.00	1.00	
Incremental Delay, d2		1.3		0.9	1.0		0.9	0.3		0.7	0.4	
Delay (s)		31.4		30.6	30.9		6.0	5.9		3.9	4.1	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		31.4			30.8			5.9			4.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.9					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		70.0					Sum of lost time (s)		14.0			
Intersection Capacity Utilization		58.2%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Avenue Two & Avenue One

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↘	↗
Traffic Volume (veh/h)	214	16	74	31	2	89
Future Volume (Veh/h)	214	16	74	31	2	89
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	214	16	74	31	2	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			230	401		222
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			230	401		222
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			94	100		89
cM capacity (veh/h)			1338	572		818
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	230	105	2	89		
Volume Left	0	74	2	0		
Volume Right	16	0	0	89		
cSH	1700	1338	572	818		
Volume to Capacity	0.14	0.06	0.00	0.11		
Queue Length 95th (m)	0.0	1.3	0.1	2.8		
Control Delay (s)	0.0	5.7	11.3	9.9		
Lane LOS	A		B	A		
Approach Delay (s)	0.0	5.7	10.0			
Approach LOS						
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			31.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Avenue Three & Avenue One

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Volume (vph)	156	41	23	853	272	179
Future Volume (vph)	156	41	23	853	272	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1883	1601	1789	1883	1789	1601
Flt Permitted	1.00	1.00	0.66	1.00	0.95	1.00
Satd. Flow (perm)	1883	1601	1239	1883	1789	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	156	41	23	853	272	179
RTOR Reduction (vph)	0	18	0	0	0	138
Lane Group Flow (vph)	156	23	23	853	272	41
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	40.1	40.1	40.1	40.1	15.9	15.9
Effective Green, g (s)	40.1	40.1	40.1	40.1	15.9	15.9
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.23	0.23
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1078	917	709	1078	406	363
v/s Ratio Prot	0.08			c0.45	c0.15	
v/s Ratio Perm		0.01	0.02			0.03
v/c Ratio	0.14	0.03	0.03	0.79	0.67	0.11
Uniform Delay, d1	7.0	6.5	6.5	11.7	24.7	21.5
Progression Factor	0.91	0.77	1.09	1.37	1.22	3.17
Incremental Delay, d2	0.3	0.1	0.1	4.1	4.1	0.1
Delay (s)	6.6	5.0	7.2	20.1	34.1	68.2
Level of Service	A	A	A	C	C	E
Approach Delay (s)	6.3			19.7	47.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			26.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			71.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 8: Avenue Five & Avenue One

<2030 Phase 2 FT> AM Peak Hour
07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	↗
Traffic Volume (veh/h)	186	16	95	838	61	77
Future Volume (Veh/h)	186	16	95	838	61	77
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	186	16	95	838	61	77
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			202		1222	194
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			202		1222	194
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		67	91
cM capacity (veh/h)			1370		185	847
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	202	95	838	61	77	
Volume Left	0	95	0	61	0	
Volume Right	16	0	0	0	77	
cSH	1700	1370	1700	185	847	
Volume to Capacity	0.12	0.07	0.49	0.33	0.09	
Queue Length 95th (m)	0.0	1.7	0.0	10.3	2.3	
Control Delay (s)	0.0	7.8	0.0	33.8	9.7	
Lane LOS		A		D	A	
Approach Delay (s)	0.0	0.8		20.4		
Approach LOS				C		
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			54.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	66	134	933	1563	2451	418
Future Volume (vph)	66	134	933	1563	2451	418
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	134	933	1563	2451	418
RTOR Reduction (vph)	0	123	0	0	0	209
Lane Group Flow (vph)	66	11	933	1563	2451	209
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	11.5	11.5	40.5	114.5	70.0	70.0
Effective Green, g (s)	11.5	11.5	40.5	114.5	70.0	70.0
Actuated g/C Ratio	0.08	0.08	0.29	0.82	0.50	0.50
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	146	131	1004	4205	2571	800
v/s Ratio Prot	c0.04		c0.27	0.30	c0.48	
v/s Ratio Perm		0.01				0.13
v/c Ratio	0.45	0.08	0.93	0.37	0.95	0.26
Uniform Delay, d1	61.2	59.4	48.4	3.3	33.4	20.1
Progression Factor	0.96	1.03	1.55	0.28	0.97	1.89
Incremental Delay, d2	2.2	0.3	8.1	0.1	4.5	0.3
Delay (s)	61.2	61.4	83.2	1.1	37.0	38.3
Level of Service	E	E	F	A	D	D
Approach Delay (s)	61.3			31.8	37.2	
Approach LOS	E			C	D	
Intersection Summary						
HCM 2000 Control Delay			35.6		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.90			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			97.3%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
20: Tremaine Rd & Burnhamthorpe Road

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	65	20	66	10	7	95	897	374	42	873	10
Future Volume (vph)	0	65	20	66	10	7	95	897	374	42	873	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817		1789	1767		1789	3421		1789	3572	
Flt Permitted		1.00		0.70	1.00		0.32	1.00		0.19	1.00	
Satd. Flow (perm)		1817		1322	1767		595	3421		356	3572	
Peak-hour factor, PHF	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. Flow (vph)	0	65	20	66	10	7	95	897	374	42	873	10
RTOR Reduction (vph)	0	18	0	0	6	0	0	36	0	0	1	0
Lane Group Flow (vph)	0	67	0	66	11	0	95	1235	0	42	882	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.6		8.6	8.6		47.4	47.4		47.4	47.4	
Effective Green, g (s)		8.6		8.6	8.6		47.4	47.4		47.4	47.4	
Actuated g/C Ratio		0.12		0.12	0.12		0.68	0.68		0.68	0.68	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		223		162	217		402	2316		241	2418	
v/s Ratio Prot		0.04			0.01			c0.36			0.25	
v/s Ratio Perm				c0.05			0.16			0.12		
v/c Ratio		0.30		0.41	0.05		0.24	0.53		0.17	0.36	
Uniform Delay, d1		28.0		28.3	27.1		4.3	5.7		4.1	4.8	
Progression Factor		1.00		0.75	0.72		1.86	2.62		0.84	0.83	
Incremental Delay, d2		0.8		1.7	0.1		0.8	0.5		1.5	0.4	
Delay (s)		28.7		23.0	19.5		8.9	15.5		5.0	4.4	
Level of Service		C		C	B		A	B		A	A	
Approach Delay (s)		28.7			22.2			15.0			4.4	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			11.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			72.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

22: Avenue two & Burnhamthorpe Road

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	361	19	76	285	246	65	148	59	49	25	16
Future Volume (vph)	92	361	19	76	285	246	65	148	59	49	25	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.58	1.00	1.00	0.54	1.00	1.00	0.74	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	1087	3579	1601	1010	3579	1601	1396	1883	1601	1248	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	92	361	19	76	285	246	65	148	59	49	25	16
RTOR Reduction (vph)	0	0	6	0	0	84	0	0	51	0	0	14
Lane Group Flow (vph)	92	361	13	76	285	162	65	148	8	49	25	2
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	46.2	46.2	46.2	46.2	46.2	46.2	9.8	9.8	9.8	9.8	9.8	9.8
Effective Green, g (s)	46.2	46.2	46.2	46.2	46.2	46.2	9.8	9.8	9.8	9.8	9.8	9.8
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.14	0.14	0.14	0.14	0.14	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	717	2362	1056	666	2362	1056	195	263	224	174	263	224
v/s Ratio Prot		0.10			0.08			c0.08			0.01	
v/s Ratio Perm	0.08		0.01	0.08		c0.10	0.05		0.01	0.04		0.00
v/c Ratio	0.13	0.15	0.01	0.11	0.12	0.15	0.33	0.56	0.04	0.28	0.10	0.01
Uniform Delay, d1	4.4	4.5	4.1	4.4	4.4	4.5	27.2	28.1	26.0	26.9	26.2	25.9
Progression Factor	1.26	1.27	1.00	1.29	1.32	6.87	1.10	1.09	1.79	0.92	0.91	1.00
Incremental Delay, d2	0.3	0.1	0.0	0.3	0.1	0.3	1.0	2.7	0.1	0.7	0.1	0.0
Delay (s)	5.9	5.9	4.1	6.0	5.9	31.2	31.0	33.2	46.8	25.5	24.0	25.9
Level of Service	A	A	A	A	A	C	C	C	D	C	C	C
Approach Delay (s)		5.8			16.2			35.6			25.2	
Approach LOS		A			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			17.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.23									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			58.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Avenue Three & Burnhamthorpe Road

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	398	21	87	923	159	58	247	51	23	25	10
Future Volume (vph)	1	398	21	87	923	159	58	247	51	23	25	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3552		1789	3579	1601	1789	1883	1601	1789	1803	
Flt Permitted	0.28	1.00		0.51	1.00	1.00	0.73	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	531	3552		955	3579	1601	1383	1883	1601	1004	1803	
Peak-hour factor, PHF	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. Flow (vph)	1	398	21	87	923	159	58	247	51	23	25	10
RTOR Reduction (vph)	0	4	0	0	0	43	0	0	40	0	8	0
Lane Group Flow (vph)	1	415	0	87	923	116	58	247	11	23	27	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	41.2	41.2		41.2	41.2	41.2	14.8	14.8	14.8	14.8	14.8	
Effective Green, g (s)	41.2	41.2		41.2	41.2	41.2	14.8	14.8	14.8	14.8	14.8	
Actuated g/C Ratio	0.59	0.59		0.59	0.59	0.59	0.21	0.21	0.21	0.21	0.21	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	312	2090		562	2106	942	292	398	338	212	381	
v/s Ratio Prot		0.12			c0.26			c0.13			0.02	
v/s Ratio Perm	0.00			0.09		0.07	0.04		0.01	0.02		
v/c Ratio	0.00	0.20		0.15	0.44	0.12	0.20	0.62	0.03	0.11	0.07	
Uniform Delay, d1	5.9	6.7		6.5	8.0	6.4	22.7	25.1	21.9	22.3	22.1	
Progression Factor	2.03	1.85		1.68	1.89	2.85	1.11	1.08	2.03	0.87	0.83	
Incremental Delay, d2	0.0	0.2		0.5	0.6	0.2	0.3	2.9	0.0	0.2	0.1	
Delay (s)	12.0	12.6		11.5	15.7	18.4	25.5	29.8	44.4	19.7	18.5	
Level of Service	B	B		B	B	B	C	C	D	B	B	
Approach Delay (s)		12.6			15.7			31.2			18.9	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			17.9		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			70.0		Sum of lost time (s)					14.0		
Intersection Capacity Utilization			70.5%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
26: Avenue Five & Burnhamthorpe Road

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	315	18	101	1154	283	56	117	54	41	17	42
Future Volume (vph)	131	315	18	101	1154	283	56	117	54	41	17	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3550		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.20	1.00		0.55	1.00	1.00	0.75	1.00	1.00	0.60	1.00	1.00
Satd. Flow (perm)	385	3550		1038	3579	1601	1406	1883	1601	1128	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	131	315	18	101	1154	283	56	117	54	41	17	42
RTOR Reduction (vph)	0	2	0	0	0	46	0	0	48	0	0	38
Lane Group Flow (vph)	131	331	0	101	1154	237	56	117	6	41	17	4
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	111.7	111.7		99.9	99.9	99.9	14.3	14.3	14.3	14.3	14.3	14.3
Effective Green, g (s)	111.7	111.7		99.9	99.9	99.9	14.3	14.3	14.3	14.3	14.3	14.3
Actuated g/C Ratio	0.80	0.80		0.71	0.71	0.71	0.10	0.10	0.10	0.10	0.10	0.10
Clearance Time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	385	2832		740	2553	1142	143	192	163	115	192	163
v/s Ratio Prot	c0.02	0.09			c0.32			c0.06			0.01	
v/s Ratio Perm	0.25			0.10		0.15	0.04		0.00	0.04		0.00
v/c Ratio	0.34	0.12		0.14	0.45	0.21	0.39	0.61	0.03	0.36	0.09	0.03
Uniform Delay, d1	4.6	3.2		6.4	8.5	6.7	58.8	60.2	56.6	58.6	56.9	56.6
Progression Factor	1.33	0.33		0.77	1.02	1.22	0.85	0.85	1.19	0.57	0.58	0.36
Incremental Delay, d2	0.5	0.1		0.2	0.3	0.2	1.7	5.1	0.1	1.4	0.1	0.0
Delay (s)	6.6	1.1		5.1	8.9	8.5	51.7	56.4	67.2	34.9	33.4	20.1
Level of Service	A	A		A	A	A	D	E	E	C	C	C
Approach Delay (s)		2.7			8.6			57.8			28.5	
Approach LOS		A			A			E			C	
Intersection Summary												
HCM 2000 Control Delay			13.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			63.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

<2030 Phase 2 FT> AM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		  	 	
Traffic Volume (vph)	125	102	161	77	548	180	873	2191	269	492	1842	251
Future Volume (vph)	125	102	161	77	548	180	873	2191	269	492	1842	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.16	1.00	1.00	0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	302	3579	1601	1321	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	125	102	161	77	548	180	873	2191	269	492	1842	251
RTOR Reduction (vph)	0	0	15	0	0	63	0	0	145	0	0	80
Lane Group Flow (vph)	125	102	146	77	548	117	873	2191	124	492	1842	171
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	pm+ov	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	36.4	36.4	72.0	25.4	25.4	46.3	35.6	64.7	64.7	20.9	50.0	50.0
Effective Green, g (s)	36.4	36.4	72.0	25.4	25.4	46.3	35.6	64.7	64.7	20.9	50.0	50.0
Actuated g/C Ratio	0.26	0.26	0.51	0.18	0.18	0.33	0.25	0.46	0.46	0.15	0.36	0.36
Clearance Time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	930	823	239	649	540	882	2423	754	528	1873	571
v/s Ratio Prot	c0.04	0.03	0.05		0.15	0.03	c0.25	0.42		0.14	c0.35	
v/s Ratio Perm	c0.17		0.05	0.06		0.04			0.08			0.11
v/c Ratio	0.82	0.11	0.18	0.32	0.84	0.22	0.99	0.90	0.16	0.93	0.98	0.30
Uniform Delay, d1	44.4	39.5	18.2	49.8	55.4	33.8	52.0	34.8	21.9	58.8	44.6	32.4
Progression Factor	1.12	1.04	0.68	1.00	1.00	1.00	0.57	1.12	2.97	0.98	1.04	1.48
Incremental Delay, d2	28.7	0.1	0.1	0.8	9.8	0.2	6.9	0.6	0.0	11.4	9.5	0.5
Delay (s)	78.2	41.2	12.5	50.6	65.2	34.0	36.4	39.5	65.1	69.2	55.8	48.4
Level of Service	E	D	B	D	E	C	D	D	E	E	E	D
Approach Delay (s)		41.2			56.8			40.8			57.6	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM 2000 Control Delay	48.7			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	0.96											
Actuated Cycle Length (s)	140.0			Sum of lost time (s)			22.0					
Intersection Capacity Utilization	100.9%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 31: Avenue two & Street Four

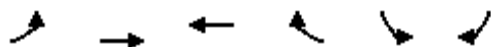
<2030 Phase 2 FT> AM Peak Hour
07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	51	19	253	191	71	49
Future Volume (Veh/h)	51	19	253	191	71	49
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	51	19	253	191	71	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	444	253			444	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	444	253			444	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	98			94	
cM capacity (veh/h)	535	786			1116	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	51	19	253	191	120	
Volume Left	51	0	0	0	71	
Volume Right	0	19	0	191	0	
cSH	535	786	1700	1700	1116	
Volume to Capacity	0.10	0.02	0.15	0.11	0.06	
Queue Length 95th (m)	2.4	0.6	0.0	0.0	1.5	
Control Delay (s)	12.4	9.7	0.0	0.0	5.2	
Lane LOS	B	A			A	
Approach Delay (s)	11.7		0.0		5.2	
Approach LOS	B					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

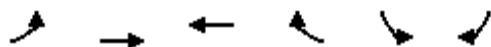


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↱	↑↑↑	↑↑↑	↰	↰↱	↰
Traffic Volume (vph)	1182	3202	1057	184	375	584
Future Volume (vph)	1182	3202	1057	184	375	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1613
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4117	1570	3541	1613
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1182	3202	1057	184	375	584
RTOR Reduction (vph)	0	0	0	85	0	0
Lane Group Flow (vph)	1182	3202	1057	99	375	584
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	53.5	106.3	48.8	48.8	19.7	140.0
Effective Green, g (s)	54.5	110.3	52.8	52.8	23.7	140.0
Actuated g/C Ratio	0.39	0.79	0.38	0.38	0.17	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	1364	3526	1552	592	599	1613
v/s Ratio Prot	0.34	c0.72	0.26		c0.11	
v/s Ratio Perm				0.06		0.36
v/c Ratio	0.87	0.91	0.68	0.17	0.63	0.36
Uniform Delay, d1	39.4	11.1	36.5	29.0	54.0	0.0
Progression Factor	1.00	1.00	0.82	1.01	1.08	1.00
Incremental Delay, d2	6.0	4.5	2.3	0.6	1.7	0.6
Delay (s)	45.4	15.6	32.3	29.9	59.9	0.6
Level of Service	D	B	C	C	E	A
Approach Delay (s)		23.7	31.9		23.8	
Approach LOS		C	C		C	
Intersection Summary						
HCM 2000 Control Delay			25.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			79.9%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Dundas St W & Avenue two

<2030 Phase 2 FT> AM Peak Hour
07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	161	3416	1238	283	66	34
Future Volume (vph)	161	3416	1238	283	66	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3464	1457
Flt Permitted	0.16	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	304	4520	4520	1601	3464	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	161	3416	1238	283	66	34
RTOR Reduction (vph)	0	0	0	68	3	29
Lane Group Flow (vph)	161	3416	1238	215	66	2
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	118.0	118.0	106.2	106.2	8.0	8.0
Effective Green, g (s)	118.0	118.0	106.2	106.2	8.0	8.0
Actuated g/C Ratio	0.84	0.84	0.76	0.76	0.06	0.06
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	338	3809	3428	1214	197	83
v/s Ratio Prot	0.03	c0.76	0.27		c0.02	
v/s Ratio Perm	0.37			0.13		0.00
v/c Ratio	0.48	0.90	0.36	0.18	0.34	0.02
Uniform Delay, d1	2.7	7.1	5.6	4.7	63.4	62.3
Progression Factor	0.51	0.71	1.68	6.48	1.00	1.02
Incremental Delay, d2	0.5	2.0	0.3	0.3	1.0	0.1
Delay (s)	1.9	7.0	9.7	30.8	64.7	63.5
Level of Service	A	A	A	C	E	E
Approach Delay (s)		6.7	13.7		64.3	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Avenue Three & Dundas St W

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	147	2986	262	58	1421	395	80	35	168	81	8	20
Future Volume (vph)	147	2986	262	58	1421	395	80	35	168	81	8	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1601	1674	4117	1570	1768	1921	1517	1555	1921	1610
Flt Permitted	0.12	1.00	1.00	0.04	1.00	1.00	0.75	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	231	4476	1601	71	4117	1570	1400	1921	1517	1202	1921	1610
Peak-hour factor, PHF	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. Flow (vph)	147	2986	262	58	1421	395	80	35	168	81	8	20
RTOR Reduction (vph)	0	0	49	0	0	115	0	0	81	0	0	18
Lane Group Flow (vph)	147	2986	213	58	1421	280	80	35	87	81	8	2
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	110.1	101.8	101.8	105.3	99.4	99.4	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	110.1	101.8	101.8	105.3	99.4	99.4	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.79	0.73	0.73	0.75	0.71	0.71	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	0.2
Lane Grp Cap (vph)	275	3254	1164	120	2923	1114	149	204	161	127	204	171
v/s Ratio Prot	c0.03	c0.67		0.02	0.35			0.02			0.00	
v/s Ratio Perm	0.39		0.13	0.34		0.18	0.06		0.06	c0.07		0.00
v/c Ratio	0.53	0.92	0.18	0.48	0.49	0.25	0.54	0.17	0.54	0.64	0.04	0.01
Uniform Delay, d1	5.4	15.7	6.0	30.2	9.0	7.2	59.3	56.9	59.3	60.0	56.1	56.0
Progression Factor	1.86	0.79	1.38	1.46	0.92	2.14	1.00	1.00	1.00	1.09	1.21	1.00
Incremental Delay, d2	0.7	2.8	0.2	2.3	0.4	0.4	4.1	0.5	3.9	7.5	0.0	0.0
Delay (s)	10.7	15.2	8.5	46.3	8.7	15.7	63.4	57.4	63.2	73.1	68.2	56.0
Level of Service	B	B	A	D	A	B	E	E	E	E	E	E
Approach Delay (s)		14.5			11.3			62.5			69.6	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			16.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			95.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2 FT> AM Peak Hour
07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	128	3170	104	33	1823	341	88	17	84	63	2	24
Future Volume (vph)	128	3170	104	33	1823	341	88	17	84	63	2	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	4391	1633	1772	4117	1601	1722	1609		3471	1623	
Flt Permitted	0.06	1.00	1.00	0.05	1.00	1.00	0.48	1.00		0.95	1.00	
Satd. Flow (perm)	102	4391	1633	84	4117	1601	863	1609		3471	1623	
Peak-hour factor, PHF	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. Flow (vph)	128	3170	104	33	1823	341	88	17	84	63	2	24
RTOR Reduction (vph)	0	0	29	0	0	37	0	76	0	0	23	0
Lane Group Flow (vph)	128	3170	75	33	1823	304	88	25	0	63	3	0
Heavy Vehicles (%)	4%	5%	0%	3%	12%	2%	6%	2%	5%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	104.0	96.1	96.1	92.7	88.8	88.8	22.0	13.2		4.8	7.2	
Effective Green, g (s)	104.0	96.1	96.1	92.7	88.8	88.8	22.0	13.2		4.8	7.2	
Actuated g/C Ratio	0.74	0.69	0.69	0.66	0.63	0.63	0.16	0.09		0.03	0.05	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	208	3014	1120	102	2611	1015	201	151		119	83	
v/s Ratio Prot	c0.05	c0.72		0.01	0.44		c0.03	0.02		0.02	0.00	
v/s Ratio Perm	0.41		0.05	0.20		0.19	c0.03					
v/c Ratio	0.62	1.05	0.07	0.32	0.70	0.30	0.44	0.17		0.53	0.04	
Uniform Delay, d1	25.8	22.0	7.2	34.3	16.8	11.6	52.5	58.3		66.5	63.1	
Progression Factor	1.26	0.81	1.83	2.27	0.86	1.15	1.00	1.00		0.96	1.57	
Incremental Delay, d2	2.9	28.6	0.1	0.6	0.5	0.3	1.5	1.1		4.2	0.2	
Delay (s)	35.5	46.3	13.2	78.5	14.9	13.6	54.0	59.4		68.3	99.1	
Level of Service	D	D	B	E	B	B	D	E		E	F	
Approach Delay (s)		44.9			15.7			56.9			77.3	
Approach LOS		D			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			34.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			92.8%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2 FT> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  		  	  	
Traffic Volume (vph)	330	2325	562	198	1313	765	621	2238	322	315	1409	169
Future Volume (vph)	330	2325	562	198	1313	765	621	2238	322	315	1409	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1569	1508	4683	1555	3079	4902	1512	3404	4902	1541
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	486	4476	1569	135	4683	1555	3079	4902	1512	3404	4902	1541
Peak-hour factor, PHF	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. Flow (vph)	330	2325	562	198	1313	765	621	2238	322	315	1409	169
RTOR Reduction (vph)	0	0	27	0	0	70	0	0	54	0	0	53
Lane Group Flow (vph)	330	2325	535	198	1313	695	621	2238	268	315	1409	116
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	21%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	67.0	55.0	72.0	54.1	46.1	55.1	17.0	46.0	54.0	9.0	38.0	54.9
Effective Green, g (s)	68.0	58.0	78.0	56.1	49.1	61.1	18.0	49.0	60.0	10.0	41.0	60.9
Actuated g/C Ratio	0.49	0.41	0.56	0.40	0.35	0.44	0.13	0.35	0.43	0.07	0.29	0.43
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	2.5	2.5	4.0	2.5	2.5	4.0	2.5
Lane Grp Cap (vph)	382	1854	874	142	1642	678	395	1715	648	243	1435	670
v/s Ratio Prot	0.11	c0.52	0.09	c0.09	0.28	0.09	c0.20	c0.46	0.03	0.09	0.29	0.02
v/s Ratio Perm	0.31		0.25	c0.47		0.36			0.14			0.05
v/c Ratio	0.86	1.25	0.61	1.39	0.80	1.02	1.57	1.30	0.41	1.30	0.98	0.17
Uniform Delay, d1	28.5	41.0	20.8	36.6	41.0	39.5	61.0	45.5	27.8	65.0	49.1	24.2
Progression Factor	1.16	0.93	0.49	1.00	1.00	1.00	1.00	1.00	1.00	0.63	0.93	2.37
Incremental Delay, d2	5.8	115.6	0.3	214.5	4.2	40.9	269.4	141.6	0.3	145.8	11.5	0.0
Delay (s)	39.0	153.6	10.5	251.1	45.2	80.4	330.4	187.1	28.1	186.9	57.3	57.3
Level of Service	D	F	B	F	D	F	F	F	C	F	E	E
Approach Delay (s)		116.9			74.9			199.0			78.8	
Approach LOS		F			E			F			E	
Intersection Summary												
HCM 2000 Control Delay			125.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.36									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			121.5%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

2030 Phase 2 Future Total PM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	121	0	2370	1232	0
Future Volume (vph)	111	121	0	2370	1232	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.96	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3349	1457		5142	3579	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3349	1457		5142	3579	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	121	0	2370	1232	0
RTOR Reduction (vph)	37	68	0	0	0	0
Lane Group Flow (vph)	121	6	0	2370	1232	0
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.3	11.3		116.7	116.7	
Effective Green, g (s)	11.3	11.3		116.7	116.7	
Actuated g/C Ratio	0.08	0.08		0.83	0.83	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	270	117		4286	2983	
v/s Ratio Prot	c0.04			c0.46	0.34	
v/s Ratio Perm		0.00				
v/c Ratio	0.45	0.05		0.55	0.41	
Uniform Delay, d1	61.4	59.4		3.6	3.0	
Progression Factor	1.00	1.00		0.06	1.00	
Incremental Delay, d2	1.6	0.2		0.2	0.4	
Delay (s)	63.0	59.6		0.4	3.4	
Level of Service	E	E		A	A	
Approach Delay (s)	61.9			0.4	3.4	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay		5.1		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.54				
Actuated Cycle Length (s)		140.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		60.8%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Tremaine Rd & Avenue One

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	65	40	133	55	58	50	635	36	14	812	0
Future Volume (vph)	5	65	40	133	55	58	50	635	36	14	812	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.92		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1776		1789	1738		1789	3550		1789	3579	
Flt Permitted	0.68	1.00		0.69	1.00		0.33	1.00		0.40	1.00	
Satd. Flow (perm)	1289	1776		1298	1738		628	3550		747	3579	
Peak-hour factor, PHF	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. Flow (vph)	5	65	40	133	55	58	50	635	36	14	812	0
RTOR Reduction (vph)	0	33	0	0	47	0	0	4	0	0	0	0
Lane Group Flow (vph)	5	72	0	133	66	0	50	667	0	14	812	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.1	13.1		13.1	13.1		42.9	42.9		42.9	42.9	
Effective Green, g (s)	13.1	13.1		13.1	13.1		42.9	42.9		42.9	42.9	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.61	0.61		0.61	0.61	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	241	332		242	325		384	2175		457	2193	
v/s Ratio Prot		0.04			0.04			0.19			c0.23	
v/s Ratio Perm	0.00			c0.10			0.08			0.02		
v/c Ratio	0.02	0.22		0.55	0.20		0.13	0.31		0.03	0.37	
Uniform Delay, d1	23.2	24.1		25.8	24.0		5.7	6.5		5.3	6.8	
Progression Factor	1.00	1.00		1.23	1.50		1.57	1.37		1.00	1.00	
Incremental Delay, d2	0.0	0.3		2.5	0.3		0.6	0.3		0.1	0.5	
Delay (s)	23.3	24.4		34.3	36.4		9.6	9.2		5.5	7.3	
Level of Service	C	C		C	D		A	A		A	A	
Approach Delay (s)		24.4			35.2			9.2			7.2	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			62.3%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Avenue Two & Avenue One

<2030 Phase 2 FT> PM Peak Hour
07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↖	↗
Traffic Volume (veh/h)	46	4	82	179	12	63
Future Volume (Veh/h)	46	4	82	179	12	63
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	46	4	82	179	12	63
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			50		391	48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			50		391	48
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		98	94
cM capacity (veh/h)			1557		581	1021
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	50	261	12	63		
Volume Left	0	82	12	0		
Volume Right	4	0	0	63		
cSH	1700	1557	581	1021		
Volume to Capacity	0.03	0.05	0.02	0.06		
Queue Length 95th (m)	0.0	1.3	0.5	1.5		
Control Delay (s)	0.0	2.6	11.3	8.8		
Lane LOS		A	B	A		
Approach Delay (s)	0.0	2.6	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			30.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Avenue Three & Avenue One

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	703	226	137	212	61	24
Future Volume (vph)	703	226	137	212	61	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1883	1601	1789	1883	1789	1601
Flt Permitted	1.00	1.00	0.35	1.00	0.95	1.00
Satd. Flow (perm)	1883	1601	661	1883	1789	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	703	226	137	212	61	24
RTOR Reduction (vph)	0	35	0	0	0	22
Lane Group Flow (vph)	703	191	137	212	61	2
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	49.9	49.9	49.9	49.9	6.1	6.1
Effective Green, g (s)	49.9	49.9	49.9	49.9	6.1	6.1
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.09	0.09
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1342	1141	471	1342	155	139
v/s Ratio Prot	c0.37			0.11	c0.03	
v/s Ratio Perm		0.12	0.21			0.00
v/c Ratio	0.52	0.17	0.29	0.16	0.39	0.02
Uniform Delay, d1	4.6	3.3	3.6	3.3	30.2	29.2
Progression Factor	1.03	1.05	1.33	0.82	0.97	1.21
Incremental Delay, d2	1.5	0.3	1.5	0.2	1.6	0.0
Delay (s)	6.2	3.8	6.3	2.9	31.0	35.3
Level of Service	A	A	A	A	C	D
Approach Delay (s)	5.6			4.3	32.2	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			6.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			71.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

8: Avenue Five & Avenue One

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↘	↱	↘	↗
Traffic Volume (veh/h)	691	49	79	235	18	90
Future Volume (Veh/h)	691	49	79	235	18	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	691	49	79	235	18	90
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			740		1108	716
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			740		1108	716
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		91	79
cM capacity (veh/h)			867		211	430
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	740	79	235	18	90	
Volume Left	0	79	0	18	0	
Volume Right	49	0	0	0	90	
cSH	1700	867	1700	211	430	
Volume to Capacity	0.44	0.09	0.14	0.09	0.21	
Queue Length 95th (m)	0.0	2.3	0.0	2.1	5.9	
Control Delay (s)	0.0	9.6	0.0	23.7	15.6	
Lane LOS		A		C	C	
Approach Delay (s)	0.0	2.4		16.9		
Approach LOS				C		
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		57.0%		ICU Level of Service	B	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2 FT> PM Peak Hour
07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	351	798	197	2409	1458	93
Future Volume (vph)	351	798	197	2409	1458	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	351	798	197	2409	1458	93
RTOR Reduction (vph)	0	133	0	0	0	59
Lane Group Flow (vph)	351	665	197	2409	1458	34
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	59.2	59.2	12.1	66.8	50.7	50.7
Effective Green, g (s)	59.2	59.2	12.1	66.8	50.7	50.7
Actuated g/C Ratio	0.42	0.42	0.09	0.48	0.36	0.36
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	756	676	299	2453	1862	579
v/s Ratio Prot	0.20		0.06	c0.47	0.28	
v/s Ratio Perm		c0.42				0.02
v/c Ratio	0.46	0.98	0.66	0.98	0.78	0.06
Uniform Delay, d1	29.0	39.9	62.0	36.0	39.8	29.1
Progression Factor	1.10	1.15	1.21	0.55	0.92	0.86
Incremental Delay, d2	0.4	29.8	3.5	11.2	3.2	0.2
Delay (s)	32.5	75.9	78.4	30.9	39.9	25.2
Level of Service	C	E	E	C	D	C
Approach Delay (s)	62.6			34.5	39.0	
Approach LOS	E			C	D	
Intersection Summary						
HCM 2000 Control Delay			41.9		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.01			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			89.2%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

20: Tremaine Rd & Burnhamthorpe Road

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	60	368	25	70	15	641	135	56	954	0
Future Volume (vph)	10	30	60	368	25	70	15	641	135	56	954	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.89		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1695		1789	1675		1789	3485		1789	3579	
Flt Permitted	0.70	1.00		0.70	1.00		0.23	1.00		0.31	1.00	
Satd. Flow (perm)	1310	1695		1316	1675		430	3485		587	3579	
Peak-hour factor, PHF	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. Flow (vph)	10	30	60	368	25	70	15	641	135	56	954	0
RTOR Reduction (vph)	0	26	0	0	46	0	0	22	0	0	0	0
Lane Group Flow (vph)	10	64	0	368	49	0	15	754	0	56	954	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.9	23.9		23.9	23.9		32.1	32.1		32.1	32.1	
Effective Green, g (s)	23.9	23.9		23.9	23.9		32.1	32.1		32.1	32.1	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.46	0.46		0.46	0.46	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	447	578		449	571		197	1598		269	1641	
v/s Ratio Prot		0.04			0.03			0.22			c0.27	
v/s Ratio Perm	0.01			c0.28			0.03			0.10		
v/c Ratio	0.02	0.11		0.82	0.09		0.08	0.47		0.21	0.58	
Uniform Delay, d1	15.3	15.8		21.1	15.6		10.6	13.1		11.3	14.0	
Progression Factor	1.00	1.00		1.32	1.14		0.82	1.15		0.72	0.67	
Incremental Delay, d2	0.0	0.1		11.1	0.1		0.6	0.9		1.7	1.4	
Delay (s)	15.3	15.9		39.0	17.8		9.4	15.9		9.9	10.9	
Level of Service	B	B		D	B		A	B		A	B	
Approach Delay (s)		15.8			34.6			15.7			10.8	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			79.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

22: Avenue two & Burnhamthorpe Road

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	363	68	116	389	69	35	34	115	188	121	69
Future Volume (vph)	24	363	68	116	389	69	35	34	115	188	121	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.52	1.00	1.00	0.54	1.00	1.00	0.68	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	983	3579	1601	1008	3579	1601	1279	1883	1601	1384	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	24	363	68	116	389	69	35	34	115	188	121	69
RTOR Reduction (vph)	0	0	29	0	0	29	0	0	89	0	0	54
Lane Group Flow (vph)	24	363	39	116	389	40	35	34	26	188	121	15
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	40.4	40.4	40.4	40.4	40.4	40.4	15.6	15.6	15.6	15.6	15.6	15.6
Effective Green, g (s)	40.4	40.4	40.4	40.4	40.4	40.4	15.6	15.6	15.6	15.6	15.6	15.6
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.58	0.58	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	567	2065	924	581	2065	924	285	419	356	308	419	356
v/s Ratio Prot		0.10			0.11			0.02			0.06	
v/s Ratio Perm	0.02		0.02	c0.12		0.02	0.03		0.02	c0.14		0.01
v/c Ratio	0.04	0.18	0.04	0.20	0.19	0.04	0.12	0.08	0.07	0.61	0.29	0.04
Uniform Delay, d1	6.4	7.0	6.4	7.1	7.0	6.4	21.7	21.5	21.5	24.5	22.6	21.3
Progression Factor	1.56	1.54	2.97	2.16	2.09	5.68	1.10	1.09	1.82	1.07	1.07	1.37
Incremental Delay, d2	0.1	0.2	0.1	0.8	0.2	0.1	0.2	0.1	0.1	3.6	0.4	0.1
Delay (s)	10.1	10.9	19.2	16.0	14.8	36.6	24.0	23.6	39.1	29.6	24.6	29.2
Level of Service	B	B	B	B	B	D	C	C	D	C	C	C
Approach Delay (s)		12.1			17.7			33.4			27.9	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			20.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			61.2%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Avenue Three & Burnhamthorpe Road

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	918	85	72	536	36	75	32	96	132	189	42
Future Volume (vph)	17	918	85	72	536	36	75	32	96	132	189	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3533		1789	3579	1601	1789	1883	1601	1789	1832	
Flt Permitted	0.45	1.00		0.25	1.00	1.00	0.56	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	852	3533		479	3579	1601	1055	1883	1601	1387	1832	
Peak-hour factor, PHF	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. Flow (vph)	17	918	85	72	536	36	75	32	96	132	189	42
RTOR Reduction (vph)	0	7	0	0	0	14	0	0	50	0	15	0
Lane Group Flow (vph)	17	996	0	72	536	22	75	32	46	132	216	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	42.0	42.0		42.0	42.0	42.0	14.0	14.0	14.0	14.0	14.0	
Effective Green, g (s)	42.0	42.0		42.0	42.0	42.0	14.0	14.0	14.0	14.0	14.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.20	0.20	0.20	0.20	0.20	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	511	2119		287	2147	960	211	376	320	277	366	
v/s Ratio Prot		c0.28			0.15			0.02			c0.12	
v/s Ratio Perm	0.02			0.15		0.01	0.07		0.03	0.10		
v/c Ratio	0.03	0.47		0.25	0.25	0.02	0.36	0.09	0.14	0.48	0.59	
Uniform Delay, d1	5.7	7.8		6.6	6.6	5.7	24.1	22.8	23.1	24.8	25.4	
Progression Factor	1.07	1.09		1.92	1.93	9.72	0.96	0.96	1.06	0.93	0.94	
Incremental Delay, d2	0.1	0.7		2.1	0.3	0.0	1.0	0.1	0.2	1.3	2.4	
Delay (s)	6.2	9.2		14.7	13.0	55.2	24.2	21.9	24.6	24.4	26.2	
Level of Service	A	A		B	B	E	C	C	C	C	C	
Approach Delay (s)		9.2			15.5			24.0			25.6	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.0			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			80.6%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

26: Avenue Five & Burnhamthorpe Road

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	1106	51	70	501	56	27	27	101	243	95	122
Future Volume (vph)	49	1106	51	70	501	56	27	27	101	243	95	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3555		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.47	1.00		0.18	1.00	1.00	0.70	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	882	3555		348	3579	1601	1310	1883	1601	1393	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	49	1106	51	70	501	56	27	27	101	243	95	122
RTOR Reduction (vph)	0	4	0	0	0	26	0	0	46	0	0	91
Lane Group Flow (vph)	49	1153	0	70	501	30	27	27	55	243	95	31
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	38.0	38.0		38.0	38.0	38.0	18.0	18.0	18.0	18.0	18.0	18.0
Effective Green, g (s)	38.0	38.0		38.0	38.0	38.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.54	0.54		0.54	0.54	0.54	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	478	1929		188	1942	869	336	484	411	358	484	411
v/s Ratio Prot		c0.32			0.14			0.01			0.05	
v/s Ratio Perm	0.06			0.20		0.02	0.02		0.03	c0.17		0.02
v/c Ratio	0.10	0.60		0.37	0.26	0.03	0.08	0.06	0.13	0.68	0.20	0.08
Uniform Delay, d1	7.7	10.8		9.2	8.5	7.5	19.7	19.6	20.0	23.4	20.3	19.7
Progression Factor	1.54	1.55		1.34	0.92	1.96	1.32	1.32	1.78	0.89	0.92	0.74
Incremental Delay, d2	0.4	1.3		5.4	0.3	0.1	0.1	0.0	0.1	5.0	0.2	0.1
Delay (s)	12.3	18.1		17.7	8.1	14.7	26.1	25.9	35.8	25.9	18.9	14.7
Level of Service	B	B		B	A	B	C	C	D	C	B	B
Approach Delay (s)		17.9			9.8			32.4			21.5	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			17.4		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			70.0		Sum of lost time (s)					14.0		
Intersection Capacity Utilization			78.2%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

<2030 Phase 2 FT> PM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	492	777	298	177	507	271	1796	84	214	1922	141
Future Volume (vph)	283	492	777	298	177	507	271	1796	84	214	1922	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.64	1.00	1.00	0.23	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1206	3579	1601	435	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	283	492	777	298	177	507	271	1796	84	214	1922	141
RTOR Reduction (vph)	0	0	39	0	0	68	0	0	37	0	0	50
Lane Group Flow (vph)	283	492	738	298	177	439	271	1796	47	214	1922	91
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	37.0	24.0	52.0	37.0	24.0	39.0	28.0	66.0	79.0	15.0	53.0	66.0
Effective Green, g (s)	37.0	24.0	52.0	37.0	24.0	39.0	28.0	66.0	79.0	15.0	53.0	66.0
Actuated g/C Ratio	0.26	0.17	0.37	0.26	0.17	0.28	0.20	0.47	0.56	0.11	0.38	0.47
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	372	613	594	244	613	454	694	2472	921	379	1985	754
v/s Ratio Prot	0.07	0.14	c0.25	c0.11	0.05	0.10	0.08	0.34	0.00	0.06	c0.37	0.01
v/s Ratio Perm	0.13		0.21	0.21		0.17			0.02			0.05
v/c Ratio	0.76	0.80	1.24	1.22	0.29	0.97	0.39	0.73	0.05	0.56	0.97	0.12
Uniform Delay, d1	45.5	55.7	44.0	47.1	50.6	49.9	48.6	29.7	13.7	59.4	42.7	20.7
Progression Factor	0.82	0.86	1.08	1.00	1.00	1.00	0.63	0.88	2.60	1.04	0.63	0.30
Incremental Delay, d2	7.8	6.6	121.3	130.6	0.3	33.5	0.1	0.6	0.0	1.0	8.7	0.0
Delay (s)	45.3	54.4	169.1	177.7	50.8	83.4	30.5	26.6	35.6	62.8	35.8	6.3
Level of Service	D	D	F	F	D	F	C	C	D	E	D	A
Approach Delay (s)		110.2			106.1			27.5			36.5	
Approach LOS		F			F			C			D	
Intersection Summary												
HCM 2000 Control Delay			60.0				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			114.3%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

31: Avenue two & Street Four

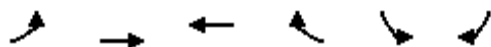
<2030 Phase 2 FT> PM Peak Hour

07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	263	77	107	158	37	268
Future Volume (Veh/h)	263	77	107	158	37	268
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	263	77	107	158	37	268
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	449	107			265	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	449	107			265	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	52	92			97	
cM capacity (veh/h)	551	947			1299	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	263	77	107	158	305	
Volume Left	263	0	0	0	37	
Volume Right	0	77	0	158	0	
cSH	551	947	1700	1700	1299	
Volume to Capacity	0.48	0.08	0.06	0.09	0.03	
Queue Length 95th (m)	19.4	2.0	0.0	0.0	0.7	
Control Delay (s)	17.3	9.1	0.0	0.0	1.2	
Lane LOS	C	A			A	
Approach Delay (s)	15.5		0.0		1.2	
Approach LOS	C					
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization			44.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2030 Phase 2 FT> PM Peak Hour
07-07-2020



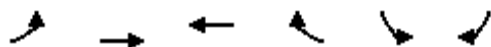
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↱	↑↑↑	↑↑↑	↰	↰↱	↰
Traffic Volume (vph)	525	1416	2967	271	181	1202
Future Volume (vph)	525	1416	2967	271	181	1202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	1416	2967	271	181	1202
RTOR Reduction (vph)	0	0	0	50	0	0
Lane Group Flow (vph)	525	1416	2967	221	181	1202
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	30.7	113.7	79.0	79.0	12.3	140.0
Effective Green, g (s)	31.7	117.7	83.0	83.0	16.3	140.0
Actuated g/C Ratio	0.23	0.84	0.59	0.59	0.12	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	793	3763	2653	949	412	1570
v/s Ratio Prot	0.15	0.32	c0.66		0.05	
v/s Ratio Perm				0.14		c0.77
v/c Ratio	0.66	0.38	1.12	0.23	0.44	0.77
Uniform Delay, d1	49.3	2.6	28.5	13.5	57.6	0.0
Progression Factor	1.00	1.00	0.55	0.65	0.85	1.00
Incremental Delay, d2	2.1	0.3	55.1	0.2	0.4	3.0
Delay (s)	51.4	2.9	70.7	8.9	49.3	3.0
Level of Service	D	A	E	A	D	A
Approach Delay (s)		16.0	65.5		9.0	
Approach LOS		B	E		A	
Intersection Summary						
HCM 2000 Control Delay			39.0		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			90.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue two

<2030 Phase 2 FT> PM Peak Hour

07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	103	1494	3006	162	300	231
Future Volume (vph)	103	1494	3006	162	300	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3416	1457
Flt Permitted	0.04	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	78	4520	4520	1601	3416	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	103	1494	3006	162	300	231
RTOR Reduction (vph)	0	0	0	34	15	1
Lane Group Flow (vph)	103	1494	3006	128	350	165
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	106.4	106.4	92.9	92.9	19.6	29.1
Effective Green, g (s)	106.4	106.4	92.9	92.9	19.6	29.1
Actuated g/C Ratio	0.76	0.76	0.66	0.66	0.14	0.21
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	3435	2999	1062	478	302
v/s Ratio Prot	c0.04	0.33	c0.67		c0.10	0.04
v/s Ratio Perm	0.41			0.08		0.08
v/c Ratio	0.59	0.43	1.00	0.12	0.73	0.55
Uniform Delay, d1	42.9	6.0	23.5	8.6	57.7	49.6
Progression Factor	1.41	0.85	0.78	1.18	0.99	1.11
Incremental Delay, d2	4.8	0.4	8.6	0.1	5.7	2.0
Delay (s)	65.4	5.5	27.0	10.2	62.9	56.9
Level of Service	E	A	C	B	E	E
Approach Delay (s)		9.4	26.2		61.1	
Approach LOS		A	C		E	

Intersection Summary

HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Avenue Three & Dundas St W

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	71	1601	93	104	2705	251	242	11	62	425	30	181
Future Volume (vph)	71	1601	93	104	2705	251	242	11	62	425	30	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	4476	1570	1825	4476	1633	1753	1921	1504	1787	1921	1611
Flt Permitted	0.05	1.00	1.00	0.06	1.00	1.00	0.74	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	104	4476	1570	120	4476	1633	1361	1921	1504	1243	1921	1611
Peak-hour factor, PHF	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. Flow (vph)	71	1601	93	104	2705	251	242	11	62	425	30	181
RTOR Reduction (vph)	0	0	44	0	0	56	0	0	49	0	0	65
Lane Group Flow (vph)	71	1601	49	104	2705	195	242	11	13	425	30	116
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	79.6	74.2	74.2	86.6	77.7	77.7	29.5	29.5	29.5	39.5	39.5	39.5
Effective Green, g (s)	79.6	74.2	74.2	86.6	77.7	77.7	29.5	29.5	29.5	39.5	39.5	39.5
Actuated g/C Ratio	0.57	0.53	0.53	0.62	0.56	0.56	0.21	0.21	0.21	0.28	0.28	0.28
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	3.0	0.2	0.2
Lane Grp Cap (vph)	125	2372	832	182	2484	906	286	404	316	374	541	454
v/s Ratio Prot	0.02	0.36		c0.04	c0.60			0.01		c0.05	0.02	
v/s Ratio Perm	0.30		0.03	0.32		0.12	0.18		0.01	c0.27		0.07
v/c Ratio	0.57	0.67	0.06	0.57	1.09	0.22	0.85	0.03	0.04	1.14	0.06	0.25
Uniform Delay, d1	31.8	24.1	16.0	19.3	31.1	15.7	53.1	43.9	44.0	50.8	36.6	38.9
Progression Factor	1.41	0.66	0.04	1.92	0.93	1.25	1.00	1.00	1.00	1.04	1.05	1.09
Incremental Delay, d2	4.4	1.4	0.1	1.9	43.6	0.2	20.4	0.0	0.1	88.8	0.0	0.1
Delay (s)	49.3	17.4	0.8	39.1	72.4	20.0	73.5	43.9	44.1	141.8	38.6	42.3
Level of Service	D	B	A	D	E	B	E	D	D	F	D	D
Approach Delay (s)		17.8			67.0			66.7			108.6	
Approach LOS		B			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			56.5	HCM 2000 Level of Service					E			
HCM 2000 Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			140.0	Sum of lost time (s)					21.4			
Intersection Capacity Utilization			102.0%	ICU Level of Service					G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		  	 	
Traffic Volume (vph)	46	1974	65	44	2873	125	61	4	25	319	15	127
Future Volume (vph)	46	1974	65	44	2873	125	61	4	25	319	15	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	4476	1601	1772	4611	1633	1789	1668		3471	1631	
Flt Permitted	0.04	1.00	1.00	0.04	1.00	1.00	0.67	1.00		0.95	1.00	
Satd. Flow (perm)	83	4476	1601	83	4611	1633	1255	1668		3471	1631	
Peak-hour factor, PHF	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. Flow (vph)	46	1974	65	44	2873	125	61	4	25	319	15	127
RTOR Reduction (vph)	0	0	23	0	0	44	0	24	0	0	114	0
Lane Group Flow (vph)	46	1974	42	44	2873	81	61	5	0	319	28	0
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%	2%	2%	0%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	95.8	90.4	90.4	95.8	90.4	90.4	13.7	6.1		16.1	14.6	
Effective Green, g (s)	95.8	90.4	90.4	95.8	90.4	90.4	13.7	6.1		16.1	14.6	
Actuated g/C Ratio	0.68	0.65	0.65	0.68	0.65	0.65	0.10	0.04		0.12	0.10	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	121	2890	1033	121	2977	1054	151	72		399	170	
v/s Ratio Prot	c0.01	0.44		0.01	c0.62		0.02	0.00		c0.09	0.02	
v/s Ratio Perm	0.24		0.03	0.23		0.05	c0.02					
v/c Ratio	0.38	0.68	0.04	0.36	0.97	0.08	0.40	0.07		0.80	0.17	
Uniform Delay, d1	34.5	15.7	9.0	13.5	23.3	9.2	59.0	64.2		60.4	57.2	
Progression Factor	1.90	0.92	1.00	2.46	0.96	1.32	1.00	1.00		0.96	1.11	
Incremental Delay, d2	1.3	0.9	0.0	0.2	1.4	0.0	1.8	0.9		10.7	0.5	
Delay (s)	67.0	15.4	9.1	33.4	23.8	12.2	60.7	65.1		68.9	63.8	
Level of Service	E	B	A	C	C	B	E	E		E	E	
Approach Delay (s)		16.3			23.5			62.2			67.3	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			25.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			87.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2 FT> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  		  	  	
Traffic Volume (vph)	218	1599	614	292	2100	300	629	1633	207	718	1997	261
Future Volume (vph)	218	1599	614	292	2100	300	629	1633	207	718	1997	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	2.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1581	1755	5142	1570	3471	5092	1445	3471	5043	1601
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4476	1581	142	5142	1570	3471	5092	1445	3471	5043	1601
Peak-hour factor, PHF	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. Flow (vph)	218	1599	614	292	2100	300	629	1633	207	718	1997	261
RTOR Reduction (vph)	0	0	31	0	0	63	0	0	64	0	0	69
Lane Group Flow (vph)	218	1599	583	292	2100	237	629	1633	143	718	1997	192
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	57.0	50.0	67.0	59.0	51.0	51.0	17.0	42.0	42.0	18.0	43.0	43.0
Effective Green, g (s)	59.0	52.0	71.0	61.0	53.0	53.0	18.0	44.0	44.0	19.0	45.0	45.0
Actuated g/C Ratio	0.42	0.37	0.51	0.44	0.38	0.38	0.13	0.31	0.31	0.14	0.32	0.32
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	189	1662	801	165	1946	594	446	1600	454	471	1620	514
v/s Ratio Prot	0.07	0.36	0.10	c0.11	0.41		0.18	0.32		c0.21	c0.40	
v/s Ratio Perm	0.42		0.27	c0.65		0.15			0.10			0.12
v/c Ratio	1.15	0.96	0.73	1.77	1.08	0.40	1.41	1.02	0.31	1.52	1.23	0.37
Uniform Delay, d1	39.0	43.0	27.0	38.1	43.5	31.8	61.0	48.0	36.5	60.5	47.5	36.6
Progression Factor	1.33	1.01	0.64	1.00	1.00	1.00	1.00	1.00	1.00	0.72	1.03	1.04
Incremental Delay, d2	105.1	12.3	2.4	369.9	45.5	2.0	197.6	27.8	0.5	237.0	105.2	0.1
Delay (s)	157.0	55.8	19.7	407.9	89.0	33.8	258.6	75.8	37.1	280.4	154.2	38.3
Level of Service	F	E	B	F	F	C	F	E	D	F	F	D
Approach Delay (s)		55.8			117.4			119.1			174.5	
Approach LOS		E			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			119.7			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.54									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			124.2%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

***2030 Phase 2 Future Total
Sensitivity AM***

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2 FT Sensi.> AM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	342	0	864	2422	0
Future Volume (vph)	167	342	0	864	2422	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.92	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3172	1457		4902	3444	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3172	1457		4902	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	342	0	864	2422	0
RTOR Reduction (vph)	14	14	0	0	0	0
Lane Group Flow (vph)	324	157	0	864	2422	0
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	18.3	18.3		109.7	109.7	
Effective Green, g (s)	18.3	18.3		109.7	109.7	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	414	190		3841	2698	
v/s Ratio Prot	0.10			0.18	c0.70	
v/s Ratio Perm		c0.11				
v/c Ratio	0.78	0.83		0.22	0.90	
Uniform Delay, d1	58.9	59.3		4.0	11.1	
Progression Factor	1.00	1.00		0.56	1.00	
Incremental Delay, d2	9.9	25.5		0.1	5.3	
Delay (s)	68.8	84.8		2.4	16.3	
Level of Service	E	F		A	B	
Approach Delay (s)	74.2			2.4	16.3	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay		20.9		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.89				
Actuated Cycle Length (s)		140.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		91.1%		ICU Level of Service		F
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2 FT Sensi.> AM Peak Hour
07-07-2020

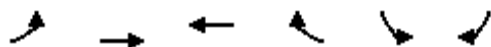
						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	66	134	933	862	2346	418
Future Volume (vph)	66	134	933	862	2346	418
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	134	933	862	2346	418
RTOR Reduction (vph)	0	123	0	0	0	209
Lane Group Flow (vph)	66	11	933	862	2346	209
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	11.5	11.5	40.5	114.5	70.0	70.0
Effective Green, g (s)	11.5	11.5	40.5	114.5	70.0	70.0
Actuated g/C Ratio	0.08	0.08	0.29	0.82	0.50	0.50
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	146	131	1004	4205	2571	800
v/s Ratio Prot	c0.04		c0.27	0.17	c0.46	
v/s Ratio Perm		0.01				0.13
v/c Ratio	0.45	0.08	0.93	0.20	0.91	0.26
Uniform Delay, d1	61.2	59.4	48.4	2.8	32.2	20.1
Progression Factor	0.95	1.08	1.61	0.51	0.96	1.84
Incremental Delay, d2	2.2	0.3	11.8	0.1	3.0	0.4
Delay (s)	60.6	64.5	89.8	1.5	33.8	37.4
Level of Service	E	E	F	A	C	D
Approach Delay (s)	63.2			47.4	34.3	
Approach LOS	E			D	C	
Intersection Summary						
HCM 2000 Control Delay			40.5		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			95.3%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> AM Peak Hour
 28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway 07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		  	  	
Traffic Volume (vph)	125	102	161	73	548	180	873	1490	182	492	1737	251
Future Volume (vph)	125	102	161	73	548	180	873	1490	182	492	1737	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.16	1.00	1.00	0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	302	3579	1601	1321	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	125	102	161	73	548	180	873	1490	182	492	1737	251
RTOR Reduction (vph)	0	0	15	0	0	61	0	0	102	0	0	81
Lane Group Flow (vph)	125	102	146	73	548	119	873	1490	80	492	1737	170
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	pm+ov	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	8	8	1	5	2	Perm	1	6	Perm
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	36.4	36.4	73.1	25.4	25.4	49.4	36.7	61.6	61.6	24.0	48.9	48.9
Effective Green, g (s)	36.4	36.4	73.1	25.4	25.4	49.4	36.7	61.6	61.6	24.0	48.9	48.9
Actuated g/C Ratio	0.26	0.26	0.52	0.18	0.18	0.35	0.26	0.44	0.44	0.17	0.35	0.35
Clearance Time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	930	835	239	649	576	909	2307	718	607	1832	559
v/s Ratio Prot	c0.04	0.03	0.05		0.15	0.04	c0.25	0.28		0.14	c0.33	
v/s Ratio Perm	c0.17		0.05	0.06		0.04			0.05			0.11
v/c Ratio	0.82	0.11	0.18	0.31	0.84	0.21	0.96	0.65	0.11	0.81	0.95	0.30
Uniform Delay, d1	44.4	39.5	17.6	49.7	55.4	31.6	50.9	30.7	23.1	55.8	44.3	33.2
Progression Factor	1.09	1.03	0.69	1.00	1.00	1.00	0.67	1.02	1.62	1.02	1.07	1.50
Incremental Delay, d2	28.7	0.1	0.1	0.7	9.8	0.2	9.9	0.5	0.1	3.8	6.3	0.6
Delay (s)	77.0	40.6	12.2	50.4	65.2	31.8	43.8	31.7	37.5	60.9	53.7	50.4
Level of Service	E	D	B	D	E	C	D	C	D	E	D	D
Approach Delay (s)		40.5			56.4			36.2			54.8	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			46.5				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			98.9%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 38: Dundas Street West/Dundas St W & Tremaine Rd

<2030 Phase 2 FT Sensi.> AM Peak Hour
07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	1182	2177	1057	184	375	584
Future Volume (vph)	1182	2177	1057	184	375	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1613
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4117	1570	3541	1613
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1182	2177	1057	184	375	584
RTOR Reduction (vph)	0	0	0	85	0	0
Lane Group Flow (vph)	1182	2177	1057	99	375	584
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	53.5	106.3	48.8	48.8	19.7	140.0
Effective Green, g (s)	54.5	110.3	52.8	52.8	23.7	140.0
Actuated g/C Ratio	0.39	0.79	0.38	0.38	0.17	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	1364	3526	1552	592	599	1613
v/s Ratio Prot	c0.34	0.49	c0.26		c0.11	
v/s Ratio Perm				0.06		0.36
v/c Ratio	0.87	0.62	0.68	0.17	0.63	0.36
Uniform Delay, d1	39.4	6.1	36.5	29.0	54.0	0.0
Progression Factor	1.00	1.00	0.96	1.29	1.08	1.00
Incremental Delay, d2	6.0	0.8	2.3	0.6	1.7	0.6
Delay (s)	45.4	7.0	37.5	37.9	59.9	0.6
Level of Service	D	A	D	D	E	A
Approach Delay (s)		20.5	37.6		23.8	
Approach LOS		C	D		C	

Intersection Summary

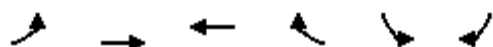
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue two

<2030 Phase 2 FT Sensi.> AM Peak Hour
07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	161	2391	1238	283	66	34
Future Volume (vph)	161	2391	1238	283	66	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3464	1457
Flt Permitted	0.16	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	304	4520	4520	1601	3464	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	161	2391	1238	283	66	34
RTOR Reduction (vph)	0	0	0	68	3	29
Lane Group Flow (vph)	161	2391	1238	215	66	2
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	118.0	118.0	106.2	106.2	8.0	8.0
Effective Green, g (s)	118.0	118.0	106.2	106.2	8.0	8.0
Actuated g/C Ratio	0.84	0.84	0.76	0.76	0.06	0.06
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	338	3809	3428	1214	197	83
v/s Ratio Prot	0.03	c0.53	0.27		c0.02	
v/s Ratio Perm	0.37			0.13		0.00
v/c Ratio	0.48	0.63	0.36	0.18	0.34	0.02
Uniform Delay, d1	2.7	3.7	5.6	4.7	63.4	62.3
Progression Factor	1.22	1.13	1.57	6.02	1.00	1.02
Incremental Delay, d2	0.9	0.6	0.3	0.3	1.0	0.1
Delay (s)	4.1	4.8	9.1	28.7	64.7	63.7
Level of Service	A	A	A	C	E	E
Approach Delay (s)		4.8	12.7		64.4	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> AM Peak Hour
42: Colonel William Pkwy/Avenue Three & Dundas St W 07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	147	1961	262	58	1421	395	80	35	168	81	8	20
Future Volume (vph)	147	1961	262	58	1421	395	80	35	168	81	8	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1601	1674	4117	1570	1768	1921	1517	1555	1921	1610
Flt Permitted	0.12	1.00	1.00	0.06	1.00	1.00	0.75	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	230	4476	1601	100	4117	1570	1400	1921	1517	1202	1921	1610
Peak-hour factor, PHF	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. Flow (vph)	147	1961	262	58	1421	395	80	35	168	81	8	20
RTOR Reduction (vph)	0	0	71	0	0	114	0	0	81	0	0	18
Lane Group Flow (vph)	147	1961	191	58	1421	281	80	35	87	81	8	2
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	110.3	101.8	101.8	105.1	99.2	99.2	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	110.3	101.8	101.8	105.1	99.2	99.2	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.79	0.73	0.73	0.75	0.71	0.71	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	0.2
Lane Grp Cap (vph)	276	3254	1164	141	2917	1112	149	204	161	127	204	171
v/s Ratio Prot	c0.03	c0.44		0.02	0.35			0.02			0.00	
v/s Ratio Perm	0.39		0.12	0.29		0.18	0.06		0.06	c0.07		0.00
v/c Ratio	0.53	0.60	0.16	0.41	0.49	0.25	0.54	0.17	0.54	0.64	0.04	0.01
Uniform Delay, d1	5.4	9.3	5.9	7.8	9.1	7.2	59.3	56.9	59.3	60.0	56.1	56.0
Progression Factor	3.38	0.63	0.24	2.34	0.64	0.82	1.00	1.00	1.00	1.22	1.32	1.00
Incremental Delay, d2	1.2	0.7	0.2	1.4	0.4	0.4	4.1	0.5	3.9	7.5	0.0	0.0
Delay (s)	19.4	6.6	1.7	19.6	6.3	6.3	63.4	57.4	63.2	80.7	74.4	56.0
Level of Service	B	A	A	B	A	A	E	E	E	F	E	E
Approach Delay (s)		6.8			6.7			62.5			75.7	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay			11.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			75.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2 FT Sensi.> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		 		
Traffic Volume (vph)	128	2145	104	33	1823	341	88	17	84	63	2	24
Future Volume (vph)	128	2145	104	33	1823	341	88	17	84	63	2	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	4391	1633	1772	4117	1601	1722	1609		3471	1623	
Flt Permitted	0.05	1.00	1.00	0.05	1.00	1.00	0.44	1.00		0.95	1.00	
Satd. Flow (perm)	96	4391	1633	87	4117	1601	805	1609		3471	1623	
Peak-hour factor, PHF	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. Flow (vph)	128	2145	104	33	1823	341	88	17	84	63	2	24
RTOR Reduction (vph)	0	0	32	0	0	36	0	75	0	0	23	0
Lane Group Flow (vph)	128	2145	72	33	1823	305	88	26	0	63	3	0
Heavy Vehicles (%)	4%	5%	0%	3%	12%	2%	6%	2%	5%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	100.4	92.5	92.5	90.0	86.1	86.1	25.6	14.8		6.8	6.0	
Effective Green, g (s)	100.4	92.5	92.5	90.0	86.1	86.1	25.6	14.8		6.8	6.0	
Actuated g/C Ratio	0.72	0.66	0.66	0.64	0.61	0.61	0.18	0.11		0.05	0.04	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	190	2901	1078	102	2531	984	249	170		168	69	
v/s Ratio Prot	c0.05	c0.49		0.01	0.44		c0.04	0.02		0.02	0.00	
v/s Ratio Perm	0.43		0.04	0.20		0.19	c0.03					
v/c Ratio	0.67	0.74	0.07	0.32	0.72	0.31	0.35	0.15		0.38	0.04	
Uniform Delay, d1	28.9	15.8	8.4	14.3	18.6	12.8	49.3	56.9		64.5	64.2	
Progression Factor	1.05	1.15	2.28	2.26	1.00	1.18	1.00	1.00		0.79	1.27	
Incremental Delay, d2	7.9	1.5	0.1	0.8	0.8	0.4	0.9	0.9		1.4	0.3	
Delay (s)	38.1	19.5	19.3	33.2	19.5	15.5	50.2	57.8		52.4	81.6	
Level of Service	D	B	B	C	B	B	D	E		D	F	
Approach Delay (s)		20.5			19.1			54.2			60.9	
Approach LOS		C			B			D			E	
Intersection Summary												
HCM 2000 Control Delay			21.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			73.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2 FT Sensi.> AM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  		  	  	
Traffic Volume (vph)	330	1300	562	198	1313	765	621	1450	322	315	1300	169
Future Volume (vph)	330	1300	562	198	1313	765	621	1450	322	315	1300	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1572	1508	4683	1555	3079	4902	1512	3404	4902	1541
Flt Permitted	0.10	1.00	1.00	0.11	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	486	4476	1572	167	4683	1555	3079	4902	1512	3404	4902	1541
Peak-hour factor, PHF	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. Flow (vph)	330	1300	562	198	1313	765	621	1450	322	315	1300	169
RTOR Reduction (vph)	0	0	29	0	0	32	0	0	37	0	0	36
Lane Group Flow (vph)	330	1300	533	198	1313	733	621	1450	285	315	1300	133
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	21%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	57.0	40.0	68.0	51.0	37.0	61.5	28.0	39.5	53.5	24.5	36.0	53.0
Effective Green, g (s)	59.0	43.0	74.0	53.0	40.0	67.5	29.0	42.5	59.5	25.5	39.0	59.0
Actuated g/C Ratio	0.42	0.31	0.53	0.38	0.29	0.48	0.21	0.30	0.42	0.18	0.28	0.42
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	2.5	2.5	4.0	2.5	2.5	4.0	2.5
Lane Grp Cap (vph)	351	1374	830	206	1338	749	637	1488	642	620	1365	649
v/s Ratio Prot	c0.12	c0.29	0.14	0.10	0.28	c0.19	c0.20	c0.30	0.05	0.09	0.27	0.03
v/s Ratio Perm	0.27		0.20	0.26		0.28			0.13			0.06
v/c Ratio	0.94	0.95	0.64	0.96	0.98	0.98	0.97	0.97	0.44	0.51	0.95	0.21
Uniform Delay, d1	37.1	47.4	23.5	40.1	49.6	35.5	55.1	48.2	28.5	51.6	49.6	25.6
Progression Factor	0.86	0.78	0.50	1.00	1.00	1.00	1.00	1.00	1.00	0.38	0.96	1.94
Incremental Delay, d2	26.8	11.5	1.1	51.4	20.5	27.3	29.2	17.5	0.4	0.2	8.5	0.1
Delay (s)	58.7	48.6	12.9	91.5	70.2	62.8	84.3	65.7	28.9	20.0	56.0	49.8
Level of Service	E	D	B	F	E	E	F	E	C	B	E	D
Approach Delay (s)		41.0			69.5			65.6			49.1	
Approach LOS		D			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			57.0									
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			103.7%									
Analysis Period (min)			15									
c Critical Lane Group												

***2030 Phase 2 Future Total
Sensitivity PM***

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2 FT Sensi.> PM Peak Hour

07-07-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	66	0	2325	680	0
Future Volume (vph)	111	66	0	2325	680	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.99	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3417	1457		5142	3579	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3417	1457		5142	3579	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	66	0	2325	680	0
RTOR Reduction (vph)	6	51	0	0	0	0
Lane Group Flow (vph)	116	4	0	2325	680	0
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.1	11.1		116.9	116.9	
Effective Green, g (s)	11.1	11.1		116.9	116.9	
Actuated g/C Ratio	0.08	0.08		0.84	0.84	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	270	115		4293	2988	
v/s Ratio Prot	c0.03			c0.45	0.19	
v/s Ratio Perm		0.00				
v/c Ratio	0.43	0.04		0.54	0.23	
Uniform Delay, d1	61.4	59.5		3.5	2.4	
Progression Factor	1.00	1.00		0.08	1.00	
Incremental Delay, d2	1.5	0.2		0.3	0.2	
Delay (s)	62.9	59.7		0.5	2.5	
Level of Service	E	E		A	A	
Approach Delay (s)	61.9			0.5	2.5	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay			4.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			59.9%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2 FT Sensi.> PM Peak Hour
07-07-2020

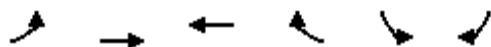
						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	351	798	197	2089	852	93
Future Volume (vph)	351	798	197	2089	852	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	351	798	197	2089	852	93
RTOR Reduction (vph)	0	123	0	0	0	60
Lane Group Flow (vph)	351	675	197	2089	852	33
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	61.9	61.9	10.4	64.1	49.7	49.7
Effective Green, g (s)	61.9	61.9	10.4	64.1	49.7	49.7
Actuated g/C Ratio	0.44	0.44	0.07	0.46	0.36	0.36
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	790	707	257	2354	1825	568
v/s Ratio Prot	0.20		0.06	c0.41	0.17	
v/s Ratio Perm		c0.42				0.02
v/c Ratio	0.44	0.95	0.77	0.89	0.47	0.06
Uniform Delay, d1	27.1	37.7	63.6	34.7	34.9	29.7
Progression Factor	1.14	1.20	1.24	0.64	0.95	0.90
Incremental Delay, d2	0.4	22.7	9.9	4.2	0.9	0.2
Delay (s)	31.2	67.9	88.6	26.5	34.1	27.0
Level of Service	C	E	F	C	C	C
Approach Delay (s)	56.7			31.8	33.4	
Approach LOS	E			C	C	
Intersection Summary						
HCM 2000 Control Delay	38.7			HCM 2000 Level of Service		D
HCM 2000 Volume to Capacity ratio	0.95					
Actuated Cycle Length (s)	140.0			Sum of lost time (s)		18.0
Intersection Capacity Utilization	77.5%			ICU Level of Service		D
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> PM Peak Hour
 28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway 07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		  	  	
Traffic Volume (vph)	283	492	777	207	177	507	271	1476	71	214	1316	141
Future Volume (vph)	283	492	777	207	177	507	271	1476	71	214	1316	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.53	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1004	3579	1601	573	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	283	492	777	207	177	507	271	1476	71	214	1316	141
RTOR Reduction (vph)	0	0	32	0	0	91	0	0	33	0	0	57
Lane Group Flow (vph)	283	492	745	207	177	416	271	1476	38	214	1316	84
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.9	24.9	67.5	30.9	19.9	38.6	42.6	63.4	74.4	18.7	39.5	55.5
Effective Green, g (s)	39.9	24.9	67.5	30.9	19.9	38.6	42.6	63.4	74.4	18.7	39.5	55.5
Actuated g/C Ratio	0.28	0.18	0.48	0.22	0.14	0.28	0.30	0.45	0.53	0.13	0.28	0.40
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	375	636	771	224	508	450	1056	2375	867	472	1479	634
v/s Ratio Prot	c0.09	0.14	c0.29	c0.07	0.05	0.12	0.08	0.28	0.00	0.06	c0.25	0.02
v/s Ratio Perm	0.13		0.17	0.13		0.13			0.02			0.04
v/c Ratio	0.75	0.77	0.97	0.92	0.35	0.93	0.26	0.62	0.04	0.45	0.89	0.13
Uniform Delay, d1	43.2	54.9	35.1	50.1	54.2	49.3	36.8	29.2	15.7	55.9	48.2	26.9
Progression Factor	1.11	1.13	1.06	1.00	1.00	1.00	0.54	0.58	2.50	1.01	0.86	0.54
Incremental Delay, d2	7.4	5.1	22.2	39.5	0.4	24.9	0.1	0.6	0.0	0.5	6.3	0.1
Delay (s)	55.2	67.3	59.3	89.6	54.6	74.2	19.9	17.6	39.3	56.8	47.9	14.6
Level of Service	E	E	E	F	D	E	B	B	D	E	D	B
Approach Delay (s)		61.1			73.9			18.8			46.2	
Approach LOS		E			E			B			D	
Intersection Summary												
HCM 2000 Control Delay			45.9				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			97.5%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 38: Dundas Street West/Dundas St W & Tremaine Rd

<2030 Phase 2 FT Sensi.> PM Peak Hour
07-07-2020



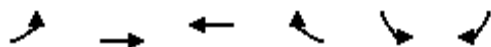
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	525	967	2467	271	181	1202
Future Volume (vph)	525	967	2467	271	181	1202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	967	2467	271	181	1202
RTOR Reduction (vph)	0	0	0	49	0	0
Lane Group Flow (vph)	525	967	2467	222	181	1202
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	29.8	113.7	79.9	79.9	12.3	140.0
Effective Green, g (s)	30.8	117.7	83.9	83.9	16.3	140.0
Actuated g/C Ratio	0.22	0.84	0.60	0.60	0.12	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	771	3763	2682	959	412	1570
v/s Ratio Prot	0.15	0.22	c0.55		0.05	
v/s Ratio Perm				0.14		c0.77
v/c Ratio	0.68	0.26	0.92	0.23	0.44	0.77
Uniform Delay, d1	50.1	2.3	25.0	13.1	57.6	0.0
Progression Factor	1.00	1.00	0.77	1.20	1.00	1.00
Incremental Delay, d2	2.5	0.2	4.0	0.3	0.4	3.0
Delay (s)	52.6	2.4	23.1	15.9	58.0	3.0
Level of Service	D	A	C	B	E	A
Approach Delay (s)		20.1	22.4		10.2	
Approach LOS		C	C		B	
Intersection Summary						
HCM 2000 Control Delay			18.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.90			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			81.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue two

<2030 Phase 2 FT Sensi.> PM Peak Hour

07-07-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	103	1045	2506	162	300	231
Future Volume (vph)	103	1045	2506	162	300	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3416	1457
Flt Permitted	0.04	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	78	4520	4520	1601	3416	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	103	1045	2506	162	300	231
RTOR Reduction (vph)	0	0	0	40	15	2
Lane Group Flow (vph)	103	1045	2506	122	350	164
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	106.4	106.4	92.9	92.9	19.6	29.1
Effective Green, g (s)	106.4	106.4	92.9	92.9	19.6	29.1
Actuated g/C Ratio	0.76	0.76	0.66	0.66	0.14	0.21
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	3435	2999	1062	478	302
v/s Ratio Prot	c0.04	0.23	c0.55		c0.10	0.04
v/s Ratio Perm	0.41			0.08		0.08
v/c Ratio	0.59	0.30	0.84	0.11	0.73	0.54
Uniform Delay, d1	34.9	5.2	17.8	8.6	57.7	49.5
Progression Factor	0.79	1.08	0.71	0.92	0.95	1.06
Incremental Delay, d2	4.9	0.2	1.5	0.1	5.7	2.0
Delay (s)	32.4	5.9	14.1	8.0	60.6	54.5
Level of Service	C	A	B	A	E	D
Approach Delay (s)		8.3	13.7		58.7	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> PM Peak Hour
 42: Colonel William Pkwy/Avenue Three & Dundas St W 07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	71	1152	93	104	2205	251	242	11	62	425	30	181
Future Volume (vph)	71	1152	93	104	2205	251	242	11	62	425	30	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	4476	1570	1825	4476	1633	1753	1921	1504	1787	1921	1611
Flt Permitted	0.06	1.00	1.00	0.14	1.00	1.00	0.74	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	110	4476	1570	266	4476	1633	1361	1921	1504	1243	1921	1611
Peak-hour factor, PHF	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. Flow (vph)	71	1152	93	104	2205	251	242	11	62	425	30	181
RTOR Reduction (vph)	0	0	47	0	0	69	0	0	49	0	0	67
Lane Group Flow (vph)	71	1152	47	104	2205	182	242	11	13	425	30	114
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	75.4	70.0	70.0	82.2	73.4	73.4	29.5	29.5	29.5	43.8	43.8	43.8
Effective Green, g (s)	75.4	70.0	70.0	82.2	73.4	73.4	29.5	29.5	29.5	43.8	43.8	43.8
Actuated g/C Ratio	0.54	0.50	0.50	0.59	0.52	0.52	0.21	0.21	0.21	0.31	0.31	0.31
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	3.0	0.2	0.2
Lane Grp Cap (vph)	125	2238	785	254	2346	856	286	404	316	428	600	504
v/s Ratio Prot	c0.02	0.26		0.03	c0.49			0.01		c0.07	0.02	
v/s Ratio Perm	0.28		0.03	0.21		0.11	0.18		0.01	c0.24		0.07
v/c Ratio	0.57	0.51	0.06	0.41	0.94	0.21	0.85	0.03	0.04	0.99	0.05	0.23
Uniform Delay, d1	29.5	23.6	18.0	15.1	31.2	17.8	53.1	43.9	44.0	47.7	33.6	35.6
Progression Factor	1.51	0.62	0.07	1.33	0.93	1.32	1.00	1.00	1.00	1.08	1.07	1.15
Incremental Delay, d2	4.5	0.8	0.1	0.7	6.3	0.4	20.4	0.0	0.1	41.3	0.0	0.1
Delay (s)	49.0	15.5	1.4	20.7	35.4	23.9	73.5	43.9	44.1	92.7	36.0	40.9
Level of Service	D	B	A	C	D	C	E	D	D	F	D	D
Approach Delay (s)		16.3			33.7			66.7			75.3	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			36.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			21.4			
Intersection Capacity Utilization			92.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2 FT Sensi.> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		  	 	
Traffic Volume (vph)	46	1525	65	44	2373	125	61	4	25	319	15	127
Future Volume (vph)	46	1525	65	44	2373	125	61	4	25	319	15	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	4476	1601	1772	4611	1633	1789	1668		3471	1631	
Flt Permitted	0.05	1.00	1.00	0.10	1.00	1.00	0.67	1.00		0.95	1.00	
Satd. Flow (perm)	85	4476	1601	178	4611	1633	1255	1668		3471	1631	
Peak-hour factor, PHF	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. Flow (vph)	46	1525	65	44	2373	125	61	4	25	319	15	127
RTOR Reduction (vph)	0	0	24	0	0	47	0	24	0	0	112	0
Lane Group Flow (vph)	46	1525	41	44	2373	78	61	5	0	319	30	0
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%	2%	2%	0%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	93.4	87.9	87.9	93.4	87.9	87.9	14.2	6.1		18.5	16.5	
Effective Green, g (s)	93.4	87.9	87.9	93.4	87.9	87.9	14.2	6.1		18.5	16.5	
Actuated g/C Ratio	0.67	0.63	0.63	0.67	0.63	0.63	0.10	0.04		0.13	0.12	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	122	2810	1005	181	2895	1025	158	72		458	192	
v/s Ratio Prot	c0.01	0.34		0.01	c0.51		0.02	0.00		c0.09	0.02	
v/s Ratio Perm	0.24		0.03	0.15		0.05	c0.02					
v/c Ratio	0.38	0.54	0.04	0.24	0.82	0.08	0.39	0.07		0.70	0.16	
Uniform Delay, d1	22.1	14.7	9.9	10.0	20.0	10.2	58.5	64.2		58.1	55.5	
Progression Factor	2.03	0.76	1.00	1.09	0.75	1.12	1.00	1.00		0.99	1.07	
Incremental Delay, d2	1.6	0.6	0.1	0.3	1.2	0.1	1.6	0.9		4.6	0.4	
Delay (s)	46.3	11.8	10.0	11.1	16.1	11.4	60.1	65.1		62.3	60.0	
Level of Service	D	B	B	B	B	B	E	E		E	E	
Approach Delay (s)		12.7			15.8			61.7			61.6	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			20.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			78.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2 FT Sensi.> PM Peak Hour

07-07-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  		  	  	
Traffic Volume (vph)	218	1150	614	292	1600	300	629	1300	207	718	1300	261
Future Volume (vph)	218	1150	614	292	1600	300	629	1300	207	718	1300	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	2.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1586	1755	5142	1570	3471	5092	1445	3471	5043	1601
Flt Permitted	0.11	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4476	1586	184	5142	1570	3471	5092	1445	3471	5043	1601
Peak-hour factor, PHF	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. Flow (vph)	218	1150	614	292	1600	300	629	1300	207	718	1300	261
RTOR Reduction (vph)	0	0	49	0	0	83	0	0	91	0	0	107
Lane Group Flow (vph)	218	1150	565	292	1600	217	629	1300	116	718	1300	154
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	48.1	36.1	62.8	59.0	43.0	43.0	26.7	36.0	36.0	27.0	36.3	36.3
Effective Green, g (s)	50.1	38.1	66.8	60.0	45.0	45.0	27.7	38.0	38.0	28.0	38.3	38.3
Actuated g/C Ratio	0.36	0.27	0.48	0.43	0.32	0.32	0.20	0.27	0.27	0.20	0.27	0.27
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	230	1218	756	302	1652	504	686	1382	392	694	1379	437
v/s Ratio Prot	0.09	0.26	0.15	c0.14	c0.31		0.18	0.26		c0.21	c0.26	
v/s Ratio Perm	0.25		0.20	0.28		0.14			0.08			0.10
v/c Ratio	0.95	0.94	0.75	0.97	0.97	0.43	0.92	0.94	0.30	1.03	0.94	0.35
Uniform Delay, d1	37.2	49.9	29.7	43.0	46.8	37.4	55.0	49.9	40.4	56.0	49.8	40.9
Progression Factor	1.46	1.16	0.73	1.00	1.00	1.00	1.00	1.00	1.00	0.80	1.00	1.10
Incremental Delay, d2	41.0	14.0	3.4	42.4	15.8	2.7	17.0	12.8	0.6	32.2	6.9	0.3
Delay (s)	95.3	72.1	25.2	85.4	62.6	40.1	72.1	62.7	41.0	77.1	56.6	45.2
Level of Service	F	E	C	F	E	D	E	E	D	E	E	D
Approach Delay (s)		60.1			62.6			63.3			61.8	
Approach LOS		E			E			E			E	
Intersection Summary												
HCM 2000 Control Delay			62.0				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			106.8%				ICU Level of Service			G		
Analysis Period (min)			15									

c Critical Lane Group

***2030 Phase 2 Future Total
Sensitivity Queues AM***

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

1: Bronte Rd & 407 Off Ramp

07-07-2020



Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	338	171	864	2422
v/c Ratio	0.79	0.84	0.22	0.90
Control Delay	70.1	85.9	2.4	17.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	70.1	85.9	2.4	17.2
Queue Length 50th (m)	45.0	46.5	10.6	227.2
Queue Length 95th (m)	61.8	#88.2	13.2	273.2
Internal Link Dist (m)	457.6		476.7	486.7
Turn Bay Length (m)		75.0		
Base Capacity (vph)	444	211	3842	2699
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.76	0.81	0.22	0.90

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues
2: Tremaine Rd & Avenue One

<2030 Phase 2 FT Sensi.> AM Peak Hour
07-07-2020

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	70	24	54	90	814	69	871
v/c Ratio	0.25	0.12	0.20	0.18	0.29	0.13	0.31
Control Delay	23.2	27.7	24.0	6.9	5.4	5.0	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	27.7	24.0	6.9	5.4	5.0	4.3
Queue Length 50th (m)	5.9	2.9	5.8	7.5	34.6	3.0	23.1
Queue Length 95th (m)	16.2	m6.2	m10.8	13.6	43.3	7.5	32.0
Internal Link Dist (m)	139.5		222.8		411.3		881.9
Turn Bay Length (m)		100.0		15.0		15.0	
Base Capacity (vph)	707	516	713	487	2766	516	2840
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.05	0.08	0.18	0.29	0.13	0.31

Intersection Summary

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

Queues
6: Avenue Three & Avenue One

<2030 Phase 2 FT Sensi.> AM Peak Hour

07-07-2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	156	41	23	853	272	179
v/c Ratio	0.14	0.04	0.03	0.79	0.67	0.36
Control Delay	7.4	2.0	8.8	22.1	38.4	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	2.0	8.8	22.1	38.4	9.3
Queue Length 50th (m)	6.1	0.1	1.5	92.8	29.5	3.4
Queue Length 95th (m)	18.3	1.8	m3.5 m#157.1	40.8	11.8	
Internal Link Dist (m)	778.4			459.4	191.6	
Turn Bay Length (m)		25.0	30.0		50.0	
Base Capacity (vph)	1079	935	710	1079	613	666
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.04	0.03	0.79	0.44	0.27

Intersection Summary

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.

Queues
10: Bronte Road & Avenue One

<2030 Phase 2 FT Sensi.> AM Peak Hour

07-07-2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	66	134	933	862	2346	418
v/c Ratio	0.45	0.53	0.93	0.20	0.91	0.41
Control Delay	68.1	17.8	89.2	1.5	34.1	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	17.8	89.2	1.5	34.1	3.7
Queue Length 50th (m)	18.1	3.7	141.1	9.3	190.0	4.8
Queue Length 95th (m)	32.9	20.8	#184.0	10.7	227.2	m14.9
Internal Link Dist (m)	444.2			110.3	476.7	
Turn Bay Length (m)	230.0		205.0			230.0
Base Capacity (vph)	345	416	1005	4206	2571	1009
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.32	0.93	0.20	0.91	0.41

Intersection Summary

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.

Queues
20: Tremaine Rd & Burnhamthorpe Road

<2030 Phase 2 FT Sensi.> AM Peak Hour

07-07-2020

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	85	66	17	95	1271	42	883
v/c Ratio	0.29	0.33	0.06	0.22	0.51	0.17	0.35
Control Delay	23.7	24.2	13.1	10.6	14.7	6.0	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	24.2	13.1	10.6	14.7	6.0	4.6
Queue Length 50th (m)	7.7	11.6	0.5	15.8	133.6	1.7	18.4
Queue Length 95th (m)	18.3	23.8	7.1	m20.0	176.7	3.4	21.2
Internal Link Dist (m)	176.3		420.0		260.1		411.3
Turn Bay Length (m)				15.0		15.0	
Base Capacity (vph)	713	509	685	426	2483	254	2559
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.13	0.02	0.22	0.51	0.17	0.35

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

22: Avenue two & Burnhamthorpe Road

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	92	361	19	76	285	246	65	148	59	49	25	16
v/c Ratio	0.12	0.14	0.02	0.11	0.11	0.21	0.28	0.47	0.18	0.23	0.08	0.05
Control Delay	7.3	6.5	0.9	7.5	6.6	5.5	31.1	34.1	10.3	24.6	21.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	6.5	0.9	7.5	6.6	5.5	31.1	34.1	10.3	24.6	21.7	0.4
Queue Length 50th (m)	8.7	17.8	0.0	10.4	20.8	31.7	8.5	19.2	2.4	6.3	3.2	0.0
Queue Length 95th (m)	19.0	29.3	m0.6	15.0	20.3	35.2	16.9	32.6	8.1	m8.9	m4.6	m0.0
Internal Link Dist (m)	420.0			634.6			242.9			311.6		
Turn Bay Length (m)	15.0		15.0	80.0		60.0	50.0		25.0	50.0		50.0
Base Capacity (vph)	760	2503	1138	706	2503	1193	538	726	655	481	726	655
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.14	0.02	0.11	0.11	0.21	0.12	0.20	0.09	0.10	0.03	0.02

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

24: Avenue Three & Burnhamthorpe Road

07-07-2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	419	87	923	159	58	247	51	23	35
v/c Ratio	0.00	0.20	0.16	0.44	0.16	0.20	0.62	0.13	0.11	0.09
Control Delay	16.0	13.4	13.7	17.2	9.0	19.7	27.0	4.7	18.8	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	13.4	13.7	17.2	9.0	19.7	27.0	4.7	18.8	13.3
Queue Length 50th (m)	0.1	21.2	13.4	87.4	17.4	7.3	36.5	1.1	2.4	2.7
Queue Length 95th (m)	m0.0	32.8	33.4	129.3	42.5	15.5	53.2	6.4	6.8	8.0
Internal Link Dist (m)		634.6		571.7			458.6			191.6
Turn Bay Length (m)	15.0		75.0		20.0	50.0		20.0	100.0	
Base Capacity (vph)	312	2092	561	2105	984	533	726	655	387	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.20	0.16	0.44	0.16	0.11	0.34	0.08	0.06	0.05

Intersection Summary

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

Queues
26: Avenue Five & Burnhamthorpe Road

<2030 Phase 2 FT Sensi.> AM Peak Hour

07-07-2020

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	131	333	101	1154	283	56	117	54	41	17	42
v/c Ratio	0.33	0.12	0.14	0.45	0.24	0.39	0.61	0.25	0.36	0.09	0.19
Control Delay	6.0	1.3	6.4	10.6	4.7	63.8	70.4	20.7	39.4	32.6	3.3
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	6.0	1.3	6.4	10.6	4.7	63.8	70.4	20.7	39.4	32.6	3.3
Queue Length 50th (m)	1.6	2.0	10.1	63.6	20.2	16.0	33.8	2.2	8.5	3.3	1.5
Queue Length 95th (m)	12.0	3.1	m12.4	m148.8	m23.7	m29.4	m53.5	m14.1	m11.7	m4.9	m2.5
Internal Link Dist (m)	571.7		306.7		401.3		269.3				
Turn Bay Length (m)	25.0		40.0		40.0	30.0		30.0	35.0		15.0
Base Capacity (vph)	466	2835	741	2555	1188	331	443	424	265	443	424
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	0.28	0.12	0.14	0.45	0.24	0.17	0.26	0.13	0.15	0.04	0.10

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	125	102	161	73	548	180	873	1490	182	492	1737	251
v/c Ratio	0.79	0.11	0.17	0.31	0.85	0.25	0.96	0.65	0.22	0.81	0.95	0.39
Control Delay	76.0	40.3	8.1	52.8	68.2	12.9	45.1	32.6	5.9	62.3	53.7	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.0	40.3	8.1	52.8	68.2	12.9	45.1	32.6	5.9	62.3	53.7	26.4
Queue Length 50th (m)	24.6	9.8	6.8	17.5	76.9	14.5	111.9	134.7	12.7	74.7	115.1	28.6
Queue Length 95th (m)	#44.2	16.9	15.3	32.6	97.7	29.7 m	#142.6	m147.1	m15.8	m82.5	#200.6	m35.6
Internal Link Dist (m)		306.7			570.2			141.9			259.9	
Turn Bay Length (m)	100.0		140.0	35.0		80.0	100.0		150.0	100.0		15.0
Base Capacity (vph)	159	971	929	254	690	746	910	2309	820	682	1832	640
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.11	0.17	0.29	0.79	0.24	0.96	0.65	0.22	0.72	0.95	0.39

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

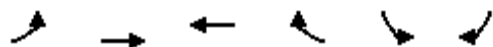
m Volume for 95th percentile queue is metered by upstream signal.

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

38: Dundas Street West/Dundas St W & Tremaine Rd

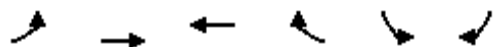
07-07-2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	1182	2177	1057	184	375	584
v/c Ratio	0.87	0.62	0.68	0.27	0.63	0.36
Control Delay	46.9	7.4	39.0	13.9	62.4	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	7.4	39.0	13.9	62.4	1.3
Queue Length 50th (m)	153.5	88.5	106.8	10.6	52.7	2.4
Queue Length 95th (m)	170.2	120.5	139.0	40.2	64.9	4.4
Internal Link Dist (m)		269.3	401.7		260.1	
Turn Bay Length (m)	85.0			60.0	70.0	
Base Capacity (vph)	1367	3525	1552	677	1011	1613
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.62	0.68	0.27	0.37	0.36
Intersection Summary						

Queues
40: Dundas St W & Avenue two

<2030 Phase 2 FT Sensi.> AM Peak Hour
07-07-2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	161	2391	1238	283	69	31
v/c Ratio	0.46	0.61	0.36	0.22	0.27	0.23
Control Delay	5.5	4.9	9.3	3.8	62.0	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	4.9	9.3	3.8	62.0	24.1
Queue Length 50th (m)	3.4	138.5	65.7	14.5	9.2	0.2
Queue Length 95th (m)	5.6	35.2	63.5	21.7	16.4	10.4
Internal Link Dist (m)		401.7	707.1		131.1	
Turn Bay Length (m)	130.0			90.0	185.0	
Base Capacity (vph)	393	3899	3473	1295	867	387
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.61	0.36	0.22	0.08	0.08
Intersection Summary						

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

42: Colonel William Pkwy/Avenue Three & Dundas St W

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	147	1961	262	58	1421	395	80	35	168	81	8	20
v/c Ratio	0.53	0.60	0.21	0.37	0.49	0.32	0.54	0.17	0.69	0.63	0.04	0.08
Control Delay	16.0	7.2	0.5	21.9	6.9	1.3	71.5	56.5	42.1	93.6	69.9	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	7.2	0.5	21.9	6.9	1.3	71.5	56.5	42.1	93.6	69.9	3.5
Queue Length 50th (m)	5.1	65.2	0.0	3.7	33.0	4.2	21.5	9.1	20.7	21.7	2.0	0.2
Queue Length 95th (m)	25.4	73.6	2.4	m9.3	34.4	6.0	36.6	18.6	42.8	35.7	7.3	2.4
Internal Link Dist (m)	707.1			504.0			309.6			458.6		
Turn Bay Length (m)	60.0		100.0	60.0		75.0	30.0		30.0	20.0		20.0
Base Capacity (vph)	335	3278	1243	157	2918	1226	362	498	460	311	498	484
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.60	0.21	0.37	0.49	0.32	0.22	0.07	0.37	0.26	0.02	0.04

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

44: Valleyridge Dr/Avenue Five & Dundas St W

07-07-2020

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	128	2145	104	33	1823	341	88	101	63	26
v/c Ratio	0.66	0.71	0.09	0.24	0.70	0.32	0.35	0.45	0.32	0.19
Control Delay	38.3	18.8	5.9	17.0	19.4	11.7	50.9	22.9	54.0	33.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	18.8	5.9	17.0	19.4	11.7	50.9	22.9	54.0	33.1
Queue Length 50th (m)	20.6	140.7	2.9	2.8	94.0	31.3	20.7	4.4	9.1	2.8
Queue Length 95th (m)	42.9	161.6	12.8	m3.6	m99.9	m33.6	34.8	21.9	17.1	12.0
Internal Link Dist (m)		504.0			219.0			321.0		401.3
Turn Bay Length (m)	55.0		75.0	25.0		25.0	20.0		90.0	
Base Capacity (vph)	196	3038	1159	136	2614	1050	344	432	669	389
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.71	0.09	0.24	0.70	0.32	0.26	0.23	0.09	0.07

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> AM Peak Hour

46: Bronte Rd & Dundas St W

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	330	1300	562	198	1313	765	621	1450	322	315	1300	169
v/c Ratio	0.91	0.95	0.63	0.94	0.98	0.93	0.97	0.97	0.45	0.51	0.95	0.23
Control Delay	50.0	49.0	12.0	85.6	70.0	47.3	84.8	66.2	23.8	20.9	56.5	29.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	49.0	12.0	85.6	70.0	47.3	84.8	66.2	23.8	20.9	56.5	29.1
Queue Length 50th (m)	32.8	141.6	82.5	40.6	132.6	170.9	88.9	~161.4	50.0	26.7	140.4	38.1
Queue Length 95th (m)	#89.8	#177.7	94.4	#88.8	#165.1	#259.0	#126.4	#191.0	77.1	m28.7	m#150.7	m42.4
Internal Link Dist (m)	219.0				753.0				338.5		240.5	
Turn Bay Length (m)	95.0			80.0	115.0			40.0	190.0			45.0
Base Capacity (vph)	362	1374	892	210	1338	861	637	1488	721	705	1365	727
Starvation Cap Reductn	0	0	3	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	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	0
Reduced v/c Ratio	0.91	0.95	0.63	0.94	0.98	0.89	0.97	0.97	0.45	0.45	0.95	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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.

HCM Unsignalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> AM Peak Hour 4: Avenue Two & Avenue One

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↬			↵	↶	↷
Traffic Volume (veh/h)	214	16	74	31	2	89
Future Volume (Veh/h)	214	16	74	31	2	89
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	214	16	74	31	2	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			230	401		222
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			230	401		222
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			94	100		89
cM capacity (veh/h)			1338	572		818
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	230	105	2	89		
Volume Left	0	74	2	0		
Volume Right	16	0	0	89		
cSH	1700	1338	572	818		
Volume to Capacity	0.14	0.06	0.00	0.11		
Queue Length 95th (m)	0.0	1.3	0.1	2.8		
Control Delay (s)	0.0	5.7	11.3	9.9		
Lane LOS	A		B	A		
Approach Delay (s)	0.0	5.7	10.0			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			31.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> AM Peak Hour 8: Avenue Five & Avenue One

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰		↱	↰	↱	↱
Traffic Volume (veh/h)	186	16	95	838	61	77
Future Volume (Veh/h)	186	16	95	838	61	77
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	186	16	95	838	61	77
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			202		1222	194
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			202		1222	194
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		67	91
cM capacity (veh/h)			1370		185	847
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	202	95	838	61	77	
Volume Left	0	95	0	61	0	
Volume Right	16	0	0	0	77	
cSH	1700	1370	1700	185	847	
Volume to Capacity	0.12	0.07	0.49	0.33	0.09	
Queue Length 95th (m)	0.0	1.7	0.0	10.3	2.3	
Control Delay (s)	0.0	7.8	0.0	33.8	9.7	
Lane LOS		A		D	A	
Approach Delay (s)	0.0	0.8		20.4		
Approach LOS				C		
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			54.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> AM Peak Hour 31: Avenue two & Street Four

07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	51	19	253	191	71	49
Future Volume (Veh/h)	51	19	253	191	71	49
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	51	19	253	191	71	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	444	253			444	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	444	253			444	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	98			94	
cM capacity (veh/h)	535	786			1116	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	51	19	253	191	120	
Volume Left	51	0	0	0	71	
Volume Right	0	19	0	191	0	
cSH	535	786	1700	1700	1116	
Volume to Capacity	0.10	0.02	0.15	0.11	0.06	
Queue Length 95th (m)	2.4	0.6	0.0	0.0	1.5	
Control Delay (s)	12.4	9.7	0.0	0.0	5.2	
Lane LOS	B	A			A	
Approach Delay (s)	11.7		0.0		5.2	
Approach LOS	B					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			

***2030 Phase 2 Future Total
Sensitivity Queues PM***

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

1: Bronte Rd & 407 Off Ramp

07-07-2020



Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	122	55	2325	680
v/c Ratio	0.44	0.33	0.54	0.23
Control Delay	63.1	19.8	0.5	2.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	63.1	19.8	0.5	2.6
Queue Length 50th (m)	16.0	0.0	2.9	16.0
Queue Length 95th (m)	25.8	14.3	3.5	23.2
Internal Link Dist (m)	457.6		476.7	486.7
Turn Bay Length (m)		75.0		
Base Capacity (vph)	371	205	4294	2989
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.27	0.54	0.23
Intersection Summary				

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

2: Tremaine Rd & Avenue One

07-07-2020

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	105	133	113	50	671	14	812
v/c Ratio	0.02	0.29	0.55	0.30	0.13	0.31	0.03	0.37
Control Delay	20.8	17.2	39.5	19.3	11.7	10.0	7.1	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	17.2	39.5	19.3	11.7	10.0	7.1	7.9
Queue Length 50th (m)	0.6	7.3	21.2	11.1	5.1	38.3	0.6	23.9
Queue Length 95th (m)	2.8	17.3	32.7	22.0	12.3	52.7	3.1	42.5
Internal Link Dist (m)		139.5		222.8		411.3		881.9
Turn Bay Length (m)	15.0		100.0		15.0		15.0	
Base Capacity (vph)	496	709	500	706	385	2177	457	2191
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	0.01	0.15	0.27	0.16	0.13	0.31	0.03	0.37
Intersection Summary								

Queues
6: Avenue Three & Avenue One

<2030 Phase 2 FT Sensi.> PM Peak Hour
07-07-2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	703	226	137	212	61	24
v/c Ratio	0.47	0.17	0.26	0.14	0.24	0.10
Control Delay	6.1	2.3	5.9	2.2	27.6	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	2.3	5.9	2.2	27.6	10.8
Queue Length 50th (m)	44.0	4.7	22.5	5.0	5.9	0.2
Queue Length 95th (m)	60.1	9.3	m36.9	m6.9	13.7	2.6
Internal Link Dist (m)	778.4			459.4	191.6	
Turn Bay Length (m)		25.0	30.0		50.0	
Base Capacity (vph)	1493	1294	524	1493	690	632
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.17	0.26	0.14	0.09	0.04

Intersection Summary

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

Queues
10: Bronte Road & Avenue One

<2030 Phase 2 FT Sensi.> PM Peak Hour

07-07-2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	351	798	197	2089	852	93
v/c Ratio	0.44	0.96	0.76	0.89	0.47	0.15
Control Delay	32.3	54.7	93.0	27.3	34.9	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	54.7	93.0	27.3	34.9	6.0
Queue Length 50th (m)	75.3	190.1	26.7	213.4	61.1	0.0
Queue Length 95th (m)	104.3	#258.0	m#47.2	89.8	72.0	10.5
Internal Link Dist (m)	444.2			82.5	476.7	
Turn Bay Length (m)	230.0		205.0			230.0
Base Capacity (vph)	830	861	258	2354	1824	628
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.93	0.76	0.89	0.47	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

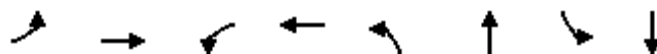
m Volume for 95th percentile queue is metered by upstream signal.

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

20: Tremaine Rd & Burnhamthorpe Road

07-07-2020



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	10	90	368	95	15	776	56	954
v/c Ratio	0.02	0.15	0.82	0.15	0.08	0.48	0.21	0.58
Control Delay	12.8	9.3	38.3	5.8	19.6	25.1	11.7	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	9.3	38.3	5.8	19.6	25.1	11.7	11.6
Queue Length 50th (m)	0.9	4.4	59.9	0.0	3.0	92.5	3.5	34.4
Queue Length 95th (m)	3.2	11.6	78.3	1.2	m5.9	108.5	7.0	40.1
Internal Link Dist (m)		176.3		420.0		260.1		411.3
Turn Bay Length (m)	15.0				15.0		15.0	
Base Capacity (vph)	542	725	545	734	196	1622	270	1643
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	0.02	0.12	0.68	0.13	0.08	0.48	0.21	0.58

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

22: Avenue two & Burnhamthorpe Road

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	363	68	116	389	69	35	34	115	188	121	69
v/c Ratio	0.04	0.18	0.07	0.20	0.19	0.07	0.12	0.08	0.26	0.61	0.29	0.17
Control Delay	13.1	12.1	6.3	18.9	16.6	11.7	22.5	21.7	6.8	33.9	24.7	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.1	12.1	6.3	18.9	16.6	11.7	22.5	21.7	6.8	33.9	24.7	6.1
Queue Length 50th (m)	2.6	21.7	3.1	11.9	21.0	1.4	4.5	4.2	2.3	24.9	15.0	1.1
Queue Length 95th (m)	m6.3	29.4	7.9	26.2	37.1	10.3	m8.2	m8.0	10.4	33.9	21.6	6.8
Internal Link Dist (m)		420.0			634.6			242.9			311.6	
Turn Bay Length (m)	15.0		15.0	80.0		60.0	50.0		25.0	50.0		50.0
Base Capacity (vph)	567	2065	952	581	2065	953	493	726	688	533	726	659
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.18	0.07	0.20	0.19	0.07	0.07	0.05	0.17	0.35	0.17	0.10

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

24: Avenue Three & Burnhamthorpe Road

07-07-2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	17	1003	72	536	36	75	32	96	132	231
v/c Ratio	0.03	0.47	0.25	0.25	0.04	0.36	0.08	0.26	0.47	0.60
Control Delay	7.6	9.7	14.8	11.3	4.8	27.5	21.4	11.0	28.0	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	9.7	14.8	11.3	4.8	27.5	21.4	11.0	28.0	28.1
Queue Length 50th (m)	1.2	44.3	9.2	35.9	0.0	12.8	5.2	7.9	19.3	32.4
Queue Length 95th (m)	3.9	62.7	19.7	52.4	7.8	19.7	m10.0	16.9	31.0	47.7
Internal Link Dist (m)		634.6		571.7			458.6			191.6
Turn Bay Length (m)	15.0		75.0		20.0	50.0		20.0	100.0	
Base Capacity (vph)	511	2123	286	2145	984	406	726	655	534	718
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.47	0.25	0.25	0.04	0.18	0.04	0.15	0.25	0.32

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

26: Avenue Five & Burnhamthorpe Road

07-07-2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	49	1157	70	501	56	27	27	101	243	95	122
v/c Ratio	0.10	0.60	0.37	0.26	0.06	0.08	0.06	0.22	0.68	0.20	0.24
Control Delay	15.8	19.8	18.8	7.0	2.0	22.6	22.1	14.2	30.4	18.5	3.2
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	15.8	19.8	18.8	7.0	2.0	22.6	22.1	14.2	30.4	18.5	3.2
Queue Length 50th (m)	4.8	79.4	5.5	17.4	0.2	4.6	4.6	10.6	27.2	9.5	0.5
Queue Length 95th (m)	11.6	98.9	24.5	39.2	5.6	7.2	7.1	13.7	m30.7	m12.3	m4.6
Internal Link Dist (m)		571.7		306.7			401.3			269.3	
Turn Bay Length (m)	25.0		40.0		20.0	30.0		30.0	35.0		15.0
Base Capacity (vph)	478	1932	188	1942	897	504	726	655	537	726	692
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	0.10	0.60	0.37	0.26	0.06	0.05	0.04	0.15	0.45	0.13	0.18

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	283	492	777	207	177	507	271	1476	71	214	1316	141
v/c Ratio	0.71	0.77	0.88	0.88	0.35	0.82	0.26	0.62	0.07	0.45	0.89	0.18
Control Delay	53.6	69.4	38.8	74.4	55.1	42.9	20.0	18.8	4.4	57.2	48.9	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	69.4	38.8	74.4	55.1	42.9	20.0	18.8	4.4	57.2	48.9	5.6
Queue Length 50th (m)	65.4	70.3	194.5	44.7	23.5	101.2	10.8	128.5	2.8	28.8	91.9	4.8
Queue Length 95th (m)	98.5	92.0	239.0	#74.1	33.5	125.1	m12.4	m155.9	m7.7	m34.5	m#162.2	m9.5
Internal Link Dist (m)		306.7			570.2			126.0			287.6	
Turn Bay Length (m)	100.0		140.0	35.0		80.0	100.0		150.0	100.0		15.0
Base Capacity (vph)	397	818	890	236	690	705	1077	2373	988	682	1478	766
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.60	0.87	0.88	0.26	0.72	0.25	0.62	0.07	0.31	0.89	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

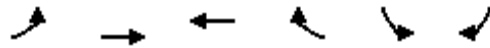
m Volume for 95th percentile queue is metered by upstream signal.

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

38: Dundas Street West/Dundas St W & Tremaine Rd

07-07-2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	525	967	2467	271	181	1202
v/c Ratio	0.68	0.26	0.92	0.27	0.44	0.77
Control Delay	55.3	2.5	23.9	9.3	60.0	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	2.5	23.9	9.3	60.0	8.7
Queue Length 50th (m)	69.8	17.3	205.8	17.7	22.0	99.6
Queue Length 95th (m)	87.5	25.1	#244.5	m22.8	33.8	103.4
Internal Link Dist (m)		312.4	401.7		260.1	
Turn Bay Length (m)	85.0			60.0	70.0	
Base Capacity (vph)	770	3762	2683	1008	1011	1570
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.26	0.92	0.27	0.18	0.77

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

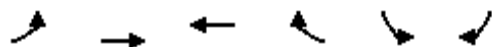
m Volume for 95th percentile queue is metered by upstream signal.

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

40: Dundas St W & Avenue two

07-07-2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	103	1045	2506	162	365	166
v/c Ratio	0.59	0.30	0.84	0.15	0.74	0.44
Control Delay	31.6	6.2	15.3	3.2	61.4	48.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	6.2	15.3	3.2	61.4	48.1
Queue Length 50th (m)	10.5	33.1	92.3	2.6	50.3	46.1
Queue Length 95th (m)	24.4	41.3	116.2	4.2	58.7	64.9
Internal Link Dist (m)		401.7	707.1		131.1	
Turn Bay Length (m)	130.0			90.0	185.0	
Base Capacity (vph)	176	3435	3000	1103	867	376
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.30	0.84	0.15	0.42	0.44

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

42: Colonel William Pkwy/Avenue Three & Dundas St W

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	1152	93	104	2205	251	242	11	62	425	30	181
v/c Ratio	0.50	0.51	0.11	0.40	0.93	0.27	0.84	0.03	0.15	0.94	0.05	0.32
Control Delay	38.4	16.3	0.4	19.7	35.5	11.9	77.5	40.5	0.8	75.9	33.5	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	16.3	0.4	19.7	35.5	11.9	77.5	40.5	0.8	75.9	33.5	19.2
Queue Length 50th (m)	5.2	70.7	0.2	10.9	191.5	15.9	64.3	2.4	0.0	110.5	5.6	14.8
Queue Length 95th (m)	22.6	81.5	0.9	m14.9	#301.3	m24.9	92.0	7.4	0.0	#145.6	m12.0	37.3
Internal Link Dist (m)		707.1			504.0			309.6			458.6	
Turn Bay Length (m)	60.0		100.0	60.0		75.0	30.0		30.0	20.0		20.0
Base Capacity (vph)	143	2237	845	284	2370	932	350	493	477	453	690	640
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.51	0.11	0.37	0.93	0.27	0.69	0.02	0.13	0.94	0.04	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

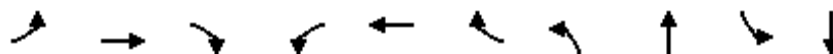
m Volume for 95th percentile queue is metered by upstream signal.

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

44: Valleyridge Dr/Avenue Five & Dundas St W

07-07-2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	1525	65	44	2373	125	61	29	319	142
v/c Ratio	0.32	0.52	0.06	0.22	0.79	0.11	0.32	0.20	0.70	0.50
Control Delay	23.7	11.9	0.8	8.7	16.4	2.6	48.8	27.8	66.1	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	11.9	0.8	8.7	16.4	2.6	48.8	27.8	66.1	19.0
Queue Length 50th (m)	3.0	66.2	0.2	3.4	91.2	2.0	13.2	1.1	45.4	3.4
Queue Length 95th (m)	m12.4	m98.7	m1.6	m4.0	m98.1	m2.4	24.5	11.2	60.2	24.9
Internal Link Dist (m)		504.0			219.0			321.0		401.3
Turn Bay Length (m)	55.0		75.0	25.0		25.0	20.0		90.0	
Base Capacity (vph)	142	2924	1089	202	3011	1110	237	400	500	545
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.52	0.06	0.22	0.79	0.11	0.26	0.07	0.64	0.26

Intersection Summary

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

Queues

<2030 Phase 2 FT Sensi.> PM Peak Hour

46: Bronte Rd & Dundas St W

07-07-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	218	1150	614	292	1600	300	629	1300	207	718	1300	261
v/c Ratio	0.93	0.95	0.73	0.95	0.97	0.51	0.92	0.94	0.43	1.03	0.94	0.48
Control Delay	84.4	72.0	21.6	78.9	62.5	25.6	73.8	63.6	19.6	76.4	57.3	21.4
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.4	72.0	21.7	78.9	62.5	25.6	73.8	63.6	19.6	76.4	57.3	21.4
Queue Length 50th (m)	43.9	141.0	91.9	64.2	159.9	39.5	88.6	129.6	17.6	~110.5	133.7	33.6
Queue Length 95th (m)	#91.1	#168.1	131.5	#120.8	#192.4	68.0	#120.4	#157.8	41.0 m	#140.1	#160.9	m41.1
Internal Link Dist (m)	219.0				753.0				338.5		256.3	
Turn Bay Length (m)	95.0			80.0	115.0			40.0	190.0			45.0
Base Capacity (vph)	235	1216	840	307	1652	587	694	1382	483	694	1377	544
Starvation Cap Reductn	0	0	6	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	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	0
Reduced v/c Ratio	0.93	0.95	0.74	0.95	0.97	0.51	0.91	0.94	0.43	1.03	0.94	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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.

HCM Unsignalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> PM Peak Hour 4: Avenue Two & Avenue One

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↖	↗
Traffic Volume (veh/h)	46	4	82	179	12	63
Future Volume (Veh/h)	46	4	82	179	12	63
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	46	4	82	179	12	63
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			50	391		48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			50	391		48
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			95	98		94
cM capacity (veh/h)			1557	581		1021
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	50	261	12	63		
Volume Left	0	82	12	0		
Volume Right	4	0	0	63		
cSH	1700	1557	581	1021		
Volume to Capacity	0.03	0.05	0.02	0.06		
Queue Length 95th (m)	0.0	1.3	0.5	1.5		
Control Delay (s)	0.0	2.6	11.3	8.8		
Lane LOS	A		B	A		
Approach Delay (s)	0.0	2.6	9.2			
Approach LOS						
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			30.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> PM Peak Hour 8: Avenue Five & Avenue One

07-07-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↘	↱	↘	↗
Traffic Volume (veh/h)	691	49	79	235	18	90
Future Volume (Veh/h)	691	49	79	235	18	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	691	49	79	235	18	90
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			740		1108	716
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			740		1108	716
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		91	79
cM capacity (veh/h)			867		211	430
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	740	79	235	18	90	
Volume Left	0	79	0	18	0	
Volume Right	49	0	0	0	90	
cSH	1700	867	1700	211	430	
Volume to Capacity	0.44	0.09	0.14	0.09	0.21	
Queue Length 95th (m)	0.0	2.3	0.0	2.1	5.9	
Control Delay (s)	0.0	9.6	0.0	23.7	15.6	
Lane LOS		A		C	C	
Approach Delay (s)	0.0	2.4		16.9		
Approach LOS				C		
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			57.0%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <2030 Phase 2 FT Sensi.> PM Peak Hour 31: Avenue two & Street Four

07-07-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	263	77	107	158	37	268
Future Volume (Veh/h)	263	77	107	158	37	268
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	263	77	107	158	37	268
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	449	107			265	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	449	107			265	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	52	92			97	
cM capacity (veh/h)	551	947			1299	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	263	77	107	158	305	
Volume Left	263	0	0	0	37	
Volume Right	0	77	0	158	0	
cSH	551	947	1700	1700	1299	
Volume to Capacity	0.48	0.08	0.06	0.09	0.03	
Queue Length 95th (m)	19.4	2.0	0.0	0.0	0.7	
Control Delay (s)	17.3	9.1	0.0	0.0	1.2	
Lane LOS	C	A			A	
Approach Delay (s)	15.5		0.0		1.2	
Approach LOS	C					
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization			44.1%		ICU Level of Service	A
Analysis Period (min)			15			

2030 Phase 2A Future Total AM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	355	0	1095	2514	0
Future Volume (vph)	167	355	0	1095	2514	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.92	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3171	1457		4902	3444	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3171	1457		4902	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	355	0	1095	2514	0
RTOR Reduction (vph)	11	11	0	0	0	0
Lane Group Flow (vph)	334	166	0	1095	2514	0
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	18.4	18.4		109.6	109.6	
Effective Green, g (s)	18.4	18.4		109.6	109.6	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	416	191		3837	2696	
v/s Ratio Prot	0.11			0.22	c0.73	
v/s Ratio Perm		c0.11				
v/c Ratio	0.80	0.87		0.29	0.93	
Uniform Delay, d1	59.0	59.6		4.3	12.2	
Progression Factor	1.00	1.00		0.37	1.00	
Incremental Delay, d2	11.2	32.2		0.2	7.4	
Delay (s)	70.3	91.8		1.8	19.6	
Level of Service	E	F		A	B	
Approach Delay (s)	77.6			1.8	19.6	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay		22.2		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.92				
Actuated Cycle Length (s)		140.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		94.1%		ICU Level of Service		F
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Tremaine Rd & Avenue One

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	50	20	9	45	3	90	660	52	22	918	0
Future Volume (vph)	0	50	20	9	45	3	90	660	52	22	918	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.99		1.00	0.99		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803		1789	1866		1789	3539		1789	3579	
Flt Permitted		1.00		0.71	1.00		0.31	1.00		0.38	1.00	
Satd. Flow (perm)		1803		1340	1866		582	3539		718	3579	
Peak-hour factor, PHF	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. Flow (vph)	0	50	20	9	45	3	90	660	52	22	918	0
RTOR Reduction (vph)	0	18	0	0	3	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	52	0	9	45	0	90	708	0	22	918	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Effective Green, g (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Actuated g/C Ratio		0.09		0.09	0.09		0.71	0.71		0.71	0.71	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		154		114	159		415	2527		512	2556	
v/s Ratio Prot		c0.03			0.02			0.20			c0.26	
v/s Ratio Perm				0.01			0.15			0.03		
v/c Ratio		0.34		0.08	0.28		0.22	0.28		0.04	0.36	
Uniform Delay, d1		30.1		29.5	30.0		3.4	3.6		2.9	3.8	
Progression Factor		1.00		1.05	1.02		1.49	1.50		1.00	1.00	
Incremental Delay, d2		1.3		0.3	1.0		1.0	0.2		0.2	0.4	
Delay (s)		31.4		31.1	31.6		6.1	5.6		3.1	4.2	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		31.4			31.6			5.7			4.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.7					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		70.0					Sum of lost time (s)		14.0			
Intersection Capacity Utilization		59.5%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 4: Avenue Two & Avenue One

<2030 Phase 2A FT> AM Peak Hour
07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↙	↗
Traffic Volume (veh/h)	58	16	40	10	2	230
Future Volume (Veh/h)	58	16	40	10	2	230
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	58	16	40	10	2	230
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			74	156		66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			74	156		66
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			97	100		77
cM capacity (veh/h)			1526	813		998
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	74	50	2	230		
Volume Left	0	40	2	0		
Volume Right	16	0	0	230		
cSH	1700	1526	813	998		
Volume to Capacity	0.04	0.03	0.00	0.23		
Queue Length 95th (m)	0.0	0.6	0.1	6.8		
Control Delay (s)	0.0	6.0	9.4	9.7		
Lane LOS	A		A	A		
Approach Delay (s)	0.0	6.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			7.1			
Intersection Capacity Utilization			24.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Avenue Three & Avenue One

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↘	↑	↘	↑
Traffic Volume (vph)	0	149	0	0	1037	0
Future Volume (vph)	0	149	0	0	1037	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	
Lane Util. Factor		1.00			1.00	
Frt		0.85			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		1601			1789	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		1601			1789	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	149	0	0	1037	0
RTOR Reduction (vph)	0	121	0	0	0	0
Lane Group Flow (vph)	0	28	0	0	1037	0
Turn Type		Perm	Perm		Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)		26.0			100.0	
Effective Green, g (s)		26.0			100.0	
Actuated g/C Ratio		0.19			0.71	
Clearance Time (s)		7.0			7.0	
Vehicle Extension (s)		3.0			3.0	
Lane Grp Cap (vph)		297			1277	
v/s Ratio Prot					0.58	
v/s Ratio Perm		0.02				
v/c Ratio		0.09			0.81	
Uniform Delay, d1		47.2			13.6	
Progression Factor		1.00			1.31	
Incremental Delay, d2		0.6			3.2	
Delay (s)		47.9			21.1	
Level of Service		D			C	
Approach Delay (s)	47.9			0.0	21.1	
Approach LOS	D			A	C	
Intersection Summary						
HCM 2000 Control Delay		24.4		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.66				
Actuated Cycle Length (s)		140.0		Sum of lost time (s)		14.0
Intersection Capacity Utilization		63.3%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

8: Avenue Five & Avenue One

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	↗
Traffic Volume (veh/h)	0	8	151	0	164	145
Future Volume (Veh/h)	0	8	151	0	164	145
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	8	151	0	164	145
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			8		306	4
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			8		306	4
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		74	87
cM capacity (veh/h)			1612		622	1080
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	8	151	0	164	145	
Volume Left	0	151	0	164	0	
Volume Right	8	0	0	0	145	
cSH	1700	1612	1700	622	1080	
Volume to Capacity	0.00	0.09	0.00	0.26	0.13	
Queue Length 95th (m)	0.0	2.4	0.0	8.0	3.5	
Control Delay (s)	0.0	7.5	0.0	12.9	8.9	
Lane LOS		A		B	A	
Approach Delay (s)	0.0	7.5		11.0		
Approach LOS				B		
Intersection Summary						
Average Delay			9.7			
Intersection Capacity Utilization			30.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2A FT> AM Peak Hour
07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	49	363	1596	2663	206
Future Volume (vph)	32	49	363	1596	2663	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	32	49	363	1596	2663	206
RTOR Reduction (vph)	0	46	0	0	0	68
Lane Group Flow (vph)	32	3	363	1596	2663	138
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	8.2	8.2	20.3	117.8	93.5	93.5
Effective Green, g (s)	8.2	8.2	20.3	117.8	93.5	93.5
Actuated g/C Ratio	0.06	0.06	0.15	0.84	0.67	0.67
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	104	93	503	4326	3434	1069
v/s Ratio Prot	c0.02		c0.10	0.31	c0.52	
v/s Ratio Perm		0.00				0.09
v/c Ratio	0.31	0.03	0.72	0.37	0.78	0.13
Uniform Delay, d1	63.2	62.2	57.2	2.6	16.0	8.4
Progression Factor	1.00	1.00	1.27	0.50	0.98	1.78
Incremental Delay, d2	1.7	0.1	3.8	0.2	0.7	0.1
Delay (s)	64.9	62.3	76.5	1.5	16.4	15.2
Level of Service	E	E	E	A	B	B
Approach Delay (s)	63.3			15.4	16.3	
Approach LOS	E			B	B	
Intersection Summary						
HCM 2000 Control Delay			16.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			85.1%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

20: Tremaine Rd & Burnhamthorpe Road

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	65	20	80	10	14	95	788	483	89	858	10
Future Volume (vph)	0	65	20	80	10	14	95	788	483	89	858	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.91		1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817		1789	1719		1789	3375		1789	3572	
Flt Permitted		1.00		0.70	1.00		0.32	1.00		0.19	1.00	
Satd. Flow (perm)		1817		1322	1719		605	3375		354	3572	
Peak-hour factor, PHF	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. Flow (vph)	0	65	20	80	10	14	95	788	483	89	858	10
RTOR Reduction (vph)	0	17	0	0	12	0	0	75	0	0	1	0
Lane Group Flow (vph)	0	68	0	80	12	0	95	1196	0	89	867	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0		9.0	9.0		47.0	47.0		47.0	47.0	
Effective Green, g (s)		9.0		9.0	9.0		47.0	47.0		47.0	47.0	
Actuated g/C Ratio		0.13		0.13	0.13		0.67	0.67		0.67	0.67	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		233		169	221		406	2266		237	2398	
v/s Ratio Prot		0.04			0.01			c0.35			0.24	
v/s Ratio Perm				c0.06			0.16			0.25		
v/c Ratio		0.29		0.47	0.05		0.23	0.53		0.38	0.36	
Uniform Delay, d1		27.6		28.3	26.8		4.5	5.9		5.1	5.0	
Progression Factor		1.00		0.97	1.03		1.83	2.81		0.80	0.82	
Incremental Delay, d2		0.7		2.1	0.1		0.8	0.5		4.3	0.4	
Delay (s)		28.3		29.6	27.6		9.0	17.0		8.4	4.5	
Level of Service		C		C	C		A	B		A	A	
Approach Delay (s)		28.3			29.2			16.4			4.8	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			74.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

22: Avenue two & Burnhamthorpe Road

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	522	19	87	307	504	65	109	132	94	20	15
Future Volume (vph)	87	522	19	87	307	504	65	109	132	94	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.56	1.00	1.00	0.46	1.00	1.00	0.74	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1064	3579	1601	864	3579	1601	1402	1883	1601	1293	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	87	522	19	87	307	504	65	109	132	94	20	15
RTOR Reduction (vph)	0	0	6	0	0	170	0	0	114	0	0	13
Lane Group Flow (vph)	87	522	13	87	307	334	65	109	18	94	20	2
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	46.4	46.4	46.4	46.4	46.4	46.4	9.6	9.6	9.6	9.6	9.6	9.6
Effective Green, g (s)	46.4	46.4	46.4	46.4	46.4	46.4	9.6	9.6	9.6	9.6	9.6	9.6
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.14	0.14	0.14	0.14	0.14	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	705	2372	1061	572	2372	1061	192	258	219	177	258	219
v/s Ratio Prot		0.15			0.09			0.06			0.01	
v/s Ratio Perm	0.08		0.01	0.10		c0.21	0.05		0.01	c0.07		0.00
v/c Ratio	0.12	0.22	0.01	0.15	0.13	0.31	0.34	0.42	0.08	0.53	0.08	0.01
Uniform Delay, d1	4.3	4.7	4.0	4.4	4.4	5.0	27.3	27.7	26.4	28.1	26.3	26.1
Progression Factor	1.29	1.33	1.00	1.91	1.88	12.66	1.12	1.11	2.08	1.07	1.08	1.00
Incremental Delay, d2	0.3	0.2	0.0	0.5	0.1	0.7	1.0	1.1	0.2	3.0	0.1	0.0
Delay (s)	5.9	6.4	4.0	8.9	8.3	64.3	31.7	31.7	54.9	32.9	28.5	26.1
Level of Service	A	A	A	A	A	E	C	C	D	C	C	C
Approach Delay (s)		6.2			39.8			41.7			31.4	
Approach LOS		A			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			28.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			65.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Avenue Three & Burnhamthorpe Road

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	515	21	94	1199	751	58	79	185	107	11	31
Future Volume (vph)	207	515	21	94	1199	751	58	79	185	107	11	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3558		1789	3579	1601	1789	1883	1601	3471	1675	
Flt Permitted	0.17	1.00		0.45	1.00	1.00	0.73	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	324	3558		852	3579	1601	1374	1883	1601	3471	1675	
Peak-hour factor, PHF	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. Flow (vph)	207	515	21	94	1199	751	58	79	185	107	11	31
RTOR Reduction (vph)	0	2	0	0	0	82	0	0	169	0	26	0
Lane Group Flow (vph)	207	534	0	94	1199	669	58	79	16	107	16	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8		8			
Actuated Green, G (s)	102.7	102.7		88.6	88.6	88.6	12.3	12.3	12.3	7.0	23.3	
Effective Green, g (s)	102.7	102.7		88.6	88.6	88.6	12.3	12.3	12.3	7.0	23.3	
Actuated g/C Ratio	0.73	0.73		0.63	0.63	0.63	0.09	0.09	0.09	0.05	0.17	
Clearance Time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	343	2610		539	2264	1013	120	165	140	173	278	
v/s Ratio Prot	c0.04	0.15			0.34			0.04		c0.03	0.01	
v/s Ratio Perm	0.40			0.11		c0.42	c0.04		0.01			
v/c Ratio	0.60	0.20		0.17	0.53	0.66	0.48	0.48	0.12	0.62	0.06	
Uniform Delay, d1	9.7	5.8		10.6	14.2	16.2	60.8	60.8	58.8	65.2	49.1	
Progression Factor	1.46	1.15		1.63	1.49	1.59	0.97	0.97	1.05	1.00	1.02	
Incremental Delay, d2	3.0	0.2		0.4	0.5	1.8	2.9	2.1	0.4	6.4	0.1	
Delay (s)	17.1	6.9		17.7	21.7	27.6	62.0	61.4	61.9	71.5	50.3	
Level of Service	B	A		B	C	C	E	E	E	E	D	
Approach Delay (s)		9.8			23.7			61.8			65.5	
Approach LOS		A			C			E			E	
Intersection Summary												
HCM 2000 Control Delay		26.2				HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		140.0				Sum of lost time (s)		22.0				
Intersection Capacity Utilization		81.3%				ICU Level of Service		D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

26: Avenue Five & Burnhamthorpe Road

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	342	433	24	101	1921	293	102	76	54	41	13	104
Future Volume (vph)	342	433	24	101	1921	293	102	76	54	41	13	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3550		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.05	1.00		0.49	1.00	1.00	0.75	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	94	3550		920	3579	1601	1411	1883	1601	1333	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	342	433	24	101	1921	293	102	76	54	41	13	104
RTOR Reduction (vph)	0	2	0	0	0	47	0	0	48	0	0	92
Lane Group Flow (vph)	342	455	0	101	1921	246	102	76	6	41	13	12
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	110.3	110.3		76.0	76.0	76.0	15.7	15.7	15.7	15.7	15.7	15.7
Effective Green, g (s)	110.3	110.3		76.0	76.0	76.0	15.7	15.7	15.7	15.7	15.7	15.7
Actuated g/C Ratio	0.79	0.79		0.54	0.54	0.54	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	440	2796		499	1942	869	158	211	179	149	211	179
v/s Ratio Prot	c0.17	0.13			c0.54			0.04			0.01	
v/s Ratio Perm	0.44			0.11		0.15	c0.07		0.00	0.03		0.01
v/c Ratio	0.78	0.16		0.20	0.99	0.28	0.65	0.36	0.03	0.28	0.06	0.07
Uniform Delay, d1	44.5	3.6		16.4	31.6	17.3	59.5	57.5	55.4	56.9	55.6	55.6
Progression Factor	1.08	0.98		0.85	1.22	1.05	0.83	0.82	1.13	0.48	0.46	0.61
Incremental Delay, d2	8.2	0.1		0.1	4.1	0.1	8.2	1.0	0.1	0.9	0.1	0.1
Delay (s)	56.2	3.7		14.1	42.8	18.2	57.7	48.2	62.5	28.3	25.8	34.3
Level of Service	E	A		B	D	B	E	D	E	C	C	C
Approach Delay (s)		26.2			38.4			55.7			32.0	
Approach LOS		C			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			36.5									D
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			140.0									18.0
Intersection Capacity Utilization			99.4%									F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

<2030 Phase 2A FT> AM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	103	245	77	548	180	1438	1621	269	492	1757	463
Future Volume (vph)	158	103	245	77	548	180	1438	1621	269	492	1757	463
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.16	1.00	1.00	0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	302	3579	1601	1320	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	158	103	245	77	548	180	1438	1621	269	492	1757	463
RTOR Reduction (vph)	0	0	0	0	0	63	0	0	147	0	0	81
Lane Group Flow (vph)	158	103	245	77	548	117	1438	1621	122	492	1757	382
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	Free	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases	4		Free	8		8			2			6
Actuated Green, G (s)	37.4	37.4	140.0	25.4	25.4	46.3	35.6	63.7	63.7	20.9	49.0	49.0
Effective Green, g (s)	37.4	37.4	140.0	25.4	25.4	46.3	35.6	63.7	63.7	20.9	49.0	49.0
Actuated g/C Ratio	0.27	0.27	1.00	0.18	0.18	0.33	0.25	0.46	0.46	0.15	0.35	0.35
Clearance Time (s)	4.0	7.0		7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	165	956	1601	239	649	540	882	2386	743	528	1835	560
v/s Ratio Prot	c0.05	0.03			0.15	0.03	c0.41	0.31		0.14	c0.34	
v/s Ratio Perm	c0.20		0.15	0.06		0.04			0.07			0.24
v/c Ratio	0.96	0.11	0.15	0.32	0.84	0.22	1.63	0.68	0.16	0.93	0.96	0.68
Uniform Delay, d1	46.3	38.7	0.0	49.8	55.4	33.8	52.2	30.1	22.5	58.8	44.5	38.8
Progression Factor	1.11	1.03	1.00	1.00	1.00	1.00	0.62	1.03	2.38	1.09	0.94	0.93
Incremental Delay, d2	56.7	0.0	0.2	0.8	9.8	0.2	284.1	0.1	0.0	17.0	9.4	4.3
Delay (s)	107.9	39.9	0.2	50.6	65.2	34.0	316.5	31.2	53.6	81.3	51.1	40.4
Level of Service	F	D	A	D	E	C	F	C	D	F	D	D
Approach Delay (s)		41.9			56.8			156.3			54.8	
Approach LOS		D			E			F			D	
Intersection Summary												
HCM 2000 Control Delay			100.1				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			117.2%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

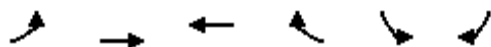
31: Avenue two & Street Four

<2030 Phase 2A FT> AM Peak Hour
07-08-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	51	19	287	191	71	55
Future Volume (Veh/h)	51	19	287	191	71	55
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	51	19	287	191	71	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	484	287			478	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	287			478	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	97			93	
cM capacity (veh/h)	506	752			1084	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	51	19	287	191	126	
Volume Left	51	0	0	0	71	
Volume Right	0	19	0	191	0	
cSH	506	752	1700	1700	1084	
Volume to Capacity	0.10	0.03	0.17	0.11	0.07	
Queue Length 95th (m)	2.5	0.6	0.0	0.0	1.6	
Control Delay (s)	12.9	9.9	0.0	0.0	5.1	
Lane LOS	B	A			A	
Approach Delay (s)	12.1		0.0		5.1	
Approach LOS	B					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			35.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2030 Phase 2A FT> AM Peak Hour
07-08-2020

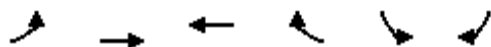


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	1182	3202	1057	184	375	583
Future Volume (vph)	1182	3202	1057	184	375	583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1613
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4117	1570	3541	1613
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1182	3202	1057	184	375	583
RTOR Reduction (vph)	0	0	0	85	0	0
Lane Group Flow (vph)	1182	3202	1057	99	375	583
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	53.5	106.3	48.8	48.8	19.7	140.0
Effective Green, g (s)	54.5	110.3	52.8	52.8	23.7	140.0
Actuated g/C Ratio	0.39	0.79	0.38	0.38	0.17	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	1364	3526	1552	592	599	1613
v/s Ratio Prot	0.34	c0.72	0.26		c0.11	
v/s Ratio Perm				0.06		0.36
v/c Ratio	0.87	0.91	0.68	0.17	0.63	0.36
Uniform Delay, d1	39.4	11.1	36.5	29.0	54.0	0.0
Progression Factor	1.00	1.00	0.83	1.08	1.10	1.00
Incremental Delay, d2	6.0	4.5	2.3	0.6	1.7	0.6
Delay (s)	45.4	15.6	32.6	32.0	61.3	0.6
Level of Service	D	B	C	C	E	A
Approach Delay (s)		23.7	32.5		24.4	
Approach LOS		C	C		C	
Intersection Summary						
HCM 2000 Control Delay			25.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			79.9%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue two

<2030 Phase 2A FT> AM Peak Hour
07-08-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	161	3416	1238	317	72	34
Future Volume (vph)	161	3416	1238	317	72	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3466	1457
Flt Permitted	0.16	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	304	4520	4520	1601	3466	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	161	3416	1238	317	72	34
RTOR Reduction (vph)	0	0	0	77	3	29
Lane Group Flow (vph)	161	3416	1238	240	72	2
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	117.9	117.9	106.1	106.1	8.1	8.1
Effective Green, g (s)	117.9	117.9	106.1	106.1	8.1	8.1
Actuated g/C Ratio	0.84	0.84	0.76	0.76	0.06	0.06
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	338	3806	3425	1213	200	84
v/s Ratio Prot	0.03	c0.76	0.27		c0.02	
v/s Ratio Perm	0.37			0.15		0.00
v/c Ratio	0.48	0.90	0.36	0.20	0.36	0.02
Uniform Delay, d1	2.7	7.1	5.7	4.8	63.5	62.2
Progression Factor	0.55	0.80	1.56	5.98	0.99	1.19
Incremental Delay, d2	0.5	1.7	0.3	0.3	1.1	0.1
Delay (s)	1.9	7.5	9.1	29.2	64.2	74.1
Level of Service	A	A	A	C	E	E
Approach Delay (s)		7.2	13.2		67.1	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Avenue Three & Dundas St W

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	147	2992	262	58	1452	363	83	33	168	76	6	20
Future Volume (vph)	147	2992	262	58	1452	363	83	33	168	76	6	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1601	1674	4117	1570	1768	1921	1517	1555	1921	1610
Flt Permitted	0.12	1.00	1.00	0.04	1.00	1.00	0.75	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	220	4476	1601	71	4117	1570	1403	1921	1517	1204	1921	1610
Peak-hour factor, PHF	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. Flow (vph)	147	2992	262	58	1452	363	83	33	168	76	6	20
RTOR Reduction (vph)	0	0	49	0	0	103	0	0	81	0	0	18
Lane Group Flow (vph)	147	2992	213	58	1452	260	83	33	87	76	6	2
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	110.1	101.7	101.7	105.1	99.2	99.2	15.0	15.0	15.0	15.0	15.0	15.0
Effective Green, g (s)	110.1	101.7	101.7	105.1	99.2	99.2	15.0	15.0	15.0	15.0	15.0	15.0
Actuated g/C Ratio	0.79	0.73	0.73	0.75	0.71	0.71	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	0.2
Lane Grp Cap (vph)	268	3251	1163	120	2917	1112	150	205	162	129	205	172
v/s Ratio Prot	c0.03	c0.67		0.02	0.35			0.02			0.00	
v/s Ratio Perm	0.40		0.13	0.34		0.17	0.06		0.06	c0.06		0.00
v/c Ratio	0.55	0.92	0.18	0.48	0.50	0.23	0.55	0.16	0.54	0.59	0.03	0.01
Uniform Delay, d1	5.7	15.8	6.0	30.4	9.2	7.1	59.3	56.8	59.2	59.6	56.0	55.9
Progression Factor	1.75	0.81	1.47	1.37	1.05	2.65	1.00	1.00	1.00	0.90	0.91	1.00
Incremental Delay, d2	0.9	2.9	0.2	2.3	0.5	0.4	4.8	0.4	3.8	4.3	0.0	0.0
Delay (s)	10.8	15.7	9.1	43.8	10.1	19.3	64.1	57.2	63.0	58.0	50.9	55.9
Level of Service	B	B	A	D	B	B	E	E	E	E	D	E
Approach Delay (s)		15.0			12.9			62.7			57.2	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			17.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			95.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		 		
Traffic Volume (vph)	128	3169	106	33	1822	346	88	17	84	64	2	24
Future Volume (vph)	128	3169	106	33	1822	346	88	17	84	64	2	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	4391	1633	1772	4117	1601	1722	1609		3471	1623	
Flt Permitted	0.06	1.00	1.00	0.05	1.00	1.00	0.48	1.00		0.95	1.00	
Satd. Flow (perm)	102	4391	1633	84	4117	1601	863	1609		3471	1623	
Peak-hour factor, PHF	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. Flow (vph)	128	3169	106	33	1822	346	88	17	84	64	2	24
RTOR Reduction (vph)	0	0	29	0	0	38	0	76	0	0	23	0
Lane Group Flow (vph)	128	3169	77	33	1822	308	88	25	0	64	3	0
Heavy Vehicles (%)	4%	5%	0%	3%	12%	2%	6%	2%	5%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	104.0	96.1	96.1	92.7	88.8	88.8	22.0	13.2		4.8	7.2	
Effective Green, g (s)	104.0	96.1	96.1	92.7	88.8	88.8	22.0	13.2		4.8	7.2	
Actuated g/C Ratio	0.74	0.69	0.69	0.66	0.63	0.63	0.16	0.09		0.03	0.05	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	208	3014	1120	102	2611	1015	201	151		119	83	
v/s Ratio Prot	c0.05	c0.72		0.01	0.44		c0.03	0.02		0.02	0.00	
v/s Ratio Perm	0.41		0.05	0.20		0.19	c0.03					
v/c Ratio	0.62	1.05	0.07	0.32	0.70	0.30	0.44	0.17		0.54	0.04	
Uniform Delay, d1	25.7	22.0	7.2	34.3	16.8	11.6	52.5	58.3		66.5	63.1	
Progression Factor	1.29	0.80	1.77	2.30	0.79	0.93	1.00	1.00		0.82	1.28	
Incremental Delay, d2	2.9	28.4	0.1	0.2	0.1	0.1	1.5	1.1		4.6	0.2	
Delay (s)	36.0	45.9	12.9	78.9	13.4	10.9	54.0	59.4		59.0	80.7	
Level of Service	D	D	B	E	B	B	D	E		E	F	
Approach Delay (s)		44.5			14.0			56.9			65.3	
Approach LOS		D			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			33.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			92.8%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2A FT> AM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	2325	562	198	1317	760	621	2238	322	314	1409	169
Future Volume (vph)	330	2325	562	198	1317	760	621	2238	322	314	1409	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1568	1508	4683	1555	3079	4902	1512	3404	4902	1541
Flt Permitted	0.08	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	486	4476	1568	141	4683	1555	3079	4902	1512	3404	4902	1541
Peak-hour factor, PHF	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. Flow (vph)	330	2325	562	198	1317	760	621	2238	322	314	1409	169
RTOR Reduction (vph)	0	0	31	0	0	52	0	0	52	0	0	33
Lane Group Flow (vph)	330	2325	531	198	1317	708	621	2238	270	314	1409	136
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	3%	3%	3%	21%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	61.0	49.0	63.0	52.0	44.0	57.0	14.0	48.0	56.0	13.0	47.0	60.0
Effective Green, g (s)	62.0	52.0	69.0	54.0	47.0	63.0	15.0	51.0	62.0	14.0	50.0	66.0
Actuated g/C Ratio	0.44	0.37	0.49	0.39	0.34	0.45	0.11	0.36	0.44	0.10	0.36	0.47
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	2.5	2.5	4.0	2.5	2.5	4.0	2.5
Lane Grp Cap (vph)	329	1662	772	142	1572	699	329	1785	669	340	1750	726
v/s Ratio Prot	c0.10	c0.52	0.08	c0.09	0.28	0.12	c0.20	c0.46	0.03	0.09	0.29	0.02
v/s Ratio Perm	0.34		0.25	0.45		0.34			0.15			0.07
v/c Ratio	1.00	1.40	0.69	1.39	0.84	1.01	1.89	1.25	0.40	0.92	0.81	0.19
Uniform Delay, d1	39.0	44.0	27.2	35.9	43.0	38.5	62.5	44.5	26.4	62.5	40.6	21.5
Progression Factor	0.94	0.94	0.61	1.00	1.00	1.00	1.00	1.00	1.00	0.51	1.04	1.94
Incremental Delay, d2	26.7	180.6	0.7	214.5	5.5	37.4	410.7	119.0	0.3	18.7	1.6	0.0
Delay (s)	63.4	222.1	17.3	250.5	48.5	75.9	473.2	163.5	26.7	50.2	43.6	41.7
Level of Service	E	F	B	F	D	E	F	F	C	D	D	D
Approach Delay (s)		170.0			75.2			210.1			44.5	
Approach LOS		F			E			F			D	
Intersection Summary												
HCM 2000 Control Delay			139.2				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.41									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			121.4%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

2030 Phase 2A Future Total PM

HCM Signalized Intersection Capacity Analysis

1: Bronte Rd & 407 Off Ramp

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	122	0	2370	1231	0
Future Volume (vph)	111	122	0	2370	1231	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.95	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3346	1457		5142	3579	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3346	1457		5142	3579	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	122	0	2370	1231	0
RTOR Reduction (vph)	40	67	0	0	0	0
Lane Group Flow (vph)	120	6	0	2370	1231	0
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.3	11.3		116.7	116.7	
Effective Green, g (s)	11.3	11.3		116.7	116.7	
Actuated g/C Ratio	0.08	0.08		0.83	0.83	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	270	117		4286	2983	
v/s Ratio Prot	c0.04			c0.46	0.34	
v/s Ratio Perm		0.00				
v/c Ratio	0.45	0.05		0.55	0.41	
Uniform Delay, d1	61.4	59.4		3.6	3.0	
Progression Factor	1.00	1.00		0.37	1.00	
Incremental Delay, d2	1.6	0.2		0.4	0.4	
Delay (s)	63.0	59.6		1.7	3.4	
Level of Service	E	E		A	A	
Approach Delay (s)	61.9			1.7	3.4	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay			5.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			60.8%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Tremaine Rd & Avenue One

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	65	40	39	55	16	50	677	14	5	821	0
Future Volume (vph)	5	65	40	39	55	16	50	677	14	5	821	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1776		1789	1820		1789	3568		1789	3579	
Flt Permitted	0.71	1.00		0.69	1.00		0.34	1.00		0.39	1.00	
Satd. Flow (perm)	1339	1776		1298	1820		643	3568		732	3579	
Peak-hour factor, PHF	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. Flow (vph)	5	65	40	39	55	16	50	677	14	5	821	0
RTOR Reduction (vph)	0	35	0	0	14	0	0	1	0	0	0	0
Lane Group Flow (vph)	5	70	0	39	57	0	50	690	0	5	821	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.4	8.4		8.4	8.4		47.6	47.6		47.6	47.6	
Effective Green, g (s)	8.4	8.4		8.4	8.4		47.6	47.6		47.6	47.6	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.68	0.68		0.68	0.68	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	160	213		155	218		437	2426		497	2433	
v/s Ratio Prot		c0.04			0.03			0.19			c0.23	
v/s Ratio Perm	0.00			0.03			0.08			0.01		
v/c Ratio	0.03	0.33		0.25	0.26		0.11	0.28		0.01	0.34	
Uniform Delay, d1	27.2	28.2		27.9	28.0		3.9	4.4		3.6	4.7	
Progression Factor	1.00	1.00		1.05	1.04		1.80	1.77		1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.9	0.6		0.5	0.3		0.0	0.4	
Delay (s)	27.3	29.1		30.2	29.8		7.5	8.1		3.6	5.0	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		29.0			30.0			8.1			5.0	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.3				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			57.4%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Avenue Two & Avenue One

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↘	↗
Traffic Volume (veh/h)	15	4	173	43	12	61
Future Volume (Veh/h)	15	4	173	43	12	61
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	15	4	173	43	12	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			19		406	17
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			19		406	17
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		98	94
cM capacity (veh/h)			1597		536	1062
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	19	216	12	61		
Volume Left	0	173	12	0		
Volume Right	4	0	0	61		
cSH	1700	1597	536	1062		
Volume to Capacity	0.01	0.11	0.02	0.06		
Queue Length 95th (m)	0.0	2.8	0.5	1.4		
Control Delay (s)	0.0	6.2	11.9	8.6		
Lane LOS		A	B	A		
Approach Delay (s)	0.0	6.2	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			28.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Avenue Three & Avenue One

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↘	↑	↘	↑
Traffic Volume (vph)	0	882	0	0	214	0
Future Volume (vph)	0	882	0	0	214	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	
Lane Util. Factor		1.00			1.00	
Frt		0.85			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		1601			1789	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		1601			1789	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	882	0	0	214	0
RTOR Reduction (vph)	0	353	0	0	0	0
Lane Group Flow (vph)	0	529	0	0	214	0
Turn Type		Perm	Perm		Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)		42.0			14.0	
Effective Green, g (s)		42.0			14.0	
Actuated g/C Ratio		0.60			0.20	
Clearance Time (s)		7.0			7.0	
Vehicle Extension (s)		3.0			3.0	
Lane Grp Cap (vph)		960			357	
v/s Ratio Prot					c0.12	
v/s Ratio Perm		c0.33				
v/c Ratio		0.55			0.60	
Uniform Delay, d1		8.4			25.5	
Progression Factor		1.27			1.30	
Incremental Delay, d2		2.3			2.7	
Delay (s)		12.9			35.9	
Level of Service		B			D	
Approach Delay (s)	12.9			0.0	35.9	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay		17.4		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.56				
Actuated Cycle Length (s)		70.0		Sum of lost time (s)		14.0
Intersection Capacity Utilization		60.4%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 8: Avenue Five & Avenue One

<2030 Phase 2A FT> PM Peak Hour
07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	↗
Traffic Volume (veh/h)	0	115	144	0	6	140
Future Volume (Veh/h)	0	115	144	0	6	140
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	115	144	0	6	140
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			115		346	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			115		346	58
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		99	86
cM capacity (veh/h)			1474		588	1009
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	115	144	0	6	140	
Volume Left	0	144	0	6	0	
Volume Right	115	0	0	0	140	
cSH	1700	1474	1700	588	1009	
Volume to Capacity	0.07	0.10	0.00	0.01	0.14	
Queue Length 95th (m)	0.0	2.5	0.0	0.2	3.7	
Control Delay (s)	0.0	7.7	0.0	11.2	9.1	
Lane LOS		A		B	A	
Approach Delay (s)	0.0	7.7		9.2		
Approach LOS				A		
Intersection Summary						
Average Delay			6.1			
Intersection Capacity Utilization			24.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

10: Bronte Road & Avenue One

<2030 Phase 2A FT> PM Peak Hour
07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	182	326	72	2579	1503	48
Future Volume (vph)	182	326	72	2579	1503	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	4.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	182	326	72	2579	1503	48
RTOR Reduction (vph)	0	25	0	0	0	16
Lane Group Flow (vph)	182	301	72	2579	1503	32
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	19.5	28.7	9.2	106.5	93.3	93.3
Effective Green, g (s)	19.5	28.7	9.2	106.5	93.3	93.3
Actuated g/C Ratio	0.14	0.20	0.07	0.76	0.67	0.67
Clearance Time (s)	7.0	4.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	249	328	228	3911	3426	1066
v/s Ratio Prot	0.10	c0.06	0.02	c0.50	0.29	
v/s Ratio Perm		0.13				0.02
v/c Ratio	0.73	0.92	0.32	0.66	0.44	0.03
Uniform Delay, d1	57.7	54.5	62.4	8.0	11.0	7.9
Progression Factor	1.00	1.00	1.12	0.58	0.92	0.89
Incremental Delay, d2	10.5	29.0	0.5	0.5	0.4	0.0
Delay (s)	68.3	83.5	70.7	5.2	10.5	7.1
Level of Service	E	F	E	A	B	A
Approach Delay (s)	78.0			7.0	10.4	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay	15.8			HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio	0.73					
Actuated Cycle Length (s)	140.0			Sum of lost time (s)		18.0
Intersection Capacity Utilization	71.6%			ICU Level of Service		C
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

20: Tremaine Rd & Burnhamthorpe Road

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	60	429	25	86	15	645	131	33	892	0
Future Volume (vph)	10	30	60	429	25	86	15	645	131	33	892	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.88		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1695		1789	1665		1789	3488		1789	3579	
Flt Permitted	0.69	1.00		0.70	1.00		0.24	1.00		0.30	1.00	
Satd. Flow (perm)	1291	1695		1316	1665		456	3488		565	3579	
Peak-hour factor, PHF	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. Flow (vph)	10	30	60	429	25	86	15	645	131	33	892	0
RTOR Reduction (vph)	0	31	0	0	54	0	0	23	0	0	0	0
Lane Group Flow (vph)	10	59	0	429	57	0	15	753	0	33	892	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.2	26.2		26.2	26.2		29.8	29.8		29.8	29.8	
Effective Green, g (s)	26.2	26.2		26.2	26.2		29.8	29.8		29.8	29.8	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.43	0.43		0.43	0.43	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	483	634		492	623		194	1484		240	1523	
v/s Ratio Prot		0.04			0.03			0.22			c0.25	
v/s Ratio Perm	0.01			c0.33			0.03			0.06		
v/c Ratio	0.02	0.09		0.87	0.09		0.08	0.51		0.14	0.59	
Uniform Delay, d1	13.8	14.2		20.3	14.2		11.9	14.7		12.3	15.4	
Progression Factor	1.00	1.00		0.73	0.17		0.84	1.16		0.74	0.75	
Incremental Delay, d2	0.0	0.1		15.2	0.1		0.7	1.1		1.2	1.6	
Delay (s)	13.8	14.3		30.0	2.5		10.7	18.1		10.2	13.1	
Level of Service	B	B		C	A		B	B		B	B	
Approach Delay (s)		14.2			24.3			18.0			13.0	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			69.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

<2030 Phase 2A FT> PM Peak Hour

22: Avenue two & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	395	68	178	528	137	35	28	130	382	85	65
Future Volume (vph)	23	395	68	178	528	137	35	28	130	382	85	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.46	1.00	1.00	0.52	1.00	1.00	0.70	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	859	3579	1601	977	3579	1601	1322	1883	1601	1392	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	23	395	68	178	528	137	35	28	130	382	85	65
RTOR Reduction (vph)	0	0	36	0	0	73	0	0	87	0	0	43
Lane Group Flow (vph)	23	395	32	178	528	64	35	28	43	382	85	22
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	32.8	32.8	32.8	32.8	32.8	32.8	23.2	23.2	23.2	23.2	23.2	23.2
Effective Green, g (s)	32.8	32.8	32.8	32.8	32.8	32.8	23.2	23.2	23.2	23.2	23.2	23.2
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	402	1677	750	457	1677	750	438	624	530	461	624	530
v/s Ratio Prot		0.11			0.15			0.01			0.05	
v/s Ratio Perm	0.03		0.02	c0.18		0.04	0.03		0.03	c0.27		0.01
v/c Ratio	0.06	0.24	0.04	0.39	0.31	0.09	0.08	0.04	0.08	0.83	0.14	0.04
Uniform Delay, d1	10.2	11.1	10.1	12.1	11.6	10.3	16.1	15.9	16.1	21.6	16.4	15.9
Progression Factor	1.42	1.40	2.59	1.12	1.09	3.22	1.19	1.18	2.23	0.69	0.72	0.40
Incremental Delay, d2	0.3	0.3	0.1	2.4	0.5	0.2	0.1	0.0	0.1	11.7	0.1	0.0
Delay (s)	14.7	15.9	26.2	16.0	13.1	33.4	19.1	18.8	35.9	26.5	11.9	6.3
Level of Service	B	B	C	B	B	C	B	B	D	C	B	A
Approach Delay (s)		17.2			17.0			30.4			21.7	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			68.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

24: Avenue Three & Burnhamthorpe Road

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1133	85	168	670	155	75	16	103	638	67	177
Future Volume (vph)	43	1133	85	168	670	155	75	16	103	638	67	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3541		1789	3579	1601	1789	1883	1601	3471	1679	
Flt Permitted	0.40	1.00		0.09	1.00	1.00	0.61	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	748	3541		162	3579	1601	1144	1883	1601	3471	1679	
Peak-hour factor, PHF	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. Flow (vph)	43	1133	85	168	670	155	75	16	103	638	67	177
RTOR Reduction (vph)	0	3	0	0	0	34	0	0	92	0	79	0
Lane Group Flow (vph)	43	1215	0	168	670	121	75	16	11	638	165	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8		8			
Actuated Green, G (s)	60.9	60.9		78.9	78.9	78.9	14.9	14.9	14.9	28.2	47.1	
Effective Green, g (s)	60.9	60.9		78.9	78.9	78.9	14.9	14.9	14.9	28.2	47.1	
Actuated g/C Ratio	0.43	0.43		0.56	0.56	0.56	0.11	0.11	0.11	0.20	0.34	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	325	1540		253	2017	902	121	200	170	699	564	
v/s Ratio Prot		c0.34		c0.07	0.19			0.01		c0.18	0.10	
v/s Ratio Perm	0.06			0.31		0.08	c0.07		0.01			
v/c Ratio	0.13	0.79		0.66	0.33	0.13	0.62	0.08	0.06	0.91	0.29	
Uniform Delay, d1	23.7	34.0		25.6	16.4	14.4	59.8	56.4	56.3	54.7	34.2	
Progression Factor	0.93	0.91		1.80	1.60	2.30	0.84	0.81	1.13	1.00	1.00	
Incremental Delay, d2	0.8	4.0		6.2	0.4	0.3	9.0	0.2	0.2	13.3	0.2	
Delay (s)	22.9	34.9		52.2	26.7	33.5	59.3	45.9	63.7	67.9	34.3	
Level of Service	C	C		D	C	C	E	D	E	E	C	
Approach Delay (s)		34.5			32.0			60.6			58.6	
Approach LOS		C			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			41.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				22.0		
Intersection Capacity Utilization			88.2%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

26: Avenue Five & Burnhamthorpe Road

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1738	89	70	671	55	36	19	101	249	61	292
Future Volume (vph)	107	1738	89	70	671	55	36	19	101	249	61	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3552		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.38	1.00		0.07	1.00	1.00	0.72	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	724	3552		140	3579	1601	1351	1883	1601	1403	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	107	1738	89	70	671	55	36	19	101	249	61	292
RTOR Reduction (vph)	0	3	0	0	0	14	0	0	31	0	0	236
Lane Group Flow (vph)	107	1824	0	70	671	41	36	19	70	249	61	56
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	99.1	99.1		99.1	99.1	99.1	26.9	26.9	26.9	26.9	26.9	26.9
Effective Green, g (s)	99.1	99.1		99.1	99.1	99.1	26.9	26.9	26.9	26.9	26.9	26.9
Actuated g/C Ratio	0.71	0.71		0.71	0.71	0.71	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	512	2514		99	2533	1133	259	361	307	269	361	307
v/s Ratio Prot		c0.51			0.19			0.01			0.03	
v/s Ratio Perm	0.15			0.50		0.03	0.03		0.04	c0.18		0.04
v/c Ratio	0.21	0.73		0.71	0.26	0.04	0.14	0.05	0.23	0.93	0.17	0.18
Uniform Delay, d1	7.0	12.3		12.0	7.4	6.1	46.9	46.2	47.8	55.6	47.2	47.3
Progression Factor	1.41	1.09		1.88	1.28	1.70	0.99	1.01	1.02	1.06	1.07	1.65
Incremental Delay, d2	0.6	1.2		30.5	0.2	0.1	0.2	0.1	0.4	35.3	0.2	0.3
Delay (s)	10.5	14.6		53.0	9.6	10.5	46.5	46.8	49.1	94.5	50.7	78.4
Level of Service	B	B		D	A	B	D	D	D	F	D	E
Approach Delay (s)		14.3			13.5			48.2			82.3	
Approach LOS		B			B			D			F	
Intersection Summary												
HCM 2000 Control Delay			27.4									
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			97.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

<2030 Phase 2A FT> PM Peak Hour

28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway

07/14/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	453	492	1245	298	177	507	395	1671	84	214	1450	186
Future Volume (vph)	453	492	1245	298	177	507	395	1671	84	214	1450	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.62	1.00	1.00	0.25	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1177	3579	1601	471	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	453	492	1245	298	177	507	395	1671	84	214	1450	186
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	27	0	0	46
Lane Group Flow (vph)	453	492	1245	298	177	439	395	1671	57	214	1450	140
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases	4		Free	8		8			2			6
Actuated Green, G (s)	45.0	25.0	140.0	43.8	24.4	39.0	21.9	59.0	78.4	14.6	51.7	71.7
Effective Green, g (s)	45.0	25.0	140.0	43.8	24.4	39.0	21.9	59.0	78.4	14.6	51.7	71.7
Actuated g/C Ratio	0.32	0.18	1.00	0.31	0.17	0.28	0.16	0.42	0.56	0.10	0.37	0.51
Clearance Time (s)	4.0	7.0		4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	465	639	1601	334	623	454	542	2210	914	369	1936	819
v/s Ratio Prot	c0.14	0.14		0.12	0.05	0.10	0.11	0.32	0.01	0.06	0.28	0.02
v/s Ratio Perm	0.17		c0.78	0.15		0.17			0.03			0.06
v/c Ratio	0.97	0.77	0.78	0.89	0.28	0.97	0.73	0.76	0.06	0.58	0.75	0.17
Uniform Delay, d1	44.6	54.8	0.0	40.2	50.2	49.9	56.2	34.4	14.0	59.8	38.5	18.3
Progression Factor	0.79	0.83	1.00	1.00	1.00	1.00	0.58	0.93	2.57	1.12	0.77	0.42
Incremental Delay, d2	28.6	4.0	2.7	24.4	0.3	33.5	1.8	0.9	0.0	2.0	2.4	0.1
Delay (s)	63.7	49.6	2.7	64.7	50.5	83.4	34.2	32.9	36.0	68.8	32.3	7.8
Level of Service	E	D	A	E	D	F	C	C	D	E	C	A
Approach Delay (s)		25.9			71.8			33.2			34.0	
Approach LOS		C			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			101.3%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

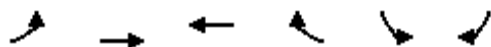
31: Avenue two & Street Four

<2030 Phase 2A FT> PM Peak Hour
07-08-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	248	77	116	142	37	294
Future Volume (Veh/h)	248	77	116	142	37	294
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	248	77	116	142	37	294
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	484	116			258	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	116			258	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	53	92			97	
cM capacity (veh/h)	526	936			1307	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	248	77	116	142	331	
Volume Left	248	0	0	0	37	
Volume Right	0	77	0	142	0	
cSH	526	936	1700	1700	1307	
Volume to Capacity	0.47	0.08	0.07	0.08	0.03	
Queue Length 95th (m)	19.0	2.0	0.0	0.0	0.7	
Control Delay (s)	17.8	9.2	0.0	0.0	1.1	
Lane LOS	C	A			A	
Approach Delay (s)	15.7		0.0		1.1	
Approach LOS	C					
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			44.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
38: Dundas Street West/Dundas St W & Tremaine Rd

<2030 Phase 2A FT> PM Peak Hour
07-08-2020

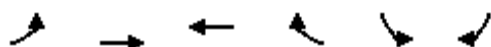


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	525	1416	2967	271	181	1201
Future Volume (vph)	525	1416	2967	271	181	1201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	1416	2967	271	181	1201
RTOR Reduction (vph)	0	0	0	50	0	0
Lane Group Flow (vph)	525	1416	2967	221	181	1201
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	30.7	113.7	79.0	79.0	12.3	140.0
Effective Green, g (s)	31.7	117.7	83.0	83.0	16.3	140.0
Actuated g/C Ratio	0.23	0.84	0.59	0.59	0.12	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	793	3763	2653	949	412	1570
v/s Ratio Prot	0.15	0.32	c0.66		0.05	
v/s Ratio Perm				0.14		c0.76
v/c Ratio	0.66	0.38	1.12	0.23	0.44	0.76
Uniform Delay, d1	49.3	2.6	28.5	13.5	57.6	0.0
Progression Factor	1.00	1.00	0.56	0.64	0.86	1.00
Incremental Delay, d2	2.1	0.3	55.0	0.2	0.4	2.8
Delay (s)	51.4	2.9	70.9	8.8	49.7	2.8
Level of Service	D	A	E	A	D	A
Approach Delay (s)		16.0	65.7		9.0	
Approach LOS		B	E		A	
Intersection Summary						
HCM 2000 Control Delay			39.1		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			90.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

40: Dundas St W & Avenue two

<2030 Phase 2A FT> PM Peak Hour
07-08-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	98	1499	3017	160	321	221
Future Volume (vph)	98	1499	3017	160	321	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.98	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3431	1457
Flt Permitted	0.04	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	78	4520	4520	1601	3431	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	98	1499	3017	160	321	221
RTOR Reduction (vph)	0	0	0	33	10	1
Lane Group Flow (vph)	98	1499	3017	127	362	169
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	105.9	105.9	92.8	92.8	20.1	29.2
Effective Green, g (s)	105.9	105.9	92.8	92.8	20.1	29.2
Actuated g/C Ratio	0.76	0.76	0.66	0.66	0.14	0.21
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	3419	2996	1061	492	303
v/s Ratio Prot	c0.04	0.33	c0.67		c0.11	0.04
v/s Ratio Perm	0.40			0.08		0.08
v/c Ratio	0.58	0.44	1.01	0.12	0.74	0.56
Uniform Delay, d1	42.0	6.2	23.6	8.6	57.4	49.6
Progression Factor	1.42	0.86	0.78	1.16	0.99	0.95
Incremental Delay, d2	4.5	0.4	6.8	0.0	5.6	2.2
Delay (s)	64.0	5.7	25.2	10.0	62.3	49.6
Level of Service	E	A	C	B	E	D
Approach Delay (s)		9.3	24.5		58.3	
Approach LOS		A	C		E	

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

42: Colonel William Pkwy/Avenue Three & Dundas St W

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	42	1654	95	104	2764	193	243	9	62	372	28	130
Future Volume (vph)	42	1654	95	104	2764	193	243	9	62	372	28	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	4476	1570	1825	4476	1633	1753	1921	1504	1787	1921	1611
Flt Permitted	0.05	1.00	1.00	0.06	1.00	1.00	0.74	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	104	4476	1570	106	4476	1633	1364	1921	1504	1246	1921	1611
Peak-hour factor, PHF	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. Flow (vph)	42	1654	95	104	2764	193	243	9	62	372	28	130
RTOR Reduction (vph)	0	0	45	0	0	42	0	0	49	0	0	65
Lane Group Flow (vph)	42	1654	50	104	2764	151	243	9	13	372	28	65
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	79.1	74.1	74.1	86.9	78.0	78.0	29.6	29.6	29.6	39.6	39.6	39.6
Effective Green, g (s)	79.1	74.1	74.1	86.9	78.0	78.0	29.6	29.6	29.6	39.6	39.6	39.6
Actuated g/C Ratio	0.56	0.53	0.53	0.62	0.56	0.56	0.21	0.21	0.21	0.28	0.28	0.28
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	3.0	0.2	0.2
Lane Grp Cap (vph)	120	2369	830	175	2493	909	288	406	317	375	543	455
v/s Ratio Prot	0.01	0.37		c0.04	c0.62			0.00		c0.04	0.01	
v/s Ratio Perm	0.19		0.03	0.33		0.09	0.18		0.01	c0.24		0.04
v/c Ratio	0.35	0.70	0.06	0.59	1.11	0.17	0.84	0.02	0.04	0.99	0.05	0.14
Uniform Delay, d1	31.5	24.6	16.0	21.1	31.0	15.1	53.0	43.7	43.9	50.6	36.5	37.5
Progression Factor	1.26	0.66	0.05	1.83	0.93	1.29	1.00	1.00	1.00	1.07	1.02	1.27
Incremental Delay, d2	1.2	1.6	0.1	2.4	52.0	0.2	20.1	0.0	0.1	42.9	0.0	0.0
Delay (s)	40.9	17.8	0.9	40.9	80.9	19.7	73.0	43.8	44.0	96.9	37.3	47.6
Level of Service	D	B	A	D	F	B	E	D	D	F	D	D
Approach Delay (s)		17.4			75.7			66.5			81.7	
Approach LOS		B			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			57.4			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			21.4			
Intersection Capacity Utilization			100.3%			ICU Level of Service			G			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

44: Valleyridge Dr/Avenue Five & Dundas St W

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					  		
Traffic Volume (vph)	42	1978	65	44	2880	120	61	4	25	319	15	119
Future Volume (vph)	42	1978	65	44	2880	120	61	4	25	319	15	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	4476	1601	1772	4611	1633	1789	1668		3471	1633	
Flt Permitted	0.04	1.00	1.00	0.04	1.00	1.00	0.67	1.00		0.95	1.00	
Satd. Flow (perm)	82	4476	1601	84	4611	1633	1264	1668		3471	1633	
Peak-hour factor, PHF	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. Flow (vph)	42	1978	65	44	2880	120	61	4	25	319	15	119
RTOR Reduction (vph)	0	0	23	0	0	42	0	24	0	0	107	0
Lane Group Flow (vph)	42	1978	42	44	2880	78	61	5	0	319	27	0
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%	2%	2%	0%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	96.4	91.1	91.1	96.6	91.2	91.2	13.2	6.1		15.4	14.4	
Effective Green, g (s)	96.4	91.1	91.1	96.6	91.2	91.2	13.2	6.1		15.4	14.4	
Actuated g/C Ratio	0.69	0.65	0.65	0.69	0.65	0.65	0.09	0.04		0.11	0.10	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	120	2912	1041	123	3003	1063	145	72		381	167	
v/s Ratio Prot	0.01	0.44		c0.01	c0.62		0.02	0.00		c0.09	0.02	
v/s Ratio Perm	0.23		0.03	0.23		0.05	c0.02					
v/c Ratio	0.35	0.68	0.04	0.36	0.96	0.07	0.42	0.07		0.84	0.16	
Uniform Delay, d1	34.7	15.3	8.8	13.2	22.7	8.9	59.4	64.2		61.1	57.3	
Progression Factor	2.14	0.94	1.00	2.73	0.96	1.31	1.00	1.00		0.99	1.10	
Incremental Delay, d2	1.2	0.9	0.0	0.2	1.2	0.0	2.0	0.9		14.4	0.5	
Delay (s)	75.5	15.3	8.8	36.2	22.9	11.7	61.4	65.1		74.8	63.3	
Level of Service	E	B	A	D	C	B	E	E		E	E	
Approach Delay (s)		16.3			22.7			62.6			71.4	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			24.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			88.1%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

46: Bronte Rd & Dundas St W

<2030 Phase 2A FT> PM Peak Hour

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	1603	614	292	2102	299	629	1633	207	715	1996	261
Future Volume (vph)	218	1603	614	292	2102	299	629	1633	207	715	1996	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	2.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1582	1755	5142	1570	3471	5092	1445	3471	5043	1601
Flt Permitted	0.09	1.00	1.00	0.08	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4476	1582	154	5142	1570	3471	5092	1445	3471	5043	1601
Peak-hour factor, PHF	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. Flow (vph)	218	1603	614	292	2102	299	629	1633	207	715	1996	261
RTOR Reduction (vph)	0	0	33	0	0	62	0	0	63	0	0	70
Lane Group Flow (vph)	218	1603	581	292	2102	237	629	1633	144	715	1996	191
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	51.0	44.0	62.0	59.0	48.0	48.0	18.0	44.0	44.0	19.0	45.0	45.0
Effective Green, g (s)	53.0	46.0	66.0	60.0	50.0	50.0	19.0	46.0	46.0	20.0	47.0	47.0
Actuated g/C Ratio	0.38	0.33	0.47	0.43	0.36	0.36	0.14	0.33	0.33	0.14	0.34	0.34
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	179	1470	745	203	1836	560	471	1673	474	495	1693	537
v/s Ratio Prot	0.07	0.36	0.11	c0.12	0.41		0.18	0.32		c0.21	c0.40	
v/s Ratio Perm	0.39		0.26	c0.49		0.15			0.10			0.12
v/c Ratio	1.22	1.09	0.78	1.44	1.14	0.42	1.34	0.98	0.30	1.44	1.18	0.36
Uniform Delay, d1	40.9	47.0	30.9	41.1	45.0	34.1	60.5	46.5	35.1	60.0	46.5	35.1
Progression Factor	1.35	1.09	0.76	1.00	1.00	1.00	1.00	1.00	1.00	0.82	0.93	0.90
Incremental Delay, d2	130.3	49.9	4.0	223.0	72.2	2.3	164.9	16.6	0.5	207.4	84.9	0.4
Delay (s)	185.6	101.3	27.5	264.1	117.2	36.4	225.4	63.0	35.5	256.4	128.2	31.8
Level of Service	F	F	C	F	F	D	F	E	D	F	F	C
Approach Delay (s)		90.2			124.2			102.1			150.6	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			118.6			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.36									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			124.2%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

***2030 Phase 2A Future Total
Sensitivity AM***

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

1: Bronte Rd & 407 Off Ramp

07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	325	0	914	2295	0
Future Volume (vph)	167	325	0	914	2295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.93	0.85		1.00	1.00	
Flt Protected	0.98	1.00		1.00	1.00	
Satd. Flow (prot)	3174	1457		4902	3444	
Flt Permitted	0.98	1.00		1.00	1.00	
Satd. Flow (perm)	3174	1457		4902	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	325	0	914	2295	0
RTOR Reduction (vph)	17	17	0	0	0	0
Lane Group Flow (vph)	313	145	0	914	2295	0
Heavy Vehicles (%)	10%	2%	0%	7%	6%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	17.9	17.9		110.1	110.1	
Effective Green, g (s)	17.9	17.9		110.1	110.1	
Actuated g/C Ratio	0.13	0.13		0.79	0.79	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	405	186		3855	2708	
v/s Ratio Prot	0.10			0.19	0.67	
v/s Ratio Perm		0.10				
v/c Ratio	0.77	0.78		0.24	0.85	
Uniform Delay, d1	59.1	59.1		3.9	9.6	
Progression Factor	1.00	1.00		0.44	1.00	
Incremental Delay, d2	9.3	19.2		0.1	3.5	
Delay (s)	68.4	78.3		1.9	13.1	
Level of Service	E	E		A	B	
Approach Delay (s)	71.7			1.9	13.1	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay			18.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			86.9%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

2: Tremaine Rd & Avenue One

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	50	20	9	45	3	90	660	52	22	918	0
Future Volume (vph)	0	50	20	9	45	3	90	660	52	22	918	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.99		1.00	0.99		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803		1789	1866		1789	3539		1789	3579	
Flt Permitted		1.00		0.71	1.00		0.31	1.00		0.38	1.00	
Satd. Flow (perm)		1803		1340	1866		582	3539		718	3579	
Peak-hour factor, PHF	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. Flow (vph)	0	50	20	9	45	3	90	660	52	22	918	0
RTOR Reduction (vph)	0	18	0	0	3	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	52	0	9	45	0	90	708	0	22	918	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Effective Green, g (s)		6.0		6.0	6.0		50.0	50.0		50.0	50.0	
Actuated g/C Ratio		0.09		0.09	0.09		0.71	0.71		0.71	0.71	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		154		114	159		415	2527		512	2556	
v/s Ratio Prot		c0.03			0.02			0.20			c0.26	
v/s Ratio Perm				0.01			0.15			0.03		
v/c Ratio		0.34		0.08	0.28		0.22	0.28		0.04	0.36	
Uniform Delay, d1		30.1		29.5	30.0		3.4	3.6		2.9	3.8	
Progression Factor		1.00		1.05	1.02		1.49	1.50		1.00	1.00	
Incremental Delay, d2		1.3		0.3	1.0		1.0	0.2		0.2	0.4	
Delay (s)		31.4		31.1	31.6		6.1	5.6		3.1	4.2	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		31.4			31.6			5.7			4.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.7										
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		70.0										
Intersection Capacity Utilization		59.5%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 2030 Phase 2A FT Sensitivity > AM Peak Hour

4: Avenue Two & Avenue One

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↘	↗
Traffic Volume (veh/h)	58	16	40	10	2	230
Future Volume (Veh/h)	58	16	40	10	2	230
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	58	16	40	10	2	230
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			74	156		66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			74	156		66
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			97	100		77
cM capacity (veh/h)			1526	813		998
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	74	50	2	230		
Volume Left	0	40	2	0		
Volume Right	16	0	0	230		
cSH	1700	1526	813	998		
Volume to Capacity	0.04	0.03	0.00	0.23		
Queue Length 95th (m)	0.0	0.6	0.1	6.8		
Control Delay (s)	0.0	6.0	9.4	9.7		
Lane LOS	A		A	A		
Approach Delay (s)	0.0	6.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			7.1			
Intersection Capacity Utilization			24.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

6: Avenue Three & Avenue One

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↘	↑	↘	↑
Traffic Volume (vph)	0	149	0	0	1037	0
Future Volume (vph)	0	149	0	0	1037	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	
Lane Util. Factor		1.00			1.00	
Frt		0.85			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		1601			1789	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		1601			1789	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	149	0	0	1037	0
RTOR Reduction (vph)	0	121	0	0	0	0
Lane Group Flow (vph)	0	28	0	0	1037	0
Turn Type		Perm	Perm		Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)		26.0			100.0	
Effective Green, g (s)		26.0			100.0	
Actuated g/C Ratio		0.19			0.71	
Clearance Time (s)		7.0			7.0	
Vehicle Extension (s)		3.0			3.0	
Lane Grp Cap (vph)		297			1277	
v/s Ratio Prot					0.58	
v/s Ratio Perm		0.02				
v/c Ratio		0.09			0.81	
Uniform Delay, d1		47.2			13.6	
Progression Factor		1.00			1.45	
Incremental Delay, d2		0.6			3.2	
Delay (s)		47.9			22.9	
Level of Service		D			C	
Approach Delay (s)	47.9			0.0	22.9	
Approach LOS	D			A	C	
Intersection Summary						
HCM 2000 Control Delay		26.0		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.66				
Actuated Cycle Length (s)		140.0		Sum of lost time (s)		14.0
Intersection Capacity Utilization		63.3%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 2030 Phase 2A FT Sensitivity > AM Peak Hour

8: Avenue Five & Avenue One

07-08-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	8	151	0	164	145
Future Volume (Veh/h)	0	8	151	0	164	145
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	8	151	0	164	145
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	8			306	4	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	8			306	4	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	91			74	87	
cM capacity (veh/h)	1612			622	1080	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	8	151	0	164	145	
Volume Left	0	151	0	164	0	
Volume Right	8	0	0	0	145	
cSH	1700	1612	1700	622	1080	
Volume to Capacity	0.00	0.09	0.00	0.26	0.13	
Queue Length 95th (m)	0.0	2.4	0.0	8.0	3.5	
Control Delay (s)	0.0	7.5	0.0	12.9	8.9	
Lane LOS		A		B	A	
Approach Delay (s)	0.0	7.5		11.0		
Approach LOS				B		
Intersection Summary						
Average Delay	9.7					
Intersection Capacity Utilization	30.8%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

10: Bronte Road & Avenue One

07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	49	363	1047	2414	206
Future Volume (vph)	32	49	363	1047	2414	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	32	49	363	1047	2414	206
RTOR Reduction (vph)	0	46	0	0	0	68
Lane Group Flow (vph)	32	3	363	1047	2414	138
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	8.2	8.2	20.3	117.8	93.5	93.5
Effective Green, g (s)	8.2	8.2	20.3	117.8	93.5	93.5
Actuated g/C Ratio	0.06	0.06	0.15	0.84	0.67	0.67
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	104	93	503	4326	3434	1069
v/s Ratio Prot	c0.02		c0.10	0.20	c0.47	
v/s Ratio Perm		0.00				0.09
v/c Ratio	0.31	0.03	0.72	0.24	0.70	0.13
Uniform Delay, d1	63.2	62.2	57.2	2.2	14.6	8.4
Progression Factor	1.00	1.00	1.42	0.61	0.91	1.56
Incremental Delay, d2	1.7	0.1	4.5	0.1	0.6	0.1
Delay (s)	64.9	62.3	85.6	1.5	13.8	13.3
Level of Service	E	E	F	A	B	B
Approach Delay (s)	63.3			23.1	13.8	
Approach LOS	E			C	B	
Intersection Summary						
HCM 2000 Control Delay			18.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			80.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

20: Tremaine Rd & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	65	20	80	10	14	95	788	483	89	858	10
Future Volume (vph)	0	65	20	80	10	14	95	788	483	89	858	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.91		1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817		1789	1719		1789	3375		1789	3572	
Flt Permitted		1.00		0.70	1.00		0.32	1.00		0.19	1.00	
Satd. Flow (perm)		1817		1322	1719		605	3375		354	3572	
Peak-hour factor, PHF	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. Flow (vph)	0	65	20	80	10	14	95	788	483	89	858	10
RTOR Reduction (vph)	0	17	0	0	12	0	0	75	0	0	1	0
Lane Group Flow (vph)	0	68	0	80	12	0	95	1196	0	89	867	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0		9.0	9.0		47.0	47.0		47.0	47.0	
Effective Green, g (s)		9.0		9.0	9.0		47.0	47.0		47.0	47.0	
Actuated g/C Ratio		0.13		0.13	0.13		0.67	0.67		0.67	0.67	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		233		169	221		406	2266		237	2398	
v/s Ratio Prot		0.04			0.01			c0.35			0.24	
v/s Ratio Perm				c0.06			0.16			0.25		
v/c Ratio		0.29		0.47	0.05		0.23	0.53		0.38	0.36	
Uniform Delay, d1		27.6		28.3	26.8		4.5	5.9		5.1	5.0	
Progression Factor		1.00		0.94	1.00		1.83	2.81		0.80	0.82	
Incremental Delay, d2		0.7		2.1	0.1		0.8	0.5		4.3	0.4	
Delay (s)		28.3		28.6	26.7		9.0	17.0		8.4	4.5	
Level of Service		C		C	C		A	B		A	A	
Approach Delay (s)		28.3			28.2			16.4			4.8	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			74.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

22: Avenue two & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	522	19	87	307	504	65	109	132	94	20	15
Future Volume (vph)	87	522	19	87	307	504	65	109	132	94	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.56	1.00	1.00	0.46	1.00	1.00	0.74	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1064	3579	1601	864	3579	1601	1402	1883	1601	1293	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	87	522	19	87	307	504	65	109	132	94	20	15
RTOR Reduction (vph)	0	0	6	0	0	170	0	0	114	0	0	13
Lane Group Flow (vph)	87	522	13	87	307	334	65	109	18	94	20	2
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	46.4	46.4	46.4	46.4	46.4	46.4	9.6	9.6	9.6	9.6	9.6	9.6
Effective Green, g (s)	46.4	46.4	46.4	46.4	46.4	46.4	9.6	9.6	9.6	9.6	9.6	9.6
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.14	0.14	0.14	0.14	0.14	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	705	2372	1061	572	2372	1061	192	258	219	177	258	219
v/s Ratio Prot		0.15			0.09			0.06			0.01	
v/s Ratio Perm	0.08		0.01	0.10		c0.21	0.05		0.01	c0.07		0.00
v/c Ratio	0.12	0.22	0.01	0.15	0.13	0.31	0.34	0.42	0.08	0.53	0.08	0.01
Uniform Delay, d1	4.3	4.7	4.0	4.4	4.4	5.0	27.3	27.7	26.4	28.1	26.3	26.1
Progression Factor	1.29	1.33	1.00	1.83	1.85	13.56	1.12	1.11	2.19	1.07	1.08	1.00
Incremental Delay, d2	0.3	0.2	0.0	0.5	0.1	0.7	1.0	1.1	0.2	3.0	0.1	0.0
Delay (s)	5.9	6.4	4.0	8.6	8.1	68.8	31.8	31.9	57.8	32.9	28.5	26.1
Level of Service	A	A	A	A	A	E	C	C	E	C	C	C
Approach Delay (s)		6.2			42.2			43.0			31.4	
Approach LOS		A			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			30.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			65.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

24: Avenue Three & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	515	21	94	1199	751	58	79	185	107	11	31
Future Volume (vph)	207	515	21	94	1199	751	58	79	185	107	11	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3558		1789	3579	1601	1789	1883	1601	3471	1675	
Flt Permitted	0.17	1.00		0.45	1.00	1.00	0.73	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	320	3558		852	3579	1601	1374	1883	1601	3471	1675	
Peak-hour factor, PHF	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. Flow (vph)	207	515	21	94	1199	751	58	79	185	107	11	31
RTOR Reduction (vph)	0	2	0	0	0	83	0	0	169	0	26	0
Lane Group Flow (vph)	207	534	0	94	1199	668	58	79	16	107	16	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8		8			
Actuated Green, G (s)	102.6	102.6		87.6	87.6	87.6	12.4	12.4	12.4	7.0	23.4	
Effective Green, g (s)	102.6	102.6		87.6	87.6	87.6	12.4	12.4	12.4	7.0	23.4	
Actuated g/C Ratio	0.73	0.73		0.63	0.63	0.63	0.09	0.09	0.09	0.05	0.17	
Clearance Time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	349	2607		533	2239	1001	121	166	141	173	279	
v/s Ratio Prot	c0.05	0.15			0.34			0.04		c0.03	0.01	
v/s Ratio Perm	0.39			0.11		c0.42	c0.04		0.01			
v/c Ratio	0.59	0.20		0.18	0.54	0.67	0.48	0.48	0.12	0.62	0.06	
Uniform Delay, d1	9.9	5.9		11.0	14.7	16.8	60.7	60.7	58.8	65.2	49.0	
Progression Factor	1.49	1.16		1.73	1.72	1.86	0.95	0.95	0.99	1.00	1.02	
Incremental Delay, d2	2.7	0.2		0.3	0.4	1.4	2.9	2.1	0.4	6.4	0.1	
Delay (s)	17.5	7.0		19.4	25.7	32.6	60.6	59.9	58.3	71.5	50.2	
Level of Service	B	A		B	C	C	E	E	E	E	D	
Approach Delay (s)		9.9			28.0			59.1			65.5	
Approach LOS		A			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			28.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			81.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

26: Avenue Five & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	342	433	24	101	1921	293	102	76	54	41	13	104
Future Volume (vph)	342	433	24	101	1921	293	102	76	54	41	13	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3550		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.05	1.00		0.49	1.00	1.00	0.75	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	94	3550		920	3579	1601	1411	1883	1601	1333	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	342	433	24	101	1921	293	102	76	54	41	13	104
RTOR Reduction (vph)	0	2	0	0	0	47	0	0	48	0	0	92
Lane Group Flow (vph)	342	455	0	101	1921	246	102	76	6	41	13	12
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	110.3	110.3		76.0	76.0	76.0	15.7	15.7	15.7	15.7	15.7	15.7
Effective Green, g (s)	110.3	110.3		76.0	76.0	76.0	15.7	15.7	15.7	15.7	15.7	15.7
Actuated g/C Ratio	0.79	0.79		0.54	0.54	0.54	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	440	2796		499	1942	869	158	211	179	149	211	179
v/s Ratio Prot	c0.17	0.13			c0.54			0.04			0.01	
v/s Ratio Perm	0.44			0.11		0.15	c0.07		0.00	0.03		0.01
v/c Ratio	0.78	0.16		0.20	0.99	0.28	0.65	0.36	0.03	0.28	0.06	0.07
Uniform Delay, d1	44.5	3.6		16.4	31.6	17.3	59.5	57.5	55.4	56.9	55.6	55.6
Progression Factor	1.08	0.98		1.13	1.39	1.34	0.82	0.81	1.36	0.49	0.48	0.61
Incremental Delay, d2	8.2	0.1		0.1	4.1	0.1	8.2	1.0	0.1	0.9	0.1	0.1
Delay (s)	56.0	3.7		18.6	48.1	23.3	57.1	47.7	75.2	28.9	26.5	34.2
Level of Service	E	A		B	D	C	E	D	E	C	C	C
Approach Delay (s)		26.1			43.6			58.2			32.2	
Approach LOS		C			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			40.1									D
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			140.0									18.0
Intersection Capacity Utilization			99.4%									F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour
 28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway 07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		 	  	
Traffic Volume (vph)	158	103	245	67	548	180	1438	1072	180	492	1508	463
Future Volume (vph)	158	103	245	67	548	180	1438	1072	180	492	1508	463
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.16	1.00	1.00	0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	302	3579	1601	1320	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	158	103	245	67	548	180	1438	1072	180	492	1508	463
RTOR Reduction (vph)	0	0	0	0	0	63	0	0	97	0	0	88
Lane Group Flow (vph)	158	103	245	67	548	117	1438	1072	83	492	1508	375
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	Free	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases	4		Free	8		8			2			6
Actuated Green, G (s)	36.4	36.4	140.0	25.4	25.4	46.3	44.6	64.7	64.7	20.9	41.0	41.0
Effective Green, g (s)	36.4	36.4	140.0	25.4	25.4	46.3	44.6	64.7	64.7	20.9	41.0	41.0
Actuated g/C Ratio	0.26	0.26	1.00	0.18	0.18	0.33	0.32	0.46	0.46	0.15	0.29	0.29
Clearance Time (s)	4.0	7.0		7.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	930	1601	239	649	540	1105	2423	754	528	1536	468
v/s Ratio Prot	c0.05	0.03			0.15	0.03	c0.41	0.20		0.14	c0.29	
v/s Ratio Perm	c0.22		0.15	0.05		0.04			0.05			0.23
v/c Ratio	1.04	0.11	0.15	0.28	0.84	0.22	1.30	0.44	0.11	0.93	0.98	0.80
Uniform Delay, d1	48.4	39.5	0.0	49.4	55.4	33.8	47.7	25.5	21.3	58.8	49.1	45.7
Progression Factor	0.98	0.91	1.00	1.00	1.00	1.00	0.64	0.91	0.95	0.95	1.02	1.03
Incremental Delay, d2	83.6	0.1	0.2	0.6	9.8	0.2	137.7	0.2	0.1	18.6	15.7	10.0
Delay (s)	130.9	36.1	0.2	50.1	65.2	34.0	168.3	23.5	20.3	74.8	66.0	57.0
Level of Service	F	D	A	D	E	C	F	C	C	E	E	E
Approach Delay (s)		48.3			56.9			100.7			66.1	
Approach LOS		D			E			F			E	
Intersection Summary												
HCM 2000 Control Delay			78.0				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			112.4%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

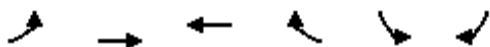
HCM Unsignalized Intersection Capacity Analysis 2030 Phase 2A FT Sensitivity > AM Peak Hour 31: Avenue two & Street Four

07-08-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	51	19	287	191	71	55
Future Volume (Veh/h)	51	19	287	191	71	55
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	51	19	287	191	71	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	484	287			478	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	287			478	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	97			93	
cM capacity (veh/h)	506	752			1084	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	51	19	287	191	126	
Volume Left	51	0	0	0	71	
Volume Right	0	19	0	191	0	
cSH	506	752	1700	1700	1084	
Volume to Capacity	0.10	0.03	0.17	0.11	0.07	
Queue Length 95th (m)	2.5	0.6	0.0	0.0	1.6	
Control Delay (s)	12.9	9.9	0.0	0.0	5.1	
Lane LOS	B	A			A	
Approach Delay (s)	12.1		0.0		5.1	
Approach LOS	B					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			35.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour 38: Dundas Street West/Dundas St W & Tremaine Rd

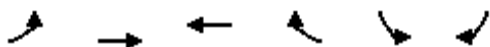
07-08-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	→	←←	→
Traffic Volume (vph)	1182	2227	1057	184	375	583
Future Volume (vph)	1182	2227	1057	184	375	583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4117	1570	3541	1613
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4117	1570	3541	1613
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1182	2227	1057	184	375	583
RTOR Reduction (vph)	0	0	0	86	0	0
Lane Group Flow (vph)	1182	2227	1057	98	375	583
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	1%	3%	12%	4%	0%	0%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	54.3	106.3	48.0	48.0	19.7	140.0
Effective Green, g (s)	54.3	106.3	48.0	48.0	19.7	140.0
Actuated g/C Ratio	0.39	0.76	0.34	0.34	0.14	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	1359	3398	1411	538	498	1613
v/s Ratio Prot	c0.34	0.50	c0.26		c0.11	
v/s Ratio Perm				0.06		0.36
v/c Ratio	0.87	0.66	0.75	0.18	0.75	0.36
Uniform Delay, d1	39.6	8.1	40.7	32.2	57.8	0.0
Progression Factor	1.00	1.00	0.85	1.12	1.18	1.00
Incremental Delay, d2	6.2	1.0	3.5	0.7	5.8	0.6
Delay (s)	45.8	9.1	38.1	36.7	74.1	0.6
Level of Service	D	A	D	D	E	A
Approach Delay (s)		21.8	37.9		29.4	
Approach LOS		C	D		C	
Intersection Summary						
HCM 2000 Control Delay			26.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			80.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour 40: Dundas St W & Avenue two

07-08-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	161	2441	1238	317	72	34
Future Volume (vph)	161	2441	1238	317	72	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3466	1457
Flt Permitted	0.16	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	304	4520	4520	1601	3466	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	161	2441	1238	317	72	34
RTOR Reduction (vph)	0	0	0	77	3	29
Lane Group Flow (vph)	161	2441	1238	240	72	2
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	117.9	117.9	106.1	106.1	8.1	8.1
Effective Green, g (s)	117.9	117.9	106.1	106.1	8.1	8.1
Actuated g/C Ratio	0.84	0.84	0.76	0.76	0.06	0.06
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	338	3806	3425	1213	200	84
v/s Ratio Prot	0.03	c0.54	0.27		c0.02	
v/s Ratio Perm	0.37			0.15		0.00
v/c Ratio	0.48	0.64	0.36	0.20	0.36	0.02
Uniform Delay, d1	2.7	3.8	5.7	4.8	63.5	62.2
Progression Factor	1.38	1.18	1.59	6.25	0.97	1.18
Incremental Delay, d2	0.8	0.7	0.3	0.3	1.1	0.1
Delay (s)	4.6	5.2	9.2	30.5	62.5	73.7
Level of Service	A	A	A	C	E	E
Approach Delay (s)		5.1	13.6		65.8	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

42: Colonel William Pkwy/Avenue Three & Dundas St W

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	147	2017	262	58	1452	363	83	33	168	76	6	20
Future Volume (vph)	147	2017	262	58	1452	363	83	33	168	76	6	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1601	1674	4117	1570	1768	1921	1517	1555	1921	1610
Flt Permitted	0.11	1.00	1.00	0.05	1.00	1.00	0.75	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	219	4476	1601	92	4117	1570	1403	1921	1517	1204	1921	1610
Peak-hour factor, PHF	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. Flow (vph)	147	2017	262	58	1452	363	83	33	168	76	6	20
RTOR Reduction (vph)	0	0	72	0	0	103	0	0	81	0	0	18
Lane Group Flow (vph)	147	2017	190	58	1452	260	83	33	87	76	6	2
Confl. Peds. (#/hr)	8					8	2		3	3		2
Heavy Vehicles (%)	1%	3%	2%	9%	12%	0%	3%	0%	6%	17%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	110.4	101.7	101.7	104.8	98.9	98.9	15.0	15.0	15.0	15.0	15.0	15.0
Effective Green, g (s)	110.4	101.7	101.7	104.8	98.9	98.9	15.0	15.0	15.0	15.0	15.0	15.0
Actuated g/C Ratio	0.79	0.73	0.73	0.75	0.71	0.71	0.11	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	0.2	0.2	0.2
Lane Grp Cap (vph)	271	3251	1163	135	2908	1109	150	205	162	129	205	172
v/s Ratio Prot	c0.03	c0.45		0.02	0.35			0.02			0.00	
v/s Ratio Perm	0.39		0.12	0.30		0.17	0.06		0.06	c0.06		0.00
v/c Ratio	0.54	0.62	0.16	0.43	0.50	0.23	0.55	0.16	0.54	0.59	0.03	0.01
Uniform Delay, d1	5.7	9.5	5.9	8.5	9.3	7.2	59.3	56.8	59.2	59.6	56.0	55.9
Progression Factor	3.37	0.58	0.17	1.91	1.05	2.64	1.00	1.00	1.00	0.92	0.91	1.00
Incremental Delay, d2	1.4	0.7	0.2	1.6	0.4	0.4	4.8	0.4	3.8	4.3	0.0	0.0
Delay (s)	20.7	6.3	1.3	17.9	10.3	19.4	64.1	57.2	63.0	58.9	51.0	55.9
Level of Service	C	A	A	B	B	B	E	E	E	E	D	E
Approach Delay (s)		6.6			12.3			62.7			57.8	
Approach LOS		A			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			13.4			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			76.6%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

44: Valleyridge Dr/Avenue Five & Dundas St W

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		 		
Traffic Volume (vph)	128	2194	106	33	1822	346	88	17	84	64	2	24
Future Volume (vph)	128	2194	106	33	1822	346	88	17	84	64	2	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	4391	1633	1772	4117	1601	1722	1609		3471	1623	
Flt Permitted	0.05	1.00	1.00	0.05	1.00	1.00	0.47	1.00		0.95	1.00	
Satd. Flow (perm)	96	4391	1633	87	4117	1601	845	1609		3471	1623	
Peak-hour factor, PHF	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. Flow (vph)	128	2194	106	33	1822	346	88	17	84	64	2	24
RTOR Reduction (vph)	0	0	31	0	0	37	0	76	0	0	23	0
Lane Group Flow (vph)	128	2194	75	33	1822	309	88	25	0	64	3	0
Heavy Vehicles (%)	4%	5%	0%	3%	12%	2%	6%	2%	5%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	101.2	93.3	93.3	89.9	86.0	86.0	24.8	14.0		6.8	6.8	
Effective Green, g (s)	101.2	93.3	93.3	89.9	86.0	86.0	24.8	14.0		6.8	6.8	
Actuated g/C Ratio	0.72	0.67	0.67	0.64	0.61	0.61	0.18	0.10		0.05	0.05	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	202	2926	1088	102	2529	983	237	160		168	78	
v/s Ratio Prot	c0.05	c0.50		0.01	0.44		c0.04	0.02		0.02	0.00	
v/s Ratio Perm	0.41		0.05	0.20		0.19	c0.03					
v/c Ratio	0.63	0.75	0.07	0.32	0.72	0.31	0.37	0.16		0.38	0.04	
Uniform Delay, d1	28.5	15.6	8.2	14.5	18.7	12.9	50.0	57.6		64.6	63.5	
Progression Factor	1.27	0.85	1.58	2.14	0.72	0.91	1.00	1.00		0.73	1.27	
Incremental Delay, d2	5.4	1.5	0.1	0.9	0.9	0.4	1.0	1.0		1.4	0.2	
Delay (s)	41.7	14.8	13.0	31.8	14.3	12.2	51.0	58.6		48.8	80.7	
Level of Service	D	B	B	C	B	B	D	E		D	F	
Approach Delay (s)		16.2			14.2			55.1			58.0	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			17.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			73.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> AM Peak Hour

46: Bronte Rd & Dundas St W

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	1350	562	198	1317	760	621	1600	322	314	1150	169
Future Volume (vph)	330	1350	562	198	1317	760	621	1600	322	314	1150	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0	3.0	4.0	1.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	4476	1572	1508	4683	1555	3079	4902	1512	3404	4902	1541
Flt Permitted	0.10	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	486	4476	1572	163	4683	1555	3079	4902	1512	3404	4902	1541
Peak-hour factor, PHF	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. Flow (vph)	330	1350	562	198	1317	760	621	1600	322	314	1150	169
RTOR Reduction (vph)	0	0	29	0	0	50	0	0	34	0	0	55
Lane Group Flow (vph)	330	1350	533	198	1317	710	621	1600	288	314	1150	114
Confl. Peds. (#/hr)			2		2							
Heavy Vehicles (%)	3%	3%	3%	21%	12%	5%	15%	7%	8%	4%	7%	6%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	56.0	40.0	68.0	52.0	38.0	58.8	28.0	43.2	57.2	20.8	36.0	52.0
Effective Green, g (s)	58.0	43.0	74.0	54.0	41.0	64.8	29.0	46.2	63.2	21.8	39.0	58.0
Actuated g/C Ratio	0.41	0.31	0.53	0.39	0.29	0.46	0.21	0.33	0.45	0.16	0.28	0.41
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	2.5	2.5	4.0	2.5	2.5	4.0	2.5
Lane Grp Cap (vph)	340	1374	830	206	1371	719	637	1617	682	530	1365	638
v/s Ratio Prot	c0.12	c0.30	0.14	0.10	0.28	c0.17	c0.20	c0.33	0.05	0.09	0.23	0.02
v/s Ratio Perm	0.28		0.20	0.27		0.29			0.14			0.05
v/c Ratio	0.97	0.98	0.64	0.96	0.96	0.99	0.97	0.99	0.42	0.59	0.84	0.18
Uniform Delay, d1	38.9	48.1	23.5	40.3	48.7	37.2	55.1	46.7	26.0	55.0	47.6	25.9
Progression Factor	1.15	0.91	0.38	1.00	1.00	1.00	1.00	1.00	1.00	0.35	1.05	2.74
Incremental Delay, d2	33.7	16.8	1.1	51.4	16.6	30.0	29.2	19.7	0.3	0.8	2.7	0.0
Delay (s)	78.2	60.6	10.1	91.7	65.3	67.1	84.3	66.4	26.3	19.8	52.6	71.2
Level of Service	E	E	B	F	E	E	F	E	C	B	D	E
Approach Delay (s)		50.6			68.2			65.7			48.2	
Approach LOS		D			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			59.2				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			106.3%				ICU Level of Service			G		
Analysis Period (min)			15									

c Critical Lane Group

***2030 Phase 2A Future Total
Sensitivity PM***

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

1: Bronte Rd & 407 Off Ramp

07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 			  	 	
Traffic Volume (vph)	111	70	0	2332	705	0
Future Volume (vph)	111	70	0	2332	705	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	0.97	0.91		0.91	0.95	
Frt	0.98	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3412	1457		5142	3579	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3412	1457		5142	3579	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	70	0	2332	705	0
RTOR Reduction (vph)	6	52	0	0	0	0
Lane Group Flow (vph)	118	5	0	2332	705	0
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.1	11.1		116.9	116.9	
Effective Green, g (s)	11.1	11.1		116.9	116.9	
Actuated g/C Ratio	0.08	0.08		0.84	0.84	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		6.0	6.0	
Lane Grp Cap (vph)	270	115		4293	2988	
v/s Ratio Prot	c0.03			c0.45	0.20	
v/s Ratio Perm		0.00				
v/c Ratio	0.44	0.04		0.54	0.24	
Uniform Delay, d1	61.5	59.5		3.5	2.4	
Progression Factor	1.00	1.00		0.98	1.00	
Incremental Delay, d2	1.5	0.2		0.4	0.2	
Delay (s)	63.0	59.7		3.8	2.6	
Level of Service	E	E		A	A	
Approach Delay (s)	62.0			3.8	2.6	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay			6.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			60.1%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

2: Tremaine Rd & Avenue One

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	65	40	39	55	16	50	677	14	5	821	0
Future Volume (vph)	5	65	40	39	55	16	50	677	14	5	821	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1776		1789	1820		1789	3568		1789	3579	
Flt Permitted	0.71	1.00		0.69	1.00		0.34	1.00		0.39	1.00	
Satd. Flow (perm)	1339	1776		1298	1820		643	3568		732	3579	
Peak-hour factor, PHF	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. Flow (vph)	5	65	40	39	55	16	50	677	14	5	821	0
RTOR Reduction (vph)	0	35	0	0	14	0	0	1	0	0	0	0
Lane Group Flow (vph)	5	70	0	39	57	0	50	690	0	5	821	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.4	8.4		8.4	8.4		47.6	47.6		47.6	47.6	
Effective Green, g (s)	8.4	8.4		8.4	8.4		47.6	47.6		47.6	47.6	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.68	0.68		0.68	0.68	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	160	213		155	218		437	2426		497	2433	
v/s Ratio Prot		c0.04			0.03			0.19			c0.23	
v/s Ratio Perm	0.00			0.03			0.08			0.01		
v/c Ratio	0.03	0.33		0.25	0.26		0.11	0.28		0.01	0.34	
Uniform Delay, d1	27.2	28.2		27.9	28.0		3.9	4.4		3.6	4.7	
Progression Factor	1.00	1.00		1.05	1.04		1.85	1.84		1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.9	0.6		0.5	0.3		0.0	0.4	
Delay (s)	27.3	29.1		30.2	29.8		7.7	8.4		3.6	5.0	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		29.0			29.9			8.4			5.0	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		9.4			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		70.0			Sum of lost time (s)			14.0				
Intersection Capacity Utilization		57.4%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 2030 Phase 2A FT Sensitivity> PM Peak Hour

4: Avenue Two & Avenue One

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↘	↗
Traffic Volume (veh/h)	15	4	173	43	12	61
Future Volume (Veh/h)	15	4	173	43	12	61
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	15	4	173	43	12	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	247					
pX, platoon unblocked						
vC, conflicting volume			19	406		17
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			19	406		17
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			89	98		94
cM capacity (veh/h)			1597	536		1062
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	19	216	12	61		
Volume Left	0	173	12	0		
Volume Right	4	0	0	61		
cSH	1700	1597	536	1062		
Volume to Capacity	0.01	0.11	0.02	0.06		
Queue Length 95th (m)	0.0	2.8	0.5	1.4		
Control Delay (s)	0.0	6.2	11.9	8.6		
Lane LOS	A		B	A		
Approach Delay (s)	0.0	6.2	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			28.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

6: Avenue Three & Avenue One

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↘	↑	↘	↑
Traffic Volume (vph)	0	882	0	0	214	0
Future Volume (vph)	0	882	0	0	214	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	
Lane Util. Factor		1.00			1.00	
Frt		0.85			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		1601			1789	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		1601			1789	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	882	0	0	214	0
RTOR Reduction (vph)	0	353	0	0	0	0
Lane Group Flow (vph)	0	529	0	0	214	0
Turn Type		Perm	Perm		Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)		42.0			14.0	
Effective Green, g (s)		42.0			14.0	
Actuated g/C Ratio		0.60			0.20	
Clearance Time (s)		7.0			7.0	
Vehicle Extension (s)		3.0			3.0	
Lane Grp Cap (vph)		960			357	
v/s Ratio Prot					c0.12	
v/s Ratio Perm		c0.33				
v/c Ratio		0.55			0.60	
Uniform Delay, d1		8.4			25.5	
Progression Factor		1.27			1.31	
Incremental Delay, d2		2.3			2.7	
Delay (s)		12.9			36.0	
Level of Service		B			D	
Approach Delay (s)	12.9			0.0	36.0	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay		17.4		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.56				
Actuated Cycle Length (s)		70.0		Sum of lost time (s)		14.0
Intersection Capacity Utilization		60.4%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 2030 Phase 2A FT Sensitivity> PM Peak Hour 8: Avenue Five & Avenue One

07-08-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↑	↖	↗
Traffic Volume (veh/h)	0	115	144	0	6	140
Future Volume (Veh/h)	0	115	144	0	6	140
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	115	144	0	6	140
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			115		346	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			115		346	58
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		99	86
cM capacity (veh/h)			1474		588	1009
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	115	144	0	6	140	
Volume Left	0	144	0	6	0	
Volume Right	115	0	0	0	140	
cSH	1700	1474	1700	588	1009	
Volume to Capacity	0.07	0.10	0.00	0.01	0.14	
Queue Length 95th (m)	0.0	2.5	0.0	0.2	3.7	
Control Delay (s)	0.0	7.7	0.0	11.2	9.1	
Lane LOS		A		B	A	
Approach Delay (s)	0.0	7.7		9.2		
Approach LOS				A		
Intersection Summary						
Average Delay			6.1			
Intersection Capacity Utilization			24.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

10: Bronte Road & Avenue One

07-08-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	182	326	72	2310	925	48
Future Volume (vph)	182	326	72	2310	925	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	4.0	4.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1601	3471	5142	5142	1601
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1789	1601	3471	5142	5142	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	182	326	72	2310	925	48
RTOR Reduction (vph)	0	66	0	0	0	16
Lane Group Flow (vph)	182	260	72	2310	925	32
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	19.6	28.1	8.5	106.4	93.9	93.9
Effective Green, g (s)	19.6	28.1	8.5	106.4	93.9	93.9
Actuated g/C Ratio	0.14	0.20	0.06	0.76	0.67	0.67
Clearance Time (s)	7.0	4.0	4.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	250	321	210	3907	3448	1073
v/s Ratio Prot	0.10	c0.05	0.02	c0.45	0.18	
v/s Ratio Perm		0.11				0.02
v/c Ratio	0.73	0.81	0.34	0.59	0.27	0.03
Uniform Delay, d1	57.6	53.4	63.1	7.3	9.3	7.7
Progression Factor	1.00	1.00	1.05	0.67	0.97	0.91
Incremental Delay, d2	10.1	13.9	0.6	0.4	0.2	0.1
Delay (s)	67.8	67.3	66.8	5.3	9.2	7.1
Level of Service	E	E	E	A	A	A
Approach Delay (s)	67.5			7.1	9.1	
Approach LOS	E			A	A	
Intersection Summary						
HCM 2000 Control Delay			15.6	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			140.0	Sum of lost time (s)		18.0
Intersection Capacity Utilization			66.4%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

20: Tremaine Rd & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	60	429	25	86	15	645	131	33	892	0
Future Volume (vph)	10	30	60	429	25	86	15	645	131	33	892	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.88		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1695		1789	1665		1789	3488		1789	3579	
Flt Permitted	0.69	1.00		0.70	1.00		0.24	1.00		0.30	1.00	
Satd. Flow (perm)	1291	1695		1316	1665		456	3488		565	3579	
Peak-hour factor, PHF	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. Flow (vph)	10	30	60	429	25	86	15	645	131	33	892	0
RTOR Reduction (vph)	0	31	0	0	54	0	0	23	0	0	0	0
Lane Group Flow (vph)	10	59	0	429	57	0	15	753	0	33	892	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.2	26.2		26.2	26.2		29.8	29.8		29.8	29.8	
Effective Green, g (s)	26.2	26.2		26.2	26.2		29.8	29.8		29.8	29.8	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.43	0.43		0.43	0.43	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	483	634		492	623		194	1484		240	1523	
v/s Ratio Prot		0.04			0.03			0.22			c0.25	
v/s Ratio Perm	0.01			c0.33			0.03			0.06		
v/c Ratio	0.02	0.09		0.87	0.09		0.08	0.51		0.14	0.59	
Uniform Delay, d1	13.8	14.2		20.3	14.2		11.9	14.7		12.3	15.4	
Progression Factor	1.00	1.00		0.73	0.17		1.48	1.84		0.74	0.75	
Incremental Delay, d2	0.0	0.1		15.2	0.1		0.6	1.0		1.2	1.6	
Delay (s)	13.8	14.3		30.1	2.5		18.3	28.1		10.2	13.1	
Level of Service	B	B		C	A		B	C		B	B	
Approach Delay (s)		14.2			24.4			27.9			13.0	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			20.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			69.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

22: Avenue two & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	395	68	178	528	137	35	28	130	382	85	65
Future Volume (vph)	23	395	68	178	528	137	35	28	130	382	85	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.46	1.00	1.00	0.52	1.00	1.00	0.70	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	859	3579	1601	977	3579	1601	1322	1883	1601	1392	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	23	395	68	178	528	137	35	28	130	382	85	65
RTOR Reduction (vph)	0	0	36	0	0	73	0	0	87	0	0	43
Lane Group Flow (vph)	23	395	32	178	528	64	35	28	43	382	85	22
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	32.8	32.8	32.8	32.8	32.8	32.8	23.2	23.2	23.2	23.2	23.2	23.2
Effective Green, g (s)	32.8	32.8	32.8	32.8	32.8	32.8	23.2	23.2	23.2	23.2	23.2	23.2
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	402	1677	750	457	1677	750	438	624	530	461	624	530
v/s Ratio Prot		0.11			0.15			0.01			0.05	
v/s Ratio Perm	0.03		0.02	c0.18		0.04	0.03		0.03	c0.27		0.01
v/c Ratio	0.06	0.24	0.04	0.39	0.31	0.09	0.08	0.04	0.08	0.83	0.14	0.04
Uniform Delay, d1	10.2	11.1	10.1	12.1	11.6	10.3	16.1	15.9	16.1	21.6	16.4	15.9
Progression Factor	1.42	1.39	2.60	1.14	1.10	3.27	1.21	1.20	2.22	0.69	0.72	0.40
Incremental Delay, d2	0.3	0.3	0.1	2.4	0.5	0.2	0.1	0.0	0.1	11.7	0.1	0.0
Delay (s)	14.7	15.8	26.3	16.1	13.2	33.9	19.5	19.1	35.7	26.5	12.0	6.4
Level of Service	B	B	C	B	B	C	B	B	D	C	B	A
Approach Delay (s)		17.2			17.2			30.4			21.7	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			68.3%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

24: Avenue Three & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1133	85	168	670	155	75	16	103	638	67	177
Future Volume (vph)	43	1133	85	168	670	155	75	16	103	638	67	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3541		1789	3579	1601	1789	1883	1601	3471	1679	
Flt Permitted	0.40	1.00		0.09	1.00	1.00	0.61	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	748	3541		161	3579	1601	1144	1883	1601	3471	1679	
Peak-hour factor, PHF	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. Flow (vph)	43	1133	85	168	670	155	75	16	103	638	67	177
RTOR Reduction (vph)	0	3	0	0	0	34	0	0	92	0	79	0
Lane Group Flow (vph)	43	1215	0	168	670	121	75	16	11	638	165	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8		8			
Actuated Green, G (s)	60.8	60.8		78.8	78.8	78.8	15.0	15.0	15.0	28.2	47.2	
Effective Green, g (s)	60.8	60.8		78.8	78.8	78.8	15.0	15.0	15.0	28.2	47.2	
Actuated g/C Ratio	0.43	0.43		0.56	0.56	0.56	0.11	0.11	0.11	0.20	0.34	
Clearance Time (s)	7.0	7.0		4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	324	1537		253	2014	901	122	201	171	699	566	
v/s Ratio Prot		c0.34		c0.07	0.19			0.01		c0.18	0.10	
v/s Ratio Perm	0.06			0.31		0.08	c0.07		0.01			
v/c Ratio	0.13	0.79		0.66	0.33	0.13	0.61	0.08	0.06	0.91	0.29	
Uniform Delay, d1	23.8	34.1		25.8	16.5	14.5	59.7	56.3	56.2	54.7	34.1	
Progression Factor	0.93	0.91		1.83	1.66	2.42	0.81	0.79	0.87	1.00	1.00	
Incremental Delay, d2	0.8	4.1		6.2	0.4	0.3	8.8	0.2	0.2	13.3	0.2	
Delay (s)	22.9	35.1		53.3	27.7	35.3	56.9	44.6	48.8	67.9	34.3	
Level of Service	C	D		D	C	D	E	D	D	E	C	
Approach Delay (s)		34.7			33.2			51.6			58.6	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			41.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)				22.0		
Intersection Capacity Utilization			88.2%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

26: Avenue Five & Burnhamthorpe Road

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1738	89	70	671	55	36	19	101	249	61	292
Future Volume (vph)	107	1738	89	70	671	55	36	19	101	249	61	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3552		1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.38	1.00		0.07	1.00	1.00	0.72	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	724	3552		140	3579	1601	1351	1883	1601	1403	1883	1601
Peak-hour factor, PHF	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. Flow (vph)	107	1738	89	70	671	55	36	19	101	249	61	292
RTOR Reduction (vph)	0	3	0	0	0	14	0	0	31	0	0	236
Lane Group Flow (vph)	107	1824	0	70	671	41	36	19	70	249	61	56
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	99.1	99.1		99.1	99.1	99.1	26.9	26.9	26.9	26.9	26.9	26.9
Effective Green, g (s)	99.1	99.1		99.1	99.1	99.1	26.9	26.9	26.9	26.9	26.9	26.9
Actuated g/C Ratio	0.71	0.71		0.71	0.71	0.71	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	512	2514		99	2533	1133	259	361	307	269	361	307
v/s Ratio Prot		c0.51			0.19			0.01			0.03	
v/s Ratio Perm	0.15			0.50		0.03	0.03		0.04	c0.18		0.04
v/c Ratio	0.21	0.73		0.71	0.26	0.04	0.14	0.05	0.23	0.93	0.17	0.18
Uniform Delay, d1	7.0	12.3		12.0	7.4	6.1	46.9	46.2	47.8	55.6	47.2	47.3
Progression Factor	1.41	1.09		2.77	2.97	4.78	1.07	1.10	1.13	1.10	1.11	1.87
Incremental Delay, d2	0.6	1.2		32.7	0.2	0.1	0.2	0.1	0.4	35.3	0.2	0.3
Delay (s)	10.5	14.6		65.8	22.1	29.4	50.5	50.9	54.6	96.3	52.7	88.9
Level of Service	B	B		E	C	C	D	D	D	F	D	F
Approach Delay (s)		14.4			26.4			53.2			88.3	
Approach LOS		B			C			D			F	
Intersection Summary												
HCM 2000 Control Delay			31.6									
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			140.0									
Intersection Capacity Utilization			97.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour 28: Bronte Rd/Bronte Road & Burnhamthorpe Road/William Halton Parkway 07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	453	492	1245	180	177	507	395	1402	70	214	872	186
Future Volume (vph)	453	492	1245	180	177	507	395	1402	70	214	872	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	3579	1601	1825	3579	1633	3471	5245	1633	3541	5245	1601
Flt Permitted	0.48	1.00	1.00	0.47	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	913	3579	1601	907	3579	1633	3471	5245	1633	3541	5245	1601
Peak-hour factor, PHF	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. Flow (vph)	453	492	1245	180	177	507	395	1402	70	214	872	186
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	38	0	0	37
Lane Group Flow (vph)	453	492	1245	180	177	439	395	1402	32	214	872	149
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA	Free	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases	4		Free	8		8			2			6
Actuated Green, G (s)	46.0	28.1	140.0	26.4	12.5	38.8	21.1	49.7	63.6	26.3	54.9	84.4
Effective Green, g (s)	46.0	28.1	140.0	26.4	12.5	38.8	21.1	49.7	63.6	26.3	54.9	84.4
Actuated g/C Ratio	0.33	0.20	1.00	0.19	0.09	0.28	0.15	0.36	0.45	0.19	0.39	0.60
Clearance Time (s)	4.0	7.0		4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	484	718	1601	262	319	452	523	1861	741	665	2056	965
v/s Ratio Prot	c0.20	0.14		0.07	0.05	c0.18	0.11	0.27	0.00	0.06	0.17	0.03
v/s Ratio Perm	0.11		c0.78	0.06		0.09			0.02			0.06
v/c Ratio	0.94	0.69	0.78	0.69	0.55	0.97	0.76	0.75	0.04	0.32	0.42	0.15
Uniform Delay, d1	42.7	51.9	0.0	51.1	61.1	50.1	57.0	39.8	21.3	49.1	31.0	12.2
Progression Factor	0.80	0.86	1.00	1.00	1.00	1.00	0.88	0.73	4.97	1.22	0.98	0.57
Incremental Delay, d2	20.2	1.9	2.7	7.3	2.1	34.8	2.7	1.2	0.0	0.3	0.6	0.1
Delay (s)	54.5	46.6	2.7	58.4	63.2	84.8	52.6	30.4	105.7	60.0	30.9	7.0
Level of Service	D	D	A	E	E	F	D	C	F	E	C	A
Approach Delay (s)		23.3			74.9			37.9			32.3	
Approach LOS		C			E			D			C	
Intersection Summary												
HCM 2000 Control Delay			36.7			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			96.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 2030 Phase 2A FT Sensitivity> PM Peak Hour

31: Avenue two & Street Four

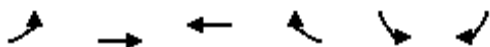
07-08-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	248	77	116	142	37	294
Future Volume (Veh/h)	248	77	116	142	37	294
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	248	77	116	142	37	294
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			155			267
pX, platoon unblocked						
vC, conflicting volume	484	116			258	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	116			258	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	53	92			97	
cM capacity (veh/h)	526	936			1307	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	
Volume Total	248	77	116	142	331	
Volume Left	248	0	0	0	37	
Volume Right	0	77	0	142	0	
cSH	526	936	1700	1700	1307	
Volume to Capacity	0.47	0.08	0.07	0.08	0.03	
Queue Length 95th (m)	19.0	2.0	0.0	0.0	0.7	
Control Delay (s)	17.8	9.2	0.0	0.0	1.1	
Lane LOS	C	A			A	
Approach Delay (s)	15.7		0.0		1.1	
Approach LOS	C					
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			44.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

38: Dundas Street West/Dundas St W & Tremaine Rd

07-08-2020

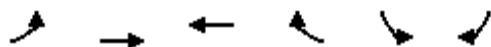


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	↑↑↑	↑	←←	↑
Traffic Volume (vph)	525	913	2365	271	181	1201
Future Volume (vph)	525	913	2365	271	181	1201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	0.0
Lane Util. Factor	0.97	*0.80	*0.80	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3506	4476	4476	1601	3541	1570
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3506	4476	4476	1601	3541	1570
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	525	913	2365	271	181	1201
RTOR Reduction (vph)	0	0	0	49	0	0
Lane Group Flow (vph)	525	913	2365	222	181	1201
Heavy Vehicles (%)	1%	3%	3%	2%	0%	4%
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	5	2	6		8	
Permitted Phases				6		Free
Actuated Green, G (s)	28.5	113.7	81.2	81.2	12.3	140.0
Effective Green, g (s)	29.5	117.7	85.2	85.2	16.3	140.0
Actuated g/C Ratio	0.21	0.84	0.61	0.61	0.12	1.00
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.5	5.5	5.5	2.5	
Lane Grp Cap (vph)	738	3763	2723	974	412	1570
v/s Ratio Prot	0.15	0.20	c0.53		0.05	
v/s Ratio Perm				0.14		c0.76
v/c Ratio	0.71	0.24	0.87	0.23	0.44	0.76
Uniform Delay, d1	51.3	2.2	22.7	12.4	57.6	0.0
Progression Factor	1.00	1.00	0.74	1.15	1.01	1.00
Incremental Delay, d2	3.2	0.2	2.5	0.3	0.4	2.8
Delay (s)	54.5	2.4	19.3	14.6	58.6	2.8
Level of Service	D	A	B	B	E	A
Approach Delay (s)		21.4	18.8		10.1	
Approach LOS		C	B		B	
Intersection Summary						
HCM 2000 Control Delay			17.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			140.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			79.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

40: Dundas St W & Avenue two

07-08-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	98	996	2415	160	321	221
Future Volume (vph)	98	996	2415	160	321	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Lane Util. Factor	1.00	*0.80	*0.80	1.00	0.97	0.91
Frt	1.00	1.00	1.00	0.85	0.98	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1789	4520	4520	1601	3431	1457
Flt Permitted	0.04	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	78	4520	4520	1601	3431	1457
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	98	996	2415	160	321	221
RTOR Reduction (vph)	0	0	0	41	10	2
Lane Group Flow (vph)	98	996	2415	119	362	168
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	105.9	105.9	92.8	92.8	20.1	29.2
Effective Green, g (s)	105.9	105.9	92.8	92.8	20.1	29.2
Actuated g/C Ratio	0.76	0.76	0.66	0.66	0.14	0.21
Clearance Time (s)	4.0	7.0	7.0	7.0	7.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	3419	2996	1061	492	303
v/s Ratio Prot	c0.04	0.22	c0.53		c0.11	0.04
v/s Ratio Perm	0.40			0.07		0.08
v/c Ratio	0.58	0.29	0.81	0.11	0.74	0.55
Uniform Delay, d1	32.1	5.3	17.1	8.6	57.4	49.6
Progression Factor	0.71	1.13	0.82	1.41	0.99	0.95
Incremental Delay, d2	4.6	0.2	1.4	0.1	5.6	2.2
Delay (s)	27.3	6.2	15.4	12.2	62.4	49.5
Level of Service	C	A	B	B	E	D
Approach Delay (s)		8.1	15.2		58.3	
Approach LOS		A	B		E	

Intersection Summary

HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

42: Colonel William Pkwy/Avenue Three & Dundas St W

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	42	1151	95	104	2162	193	243	9	62	372	28	130
Future Volume (vph)	42	1151	95	104	2162	193	243	9	62	372	28	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	4476	1570	1825	4476	1633	1753	1921	1504	1787	1921	1611
Flt Permitted	0.05	1.00	1.00	0.15	1.00	1.00	0.74	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	104	4476	1570	279	4476	1633	1364	1921	1504	1246	1921	1611
Peak-hour factor, PHF	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. Flow (vph)	42	1151	95	104	2162	193	243	9	62	372	28	130
RTOR Reduction (vph)	0	0	45	0	0	54	0	0	49	0	0	65
Lane Group Flow (vph)	42	1151	50	104	2162	139	243	9	13	372	28	65
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	0%	3%	4%	0%	3%	0%	4%	0%	7%	2%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	78.7	73.7	73.7	85.3	77.0	77.0	29.6	29.6	29.6	40.6	40.6	40.6
Effective Green, g (s)	78.7	73.7	73.7	85.3	77.0	77.0	29.6	29.6	29.6	40.6	40.6	40.6
Actuated g/C Ratio	0.56	0.53	0.53	0.61	0.55	0.55	0.21	0.21	0.21	0.29	0.29	0.29
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7	6.7	6.7	6.7	6.7	4.0	6.7	6.7
Vehicle Extension (s)	2.5	5.0	5.0	3.0	5.0	5.0	3.5	3.5	3.5	3.0	0.2	0.2
Lane Grp Cap (vph)	119	2356	826	261	2461	898	288	406	317	388	557	467
v/s Ratio Prot	0.01	0.26		c0.02	c0.48			0.00		c0.05	0.01	
v/s Ratio Perm	0.18		0.03	0.22		0.09	0.18		0.01	c0.23		0.04
v/c Ratio	0.35	0.49	0.06	0.40	0.88	0.16	0.84	0.02	0.04	0.96	0.05	0.14
Uniform Delay, d1	25.1	21.1	16.2	13.4	27.4	15.5	53.0	43.7	43.9	49.2	35.8	36.8
Progression Factor	1.28	0.61	0.10	1.06	0.73	0.96	1.00	1.00	1.00	1.09	1.04	1.34
Incremental Delay, d2	1.3	0.7	0.1	0.7	3.4	0.2	20.1	0.0	0.1	33.5	0.0	0.0
Delay (s)	33.3	13.6	1.8	14.9	23.5	15.2	73.0	43.8	44.0	87.3	37.4	49.3
Level of Service	C	B	A	B	C	B	E	D	D	F	D	D
Approach Delay (s)		13.4			22.5			66.5			75.4	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			29.0				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			21.4		
Intersection Capacity Utilization			88.6%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

44: Valleyridge Dr/Avenue Five & Dundas St W

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 		  	 	
Traffic Volume (vph)	42	1475	65	44	2278	120	61	4	25	319	15	119
Future Volume (vph)	42	1475	65	44	2278	120	61	4	25	319	15	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	4476	1601	1772	4611	1633	1789	1668		3471	1633	
Flt Permitted	0.05	1.00	1.00	0.10	1.00	1.00	0.67	1.00		0.95	1.00	
Satd. Flow (perm)	85	4476	1601	193	4611	1633	1264	1668		3471	1633	
Peak-hour factor, PHF	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. Flow (vph)	42	1475	65	44	2278	120	61	4	25	319	15	119
RTOR Reduction (vph)	0	0	24	0	0	45	0	24	0	0	105	0
Lane Group Flow (vph)	42	1475	41	44	2278	75	61	5	0	319	29	0
Heavy Vehicles (%)	3%	3%	2%	3%	0%	0%	2%	2%	0%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					
Actuated Green, G (s)	93.1	87.7	87.7	93.3	87.8	87.8	14.2	6.1		18.7	16.7	
Effective Green, g (s)	93.1	87.7	87.7	93.3	87.8	87.8	14.2	6.1		18.7	16.7	
Actuated g/C Ratio	0.66	0.63	0.63	0.67	0.63	0.63	0.10	0.04		0.13	0.12	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	5.0		3.0	3.0	
Lane Grp Cap (vph)	121	2803	1002	190	2891	1024	158	72		463	194	
v/s Ratio Prot	c0.01	0.33		0.01	c0.49		0.02	0.00		c0.09	0.02	
v/s Ratio Perm	0.22		0.03	0.15		0.05	c0.02					
v/c Ratio	0.35	0.53	0.04	0.23	0.79	0.07	0.39	0.07		0.69	0.15	
Uniform Delay, d1	19.8	14.6	10.0	9.8	19.2	10.2	58.5	64.2		57.9	55.3	
Progression Factor	2.27	0.80	1.00	1.14	0.79	1.36	1.00	1.00		0.98	1.09	
Incremental Delay, d2	1.4	0.6	0.1	0.3	1.2	0.1	1.6	0.9		4.1	0.4	
Delay (s)	46.3	12.3	10.1	11.5	16.4	13.9	60.1	65.1		61.1	60.9	
Level of Service	D	B	B	B	B	B	E	E		E	E	
Approach Delay (s)		13.1			16.2			61.7			61.1	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			20.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			76.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis <2030 Phase 2A FT Sensitivity> PM Peak Hour

46: Bronte Rd & Dundas St W

07-08-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	1100	614	292	1500	299	629	1350	207	715	1300	261
Future Volume (vph)	218	1100	614	292	1500	299	629	1350	207	715	1300	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.0	2.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	*0.80	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	4476	1586	1755	5142	1570	3471	5092	1445	3471	5043	1601
Flt Permitted	0.11	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4476	1586	184	5142	1570	3471	5092	1445	3471	5043	1601
Peak-hour factor, PHF	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. Flow (vph)	218	1100	614	292	1500	299	629	1350	207	715	1300	261
RTOR Reduction (vph)	0	0	49	0	0	88	0	0	91	0	0	107
Lane Group Flow (vph)	218	1100	565	292	1500	211	629	1350	116	715	1300	154
Confl. Peds. (#/hr)			4	4								
Heavy Vehicles (%)	2%	3%	2%	4%	2%	4%	2%	3%	13%	2%	4%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Actuated Green, G (s)	48.1	36.1	62.8	59.0	43.0	43.0	26.7	36.0	36.0	27.0	36.3	36.3
Effective Green, g (s)	50.1	38.1	66.8	60.0	45.0	45.0	27.7	38.0	38.0	28.0	38.3	38.3
Actuated g/C Ratio	0.36	0.27	0.48	0.43	0.32	0.32	0.20	0.27	0.27	0.20	0.27	0.27
Clearance Time (s)	4.0	7.0	4.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	2.5	6.0	2.5	2.5	6.0	6.0	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	230	1218	756	302	1652	504	686	1382	392	694	1379	437
v/s Ratio Prot	0.09	0.25	0.15	c0.14	0.29		0.18	c0.27		c0.21	0.26	
v/s Ratio Perm	0.25		0.20	c0.28		0.13			0.08			0.10
v/c Ratio	0.95	0.90	0.75	0.97	0.91	0.42	0.92	0.98	0.30	1.03	0.94	0.35
Uniform Delay, d1	36.7	49.2	29.7	42.8	45.5	37.3	55.0	50.6	40.4	56.0	49.8	40.9
Progression Factor	1.49	1.17	0.73	1.00	1.00	1.00	1.00	1.00	1.00	0.92	1.07	1.24
Incremental Delay, d2	41.3	9.9	3.4	42.4	8.9	2.6	17.0	18.8	0.6	38.1	10.8	0.5
Delay (s)	96.1	67.4	25.1	85.2	54.4	39.8	72.1	69.3	41.0	89.6	63.8	51.4
Level of Service	F	E	C	F	D	D	E	E	D	F	E	D
Approach Delay (s)		57.2			56.6			67.4			70.5	
Approach LOS		E			E			E			E	
Intersection Summary												
HCM 2000 Control Delay			63.3				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			107.7%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

APPENDIX

E

TRAFFIC

MODEL

COMPONENTS

APPENDIX

APPENDIX

***E-1** AM PEAK HOUR COMPONENTS*

APPENDIX

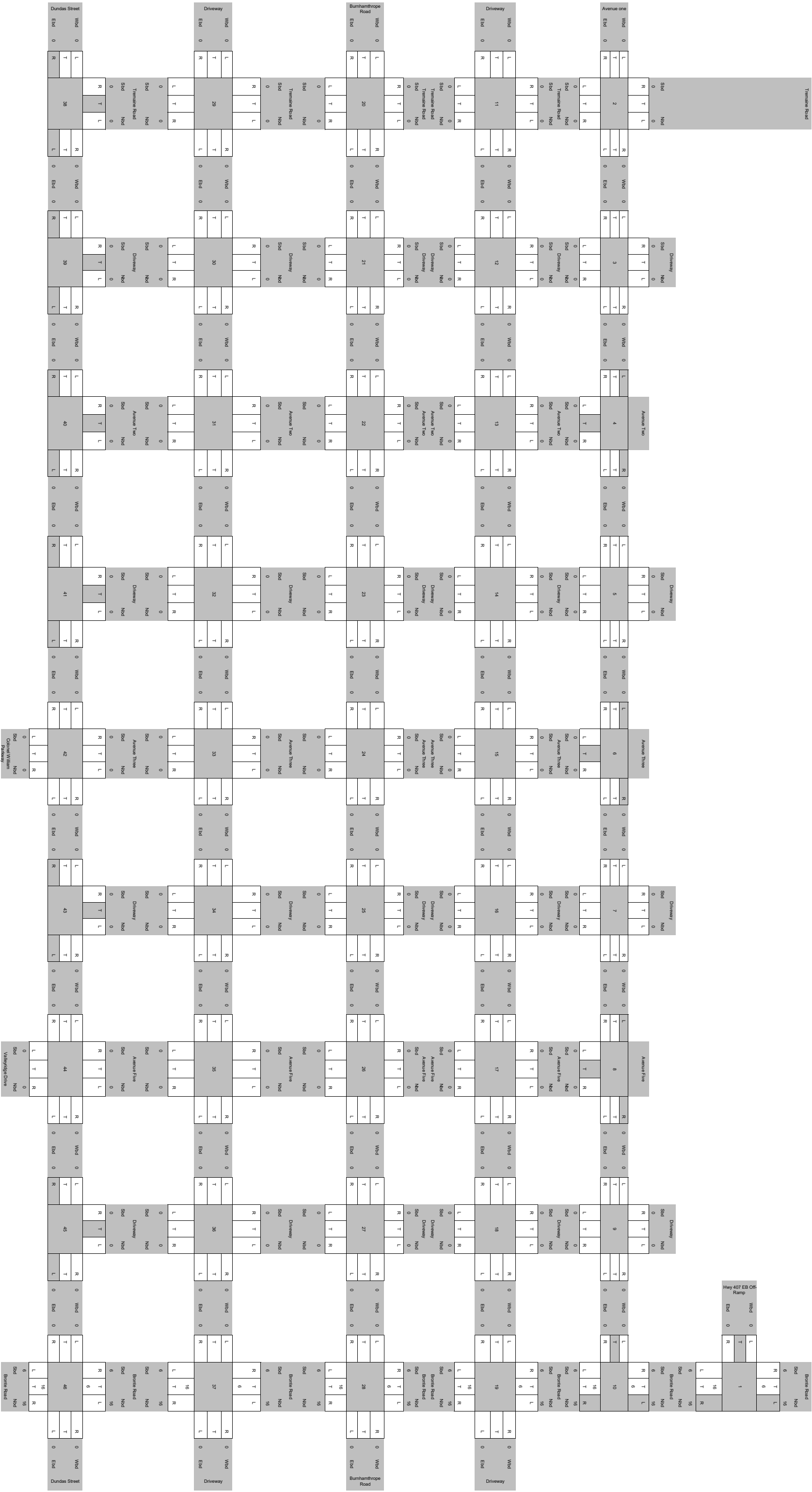


Figure X
2390 Khalsa Gate Background Development - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

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	T			
	Evd	0	R	

	R	T	L

	L	F	R

	30	Sld	Nkd

	5	Sld	Nkd

	30	Sld	Nkd

	30	Sld	Nkd

	30	Sld	Nkd

	30	Sld	Nkd

	30	Sld	Nkd

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	30	Sld	Nkd

	30	Sld	Nkd

	30	Sld	Nkd

	30	Sld	Nkd

	30	Sld	Nkd

Figure X
Evergreen and Adjacent Lands Background Development - Phase 1 2025 Horizon Year - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

WSP | 700 West Beaver Creek, Richmond Hill, ON

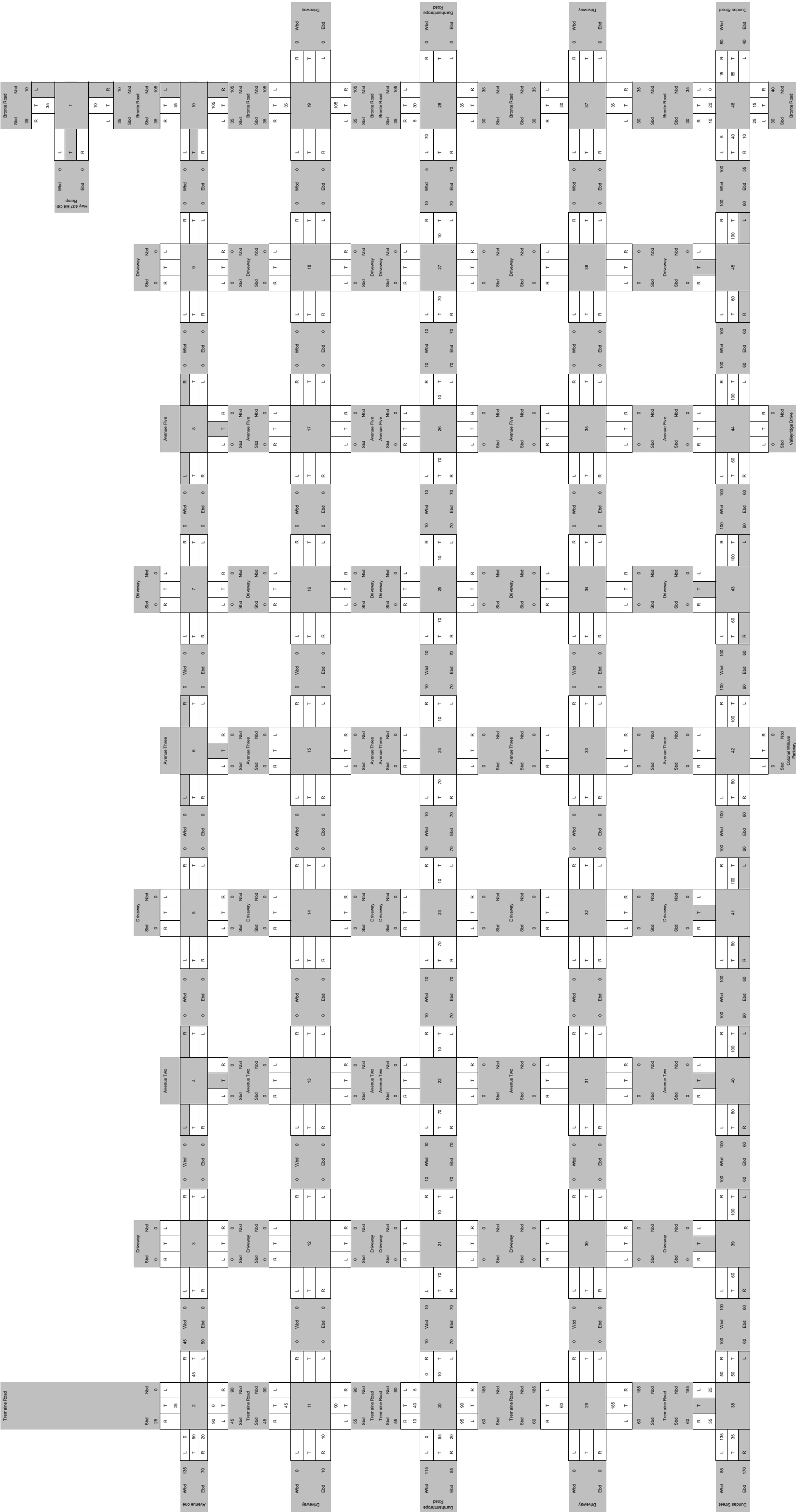


Figure X
Evergreen and Adjacent Lands Background Development - Phase 1&2 2030 Horizon Year - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Scale: NTS

1:100,000 Scale

[illegible]

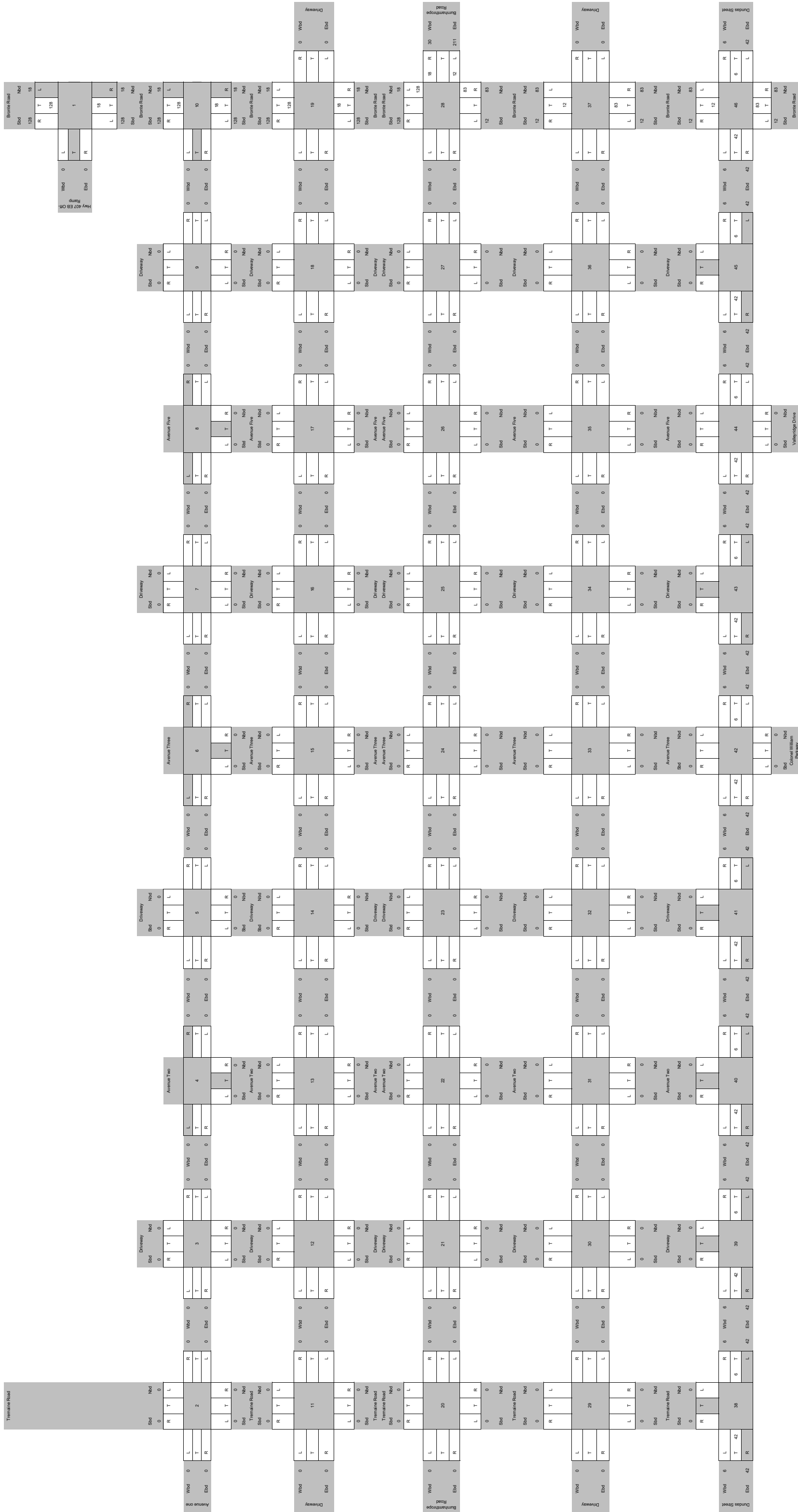
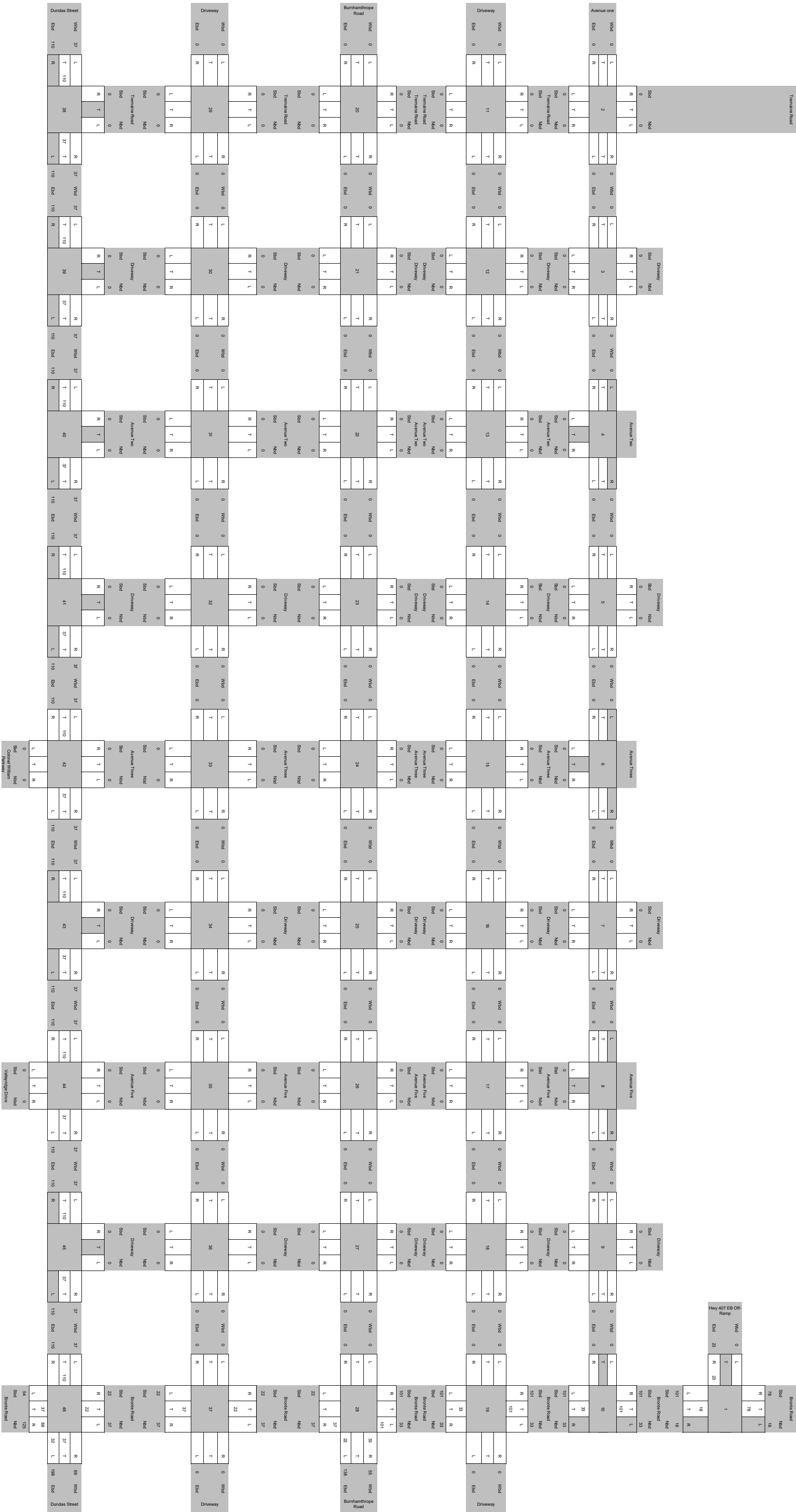


Figure X
Hilton Region Courthouse Background Development 2030 Horizon Year - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



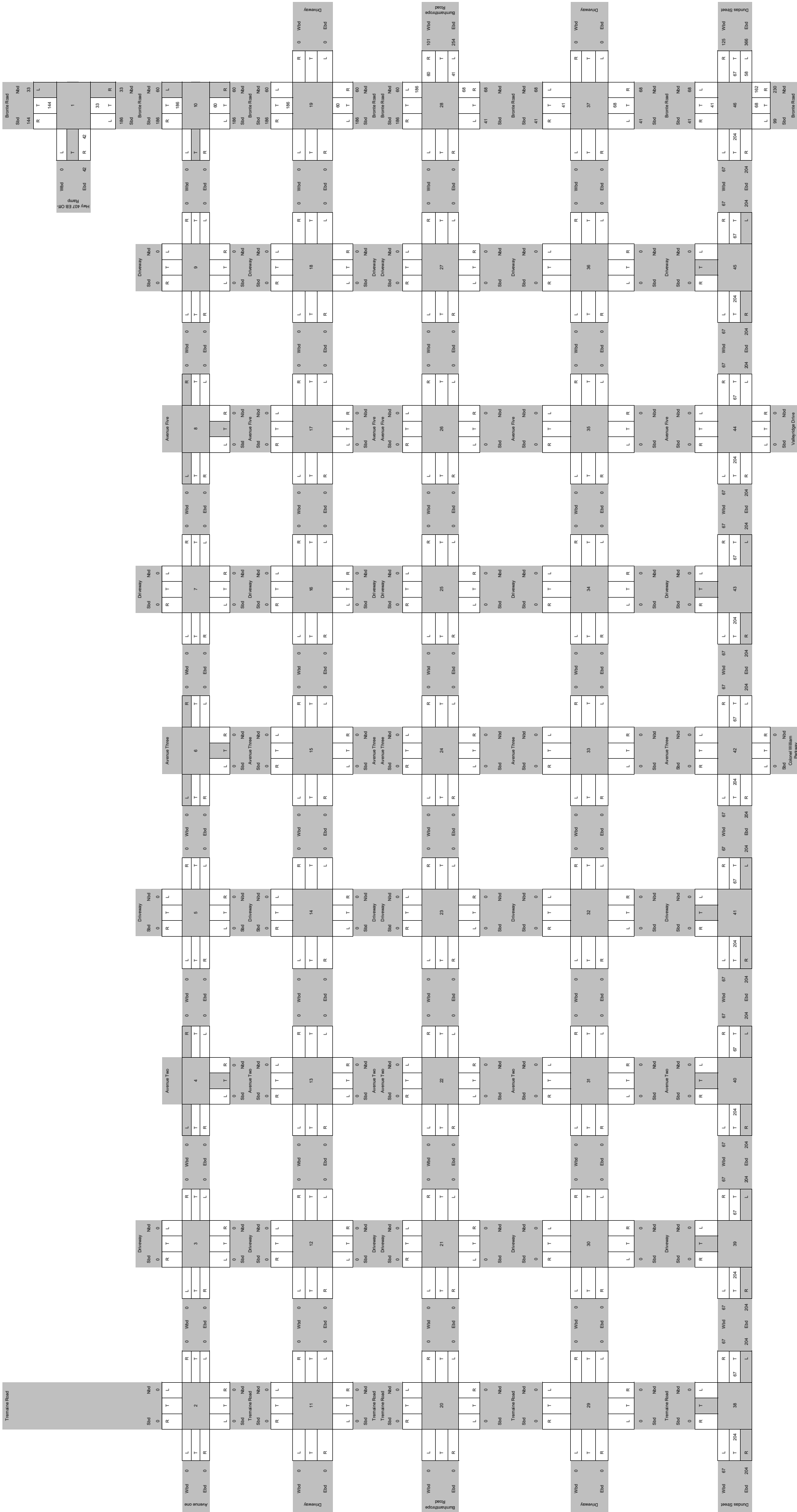


Figure X
Oakville Green Life Sciences and Technology District (ORC Parcel 1) Background Development 2030 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

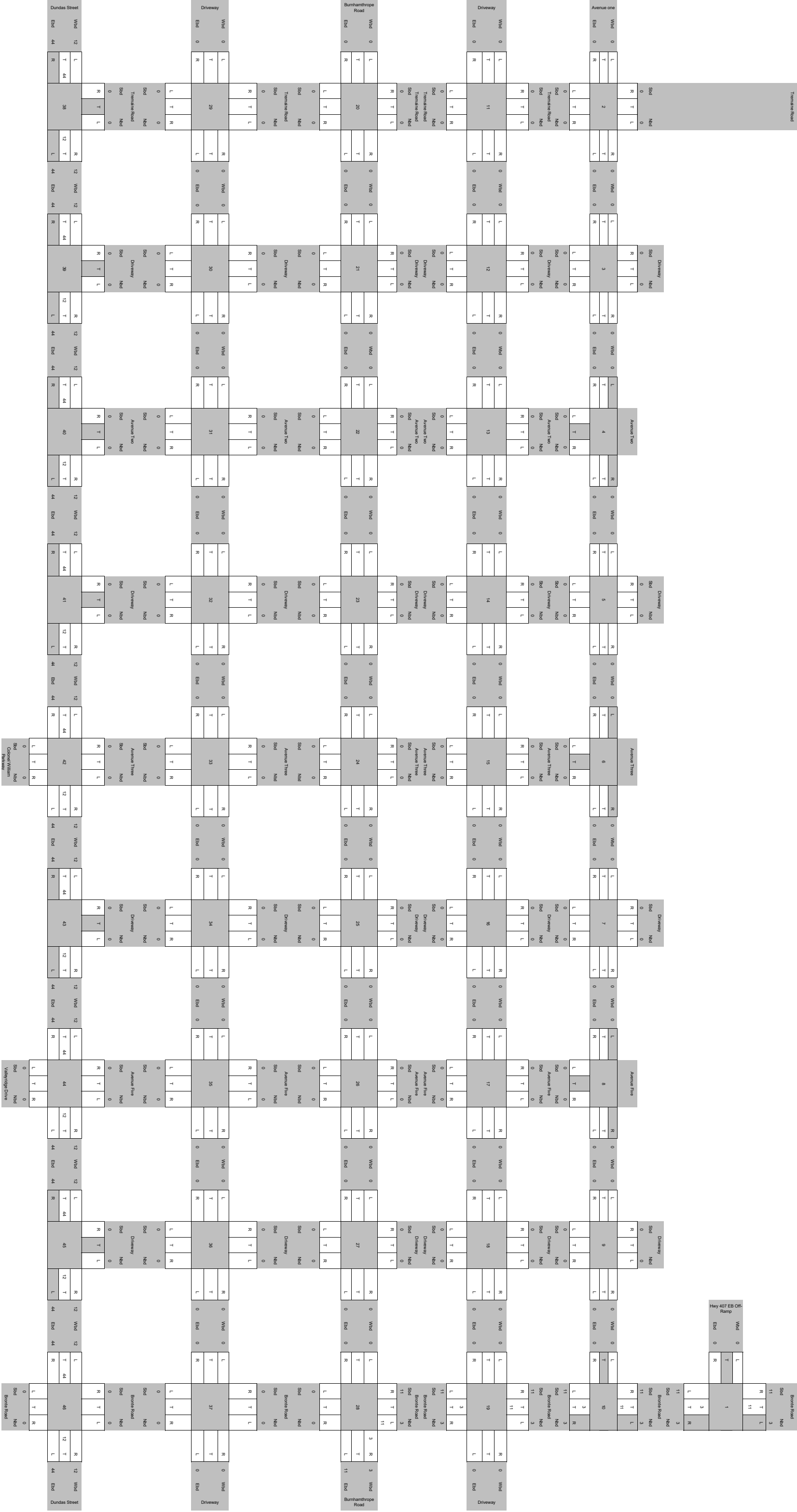


Figure X
ErinOak Kids Centre Background Development - Weekly AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

WSP

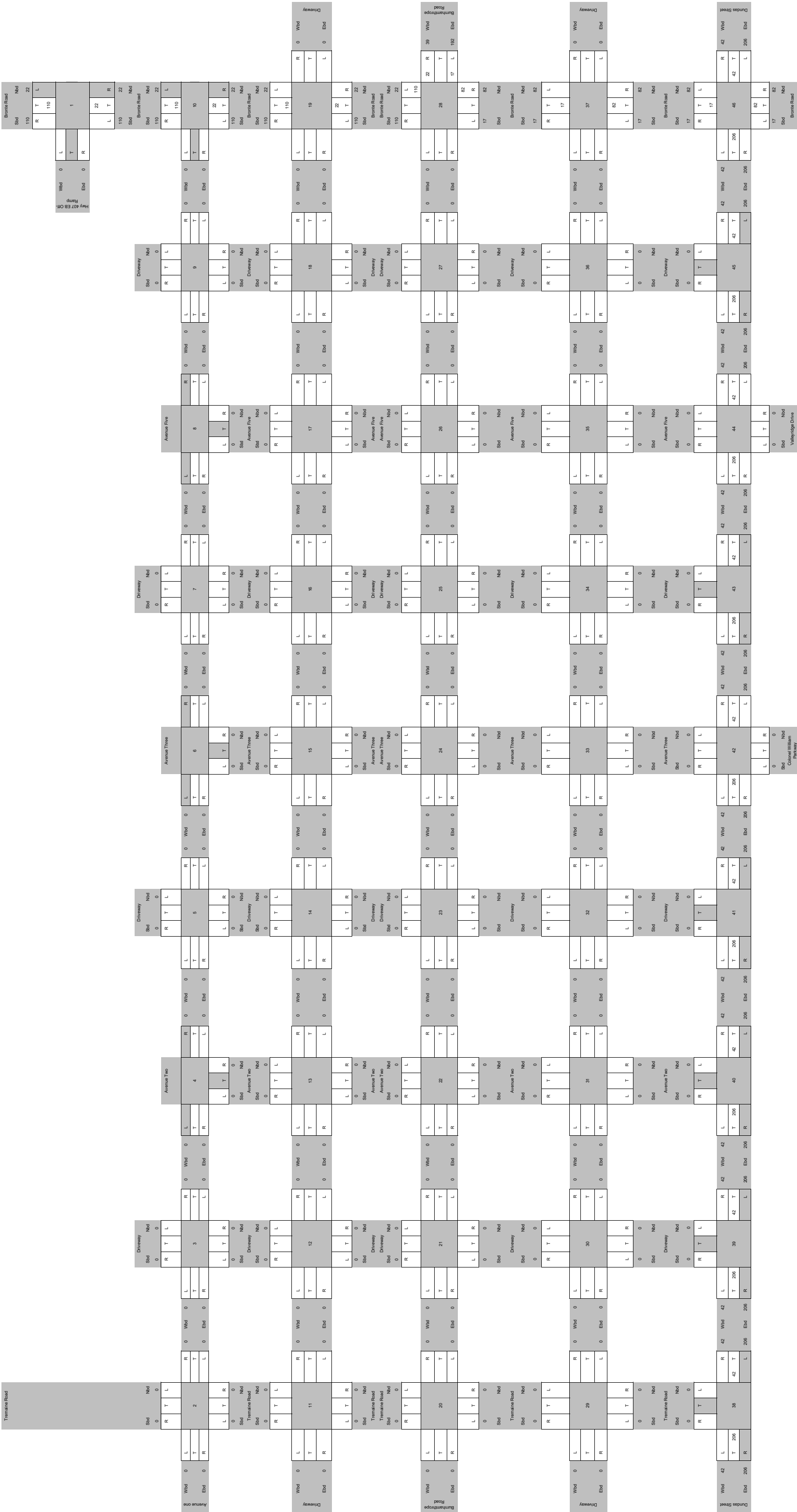
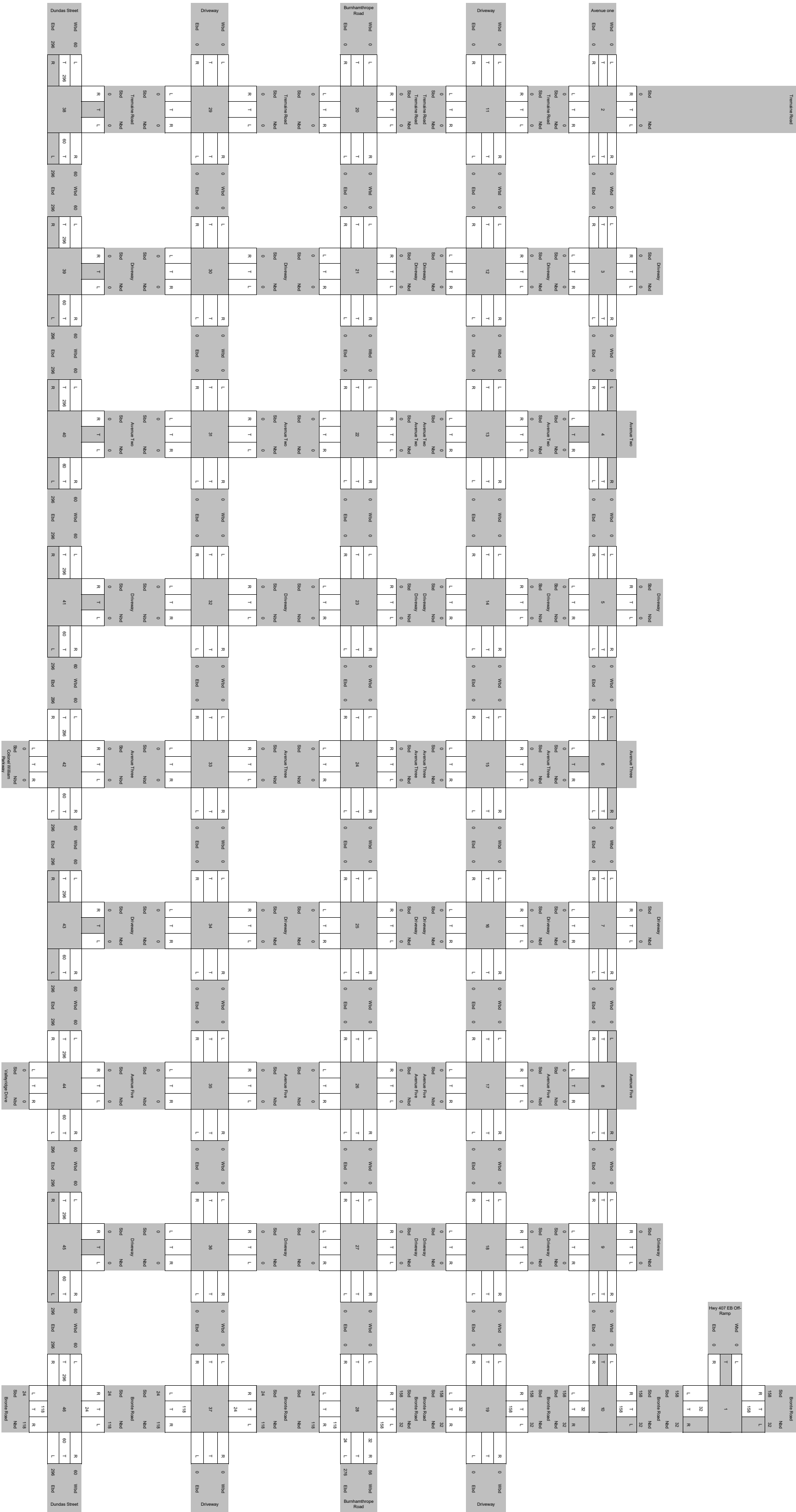


Figure X
ORC Lands Parcels 2 & 6-10 Background Development 2025 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



Surrounding 407 Employment Lands Trip Generation Breakdown per Group

Trip Assignment Notes:

The trip assignment for the 407 employments lands (site and surrounding 407 background developments) have been distributed along the driveways based on the Blocks layout. The trip generation for each block is based on a percentage of the overall trip generation (per land use) for the site or surrounding background 407 lands, with the percentage of the trip generation derived based on the percentage of the block GFA compared to the overall GFA used for the trip gen.

407 Background Lands Trip Gen per block sharing a driveway (to be applied to 2031 horizon year):

Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18	Group 19	Group 20	Group 21	Group 22
C3-4	C1	G2-1	G3-1	G1-1	C4-3	C6	G7	C7	C8	G8	G9	P5	P4
	P8	G2-2	C2-1	G1-2		G6			G10				
	G3	G2-3		P1					P6				

Percentage of Trip Gen for these blocks: Rounded up to match overall trip gen values

Group 9										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C3-4	Service Area Employment	Shopping Centre	23,130	8%	15	9	24	27	34	61
		Shopping Centre Pass-By	23,130	8%	0	0	0	16	15	31
		General Office	12,455	8%	15	2	17	2	10	12
		Total Primary				30	11	41	29	44
Total Pass-By					0	0	0	16	15	31

Group 10										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C1	Service Area Employment	Shopping Centre	85,875	29%	54	33	87	102	121	223
		Shopping Centre Pass-By	85,875	29%	0	0	0	58	58	116
		General Office	46,241	29%	55	8	63	7	40	47
P8	Light Employment	General Office	150,157	9%	133	19	152	26	120	146
G3	General Employment	Business Park	138,122	10%	133	23	156	35	100	135
Total Primary					375	83	458	170	381	551
Total Pass-By					0	0	0	58	58	116

Group 11										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G2-1	General Employment	Business Park	163,956	12%	157	29	186	41	119	160
G2-2	General Employment	Business Park	123,656	9%	119	22	141	31	90	121
G2-3	General Employment	Business Park	121,934	9%	117	20	137	31	87	118
Total					393	71	464	103	296	399

Group 12										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C2-1	Light Employment	General Office	33,906	2%	30	4	34	6	27	33
G3-1	General Employment	Business Park	57,867	4%	56	9	65	15	41	56
Total					86	13	99	21	68	89

Group 13 For Phase 2 - Broken Down Within the Excel Sheets as 13-1 (Block G1-1 & G1-2) and 13-2 (Block P1) as Block P1 would be across the river crossing

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
P1	Light Employment	General Office	146,389	8%	131	18	149	26	118	144
G1-1	General Employment	Business Park	181,178	13%	174	30	204	46	130	176
G1-2	General Employment	Business Park	118,145	8%	114	20	134	30	86	116
Total					419	68	487	102	334	436

Group 14										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C4-3	Service Area Employment	Shopping Centre	41,475	14%	26	16	42	49	59	108
		Shopping Centre Pass-By	41,475	14%	0	0	0	28	28	56
		General Office	22,333	14%	27	3	30	4	19	23
Total Primary					53	19	72	53	78	131
Total Pass-By					0	0	0	28	28	56

Group 15										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C6	Service Area Employment	Shopping Centre	77,368	26%	49	30	79	92	110	202
		Shopping Centre Pass-By	77,368	26%	0	0	0	52	52	104
		General Office	41,660	26%	49	7	56	7	35	42
G6	General Employment	Business Park	147,767	11%	142	26	168	38	107	145
Total					240	63	303	137	252	389
Total Pass-By					0	0	0	52	52	104

Group 16										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G7	General Employment	Business Park	115,045	8%	110	19	129	29	83	112
Total					110	19	129	29	83	112

Group 17										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
		Shopping Centre	8,242	3%	5	3	8	10	11	21

C7	Service Area Employment	Shopping Centre Pass-By	8,242	3%	0	0	0	6	5	11
		General Office	4,438	3%	5	1	6	1	4	5
Total					10	4	14	11	15	26
Total Pass-By					0	0	0	6	5	11

Group 18

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C8	Service Area Employment	Shopping Centre	57,959	20%	36	23	59	69	82	151
		Shopping Centre Pass-By	57,959	20%	0	0	0	39	39	78
		General Office	31,029	20%	37	5	42	5	27	32
P6	Light Employment	General Office	208,282	12%	186	25	211	37	167	204
G10	General Employment	Business Park	117,800	8%	113	19	132	30	84	114
Total Primary					372	72	444	141	360	501
Total Pass-By					0	0	0	39	39	78

Group 19

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G8	General Employment	Business Park	127,445	9%	122	22	144	32	92	124
Total					122	22	144	32	92	124

Group 20

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G9	Light Employment	General Office	393,421	22%	351	48	399	69	317	386
Total					351	48	399	69	317	386

Group 21

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
P5	Light Employment	General Office	209,358	12%	186	25	211	37	167	204
Total					186	25	211	37	167	204

Group 22

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
P4	Light Employment	General Office	626,460	35%	558	76	634	110	502	612
Total					558	76	634	110	502	612

Overall Background 407 Lands

					Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
Total Primary					3305	594	3899	1044	2989	4033
Total Pass-By					0	0	0	199	197	396

Trip Generation:

 AM Total:

 IN: 30

 OUT: 11

 Check:

 Boundaries:

 IN: 30

 OUT: 11

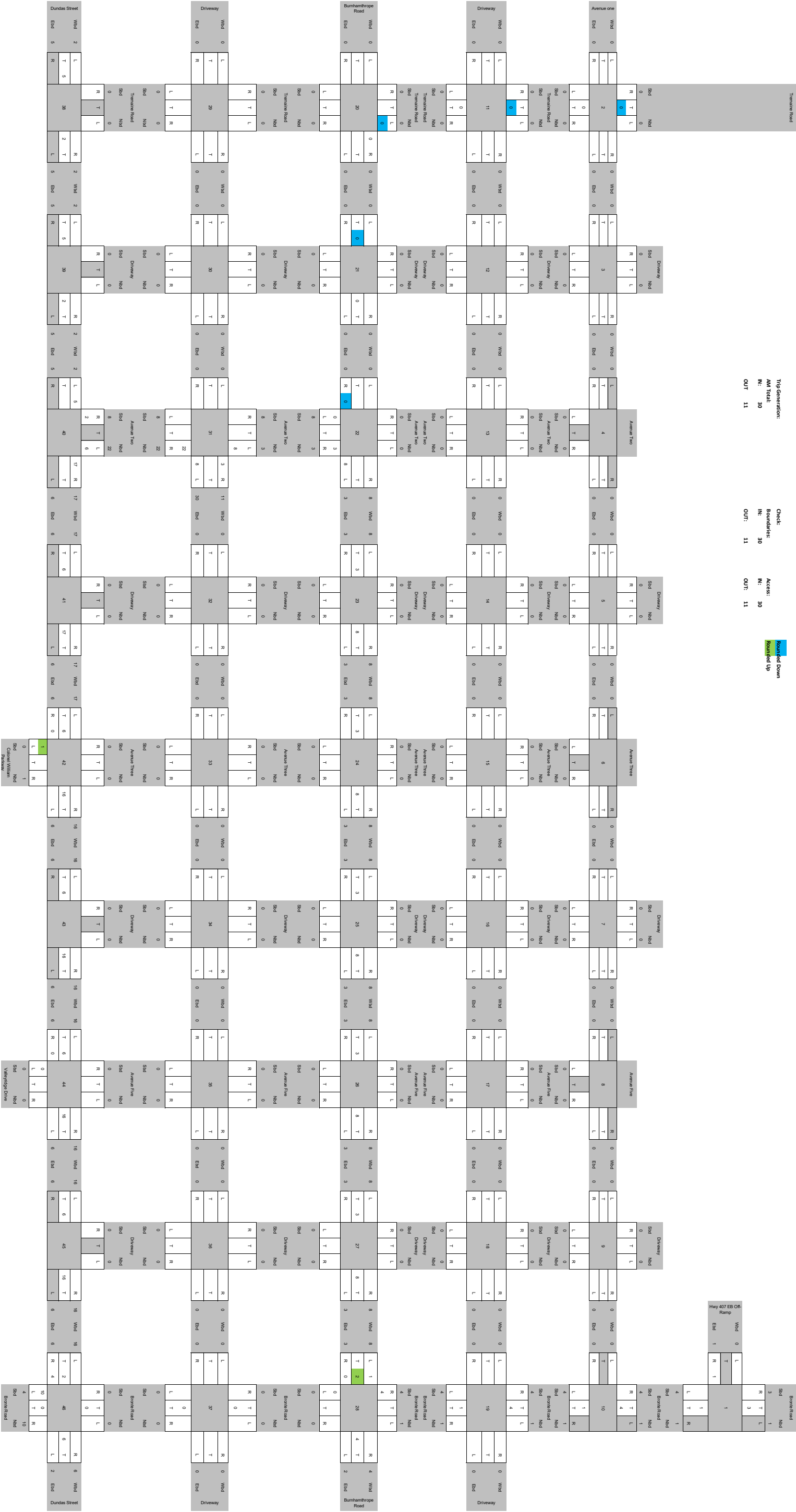
 Access:

 IN: 30

 OUT: 11

 Rounding Down

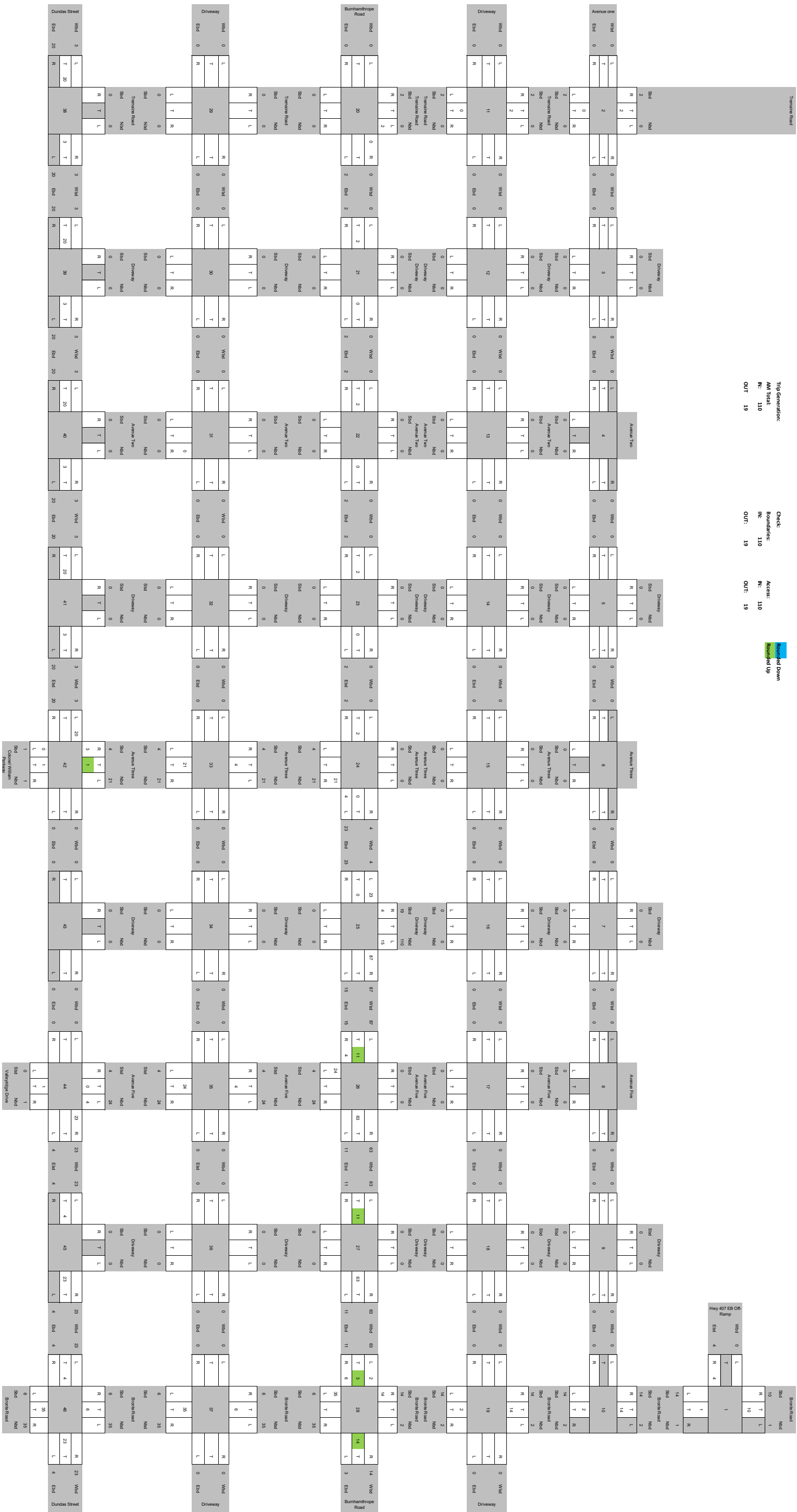
 Rounding Up



Trip Generation:		Check:		Access:	
AM Total:		Boundaries:			
IN: 288		IN: 288		IN: 288	
OUT: 50		OUT: 50		OUT: 50	

Rounded Down
Rounded Up

[illegible]



Trip Generation:
 AM Total: 393
 IN: 393
 OUT: 71
 Check:
 Boundaries: 393
 IN: 393
 OUT: 71
 Access: 393
 IN: 393
 OUT: 71
 Rounded Down
 Rounded Up

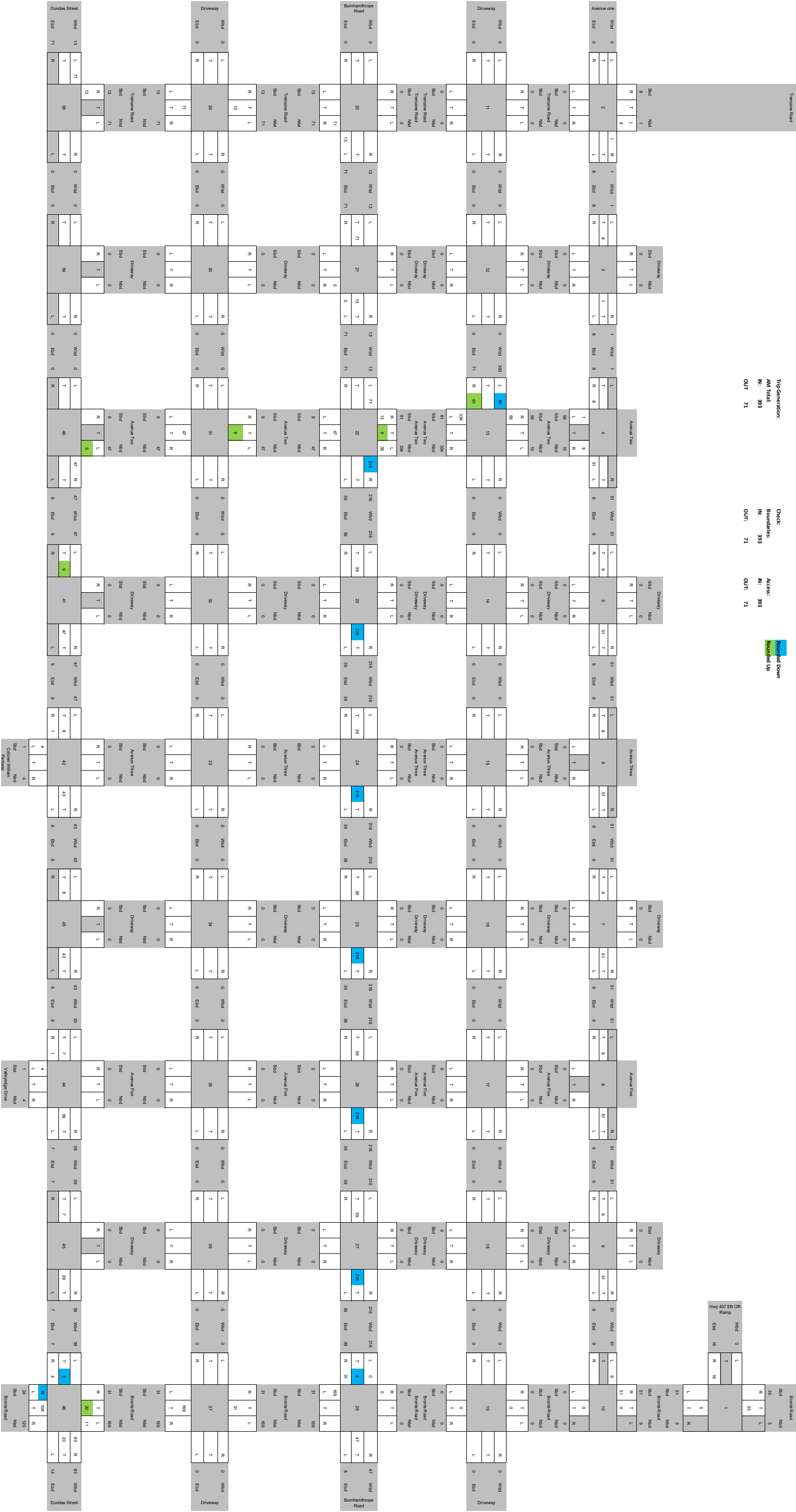


Figure X
 407 Lands Background Development Phase 2 Trip Assignment Block Group 11 - Weekday AM Peak Hour

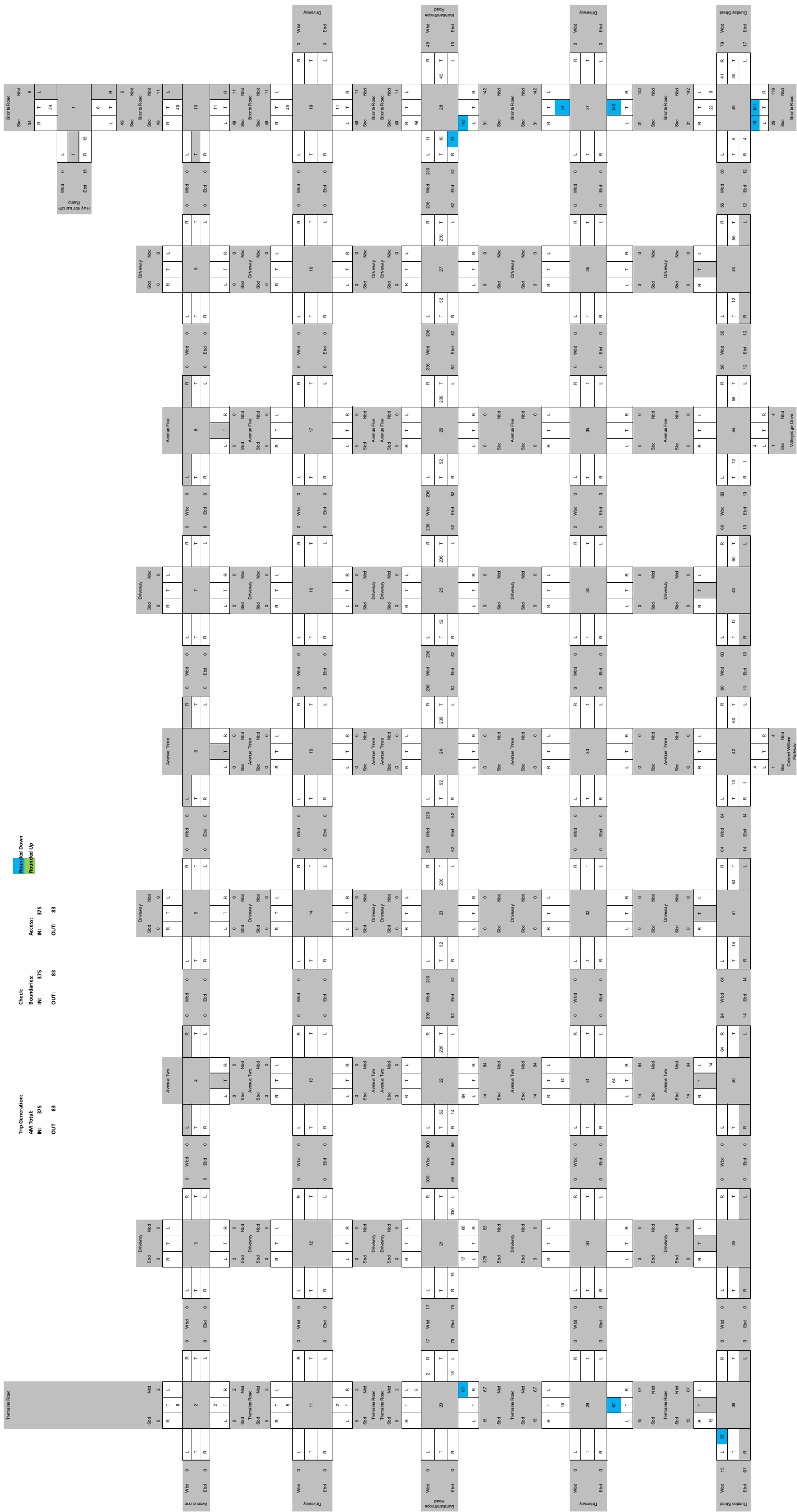


Figure X
407 Lands Background Development Phase 2A&2 Trip Assignment Block Group 10 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

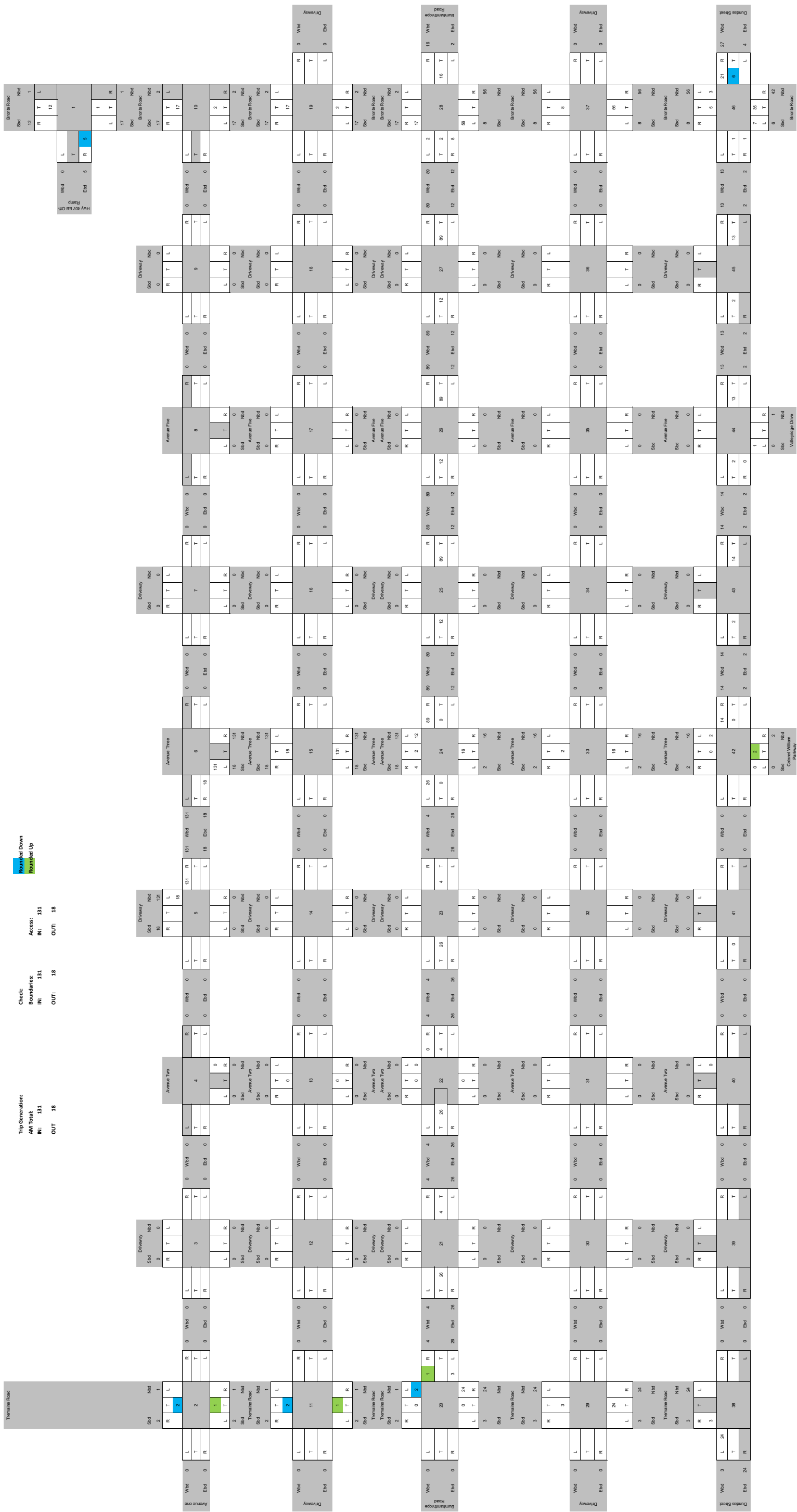


Figure X
407 Lands Background Development Phase 2A Trip Assignment Block Group 13-2 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
AM Total:
IN: 240
OUT: 63

Check:
Boundaries:
IN: 240
OUT: 63

Access:
IN: 240
OUT: 63

Boundled Down
Boundled Up

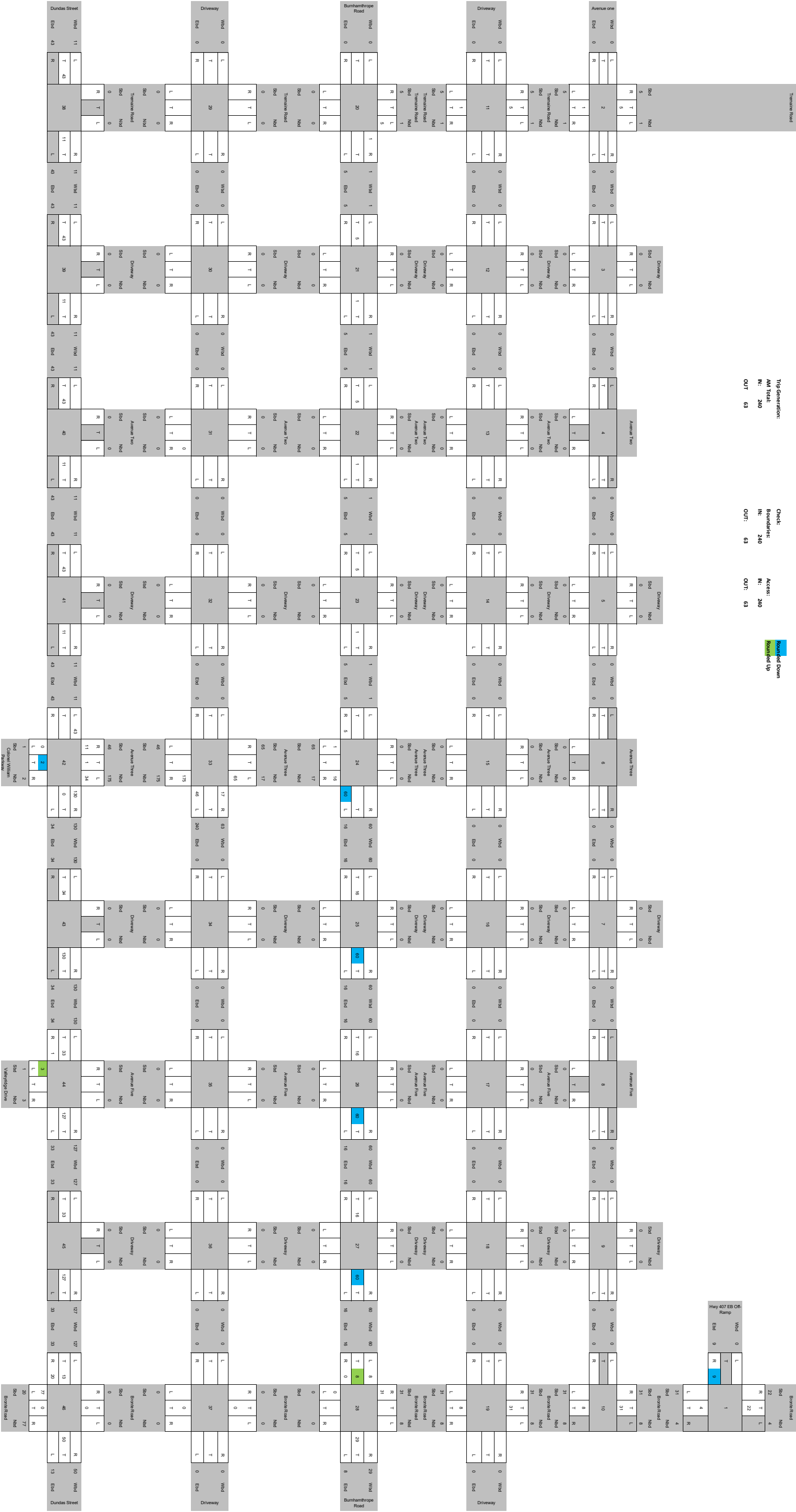


Figure X
407 Lands Background Development Phase 2A&2 Trip Assignment Block Group 15 - Weekday AM Peak Hour
407 West Employment Lands - North Oshawa Transportation Study

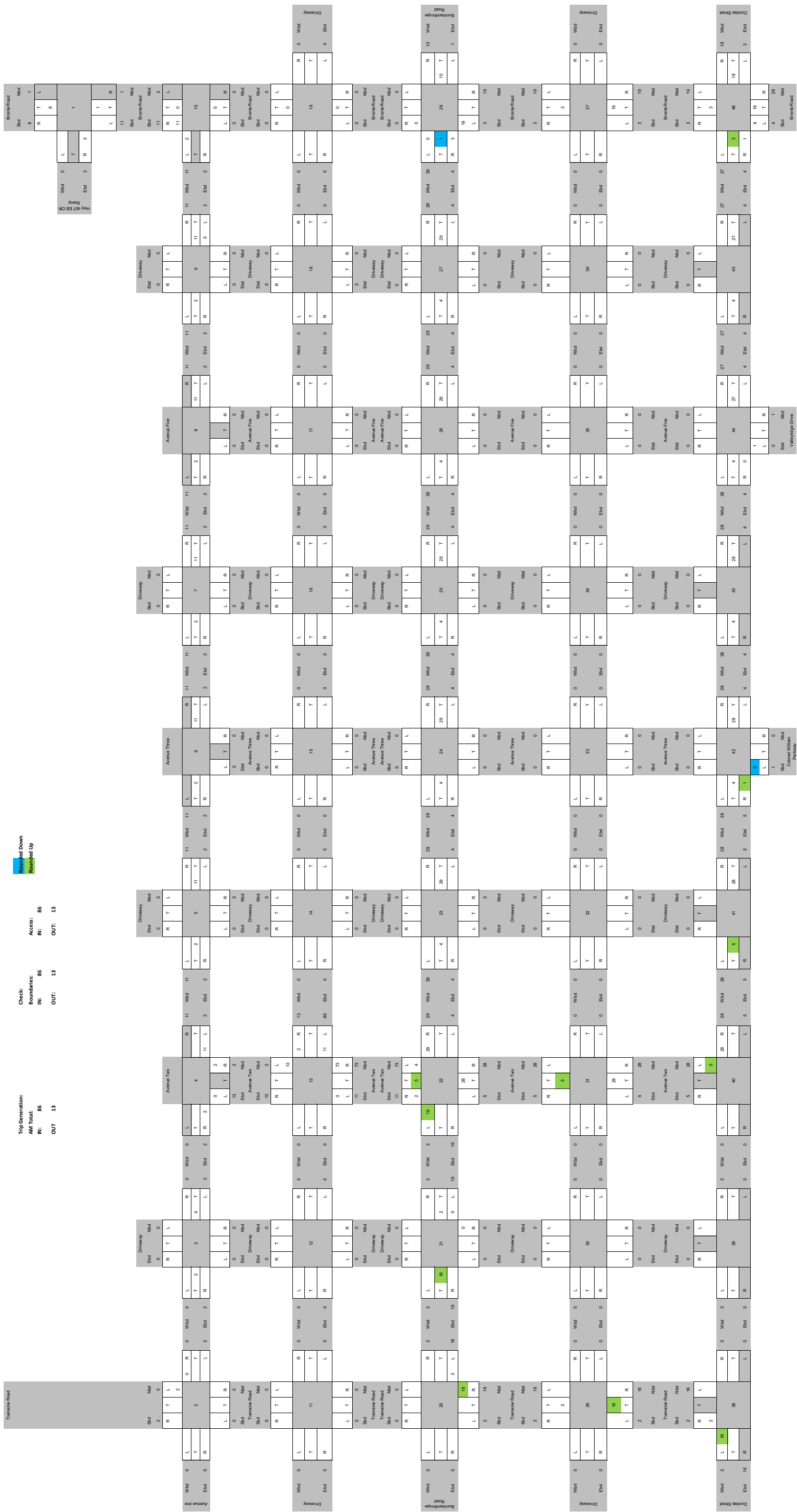


Figure X
407 Lands Background Development Phase 2 Trip Assignment Block Group 12 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
 AM Total: 351
 IN: 351
 OUT: 48
 Check:
 Boundaries: 351
 IN: 351
 OUT: 48
 Access:
 IN: 351
 OUT: 48
 Rounding Down
 Rounding Up

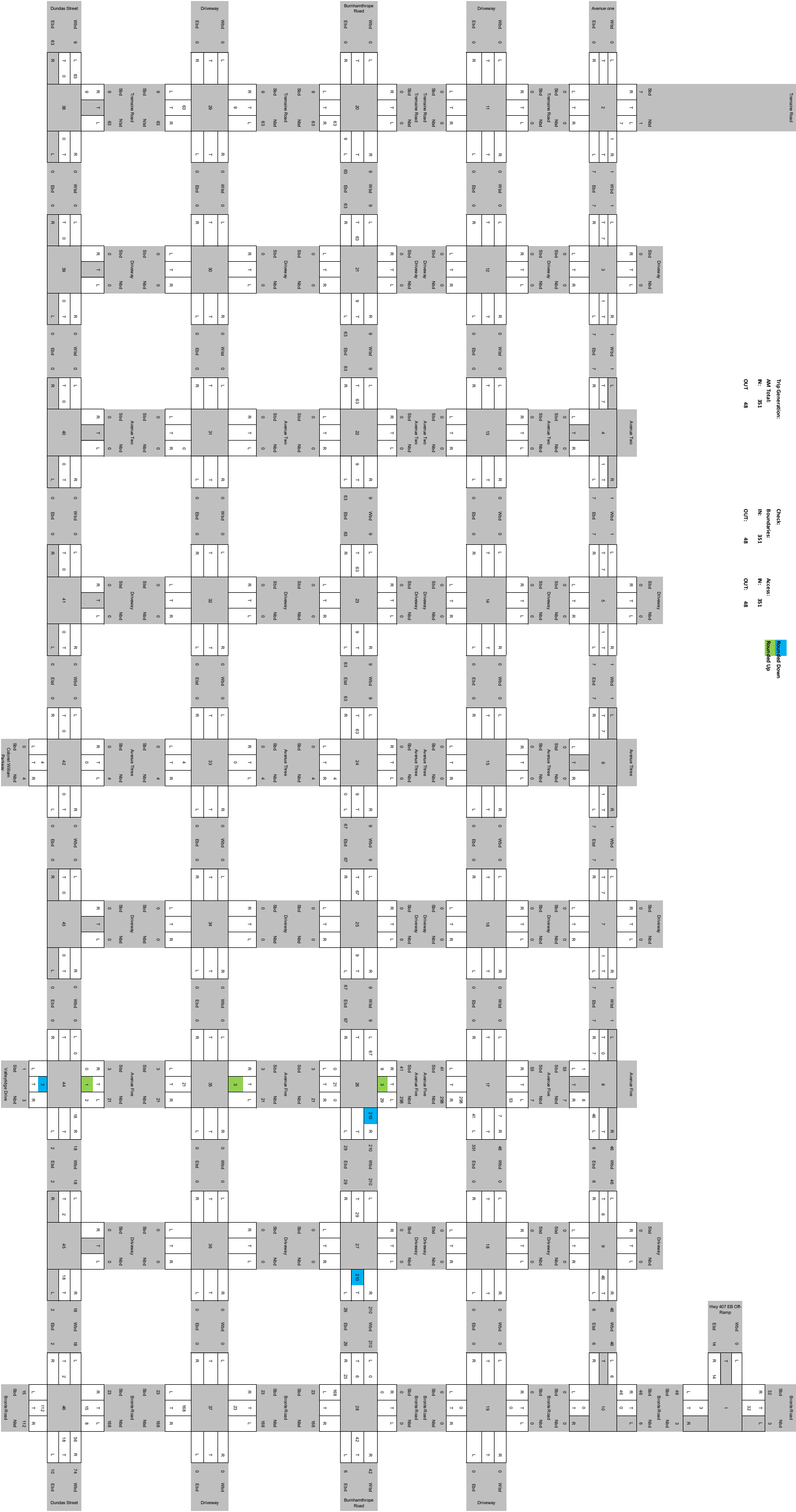


Figure X
 407 Lands Background Development Phase 2 Trip Assignment Block Group 20 - Weekday AM Peak Hour

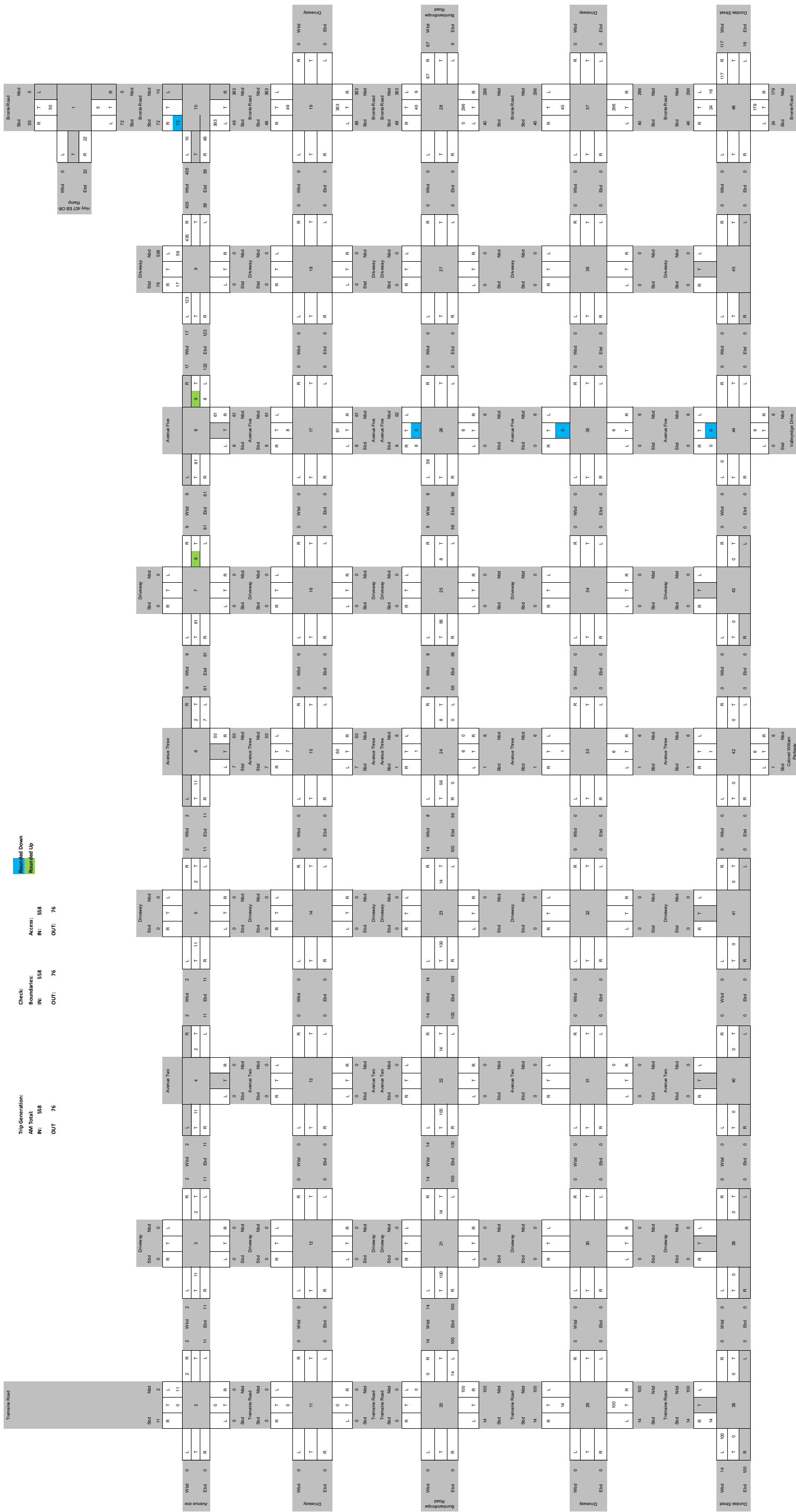


Figure X
407 Lands Background Development Phase 2 Trip Assignment Block Group 22 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

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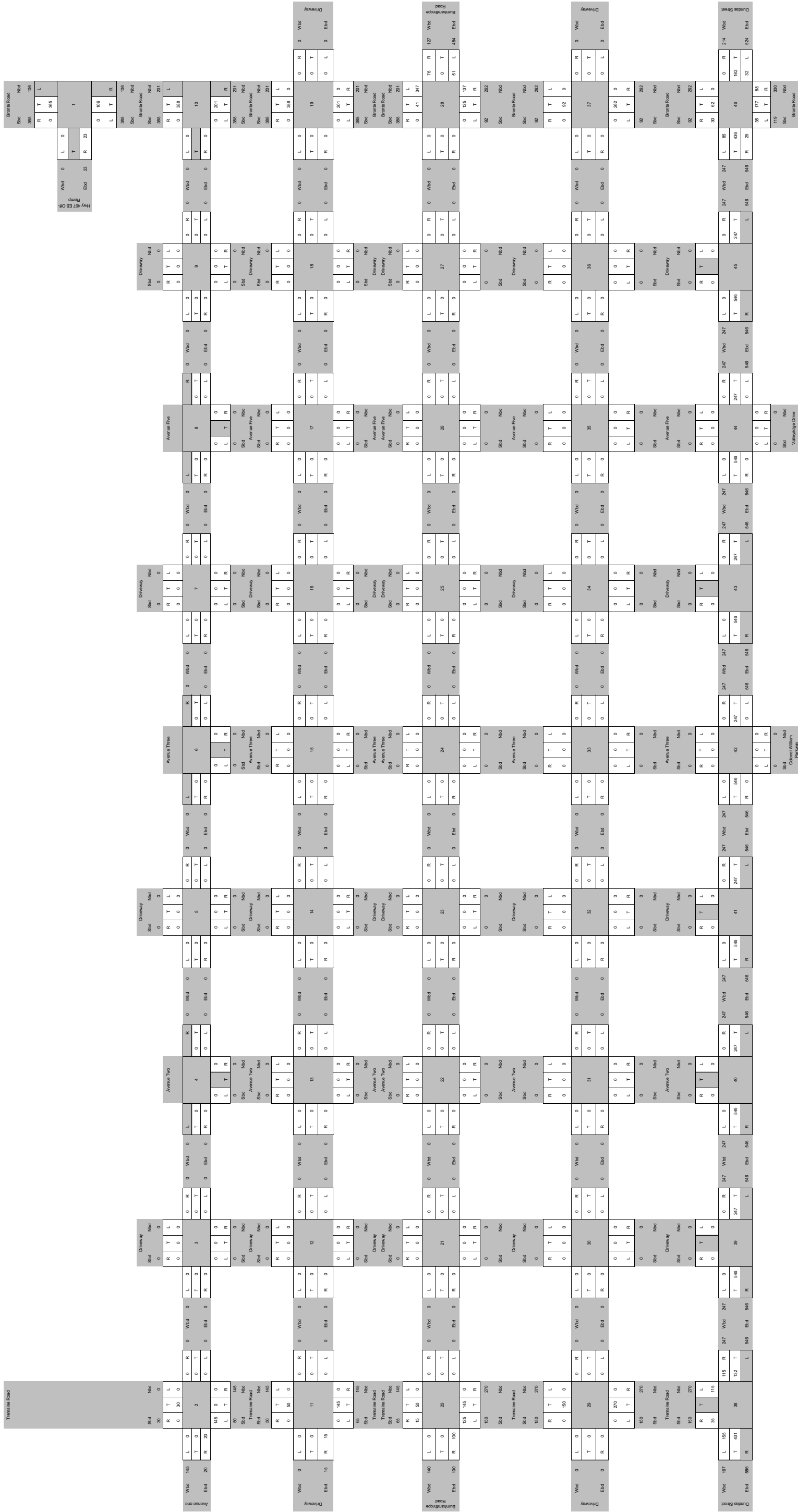


Figure X
Overall Additional Background Development Traffic (not including existing traffic growth) 2025 Phase 1 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Figure X
Overall Additional Background Traffic (not including existing traffic growth) 2030 Phase 2A - Weekday AM Peak Hour
407 West Employment Lands - North Okaville Transportation Study

TABLE 10 - Weekday AM 2030 PHASE 2A

Trenance Road										Brons Road										Hay 407 EB Ramp										Brons Road																																		
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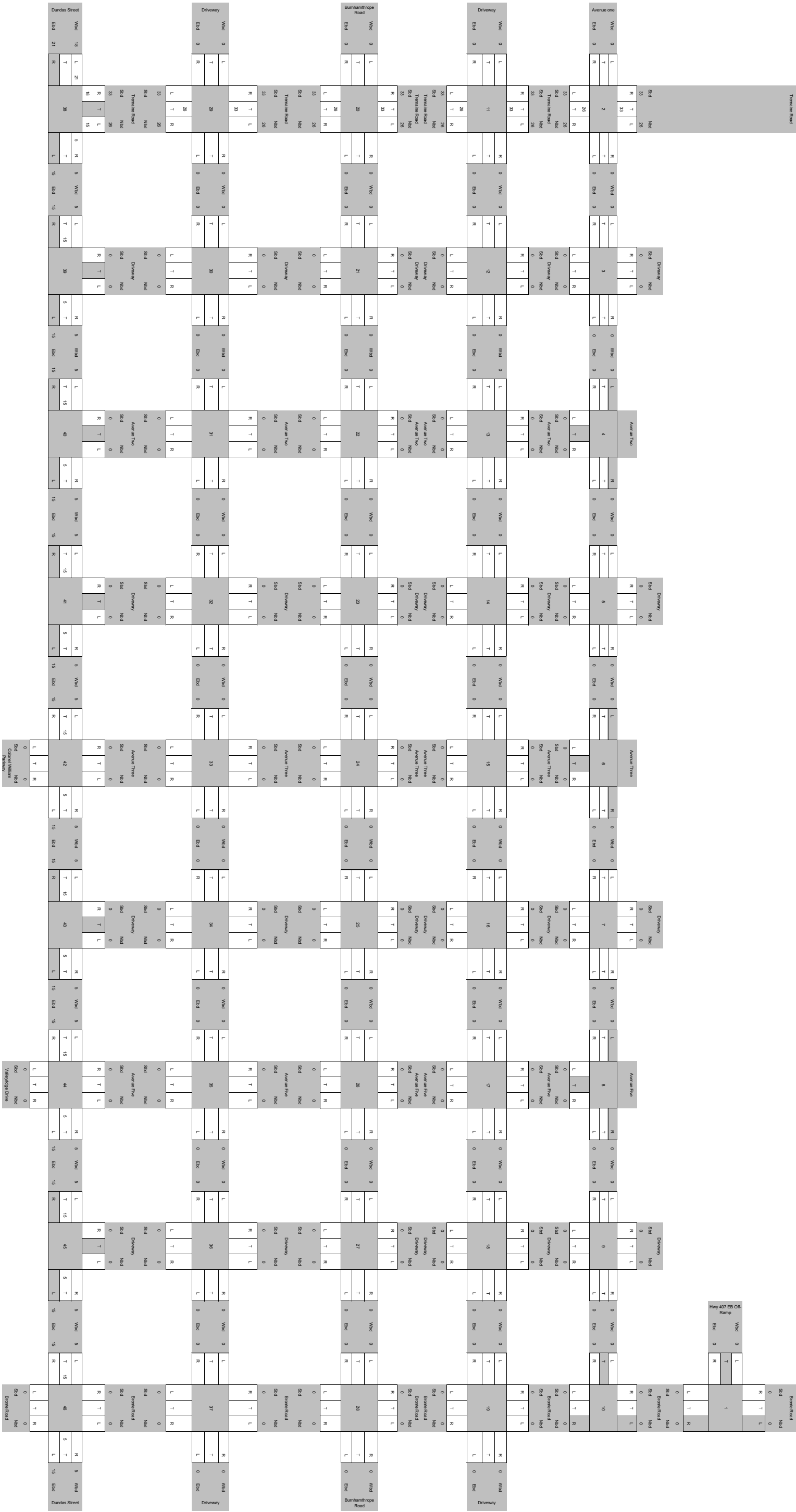


Figure X
Traffic Growth from 2018 Volumes to 2020 - Weekday AM Peak Hour
407 West Employment Lands - North Okaville Transportation Study

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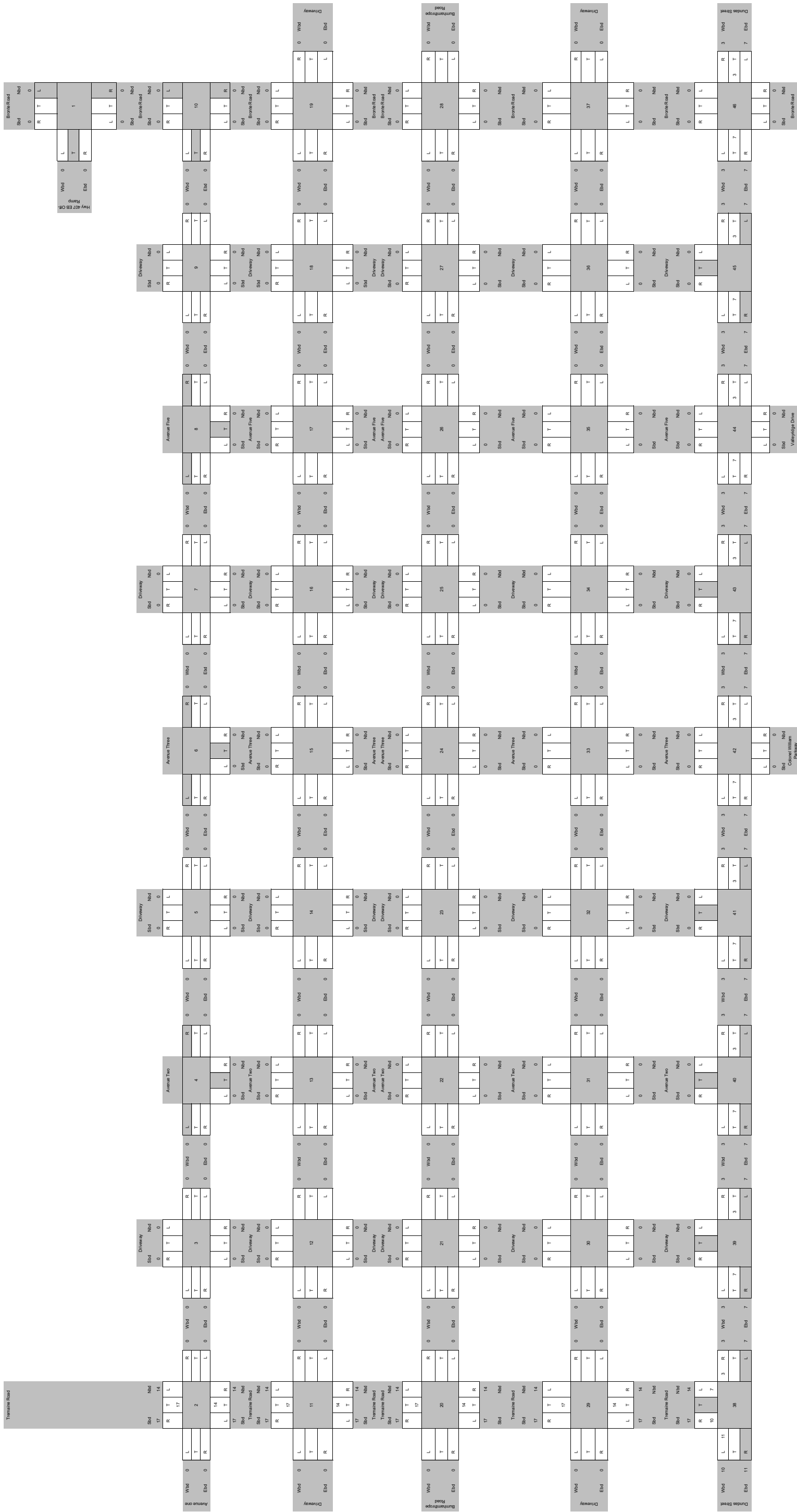


Figure X
Traffic Growth from 2020 Volumes to 2021 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

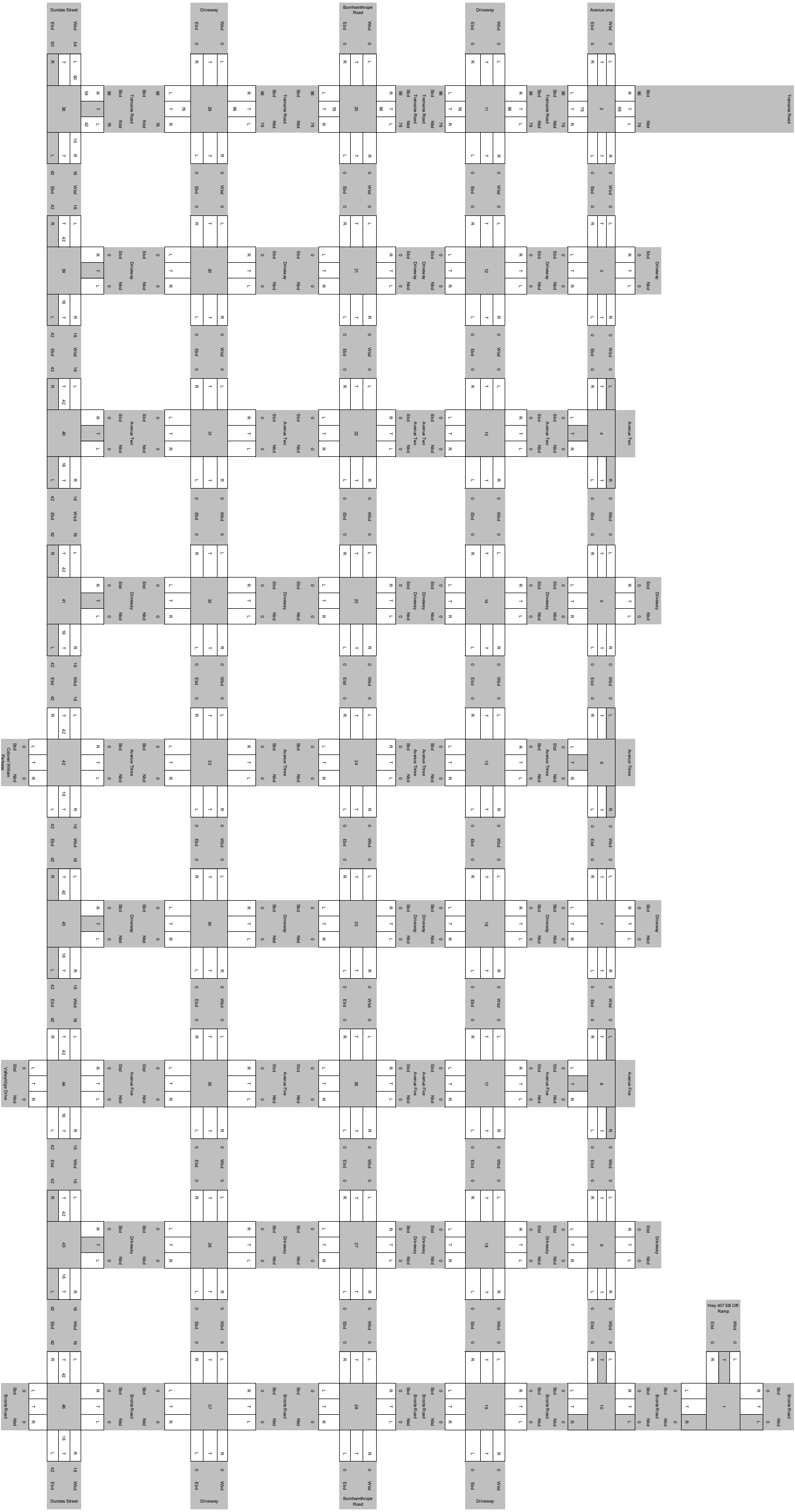
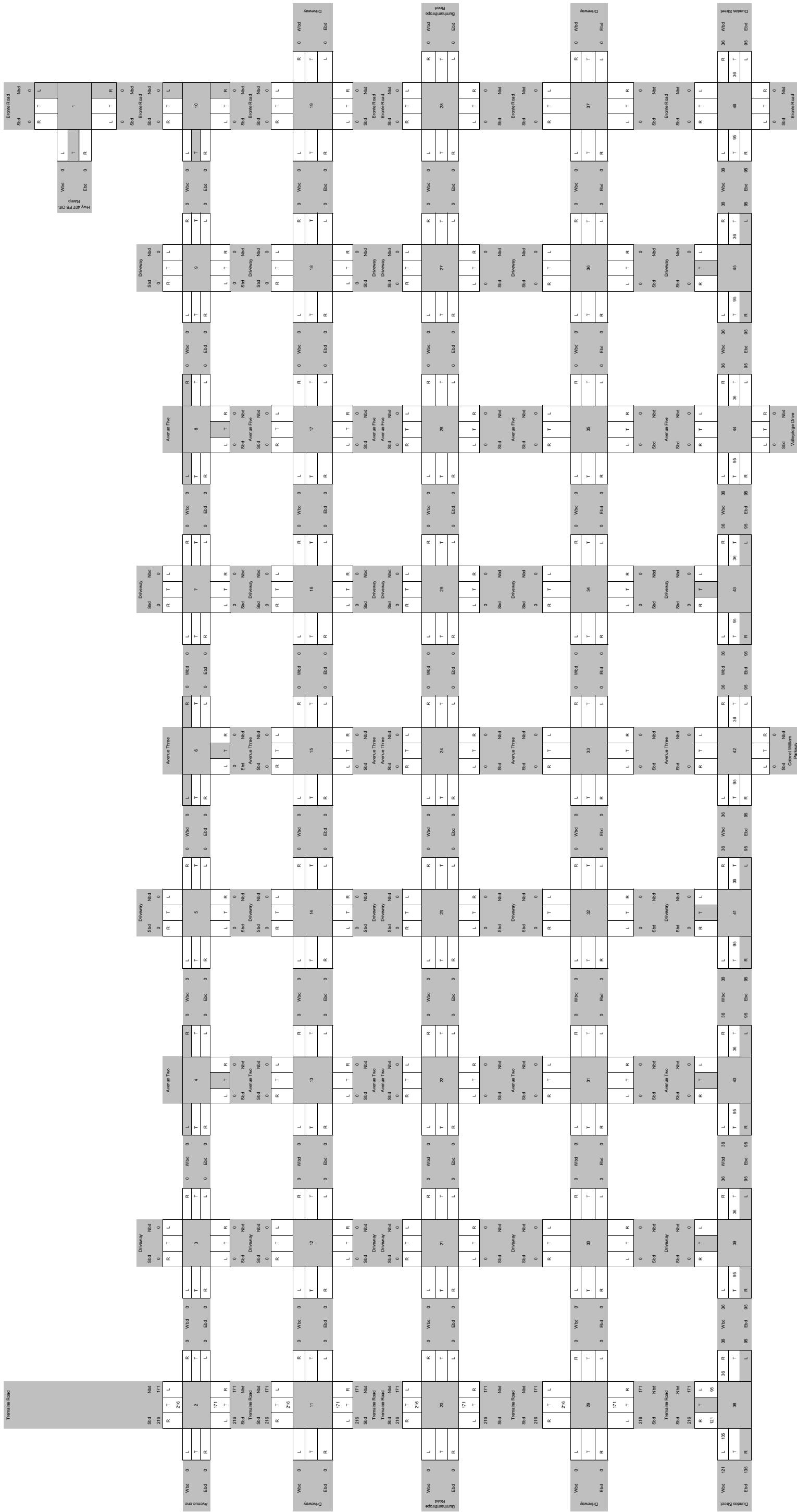


Figure X
Traffic Growth from derived 2021 Volumes (Existing with Applied Growth) to 2025 - Weekday AM Peak Hour
407 West Employment Lands - North Okavale Transportation Study



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Figure X
Future Background Volumes - Phase 2A (2030) - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Subject Lands Trip Generation per Group

Trip Assignment Notes:

The trip assignment for the 407 employments lands (site and surrounding 407 background developments) have been distributed along the driveways based on the Blocks layout. The trip generation for each block is based on a percentage of the overall trip generation (per land use) for the site or surrounding background 407 lands, with the percentage of the trip generation derived based on the percentage of the block GFA compared to the overall GFA used for the trip gen.

Blocks assumed to use the Same Driveways:

For the Phase 1 development (2021 horizon year):

Group 1	Group 2	Group 3	Group 4	Group 5
C3-3	G3-1	C2-2	C4-1	G5-1
C3-5	G4			G5-2
G3-2				C5-1

Percentage of Trip Gen for these blocks:

Rounded up to match overall trip gen values

Rounded Down to match overall trip gen values

Group 1										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C3-3	Service Area Employment	Shopping Centre	49,186	37%	50	31	81	71	87	158
		Shopping Centre Pass-By	49,186	37%	0	0	0	40	41	81
		General Office	26,485	37%	37	6	43	6	33	39
C3-5	Light Employment	General Office	105,486	41%	128	18	146	24	109	133
G3-2	General Employment	Business Park	45,811	16%	50	9	59	15	42	57
Total Primary					265	64	329	116	271	387
Total Pass-By					0	0	0	40	41	81

Group 2										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G3-1	Service Area Employment	Shopping Centre	42,539	32%	44	27	71	61	75	136
		Shopping Centre Pass-By	42,539	32%	0	0	0	35	34	69
		General Office	22,906	32%	32	5	37	6	28	34
G4	General Employment	Business Park	62,689	22%	68	12	80	20	58	78
Total Primary					144	44	188	87	161	248
Total Pass-By					0	0	0	35	34	69

Group 3										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C2-2	Light Employment	General Office	57,049	22%	70	9	79	13	59	72
Total					70	9	79	13	59	72

Group 4											
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen			
					Weekday AM Peak Hour			Weekday PM Peak Hour			
					IN	OUT	Total	IN	OUT	Total	
C4-1	Service Area Employment	Shopping Centre	40,146	30%	41	25	66	58	70	128	
		Shopping Centre Pass-By	40,146	30%	0	0	0	33	33	66	
		General Office	21,617	30%	31	3	34	5	27	32	
		Total Primary				72	28	100	63	97	160
		Total Pass-By				0	0	0	33	33	66

Group 5										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C5-1	Light Employment	General Office	92,031	36%	112	15	127	21	96	117
G5-1	General Employment	Business Park	73,022	26%	80	14	94	23	68	91
G5-2	General Employment	Business Park	97,822	35%	107	19	126	32	89	121
Total					299	48	347	76	253	329

Overall Phase 1															
					Block Trip Gen			Block Trip Gen							
					Weekday AM Peak Hour			Weekday PM Peak Hour							
					IN	OUT	Total	IN	OUT	Total					
					Total Primary					850	193	1043	355	841	1196
					Total Pass-By					0	0	0	108	108	216

Service Area Employment	Shopping Centre			135	83	218	190	232	422
	Shopping Centre Pass-By			0	0	0	108	108	216
	General Office			100	14	114	17	88	105
Light Employment	General Office			310	42	352	58	264	322
General Employment	Business Park			305	54	359	90	257	347

For the Phase 1 and 2 development (2031 horizon year):

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
C3-3	G3-1	C2-2	C4-1	G5-1	C4-2	G5-6	P2-1
C3-5	G4			G5-2		G5-5	P2-2
G3-2				C5-1		C5-2	P2-3
							P2-4

Percentage of Trip Gen for these blocks:

Rounded up to match overall trip gen values

Manually changed to match overall trip gen

Rounded Down to match overall trip gen va

Group 1										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C3-3	Service Area Employment	Shopping Centre	49,186	37%	50	31	81	71	87	158
		Shopping Centre Pass-By	49,186	37%	0	0	0	41	40	81
		General Office	26,485	37%	35	5	40	5	32	37
C3-5	Light Employment	General Office	105,486	12%	102	14	116	19	87	106
G3-2	General Employment	Business Park	45,811	8%	45	9	54	14	35	49
Total Primary					232	59	291	109	241	350
Total Pass-By					0	0	0	41	40	81

Group 2										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G3-1	Service Area Employment	Shopping Centre	42,539	32%	44	26	70	62	74	136
		Shopping Centre Pass-By	42,539	32%	0	0	0	35	35	70
		General Office	22,906	32%	30	4	34	5	26	31
G4	General Employment	Business Park	62,689	11%	62	11	73	18	49	67
Total					136	41	177	85	149	234
Total Pass-By					0	0	0	35	35	70

Group 3										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C2-2	Light Employment	General Office	57,049	6%	54	8	62	11	46	57
Total					54	8	62	11	46	57

Group 4										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C4-1	Service Area Employment	Shopping Centre	40,146	30%	41	26	67	58	70	128
		Shopping Centre Pass-By	40,146	30%	0	0	0	33	34	67
		General Office	21,617	30%	28	4	32	5	24	29
		Total			69	30	99	63	94	157
Total Pass-By			0	0	0	33	34	67		

Group 5										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C5-1	Light Employment	General Office	92,031	10%	89	12	101	17	76	93
G5-1	General Employment	Business Park	73,022	12%	72	14	86	21	58	79
G5-2	General Employment	Business Park	97,822	16%	97	17	114	29	77	106
Total					258	43	301	67	211	278

Group 6										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C4-2	General Employment	Business Park	42,711	7%	42	8	50	13	33	46
Total					42	8	50	13	33	46

Group 7										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G5-6	General Employment	Business Park	96,100	11%	93	13	106	18	79	97
G5-5	General Employment	Business Park	92,656	16%	92	16	108	27	72	99
C5-2	General Employment	Business Park	87,145	15%	86	16	102	25	68	93
Total					271	45	316	70	219	289

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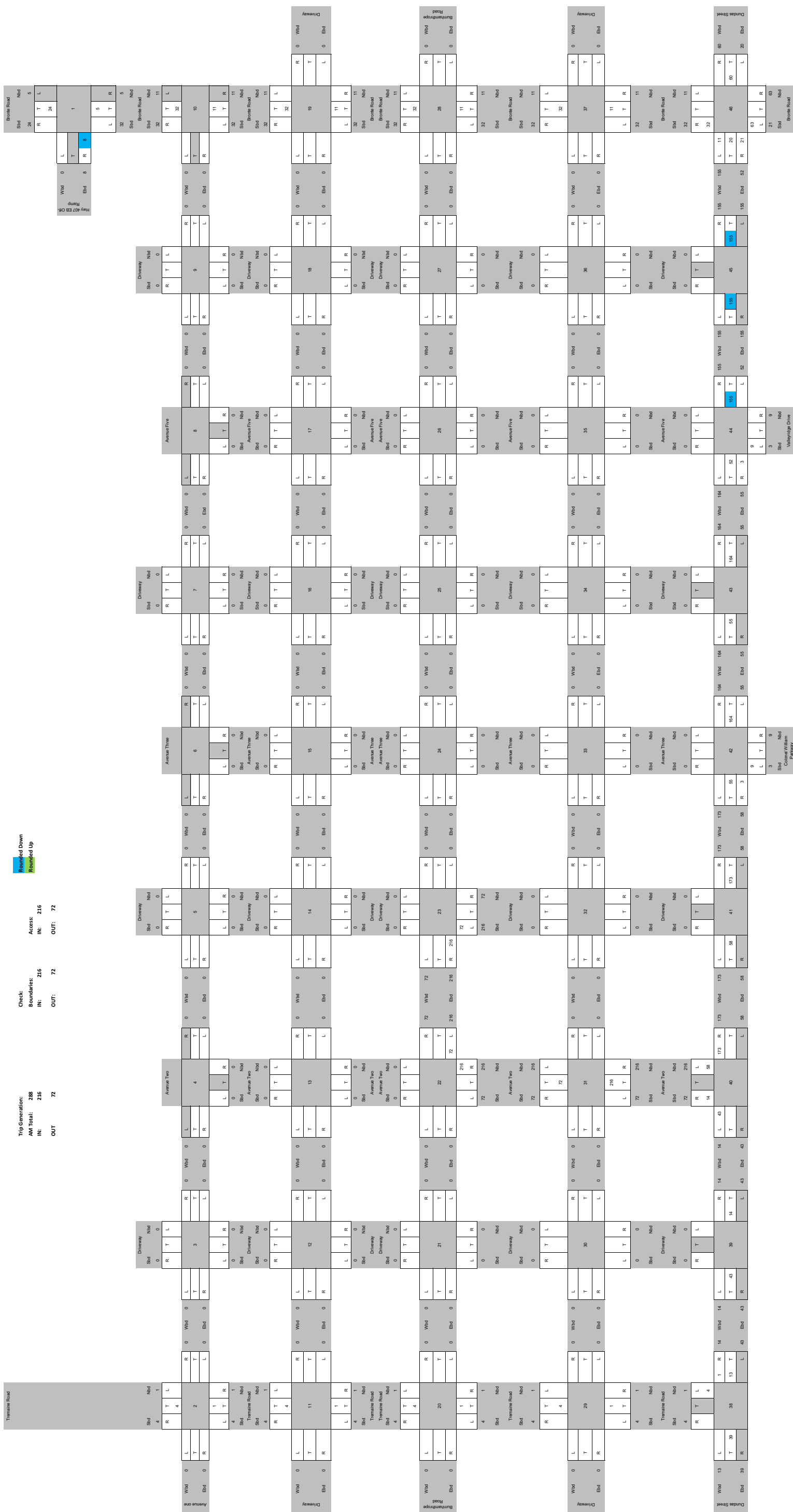
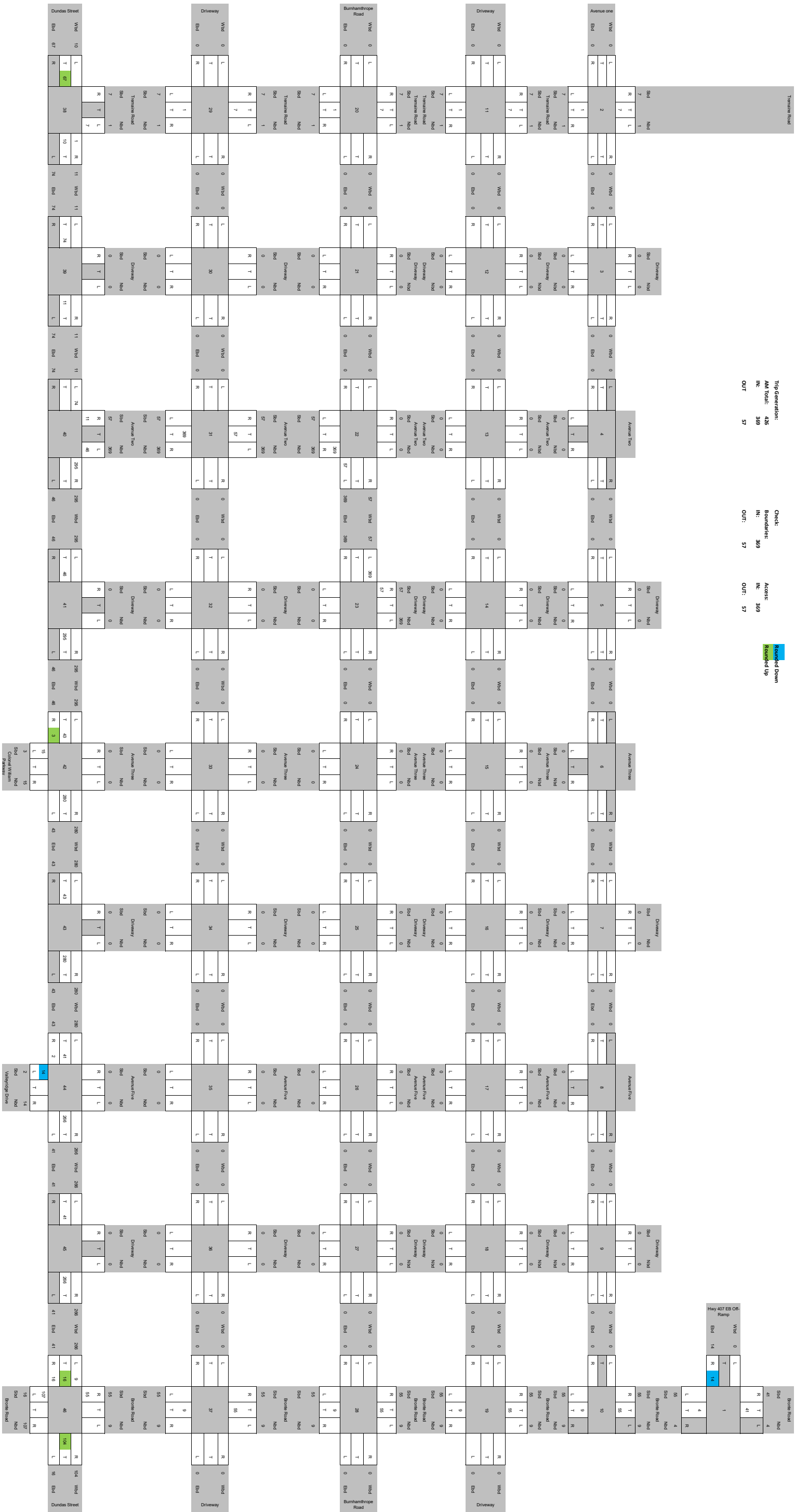
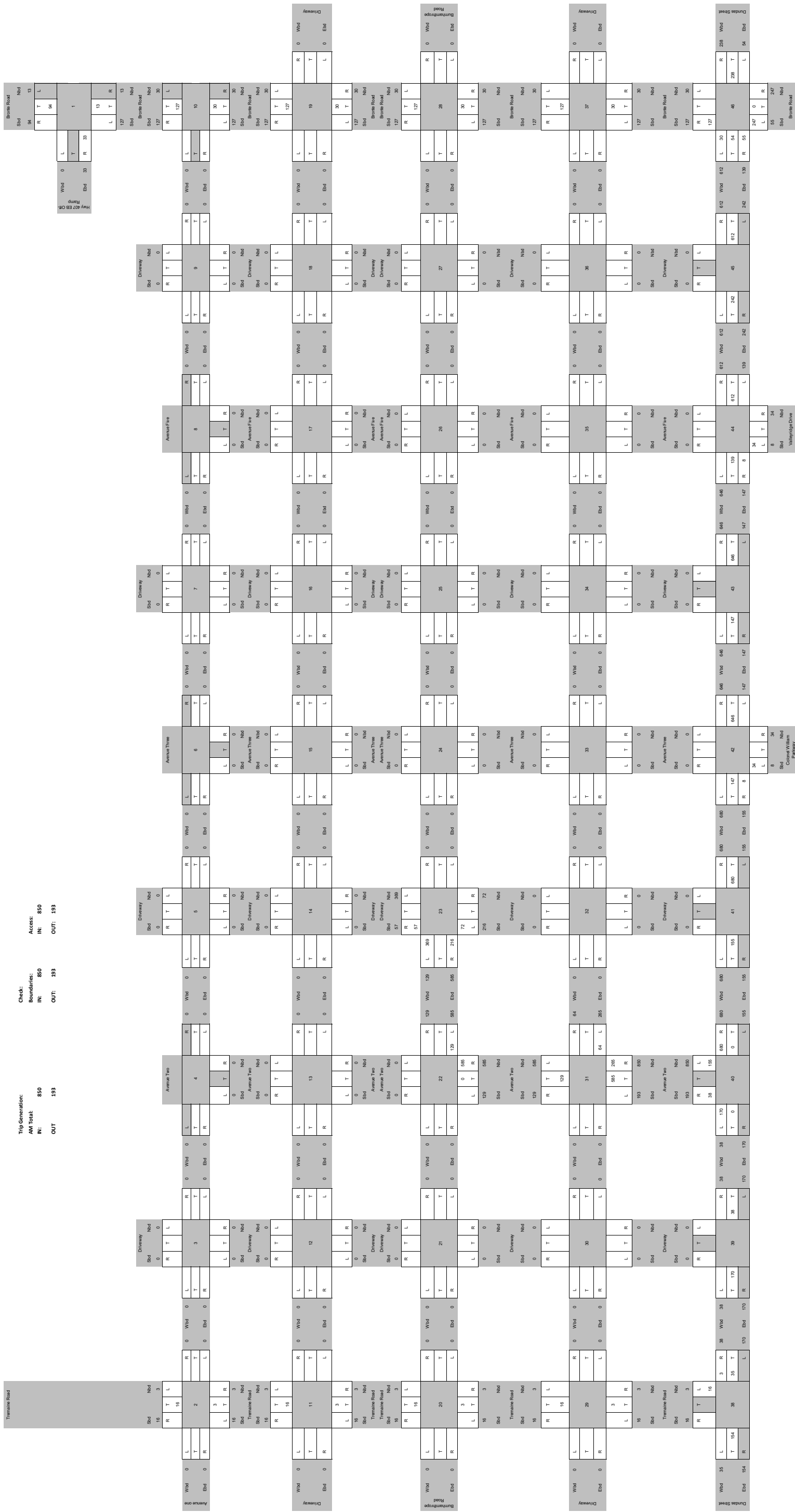
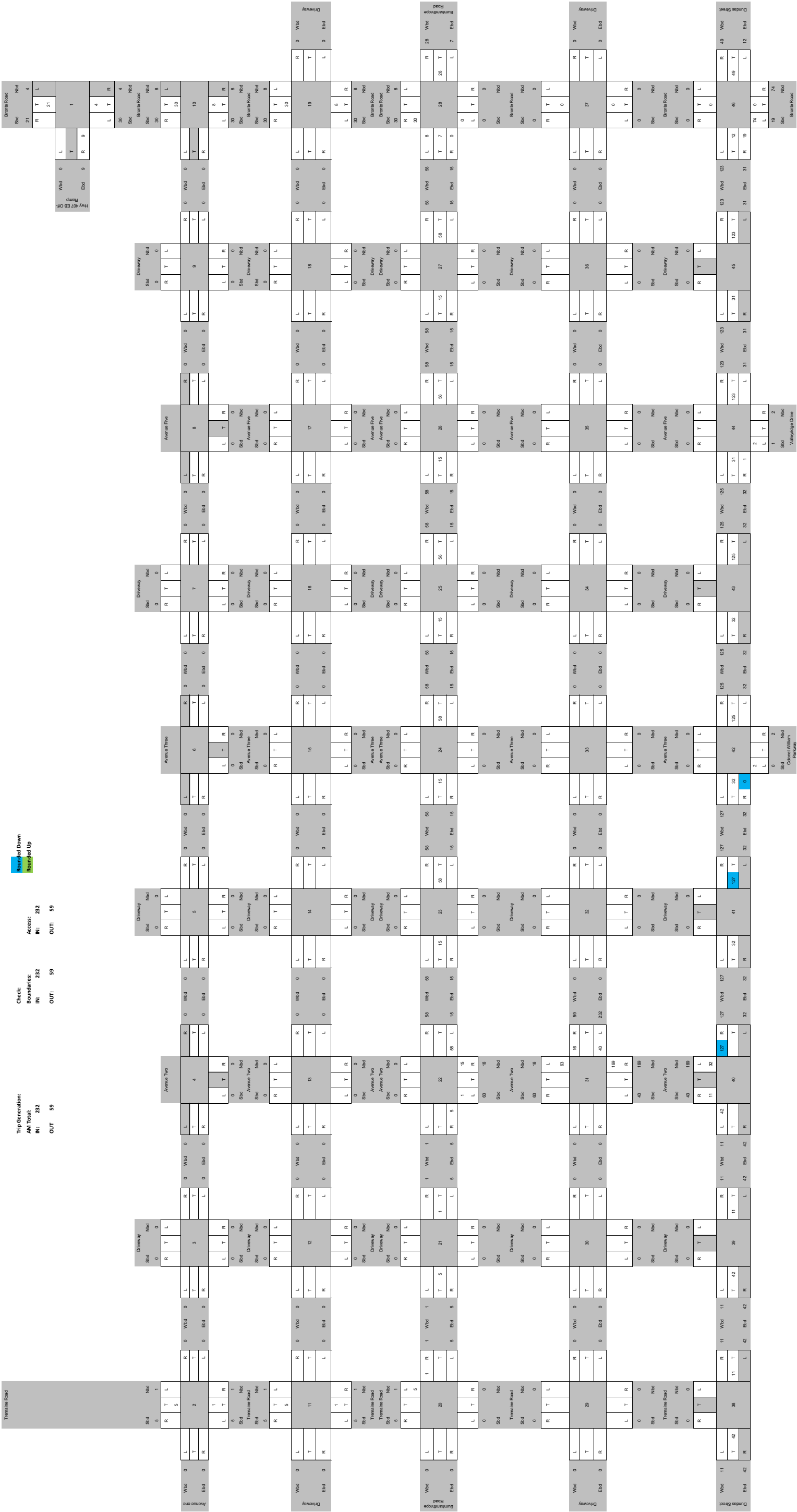


Figure X
Phase 1 Trip Assignment - Block Groups 2&4 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study





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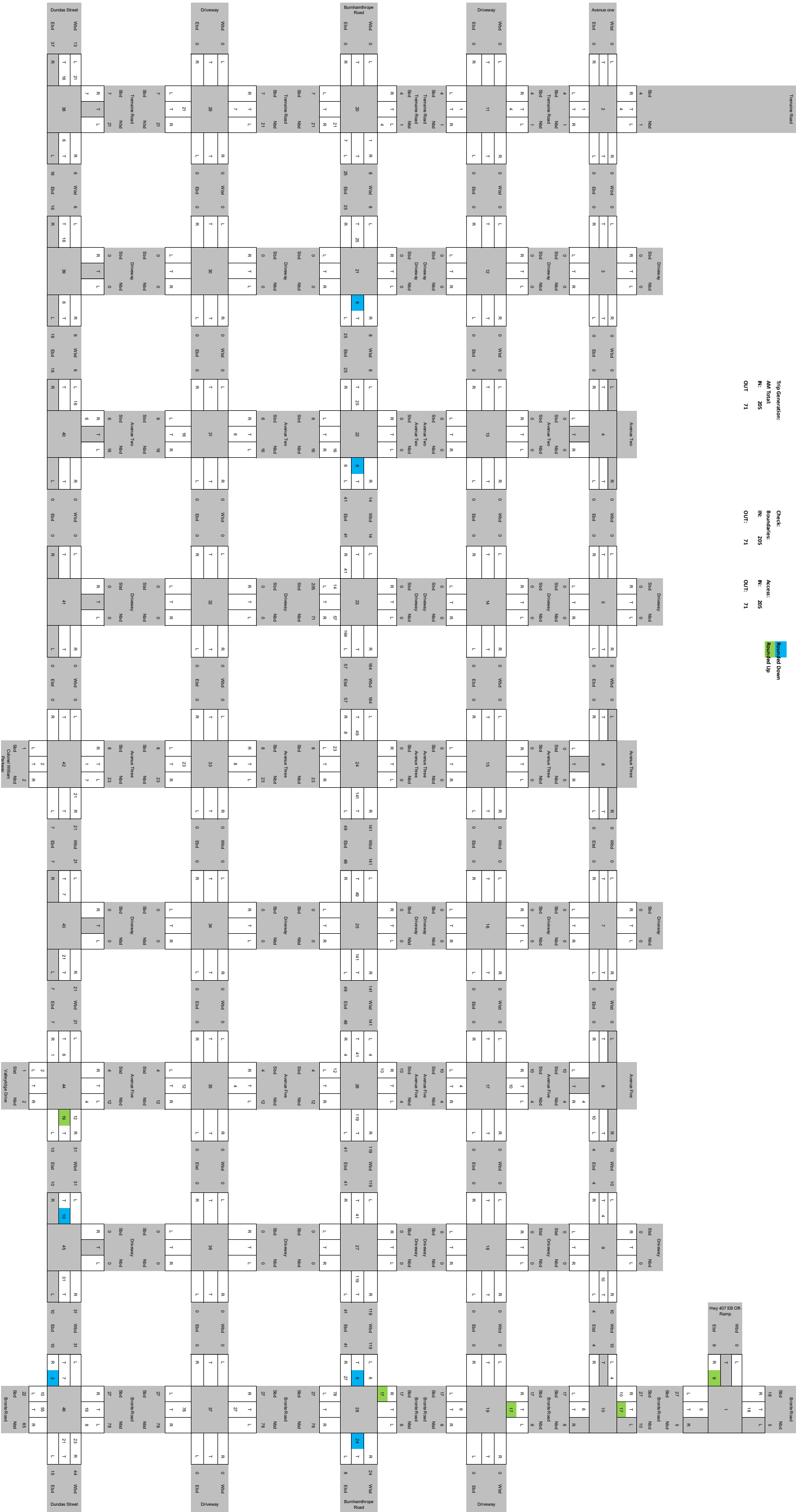


Trip Generation:
AM Total:
IN: 205
OUT: 71

Check:
Boundaries:
IN: 205
OUT: 71

Access:
IN: 205
OUT: 71

Round Down
Rounded Up



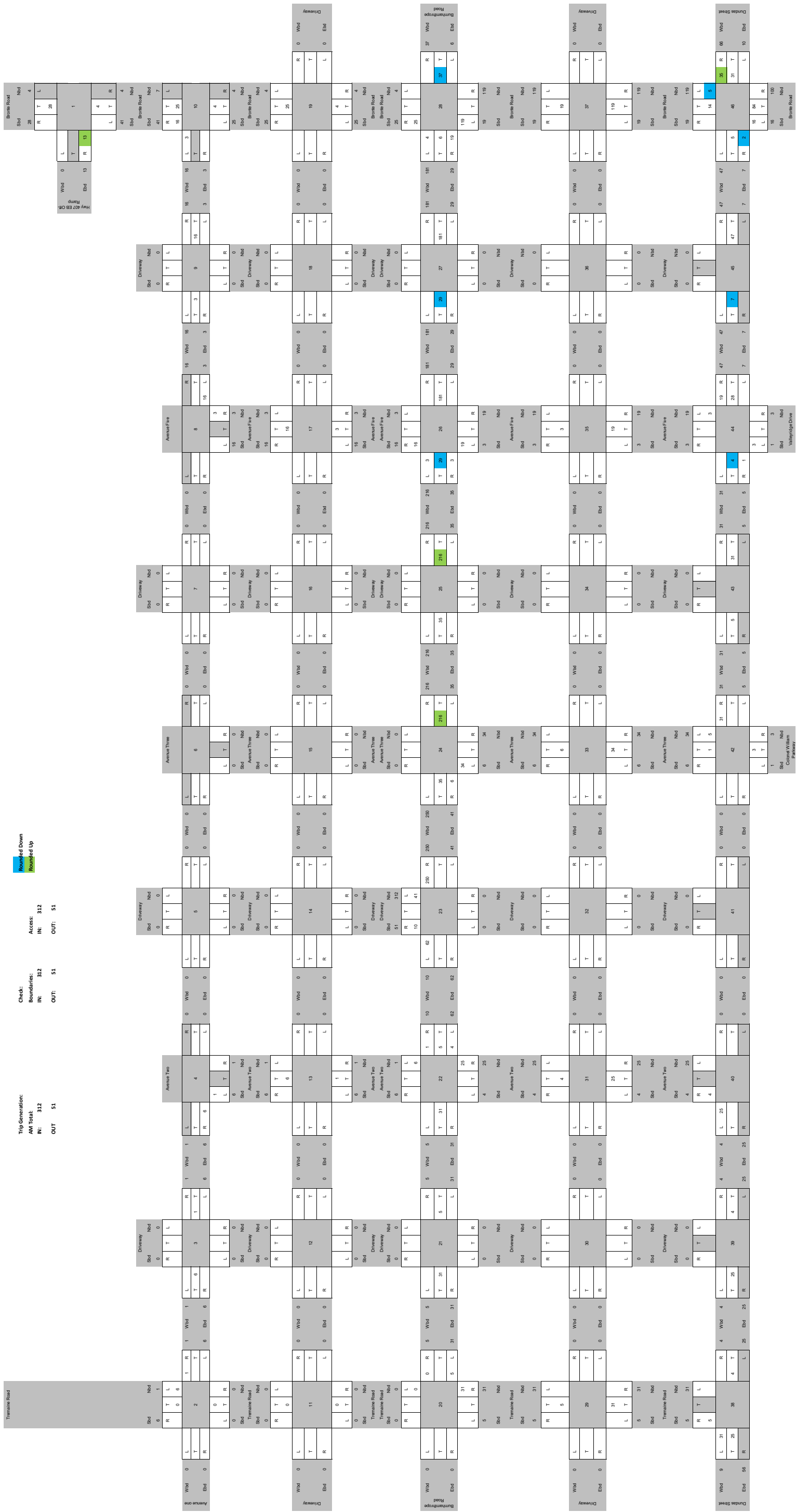


Figure X
Phase 2A Trip Assignment - Block Group 385 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
AM Total: 312
IN: 312
OUT: 51

Check:
Boundaries:
IN: 312
OUT: 51

Access:
IN: 312
OUT: 51

Buffered Down
Rounded Up

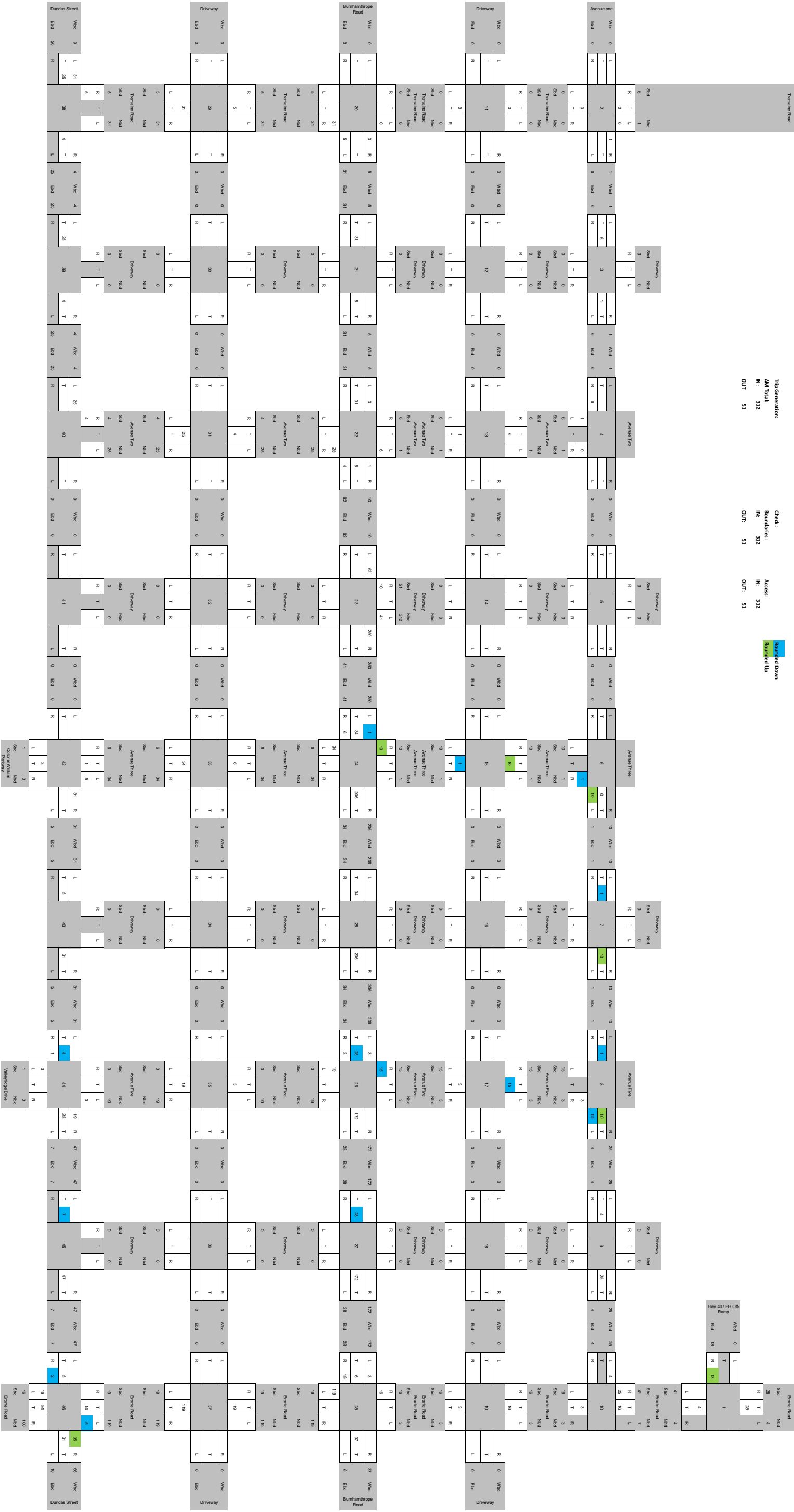


Figure X
Phase 2 Trip Assignment - Block Group 345 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

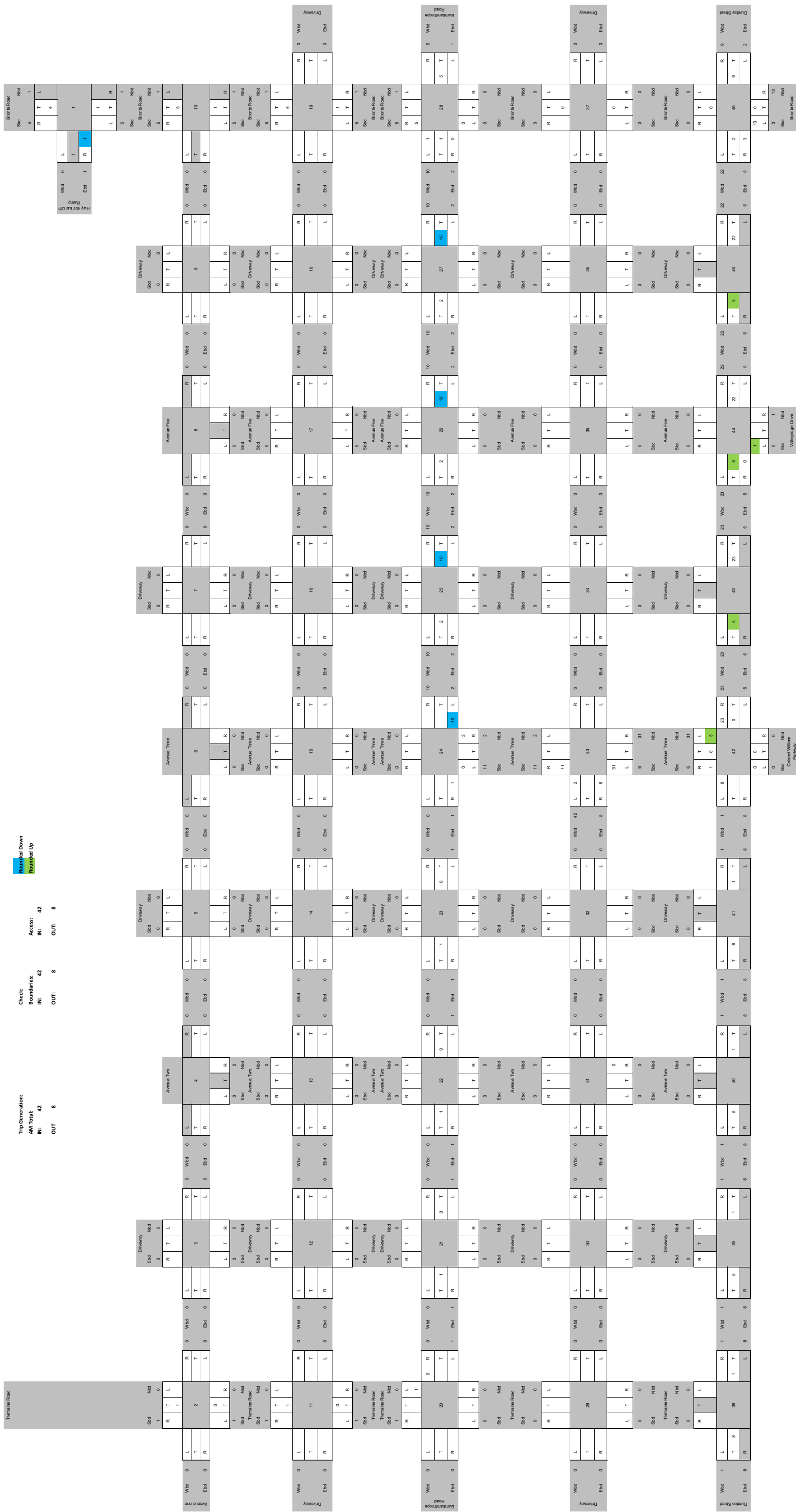
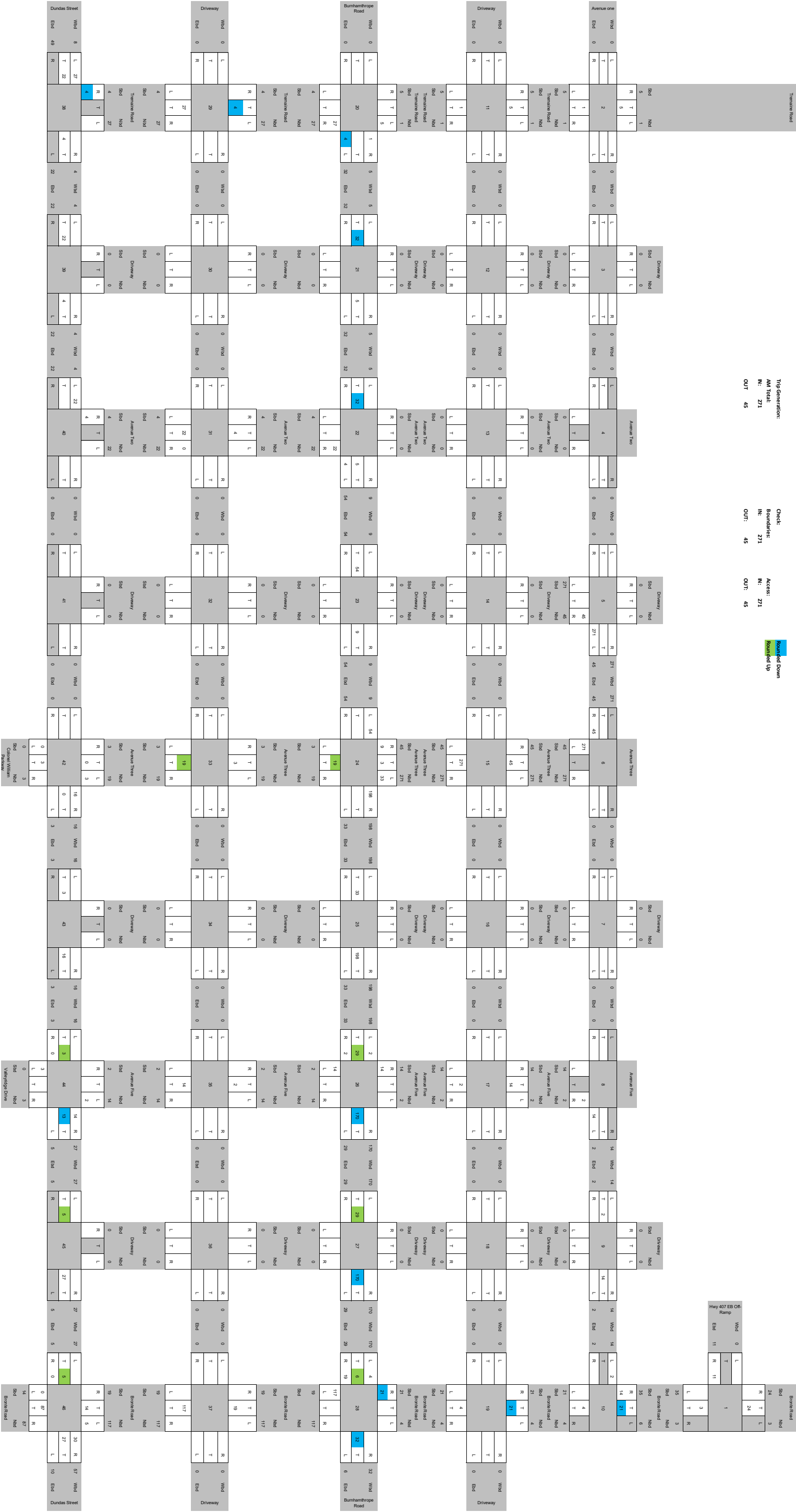


Figure X
Phase 2A and 2 Trip Assignment - Block Group 6 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
 AM Total:
 IN: 271
 OUT: 45
 Check:
 Boundaries:
 IN: 271
 OUT: 45
 Access:
 IN: 271
 OUT: 45
 Rounding Down
 Rounding Up



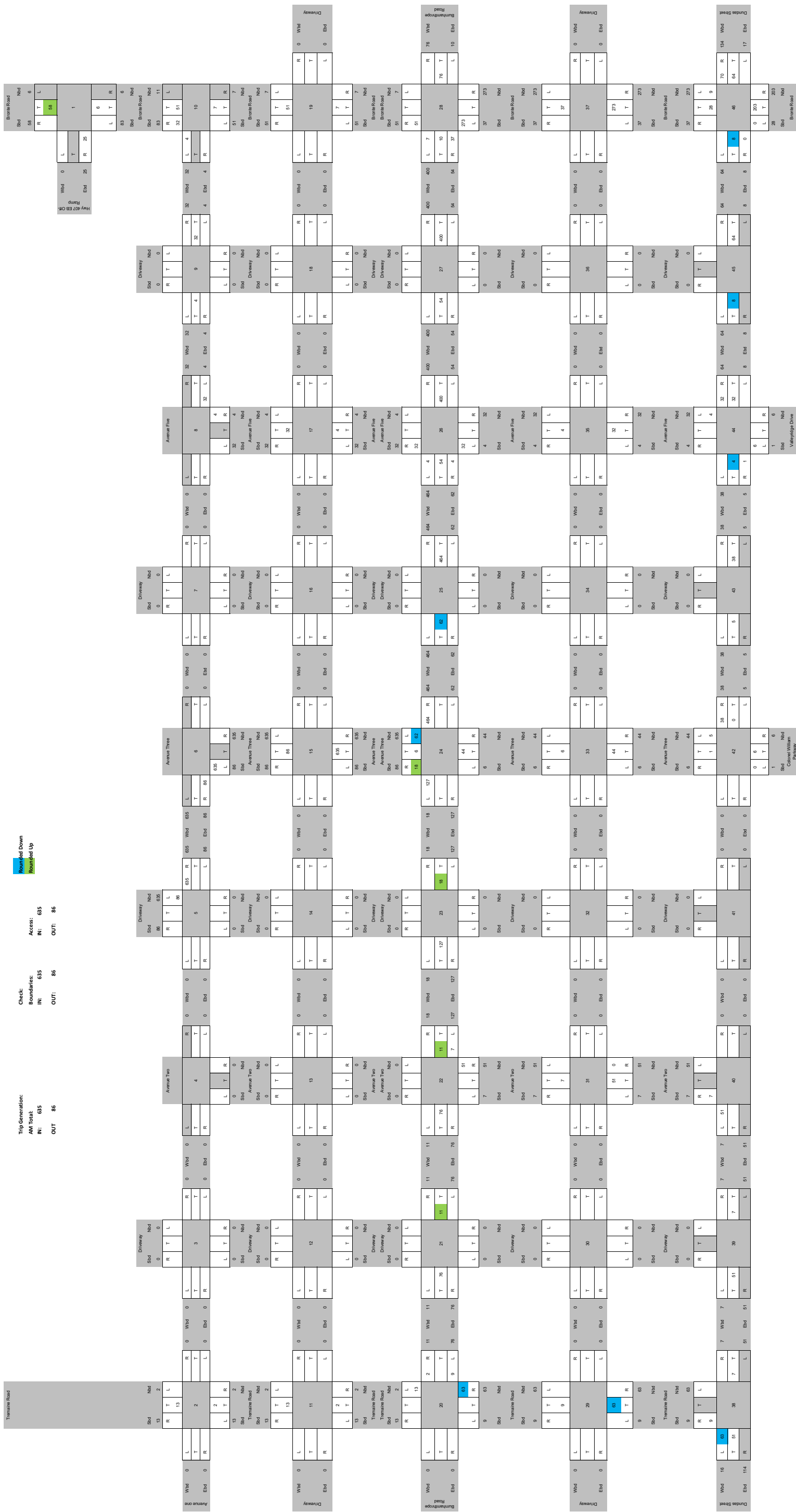
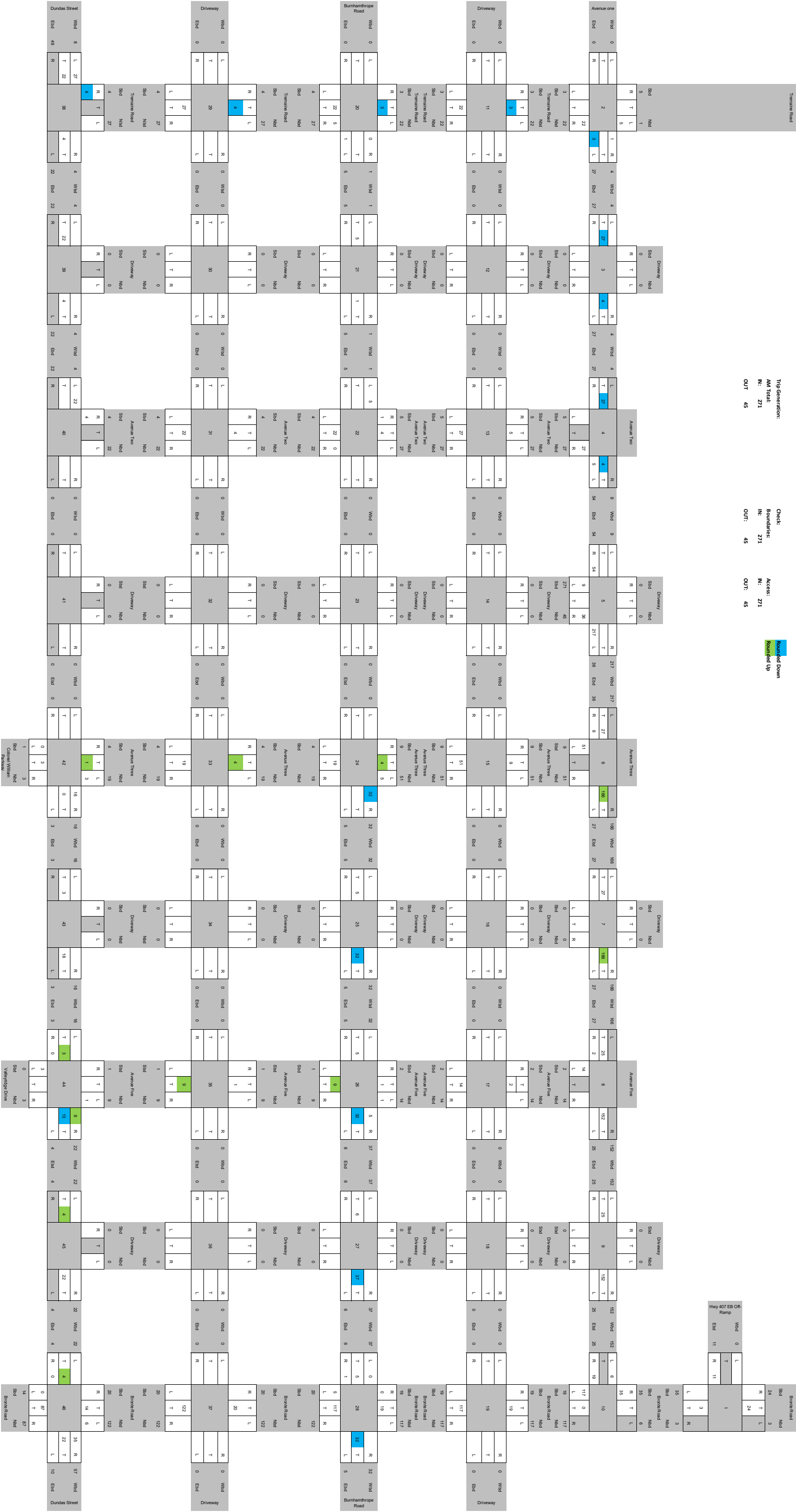
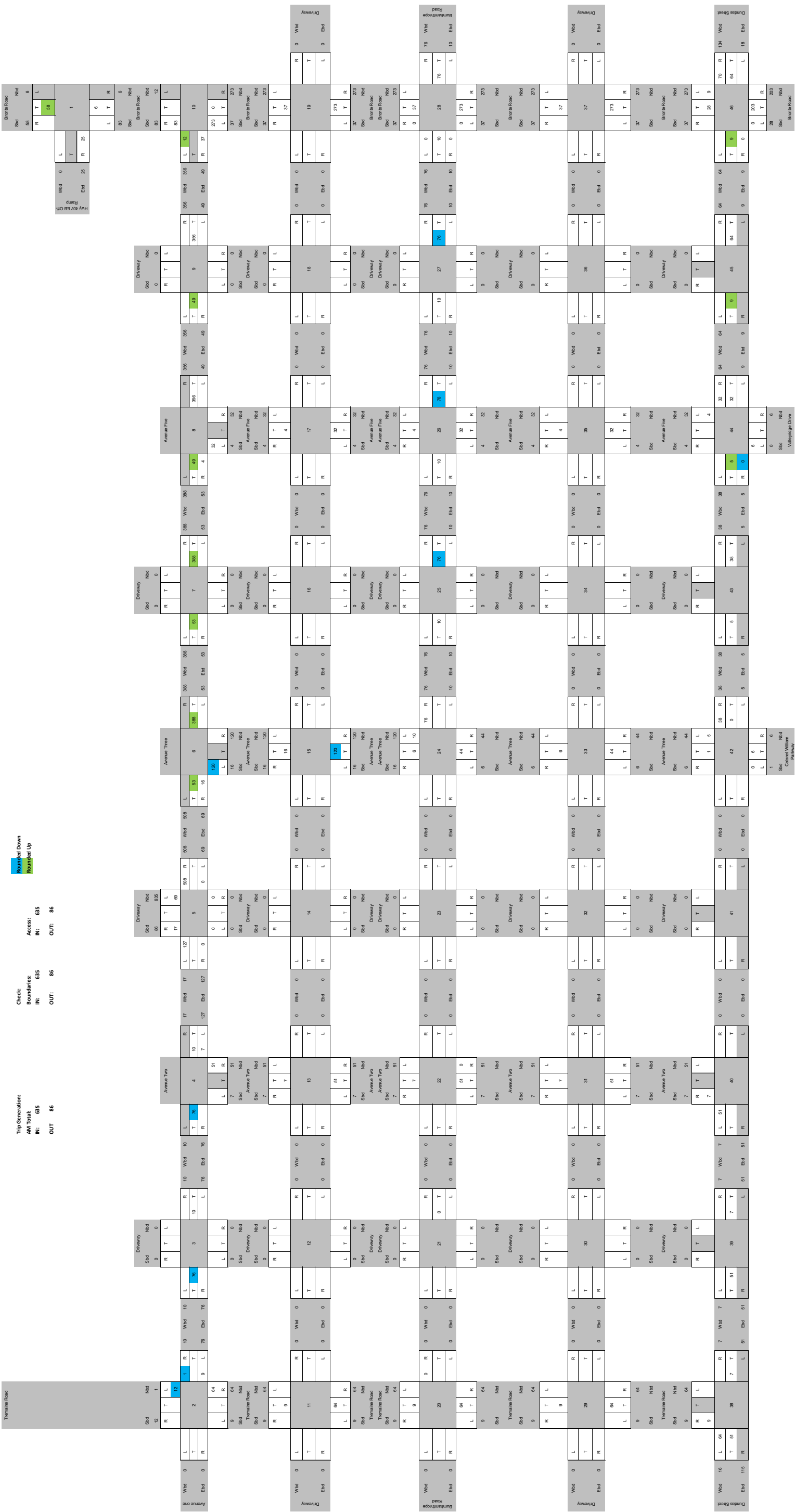


Figure X
Phase 2A Trip Assignment - Block Group 8 - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
 AM Total:
 IN: 271
 OUT: 45
 Check:
 Boundaries:
 IN: 271
 OUT: 45
 Access:
 IN: 271
 OUT: 45
 Routed Down
 Routed Up

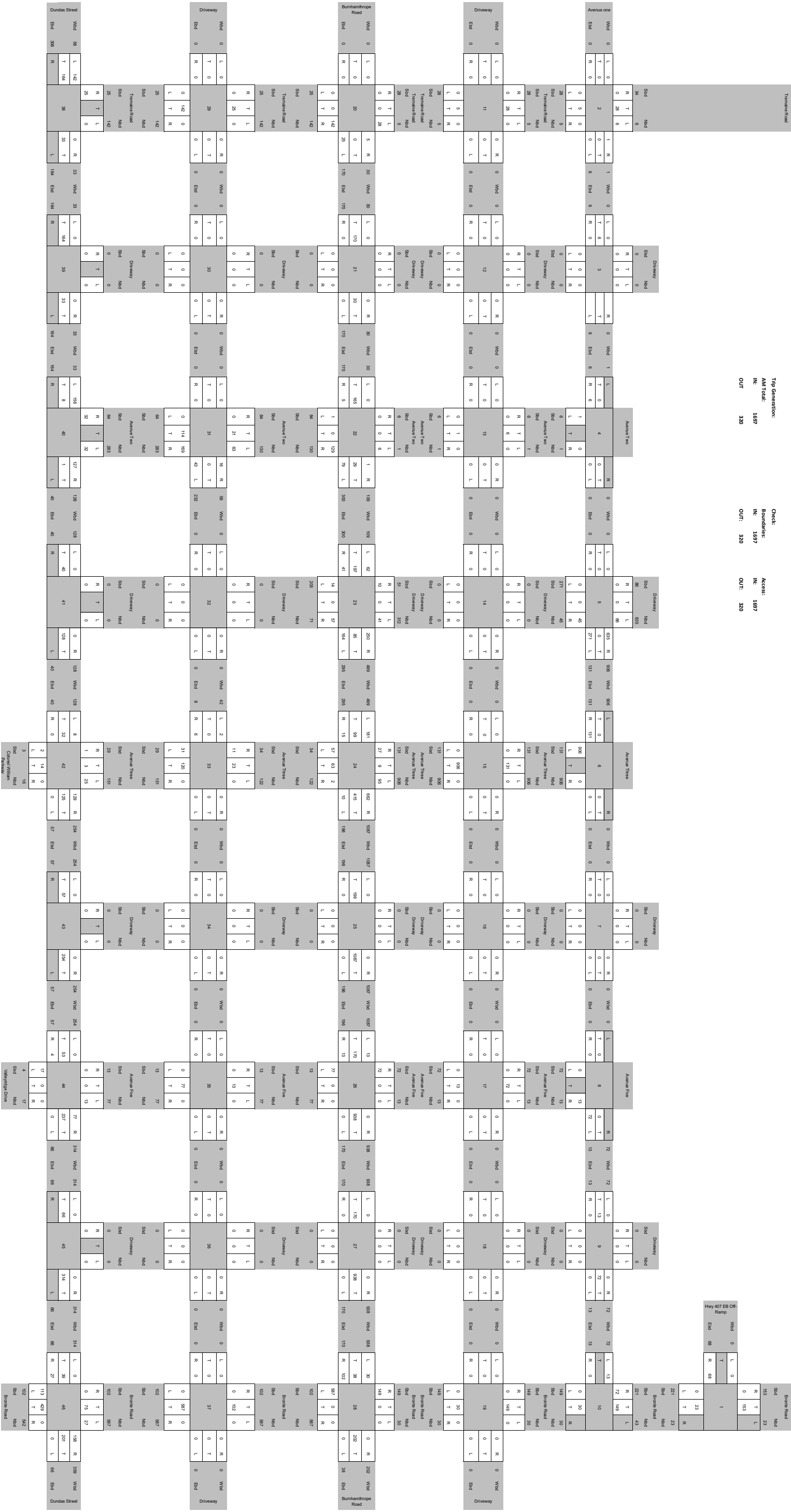




Top Generation:
AAI Total: 1697
In: 1697
Out: 320

Circle:
Roundabout:
In: 1697
Out: 320

Access:
In: 1697
Out: 320



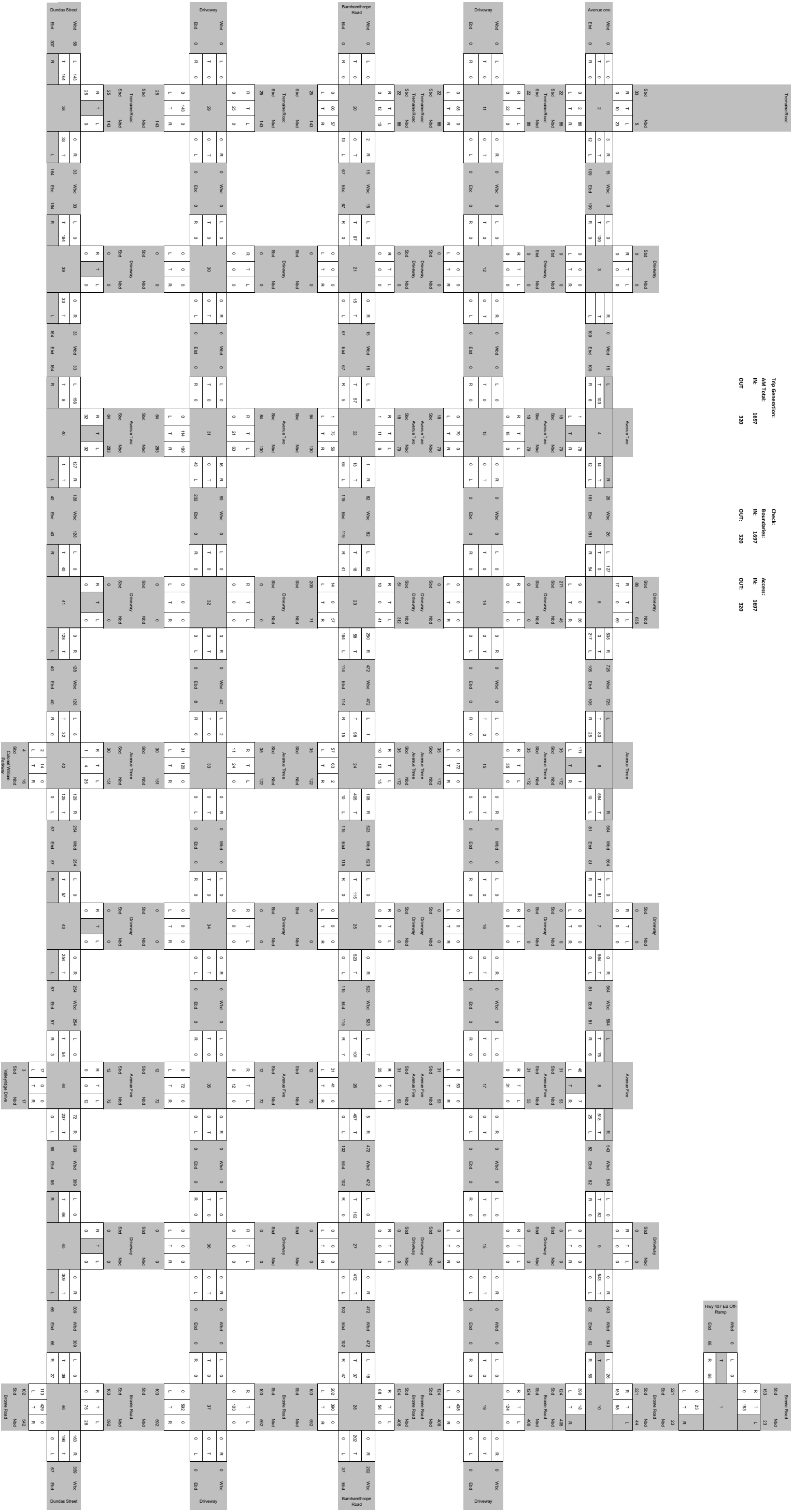
[illegible]

Figure X
Phase 2A (2030) Future Total Traffic Volumes - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Top Generation:
AADT Total: 1697
In: 1697
Out: 320

Circle:
Roundabout:
In: 1697
Out: 320

Access:
In: 1697
Out: 320



[illegible]

Figure X
Phase 2 (2030) Future Total Traffic Volumes - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

[illegible]

[illegible]

Figure X
Phase 2A (2030) Future Total Traffic Volumes with Sensitivity Adjustment - Weekday AM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

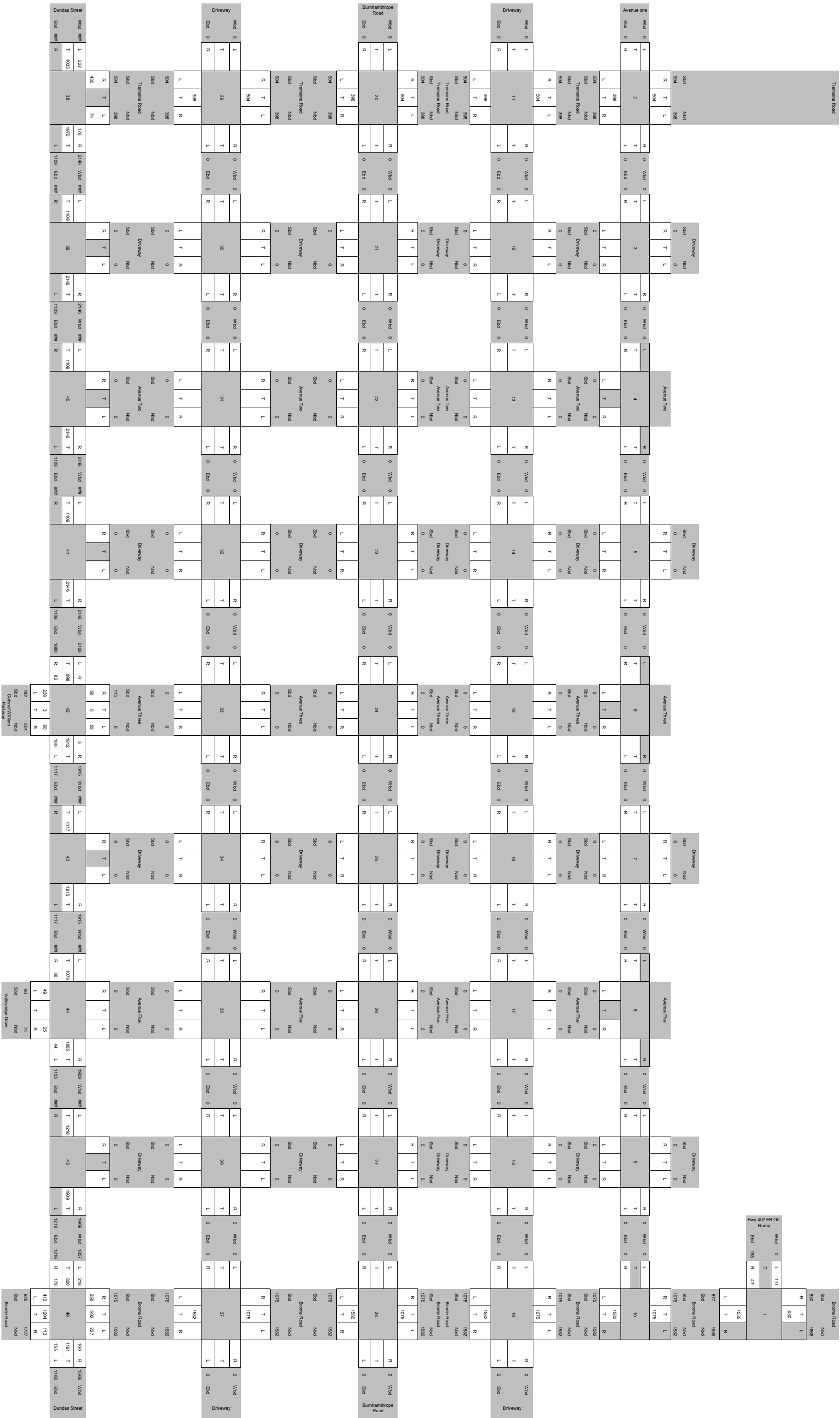
Modified Volumes

14.00027_1_FWH_ModAdj_AM_2030(032).xlsx

APPENDIX

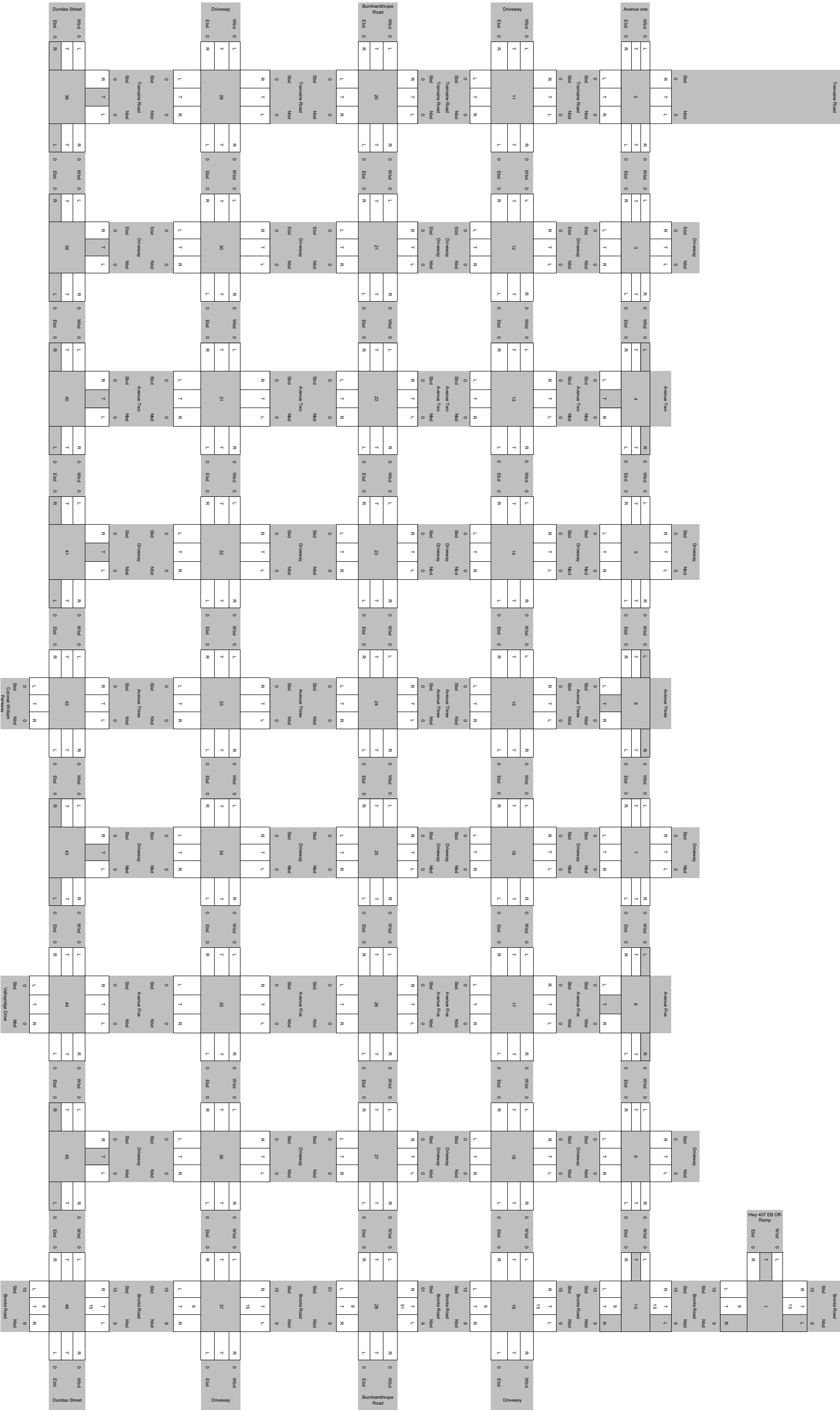
E-2 PM PEAK HOUR COMPONENTS

APPENDIX



[illegible]

Figure X
Derived 2020 Traffic Volumes - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



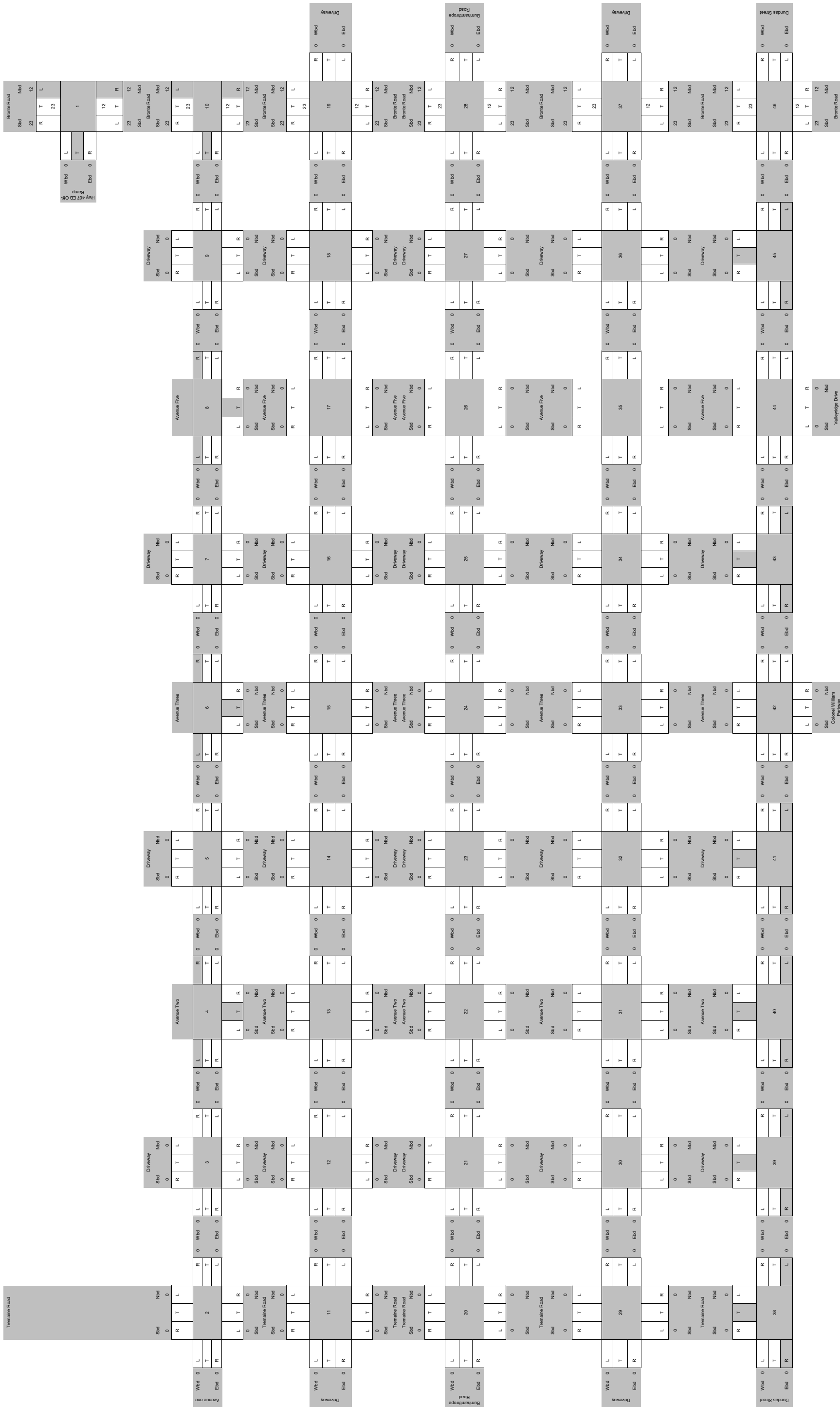


Figure X
2385 & 2389 Khalsa Gate Background Development - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

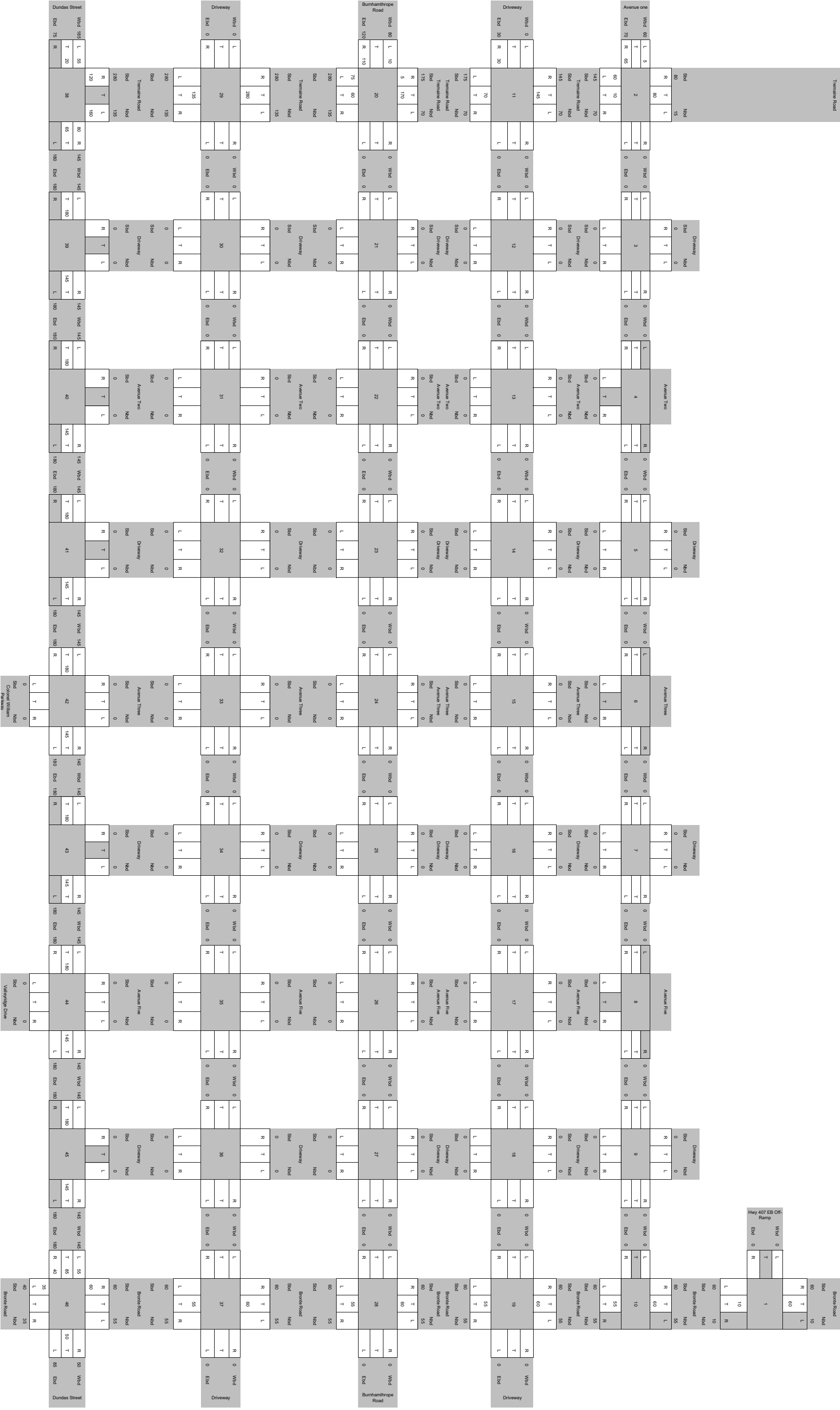


Figure X
Evergreen and Adjacent Lands Background Development - Phase 1 2025 Horizon Year - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

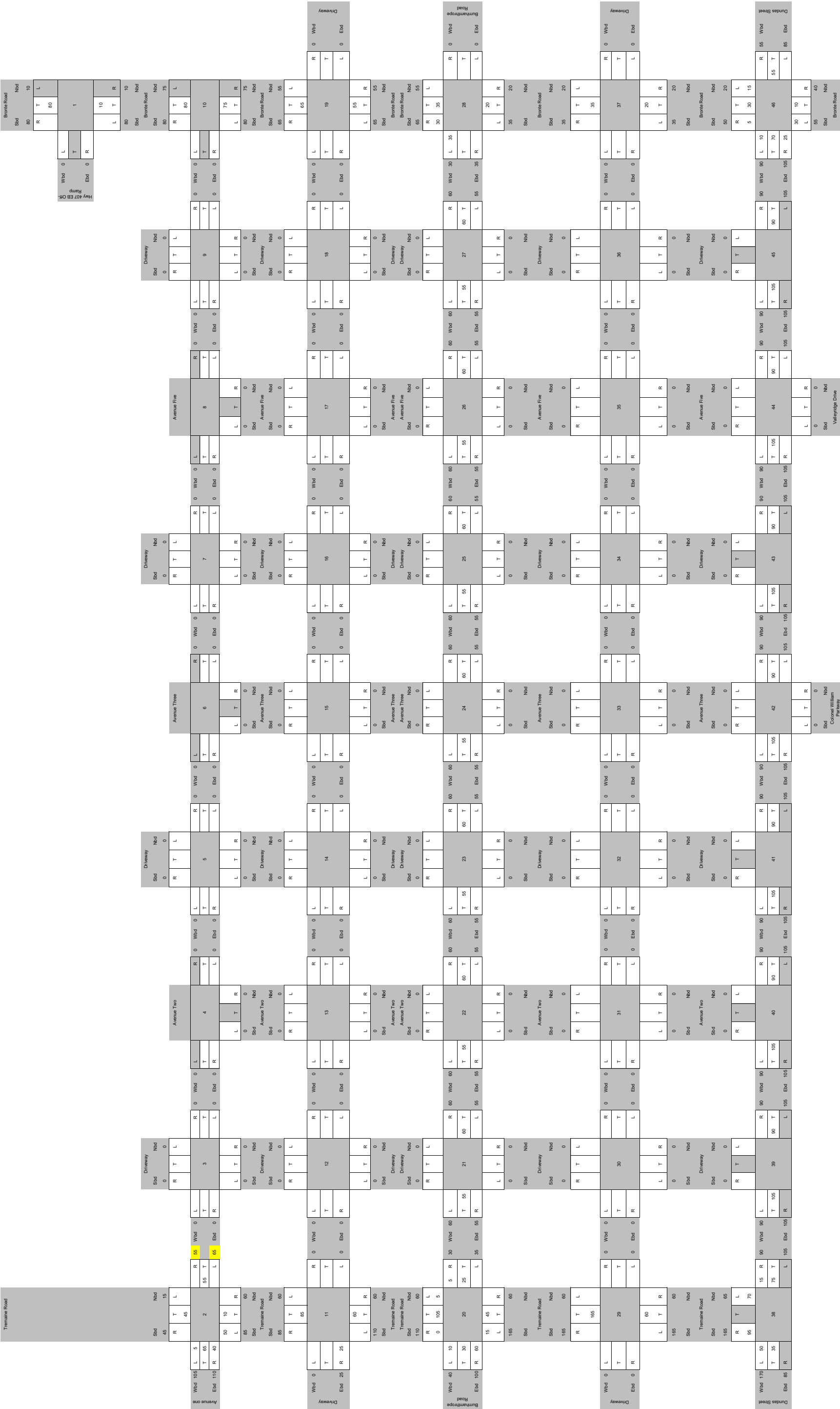


Figure X
Evergreen and Adjacent Lands Background Development - Phase 142 2030 Horizon Year - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

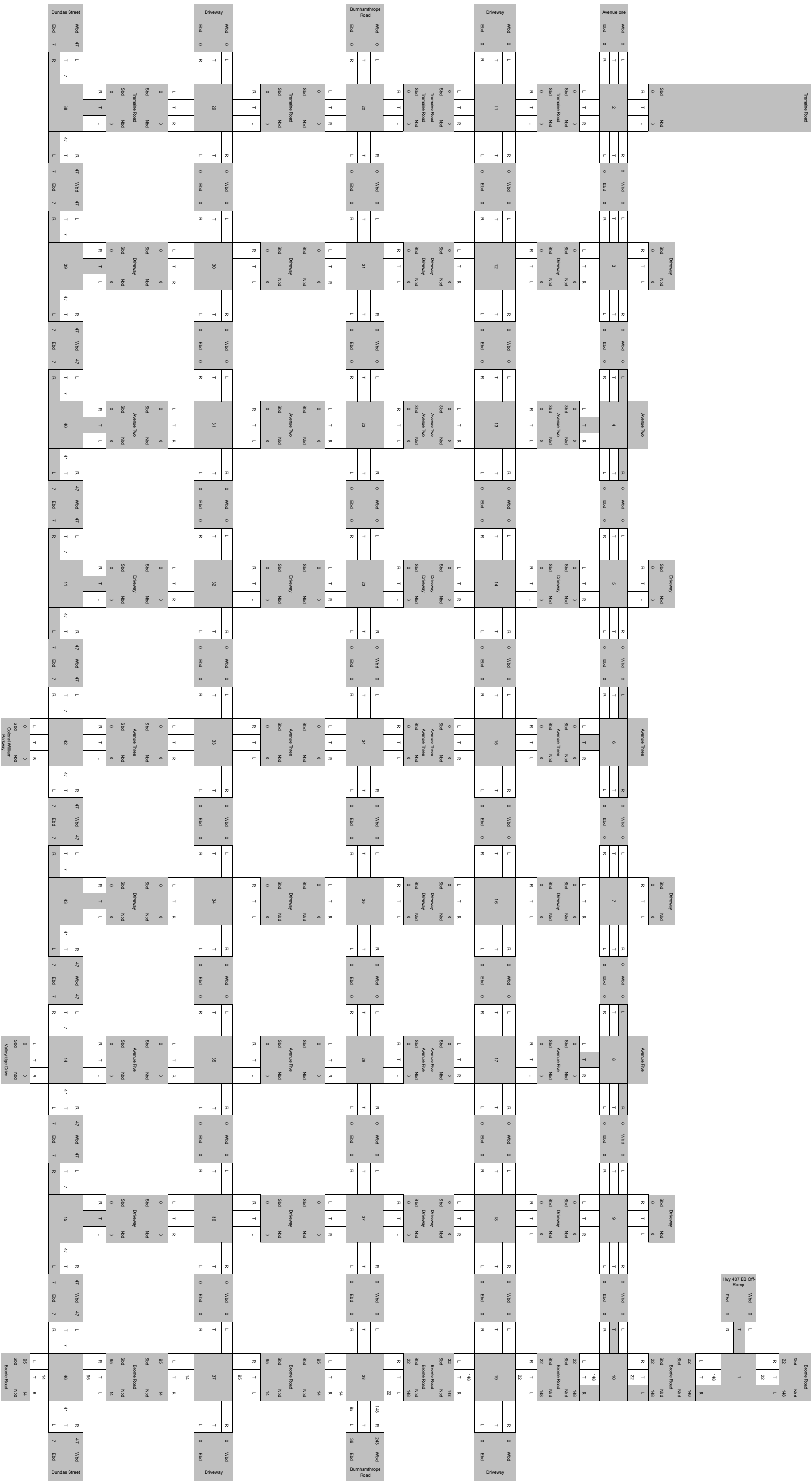


Figure X
Haiton Region Courthouse Background Development 2025 Horizon Year - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

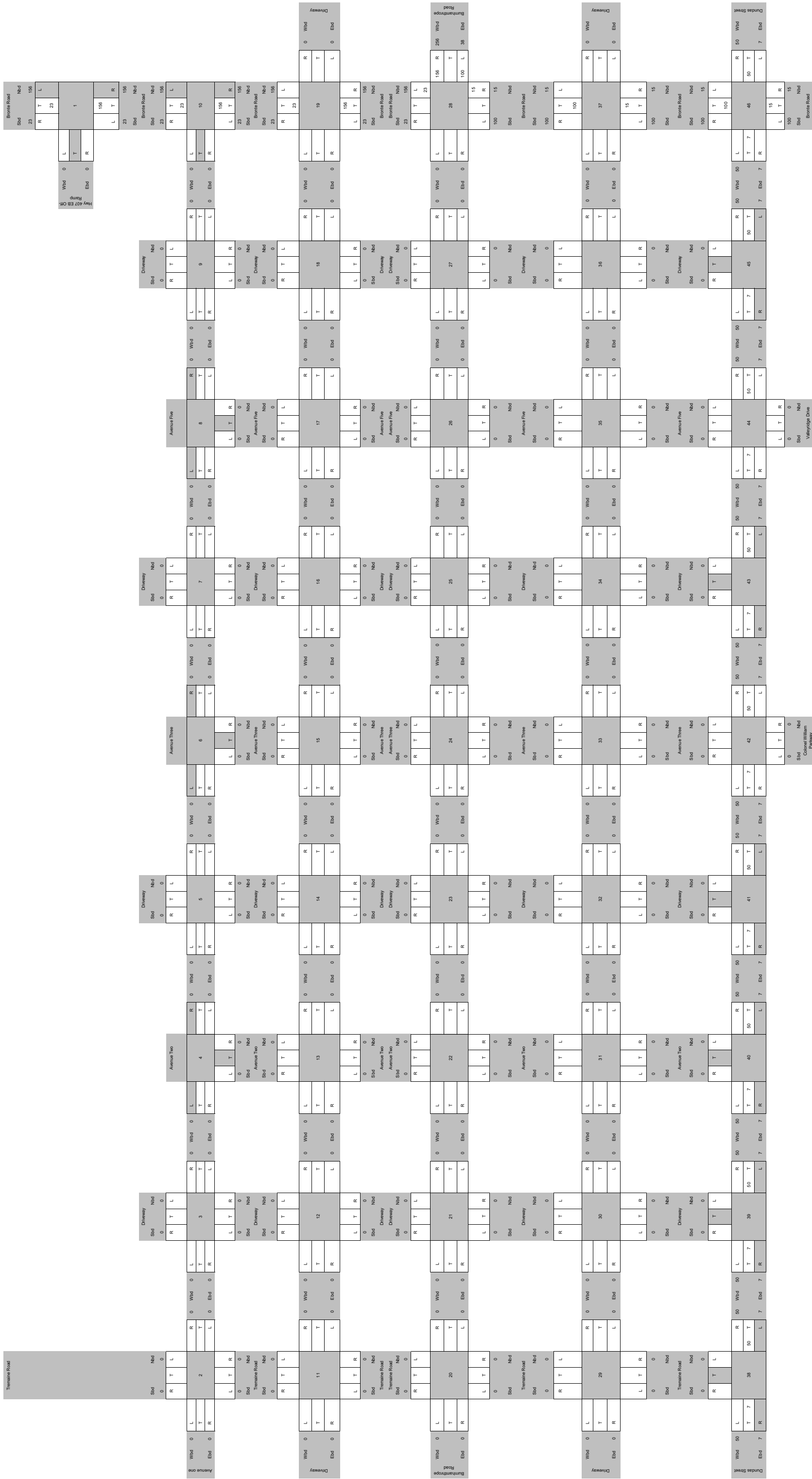
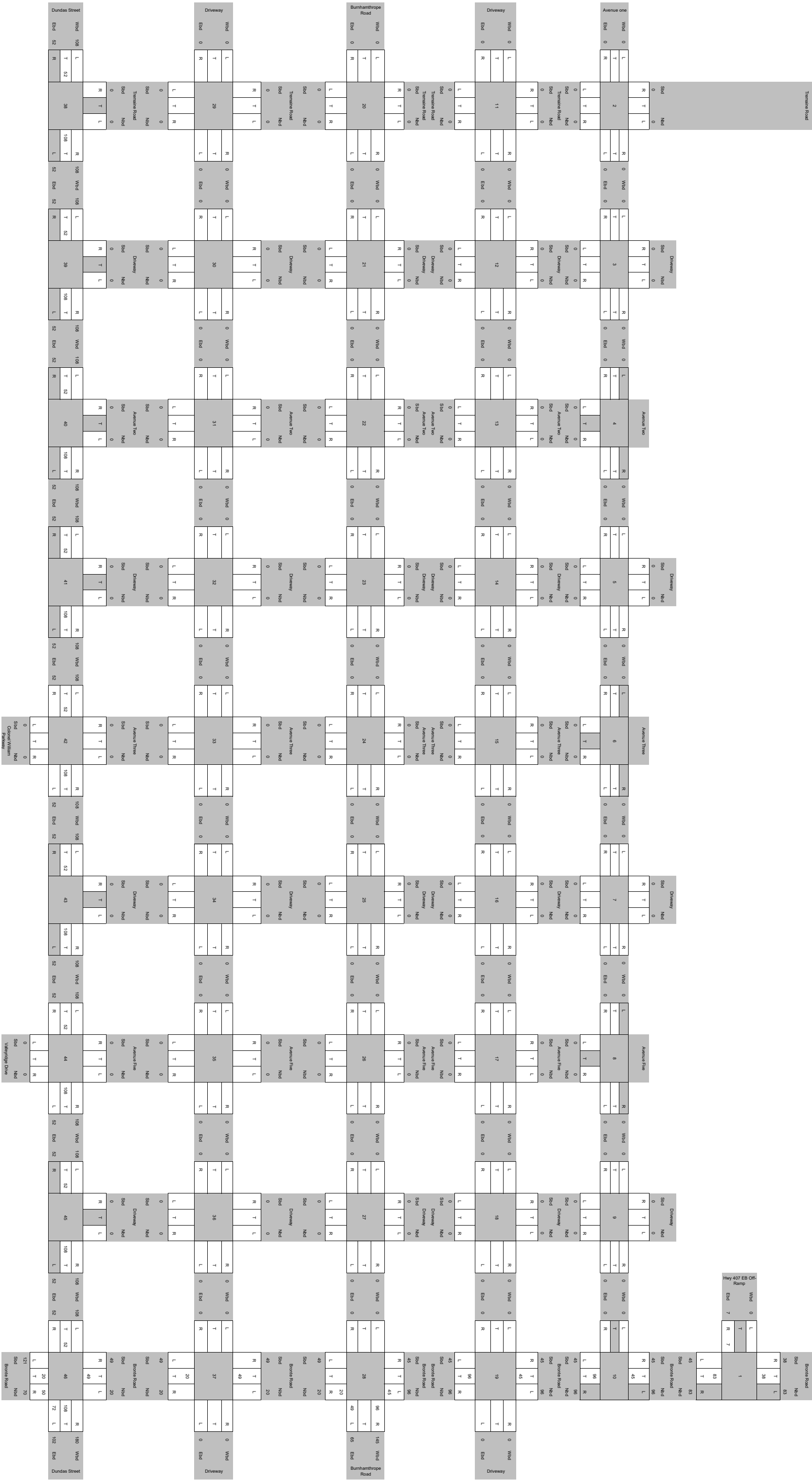


Figure X
Hallon Region Courthouse Background Development 2030 Horizon Year - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



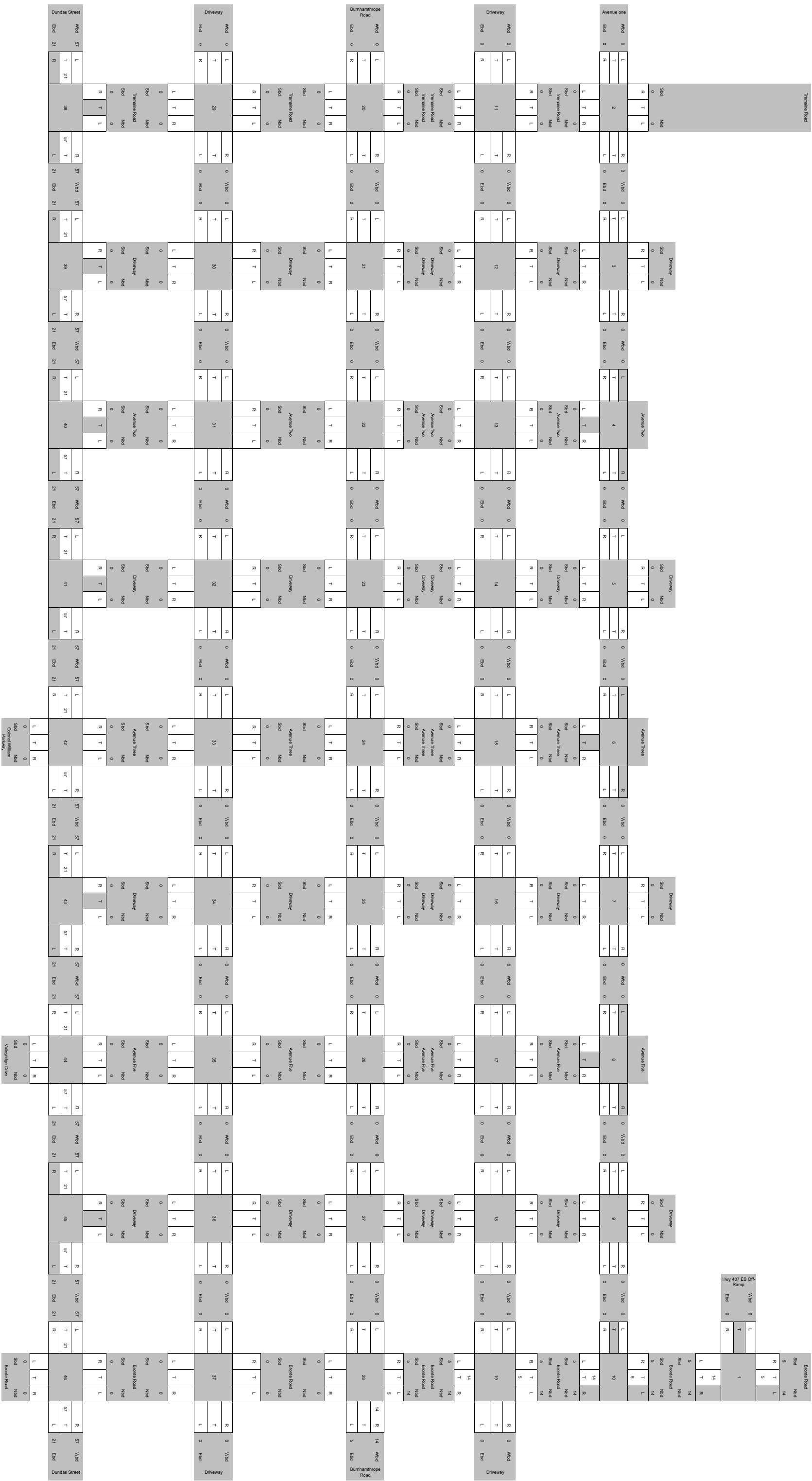


Figure X
ErinOak Kids Centre Background Development - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

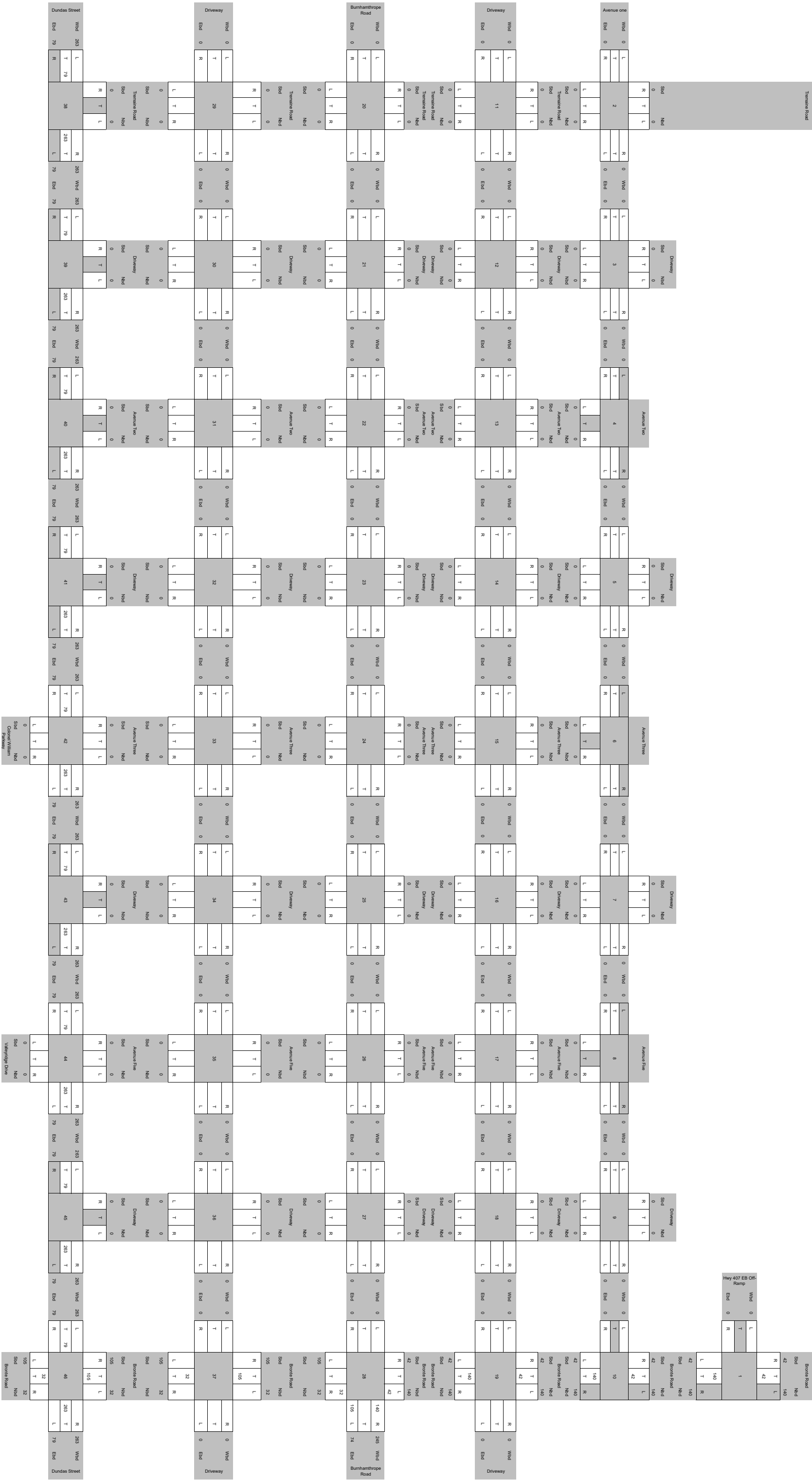


Figure X
PNC Lands Parcels 2 & 4-12 Background Development 2030 Horizon Year - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

14-00225 - 7/20/2016 10:00 AM 2/20/2016 10:00 AM

Scale: NTS



Surrounding 407 Employment Lands Trip Generation Breakdown per Group

Trip Assignment Notes:

The trip assignment for the 407 employments lands (site and surrounding 407 background developments) have been distributed along the driveways based on the Blocks layout. The trip generation for each block is based on a percentage of the overall trip generation (per land use) for the site or surrounding background 407 lands, with the percentage of the trip generation derived based on the percentage of the block GFA compared to the overall GFA used for the trip gen.

407 Background Lands Trip Gen per block sharing a driveway (to be applied to 2031 horizon year):

Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18	Group 19	Group 20	Group 21	Group 22
C3-4	C1	G2-1	G3-1	G1-1	C4-3	C6	G7	C7	C8	G8	G9	P5	P4
	P8	G2-2	C2-1	G1-2		G6			G10				
	G3	G2-3		P1					P6				

Percentage of Trip Gen for these blocks: Rounded up to match overall trip gen values

Group 9

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C3-4	Service Area Employment	Shopping Centre	23,130	8%	15	9	24	27	34	61
		Shopping Centre Pass-By	23,130	8%	0	0	0	16	15	31
		General Office	12,455	8%	15	2	17	2	10	12
		Total Primary				30	11	41	29	44
Total Pass-By					0	0	0	16	15	31

Group 10

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
	Service Area Employment	Shopping Centre	85,875	29%	54	33	87	101	123	224
		Shopping Centre Pass-By	85,875	29%	0	0	0	58	58	116
		General Office	46,241	29%	55	8	63	7	40	47
P8	Light Employment	General Office	150,157	9%	133	19	152	26	120	146
G3	General Employment	Business Park	138,122	10%	133	23	156	35	100	135
Total Primary					375	83	458	169	383	552
Total Pass-By					0	0	0	58	58	116

Group 11

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G2-1	General Employment	Business Park	163,956	12%	157	29	186	41	119	160
G2-2	General Employment	Business Park	123,656	9%	119	22	141	31	90	121
G2-3	General Employment	Business Park	121,934	9%	117	20	137	31	87	118
Total					393	71	464	103	296	399

Group 12

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C2-1	Light Employment	General Office	33,906	2%	30	4	34	6	27	33
G3-1	General Employment	Business Park	57,867	4%	56	9	65	15	41	56
Total					86	13	99	21	68	89

Group 13 For Phase 2 - Broken Down Within the Excel Sheets as 13-1 (Block G1-1 & G1-2) and 13-2 (Block P1) as Block P1 would be across the river crossing

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
P1	Light Employment	General Office	146,389	8%	131	18	149	26	118	144
G1-1	General Employment	Business Park	181,178	13%	174	30	204	46	130	176
G1-2	General Employment	Business Park	118,145	8%	114	20	134	30	86	116
Total					419	68	487	102	334	436

Group 14

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C4-3	Service Area Employment	Shopping Centre	41,475	14%	26	16	42	49	59	108
		Shopping Centre Pass-By	41,475	14%	0	0	0	28	28	56
		General Office	22,333	14%	27	3	30	4	19	23
		Total Primary				53	19	72	53	78
Total Pass-By					0	0	0	28	28	56

Group 15

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C6	Service Area Employment	Shopping Centre	77,368	26%	49	30	79	92	110	202
		Shopping Centre Pass-By	77,368	26%	0	0	0	52	52	104
		General Office	41,660	26%	49	7	56	7	35	42
G6	General Employment	Business Park	147,767	11%	142	26	168	38	107	145
Total					240	63	303	137	252	389
Total Pass-By					0	0	0	52	52	104

Group 16

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G7	General Employment	Business Park	115,045	8%	110	19	129	29	83	112
Total					110	19	129	29	83	112

Group 17

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C7	Service Area Employment	Shopping Centre	8,242	3%	5	3	8	10	11	21
		Shopping Centre								
		Pass-By	8,242	3%	0	0	0	5	6	11
		General Office	4,438	3%	5	1	6	1	4	5
Total					10	4	14	11	15	26
Total Pass-By					0	0	0	5	6	11

Group 18

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C8	Service Area Employment	Shopping Centre	57,959	20%	36	23	59	69	82	151
		Shopping Centre Pass-By	57,959	20%	0	0	0	39	39	78
		General Office	31,029	20%	37	5	42	5	27	32
P6	Light Employment	General Office	208,282	12%	186	25	211	37	167	204
G10	General Employment	Business Park	117,800	8%	113	19	132	30	84	114
Total Primary					372	72	444	141	360	501
Total Pass-By					0	0	0	39	39	78

Group 19

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G8	General Employment	Business Park	127,445	9%	122	22	144	32	92	124
Total					122	22	144	32	92	124

Group 20

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G9	Light Employment	General Office	393,421	22%	351	48	399	69	317	386
Total					351	48	399	69	317	386

Group 21

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
P5	Light Employment	General Office	209,358	12%	186	25	211	37	167	204
Total					186	25	211	37	167	204

Group 22

Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Trip Gen	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
P4	Light Employment	General Office	626,460	35%	558	76	634	110	502	612
Total					558	76	634	110	502	612

Overall Background 407 Lands

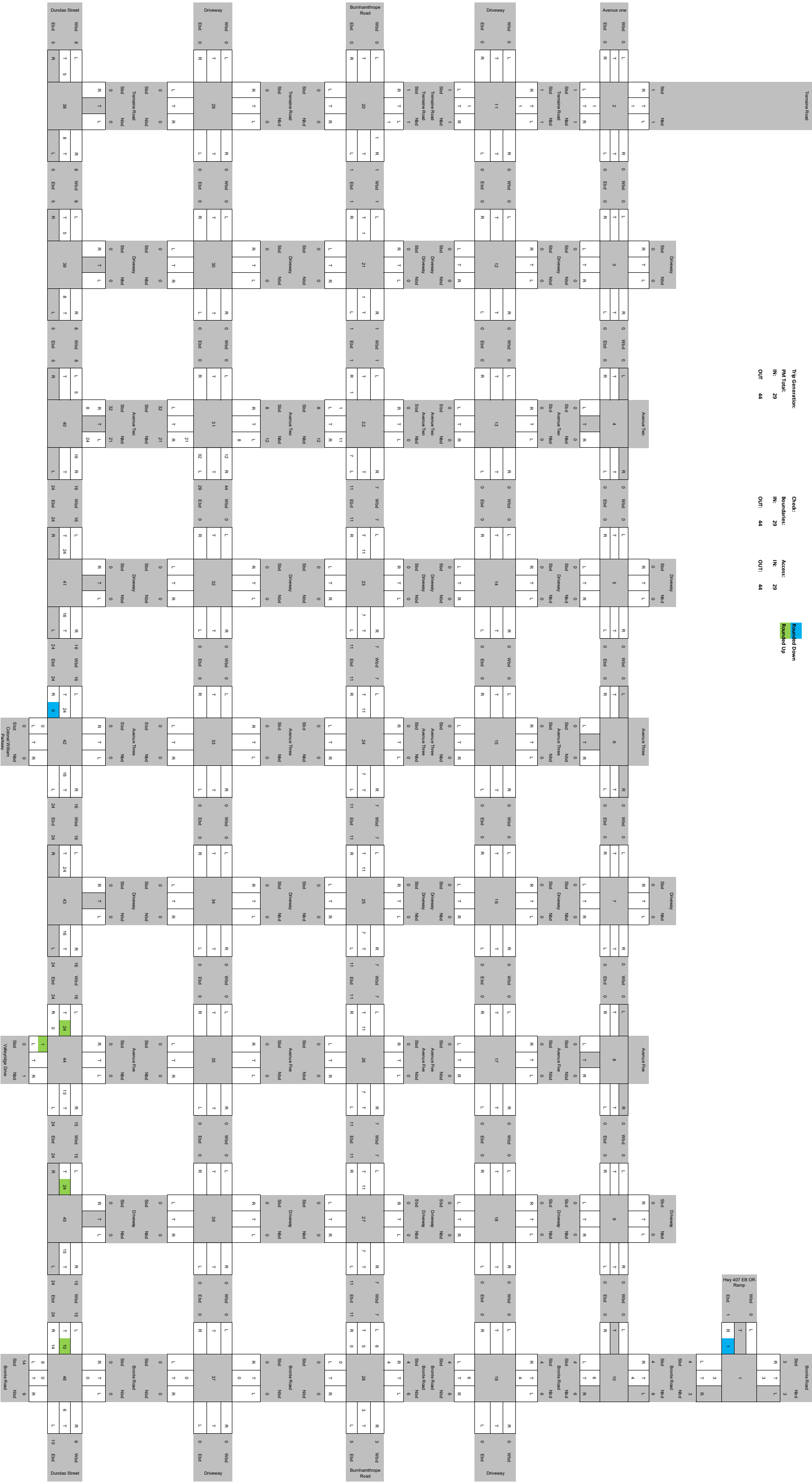
					Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
Total Primary					3305	594	3899	1043	2991	4034
Total Pass-By					0	0	0	198	198	396

Tip Generation:
PM Total: 29
IN: 29
OUT: 44

Check:
Boundaries: 29
IN: 29
OUT: 44

Access: 29
IN: 29
OUT: 44

Founded Down
Founded Up



Hwy 407 EB Off-Ramp
Wbd 0
T 1
R 1

Figure X
407 Lands Background Development Phase 2A&2 Trip Assignment Block Group 9 - Weekday PM Peak Hour
407 Lands Employment Lands - North Ontario Transportation Study

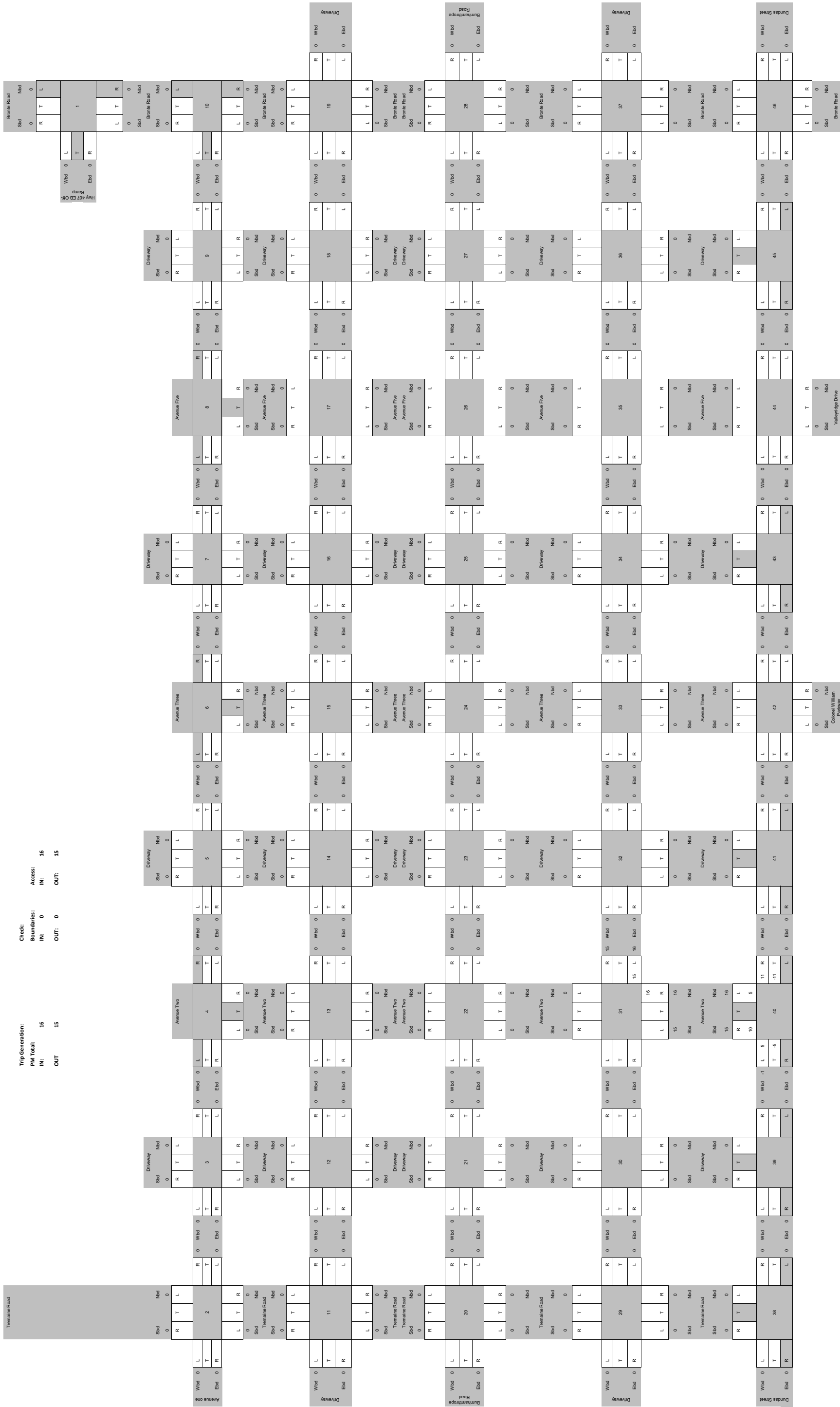


Figure X
407 Lands Background Development Phase 2A&2 Pass-By Trip Assignment Block Group 9 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
 PM Total:
 IN: 159
 OUT: 383
 Check:
 Boundaries:
 IN: 169
 OUT: 383
 Access:
 IN: 169
 OUT: 383

Rounded Down
 Rounded Up

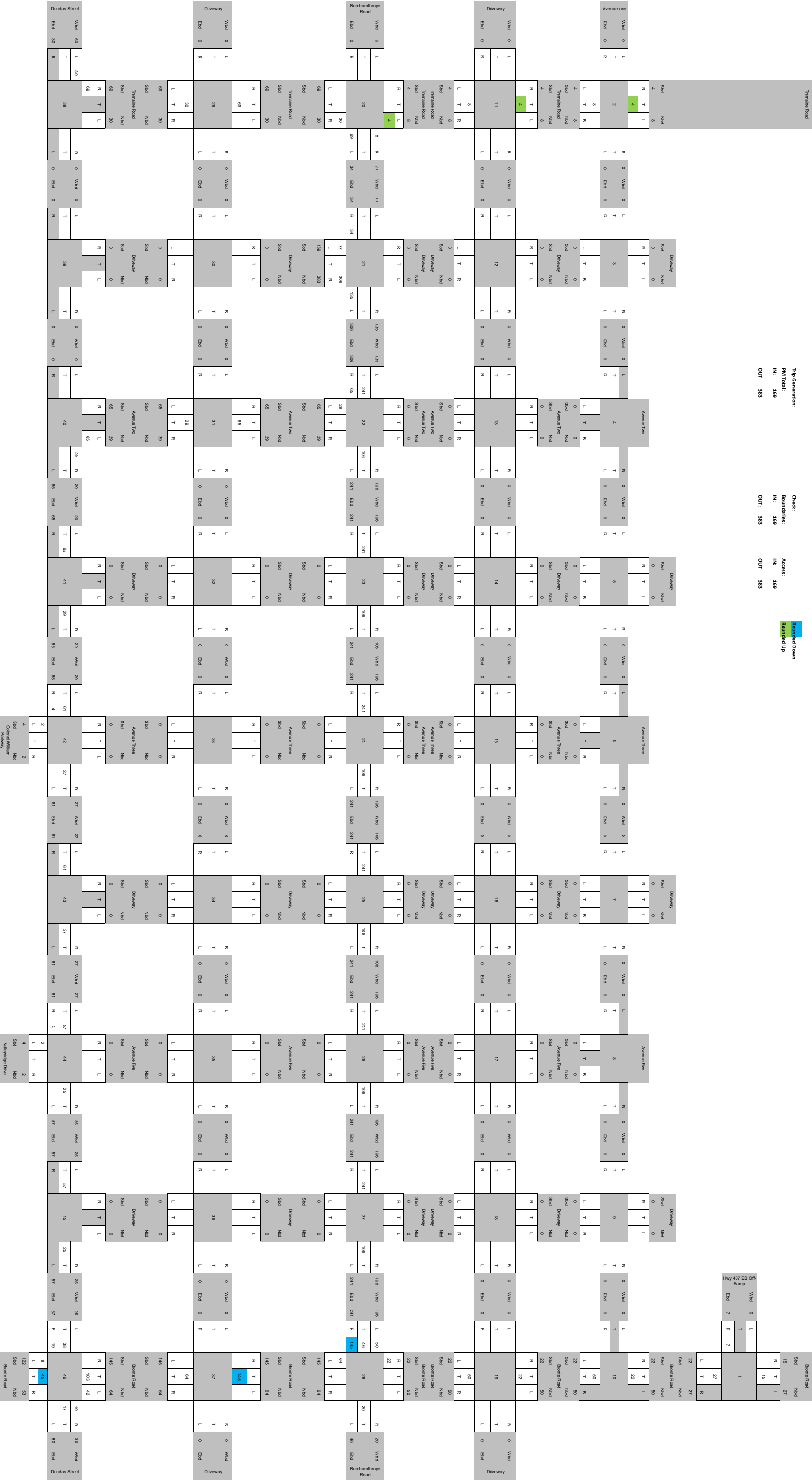


Figure X
 407 Lands Background Development Phase 2A&2 Trip Assignment Block Group 10 - Weekday PM Peak Hour
 407 West Employment Lands - North Quarter Transportation Study

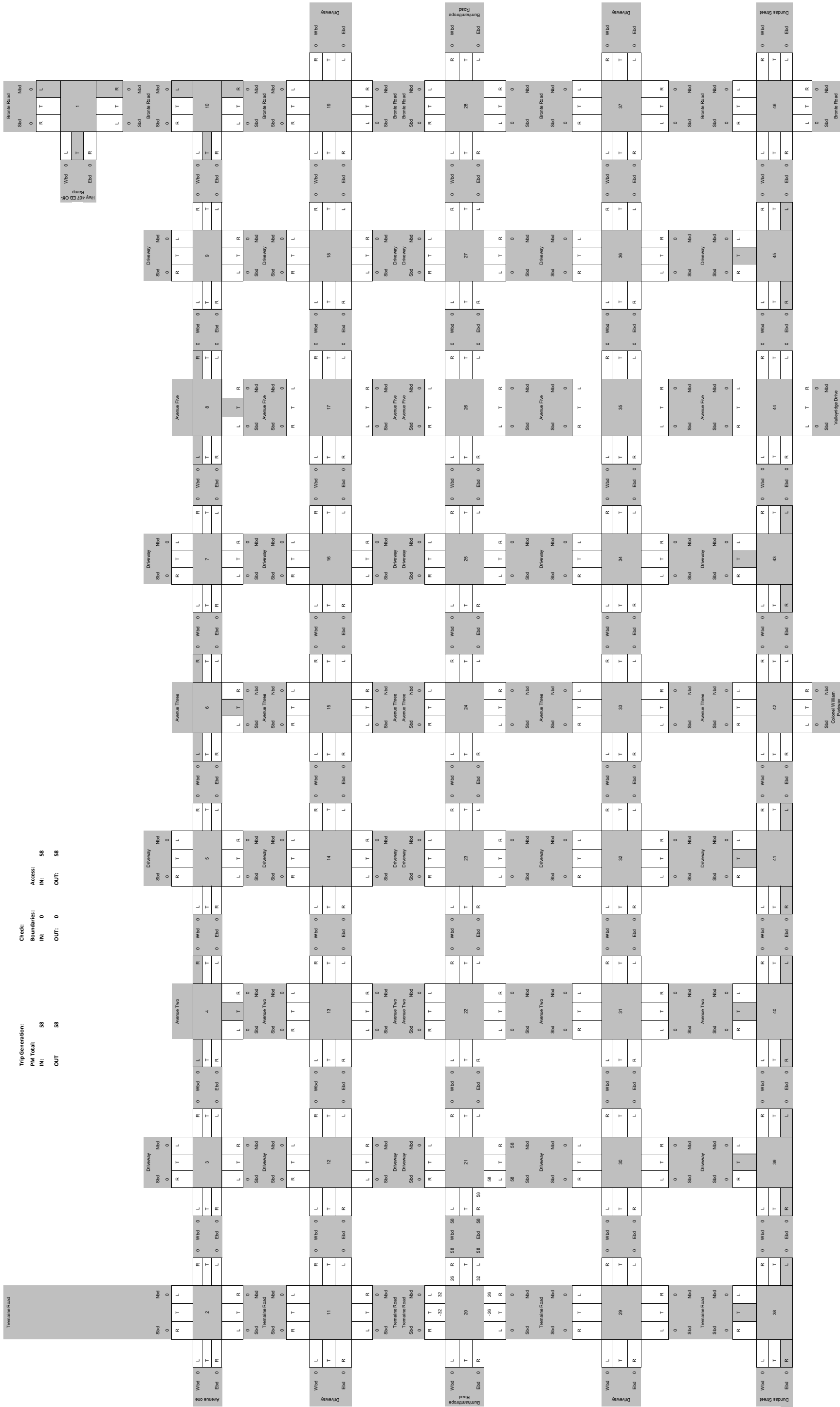


Figure X
407 Lands Background Development Phase 2A&2 Pass-By Trip Assignment Block Group 10 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

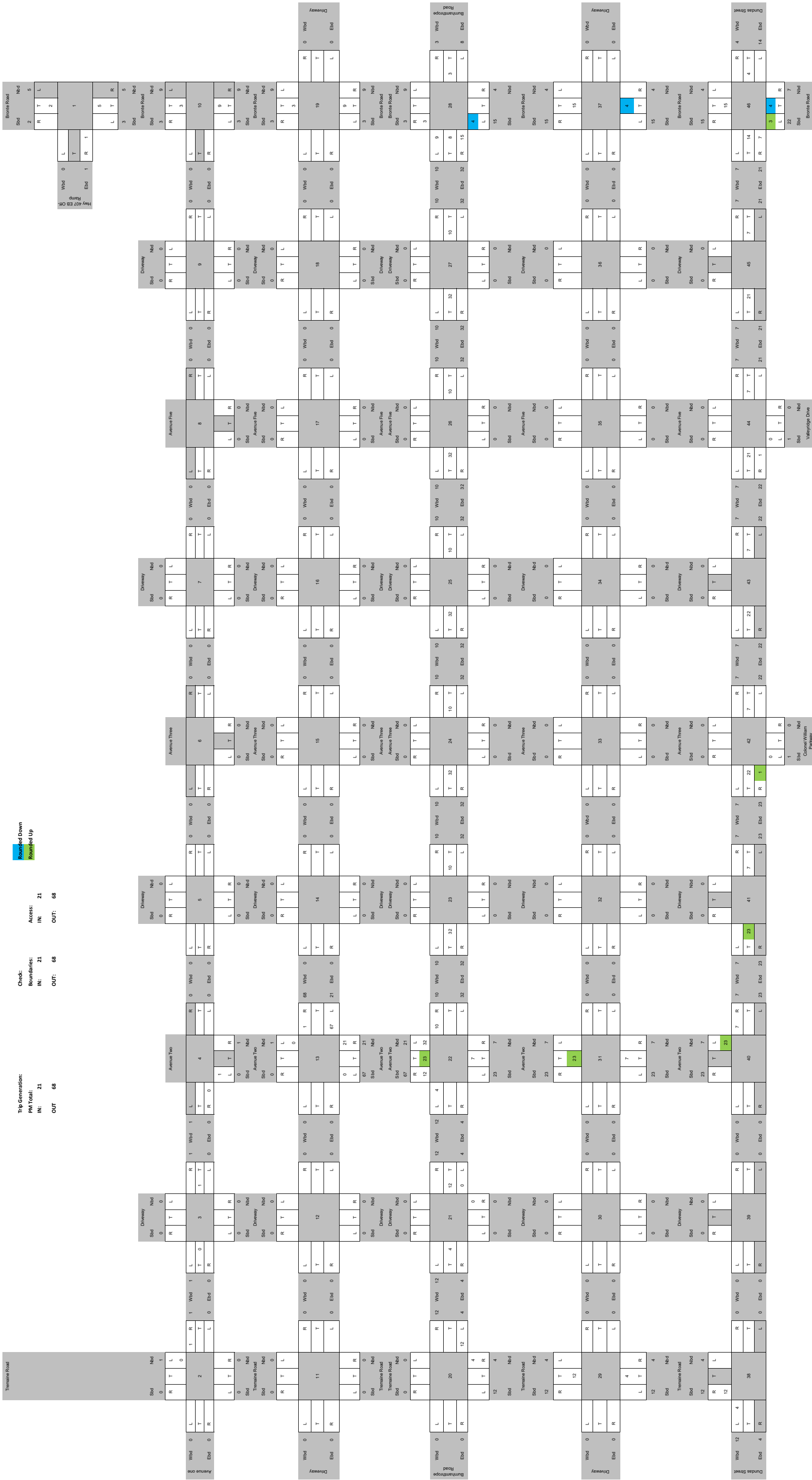


Figure X
407 Lands Background Development Phase 2A Trip Assignment Block Group 12 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
AM Total: 26
IN: 26
OUT: 118

Check:
Boundaries:
IN: 26
OUT: 118

Access:
Rounded Down
Rounded Up

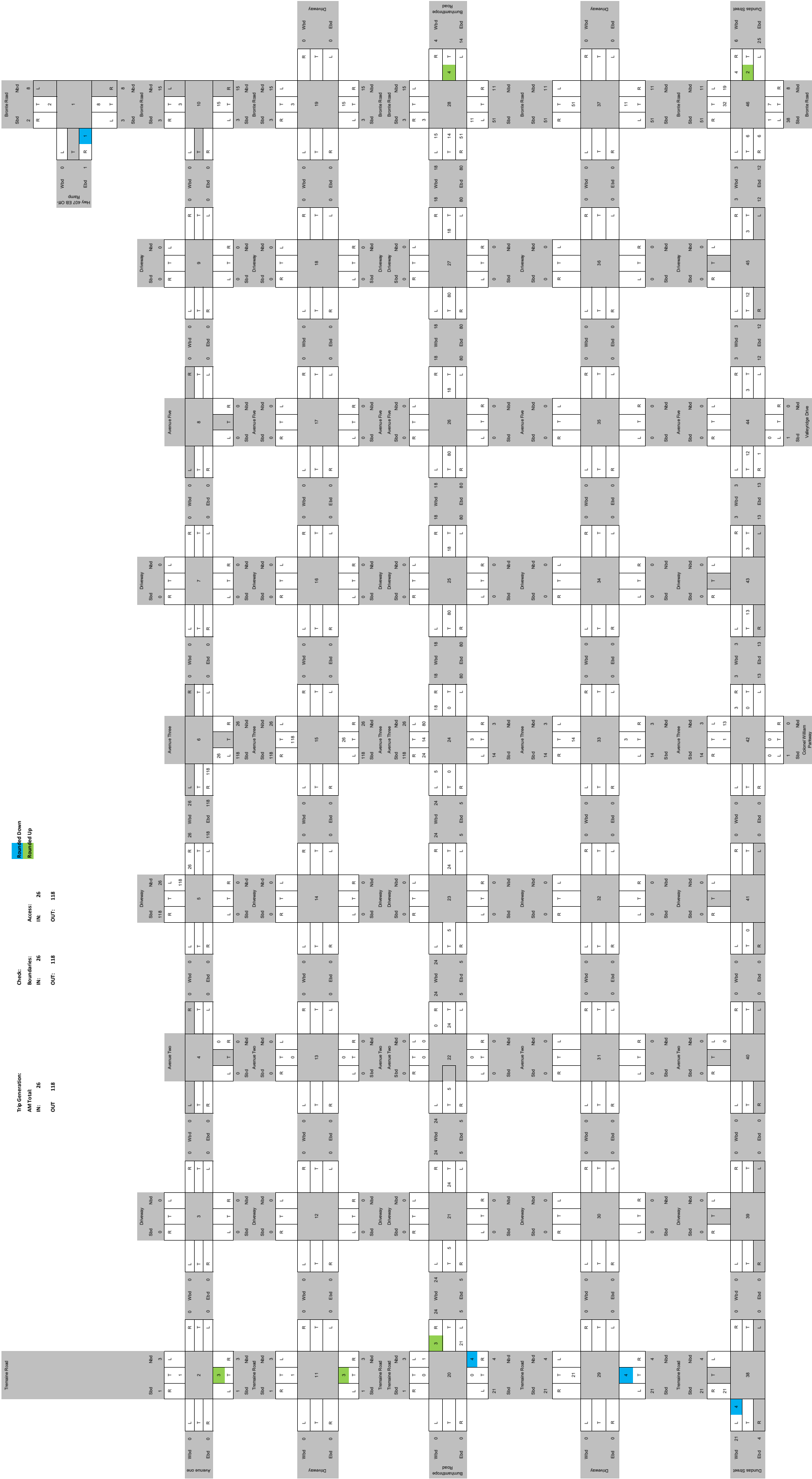


Figure X
407 West Employment Lands - North Oakville Transportation Study
Trip Assignment Block Group 13-2 - Weekday PM Peak Hour

Trip Generation:
PM Total: IN: 53 OUT: 78
Check: Boundaries: IN: 53 OUT: 78
Access: IN: 53 OUT: 78

Found at Down
Found at Up

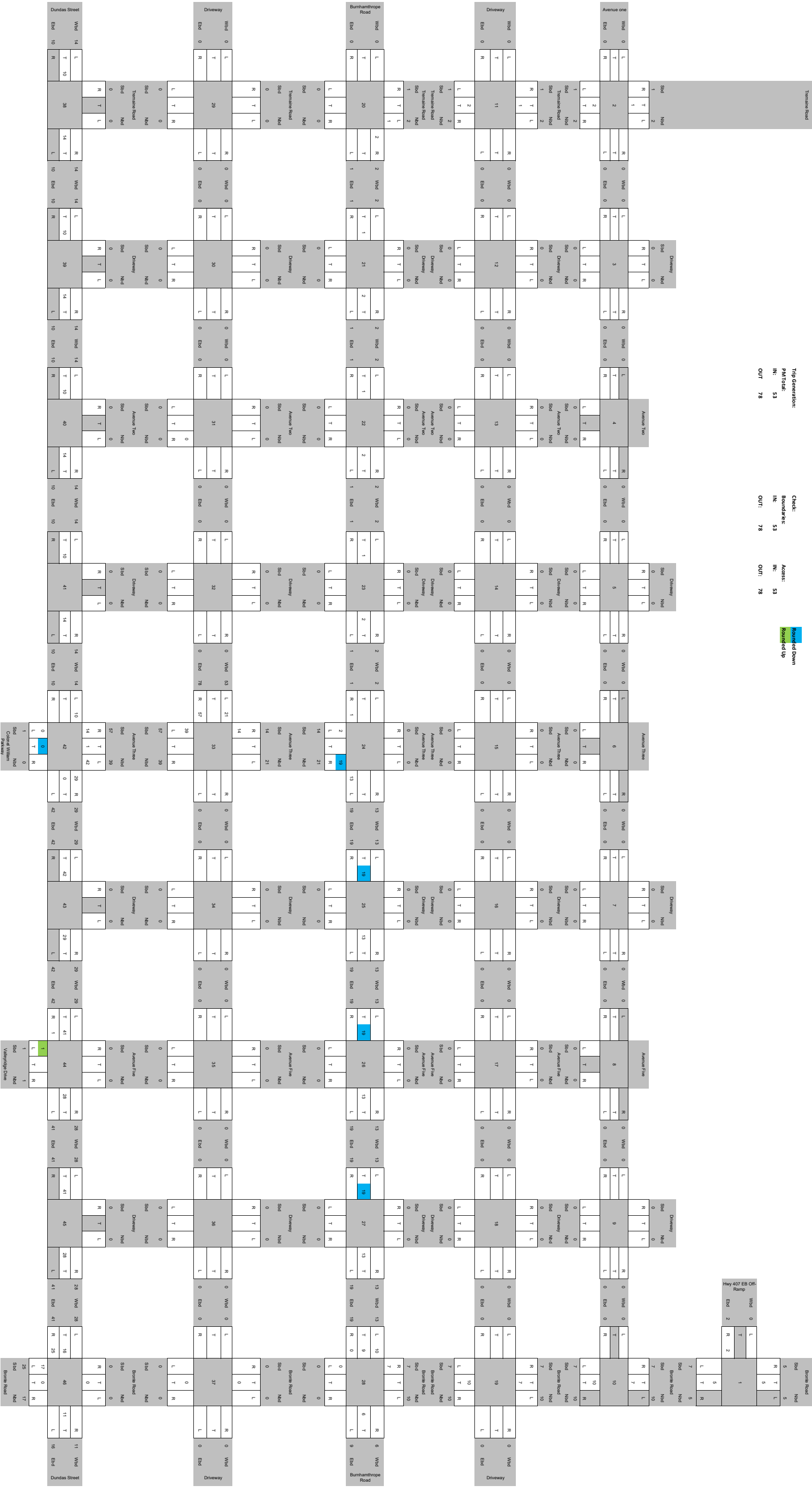


Figure X
407 Lands Background Development Phase 2A&2 Trip Assignment Block Group 14 - Weekday PM Peak Hour
407 Week Employment Lands - North Oakville Transportation Study

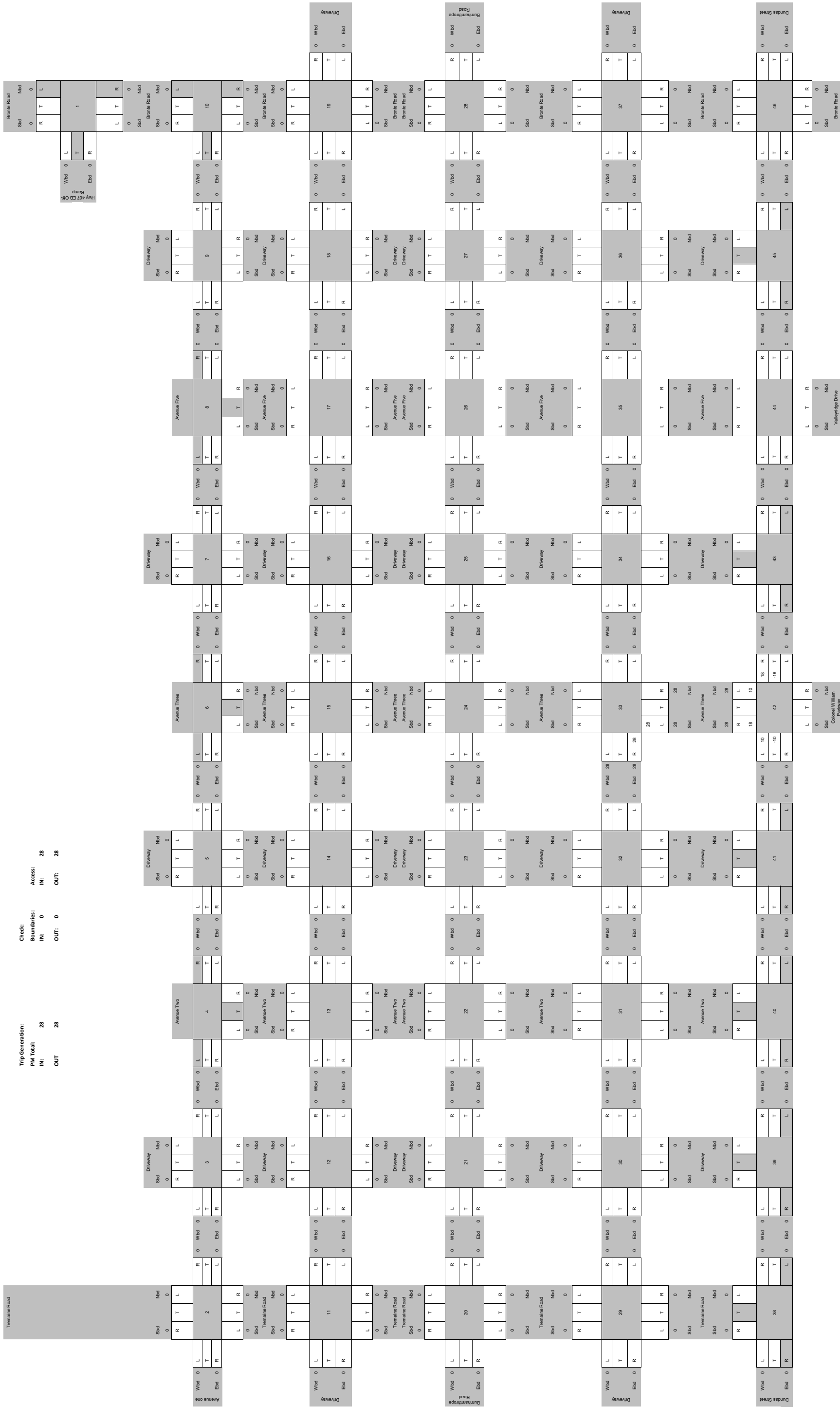


Figure X
407 Lands Background Development Phase 2A&2 Pass-By Trip Assignment Block Group 14 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:		Check:		Access:	
PM Total:		Boundaries:		IN:	137
IN:	137	IN:	137	IN:	137
OUT:	252	OUT:	252	OUT:	252

Rounded Down
Rounded Up

[illegible]

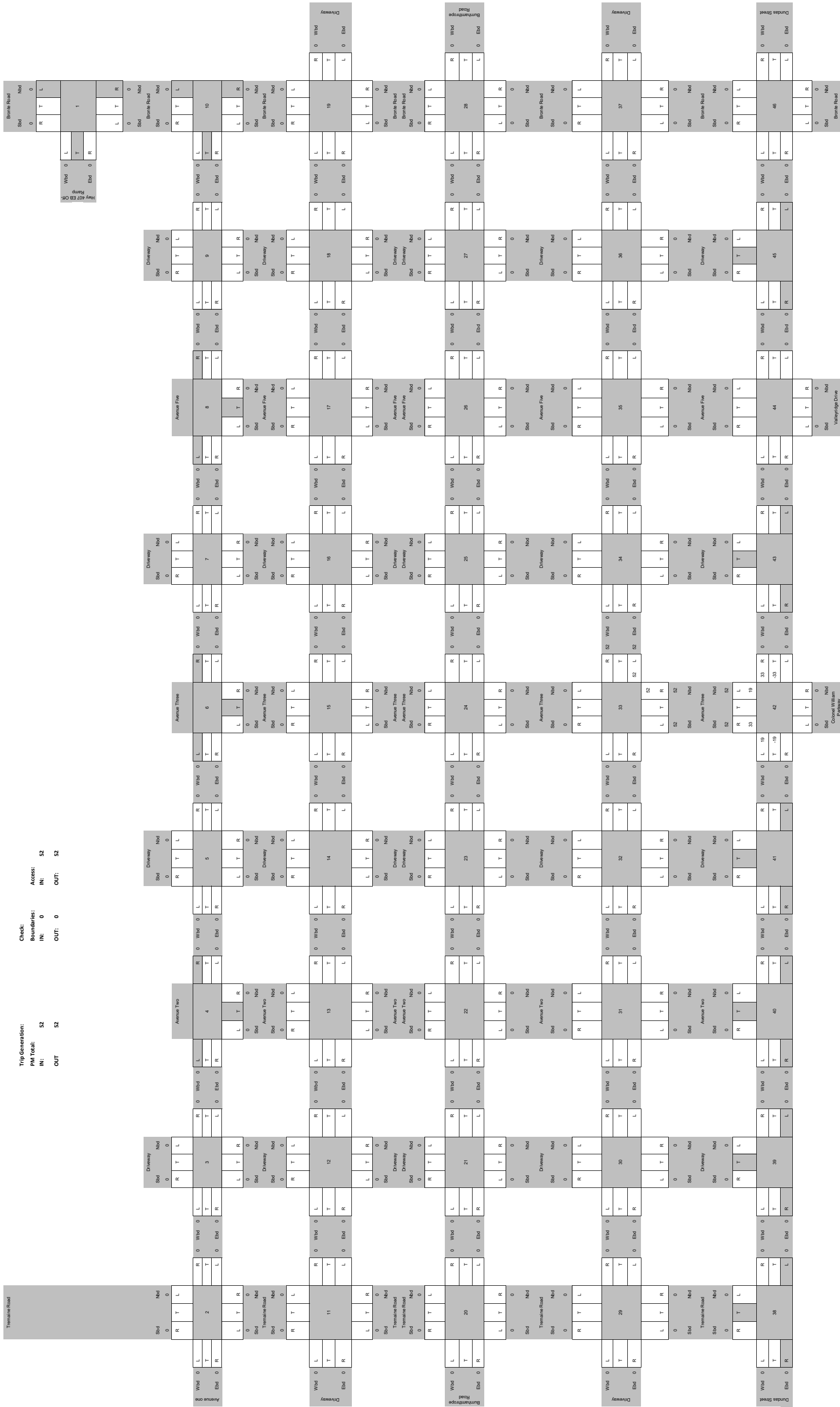


Figure X
407 Lands Background Development Phase 2A&2 Pass-By Trip Assignment Block Group 15 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

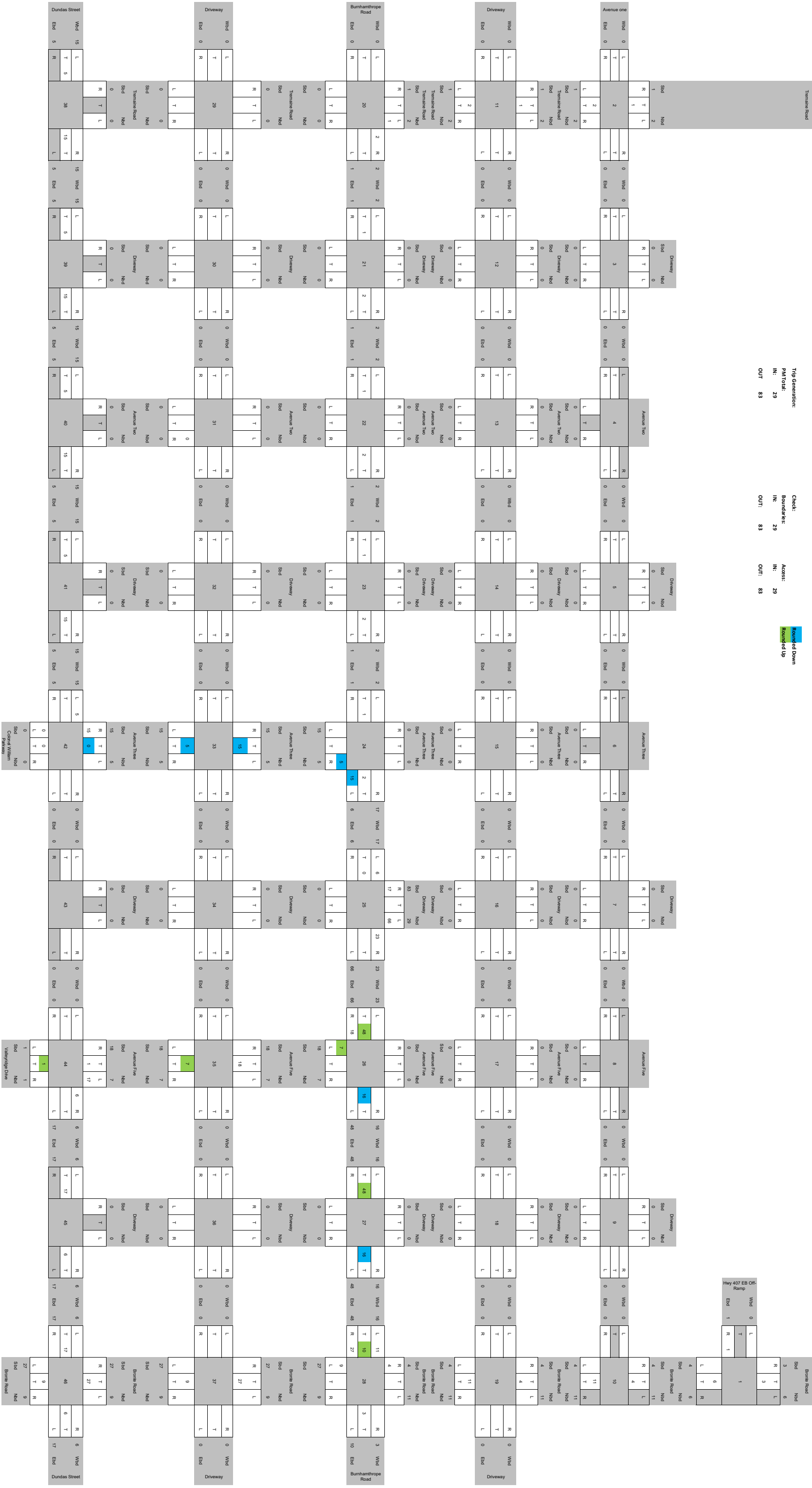


Trip Generation:
PM Total: 29
IN: 29
OUT: 83

Check:
Boundaries: 29
IN: 29
OUT: 83

Access:
IN: 29
OUT: 83

Found at Down
Found at Up



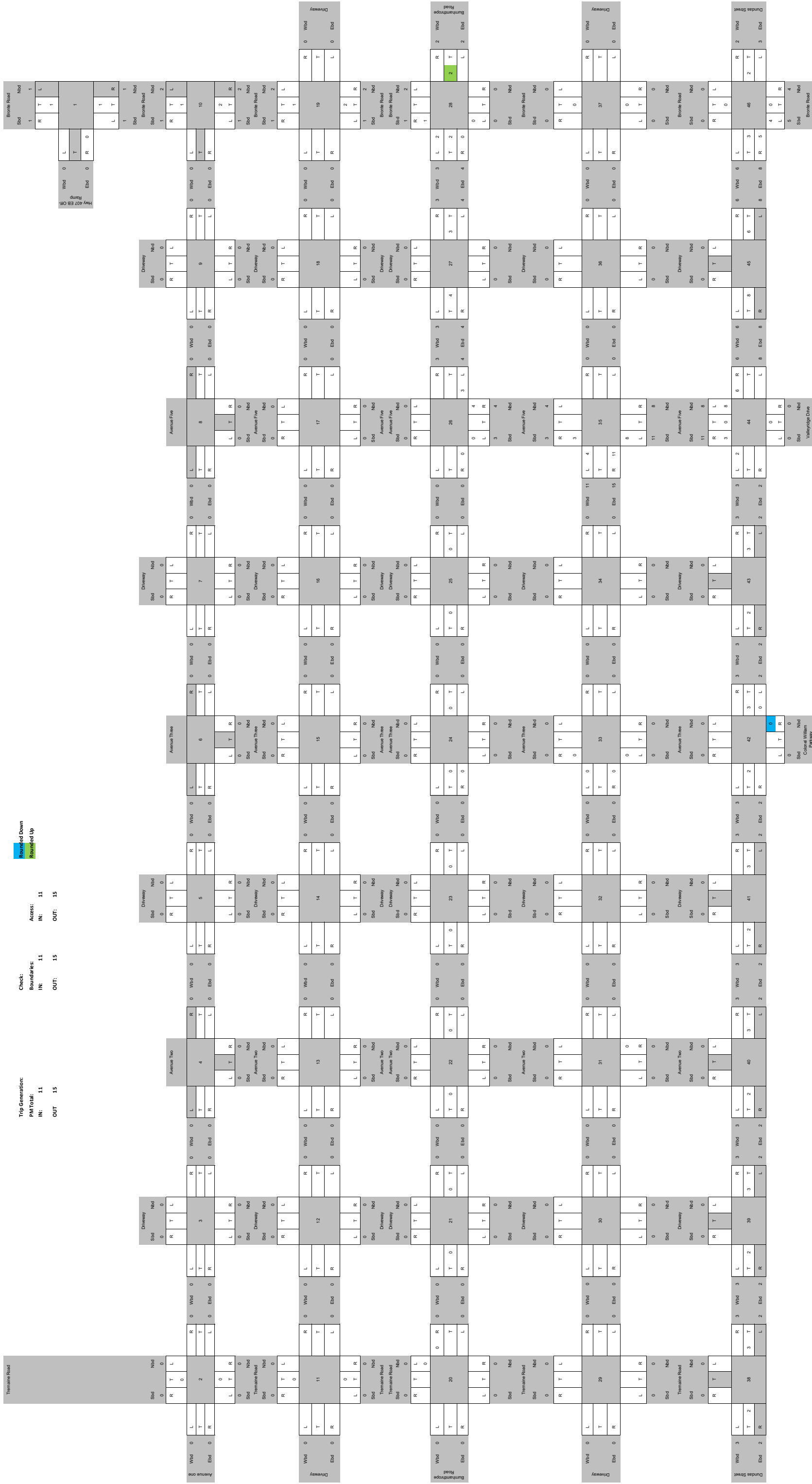
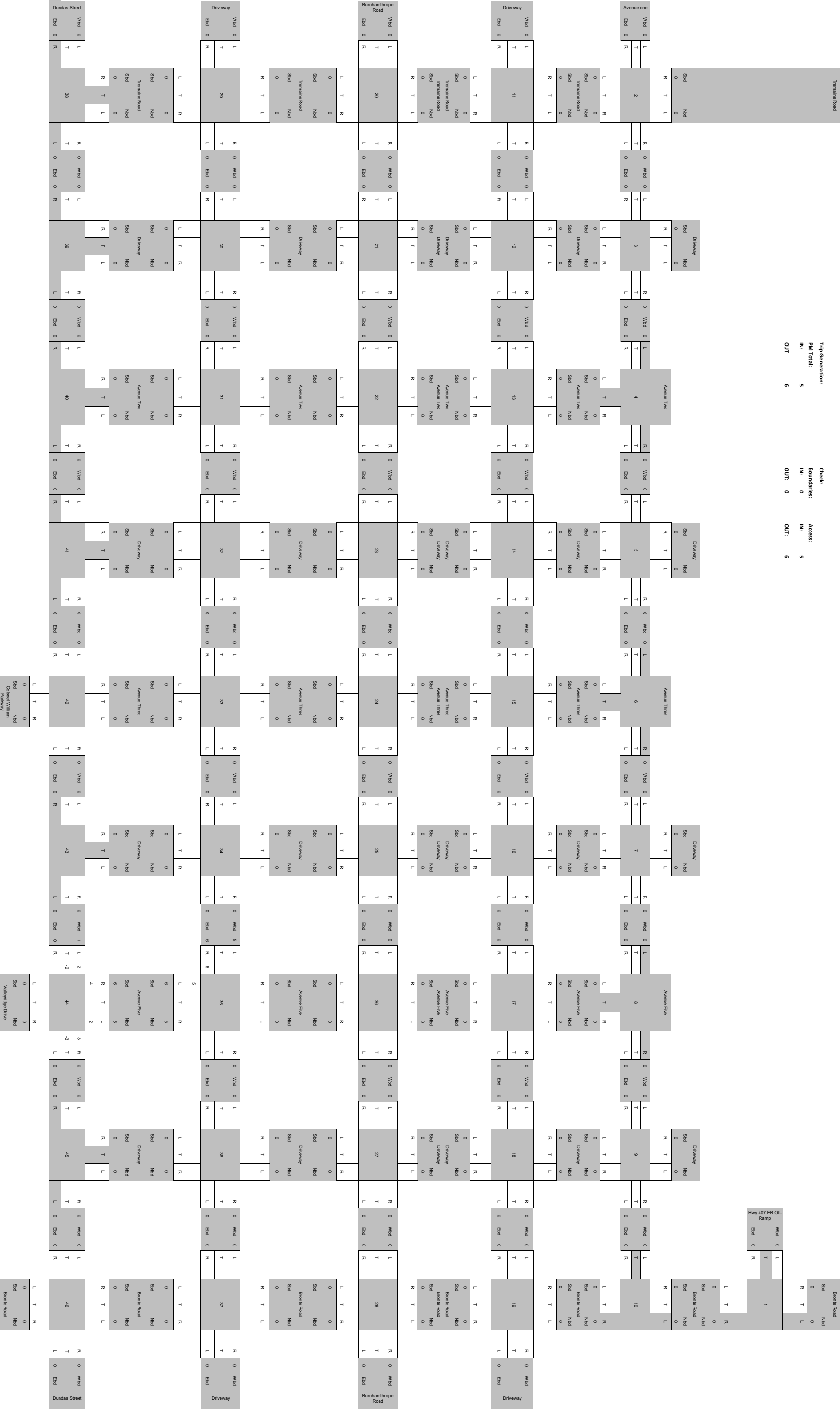


Figure X
407 Lands Background Development Phase 2A&2 Trip Assignment Block Group 17 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: 5
IN: 5
OUT: 6

Check:
Boundaries: 0
IN: 0
OUT: 0

Access: 5
IN: 5
OUT: 6



Trip Generation:
PM Total: IN: 141 OUT 360

Check:
Boundaries: Access: IN: 141 OUT: 360

Rounded Down
Rounded Up

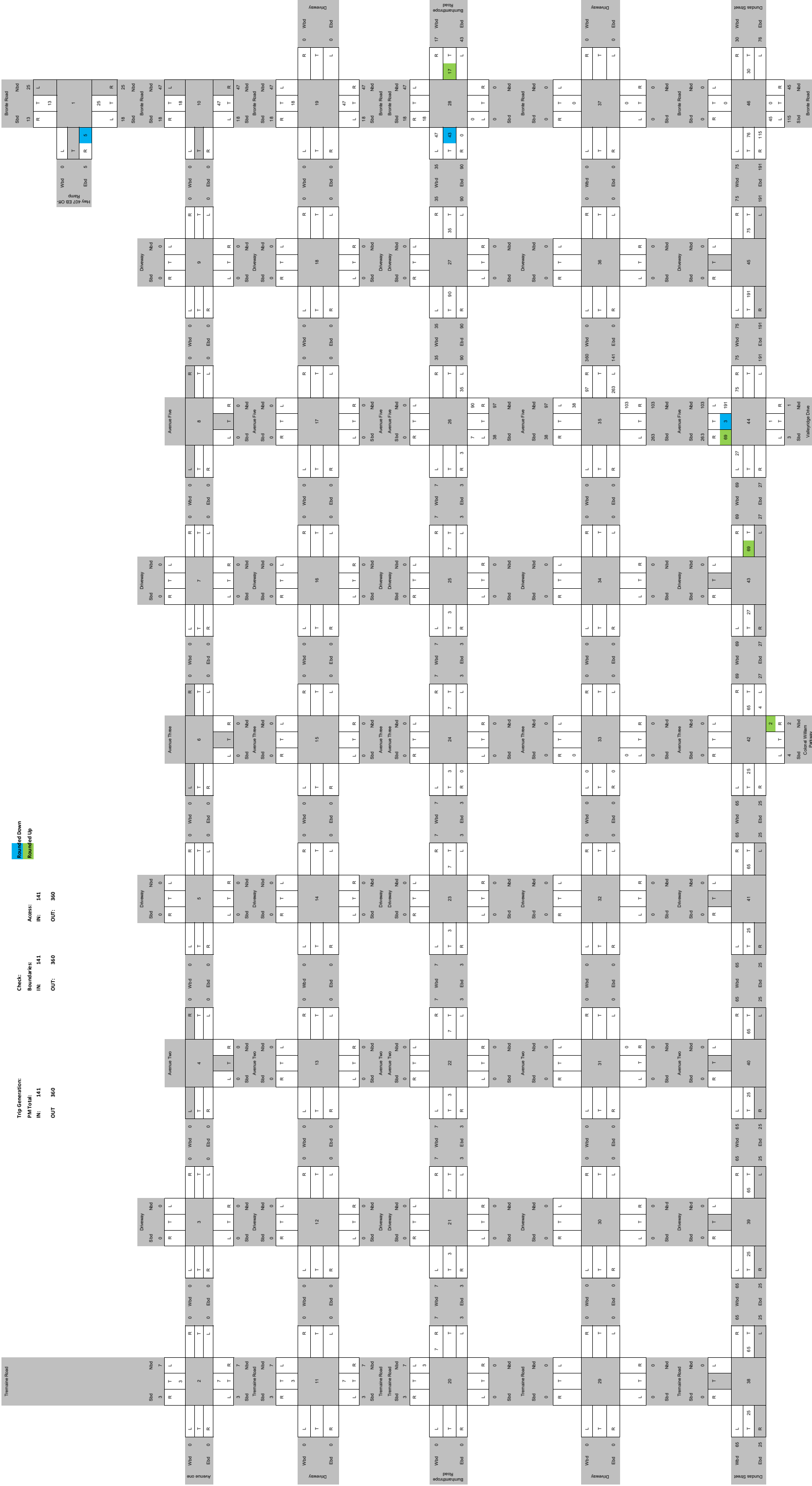
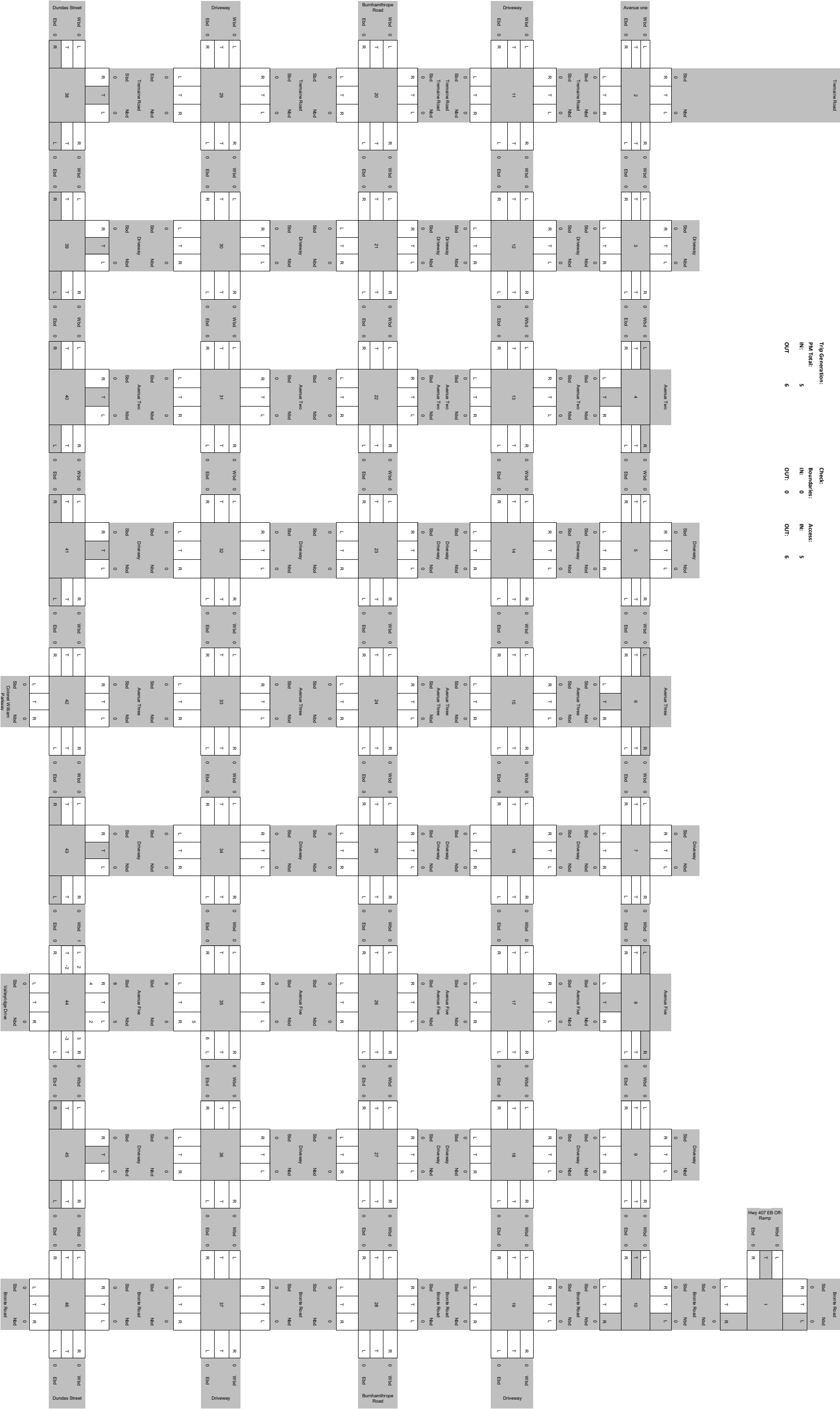


Figure X
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: 5
IN: 5
OUT: 6

Check:
Boundaries: 0
IN: 0
OUT: 0

Access:
IN: 5
OUT: 6



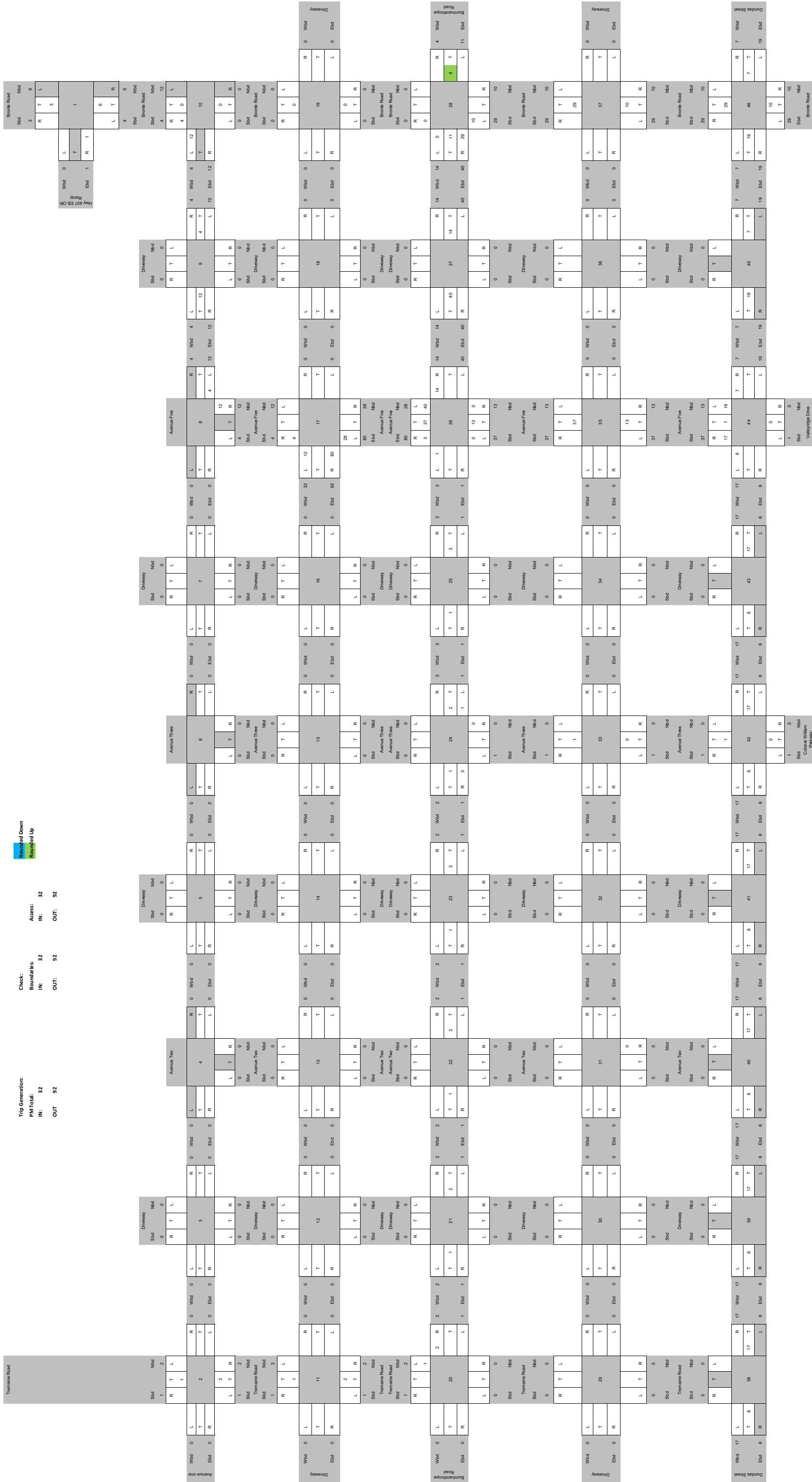


Figure X
407 Lands Background Development Phase 2A Trip Assignment Block Group 19 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: 69
IN: 69
OUT: 317

Check:
Boundaries: 69
IN: 69
OUT: 317

Access:
IN: 69
OUT: 317

Found at Down
Found at Up

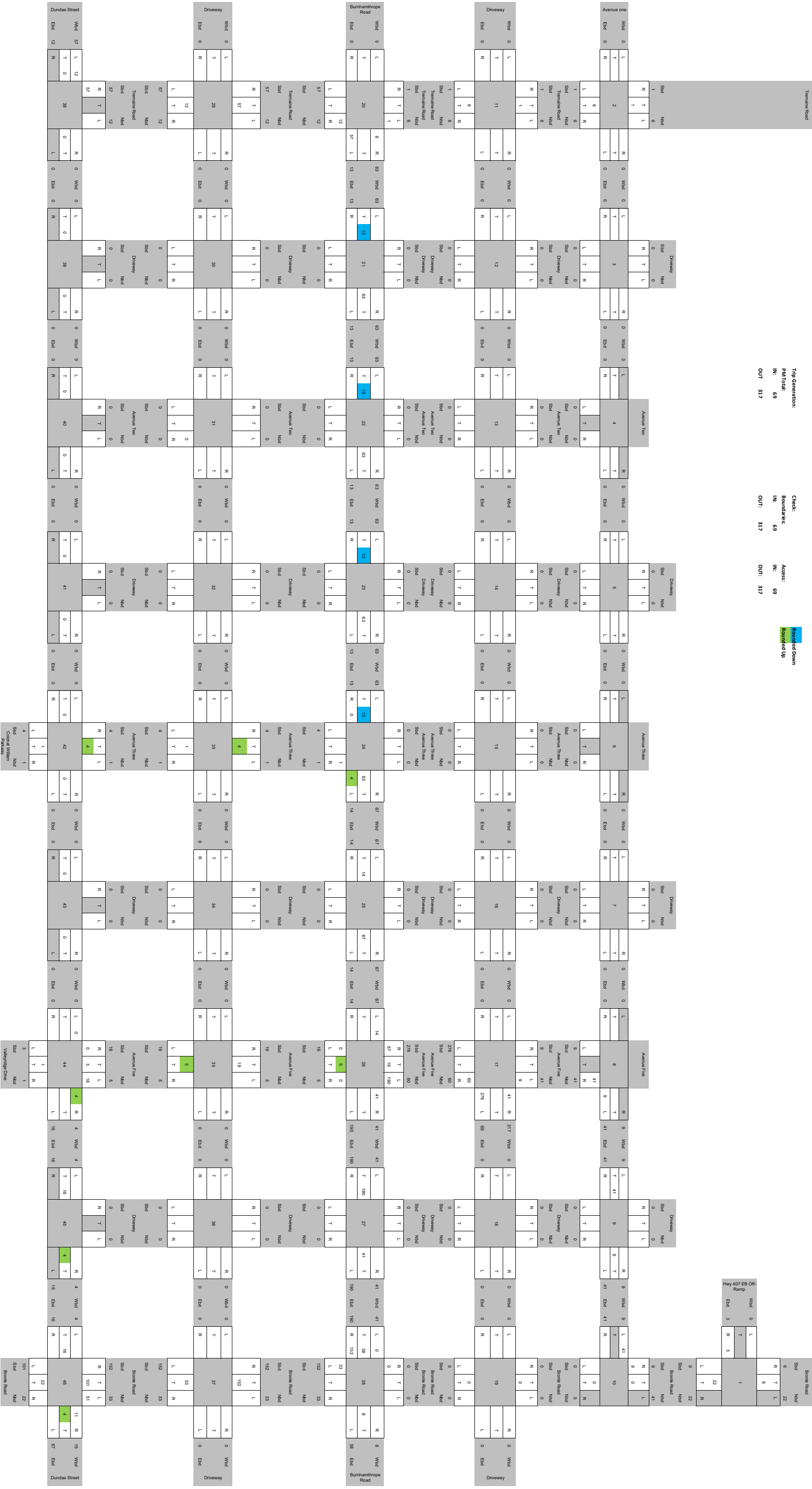


Figure X
407 Lands Background Development Phase 2A Trip Assignment Block Group 20 - Weekday PM Peak Hour
407 Week Employment Lands - North Okanagan Transportation Study

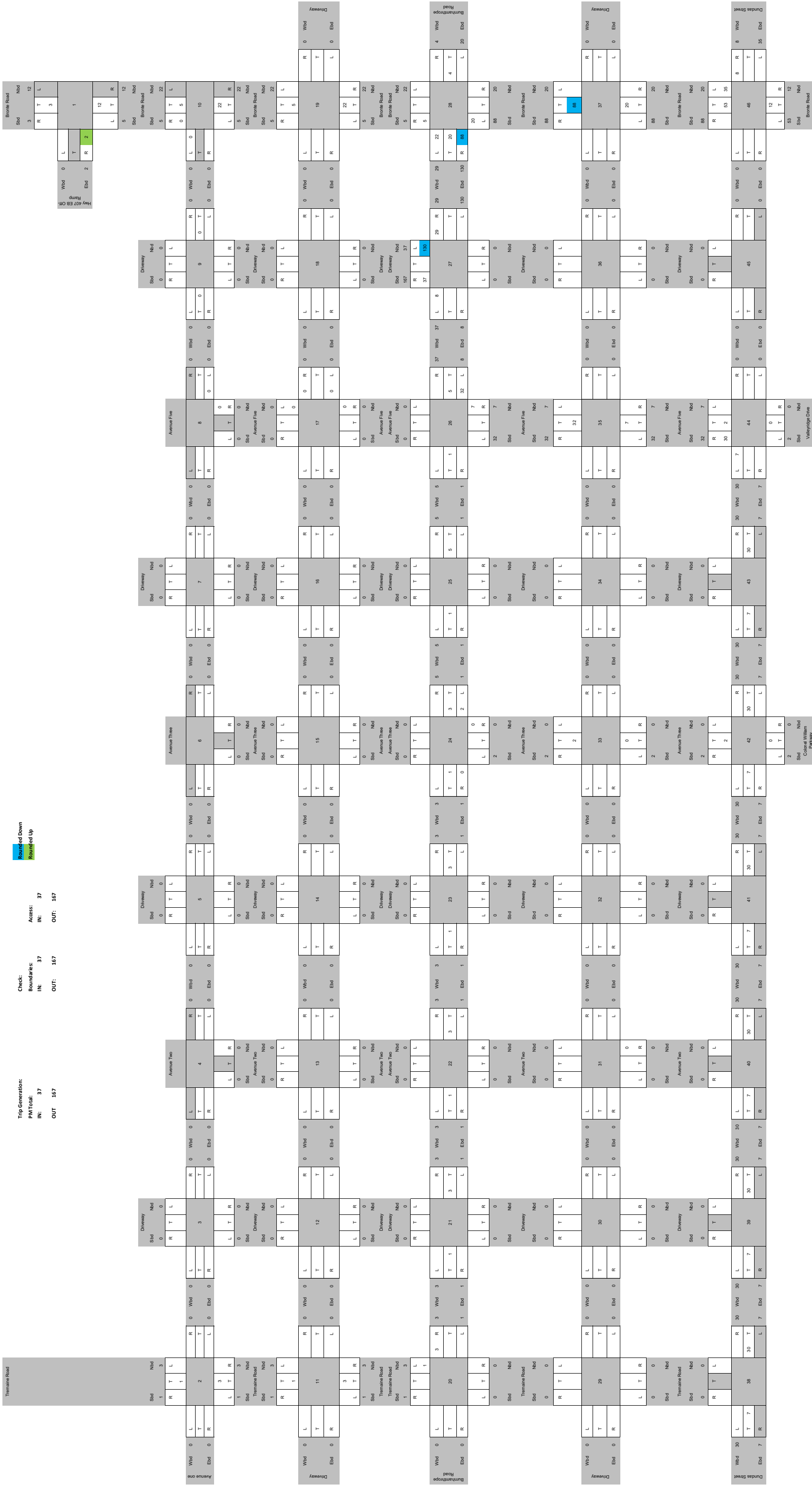


Figure X
407 Lands Background Development Phase 2A&2 Trip Assignment Block Group 21 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: IN: 110 OUT: 502
Check: Boundaries: IN: 110 OUT: 502
Access: IN: 110 OUT: 502

Found at Down
Found at Up

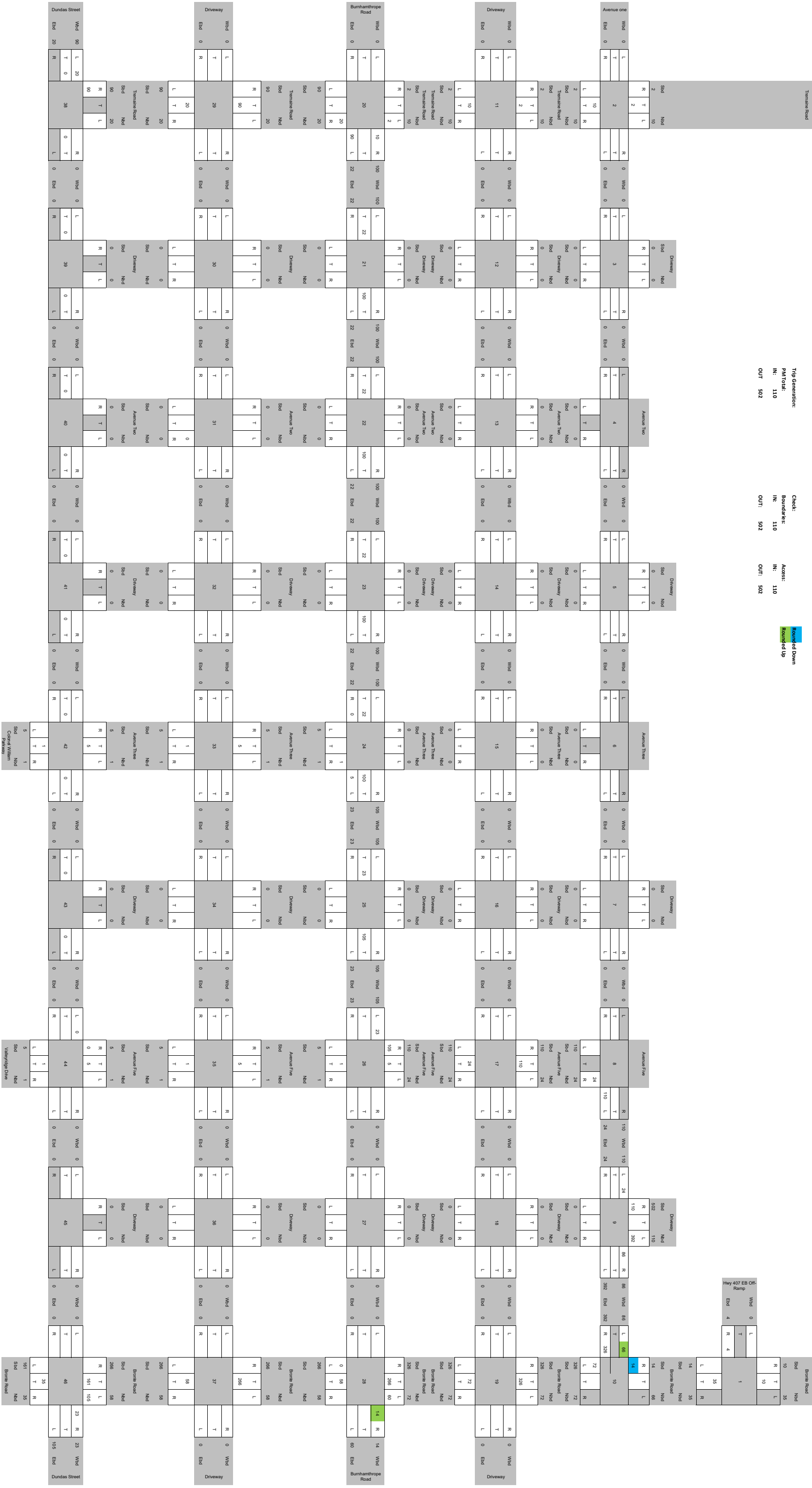


Figure X
407 Lands Background Development Phase 2A Trip Assignment Block Group 22 - Weekday PM Peak Hour
407 Week Employment Lands - North Oakville Transportation Study

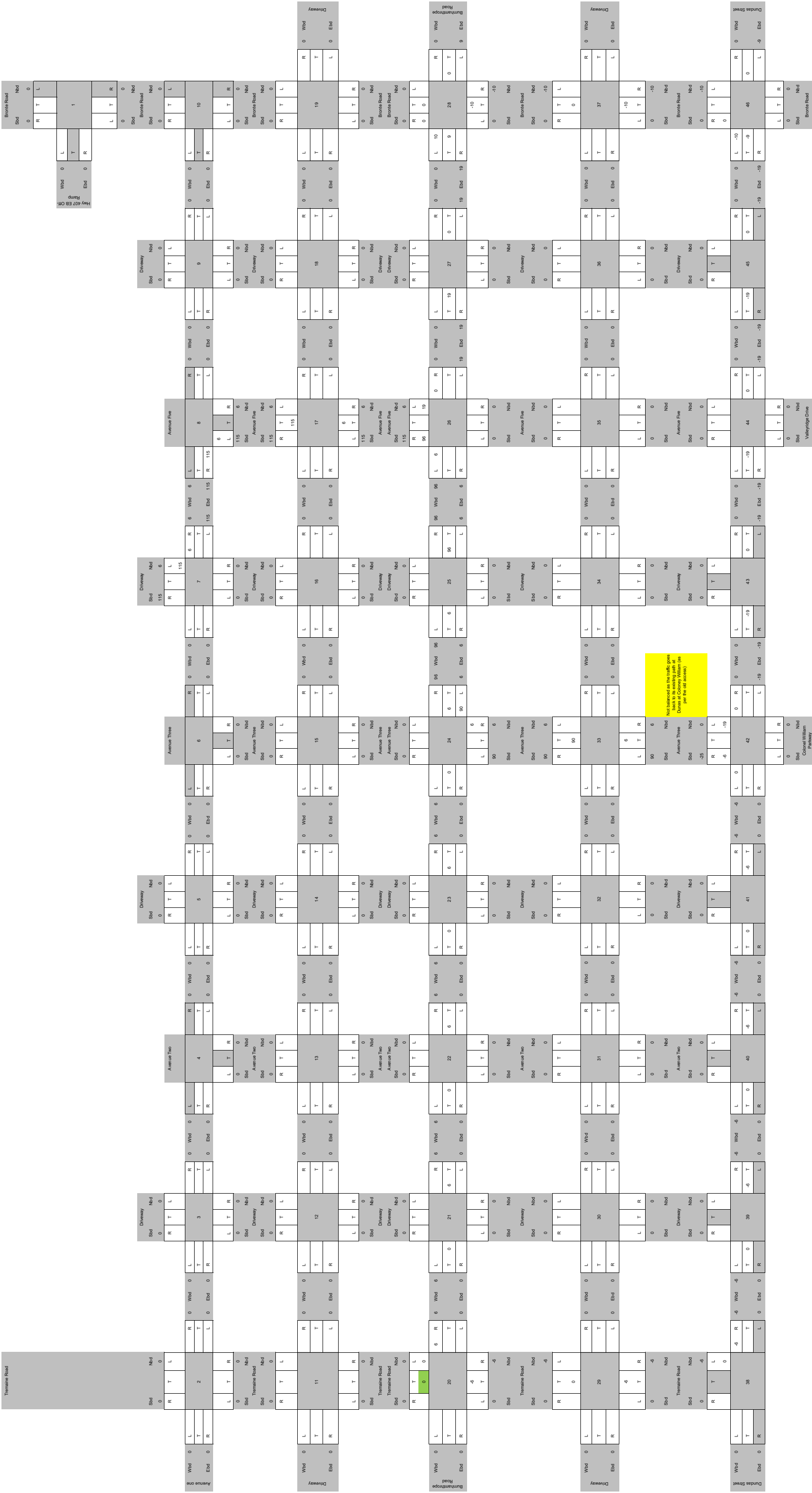


Figure X
Background Development Traffic Reassignment Phase 2A - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



Tip Generation:
PM Total:
IN: 103
OUT: 296

Check:
Boundaries:
IN: 103
OUT: 296

Access:
IN: 103
OUT: 296

 Rounded Down
 Rounded Up

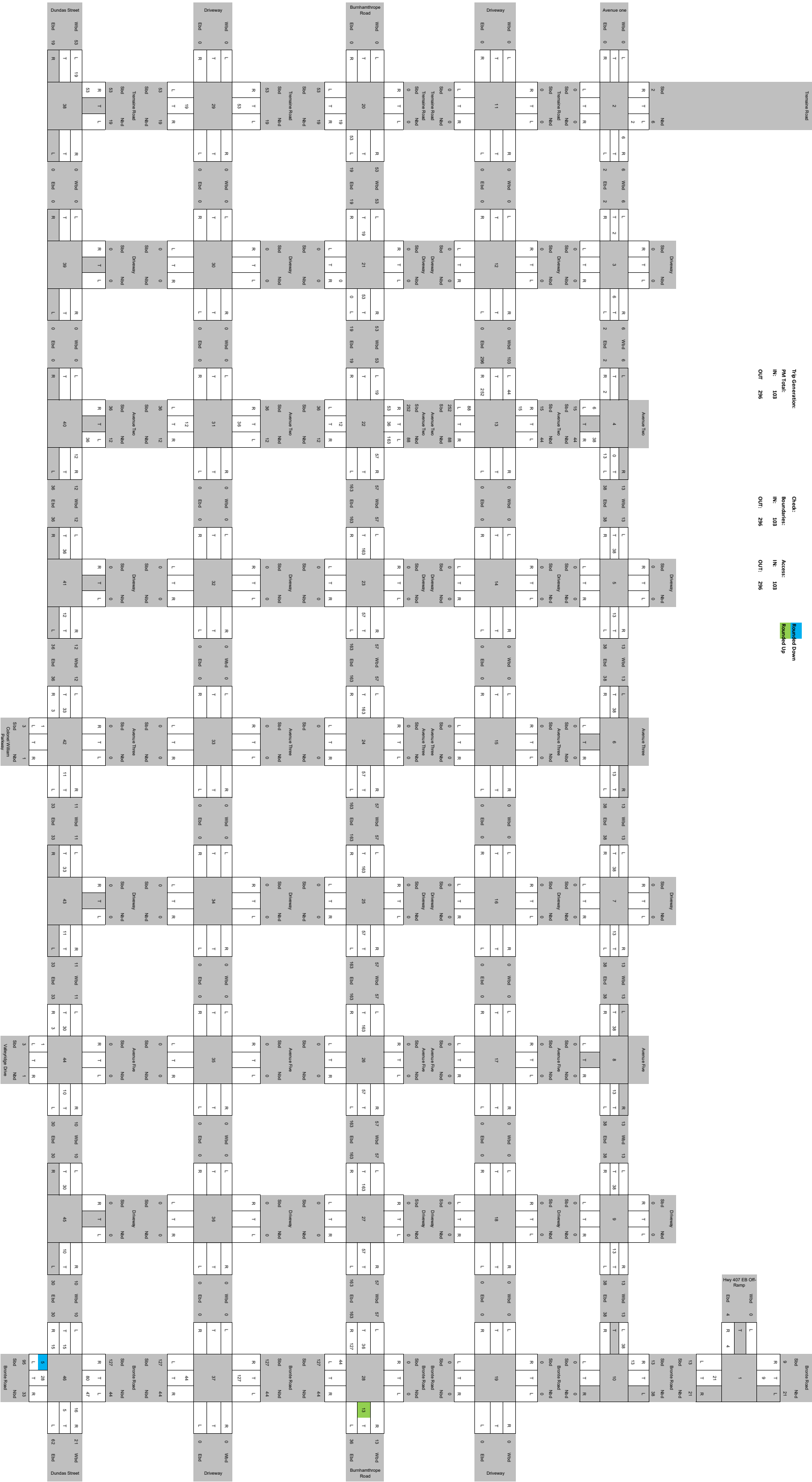


Figure X
407 Lakes Background Development Phase 2 Trip Assignment Block Group 11 - Weekday PM Peak Hour
407 Lakes Employment Lands - North Oakes Transportation Study

Trip Generation:

PM Total:
 IN: 21
 OUT: 68

 Check:

Rounded Down
 Rounded Up

 Access:

IN: 21
 OUT: 68

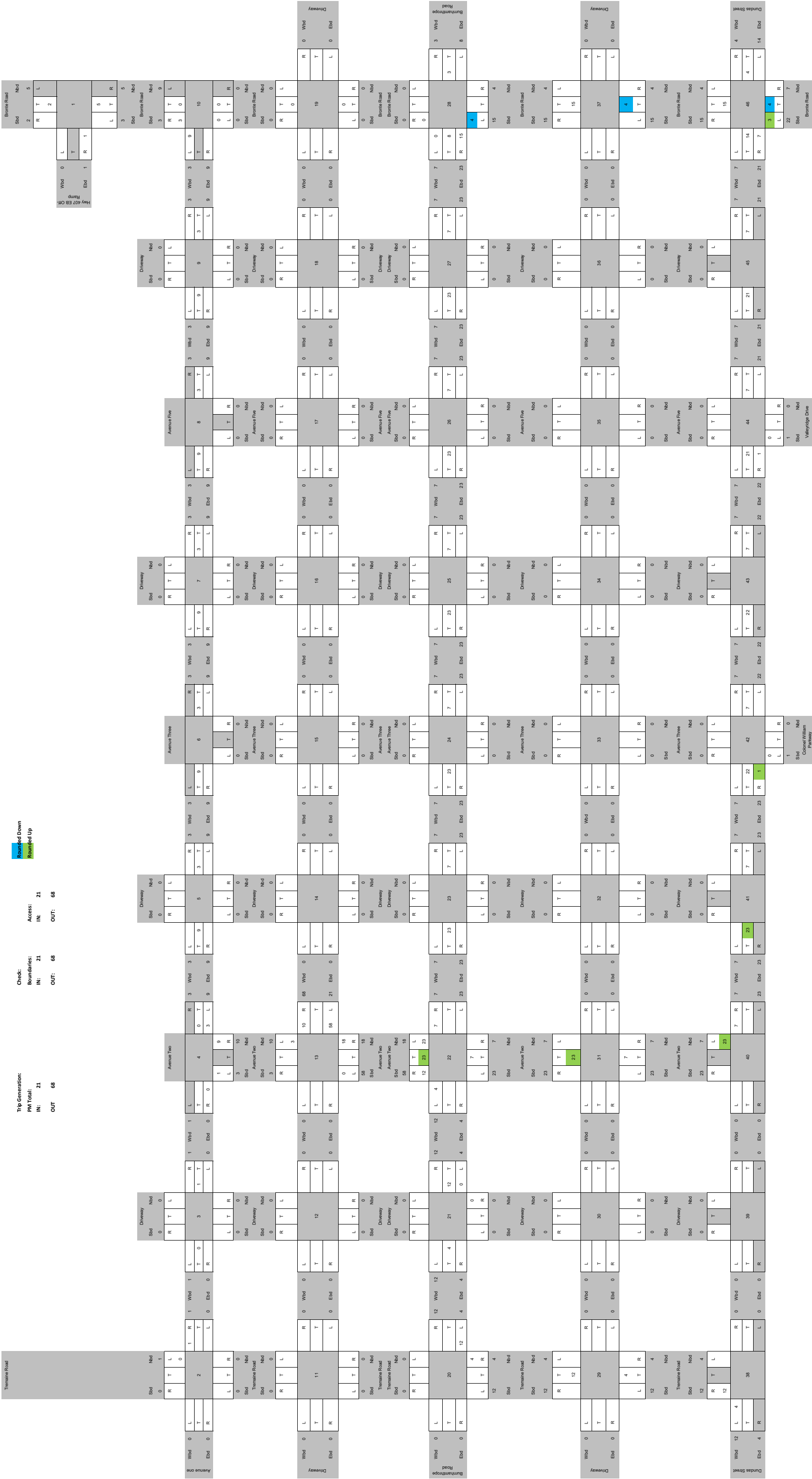
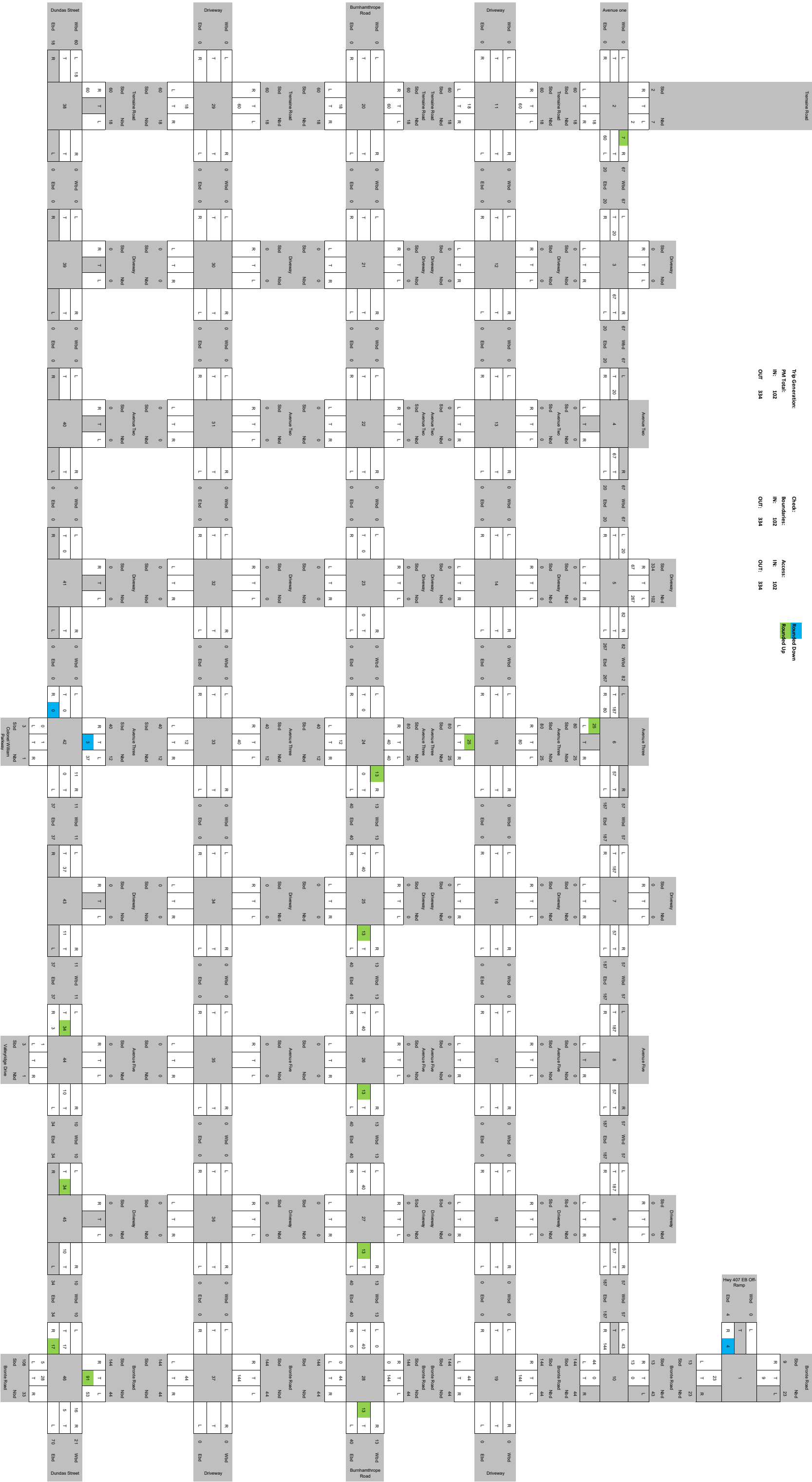


Figure X
 407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
 PM Total:
 IN: 102
 OUT: 334
 Check:
 Boundaries:
 IN: 102
 OUT: 334
 Access:
 IN: 102
 OUT: 334

Rounded Down
 Rounded Up



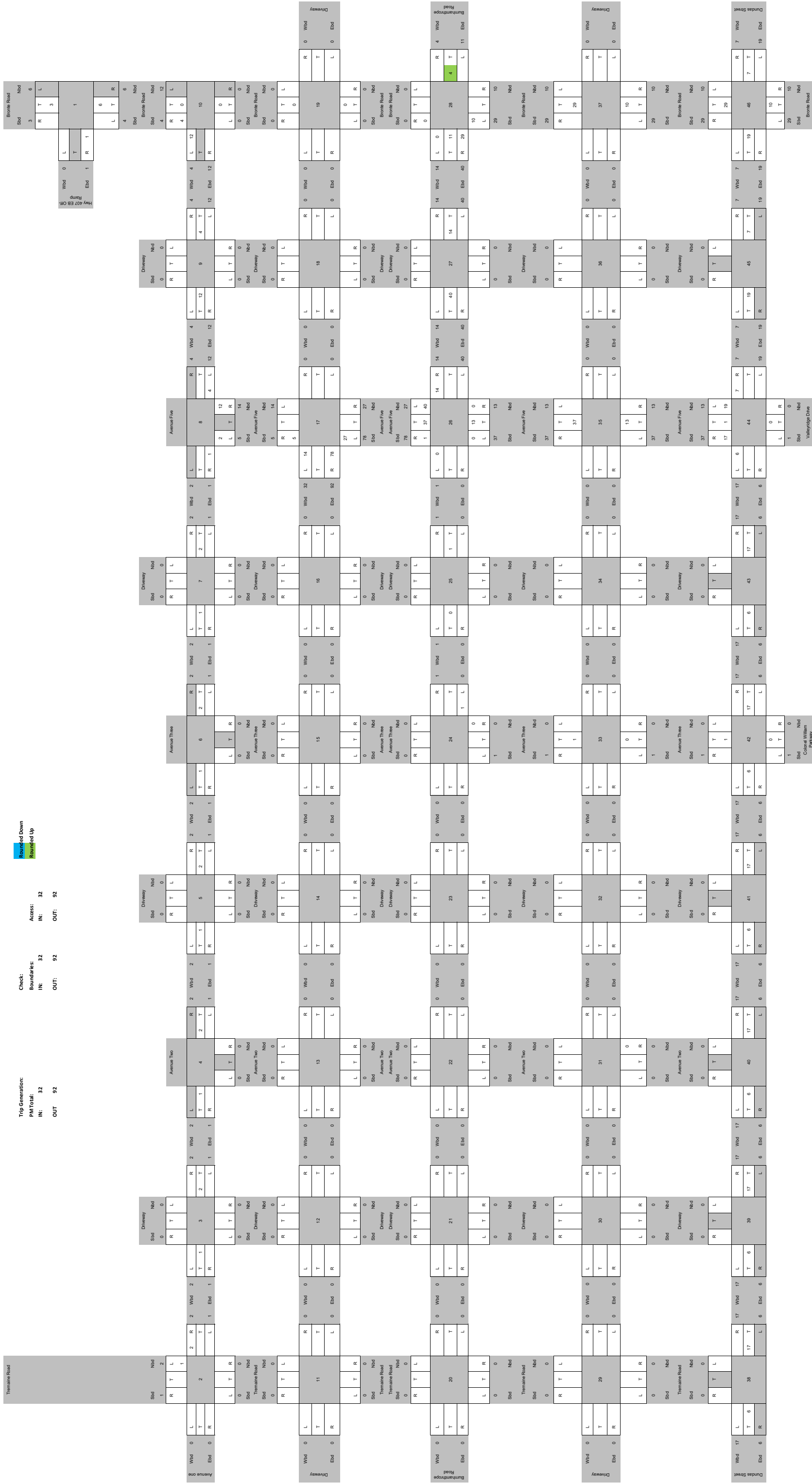


Figure X
407 Lands Background Development Phase 2 Trip Assignment Block Group 19 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

34-09-0221, TWE, March 2013, 22 of 24

Trip Generation:
PM Total: 69
IN: 69
OUT: 317

Check:
Boundaries: 69
IN: 69
OUT: 317

Access:
IN: 69
OUT: 317

Found at Down
Found at Up

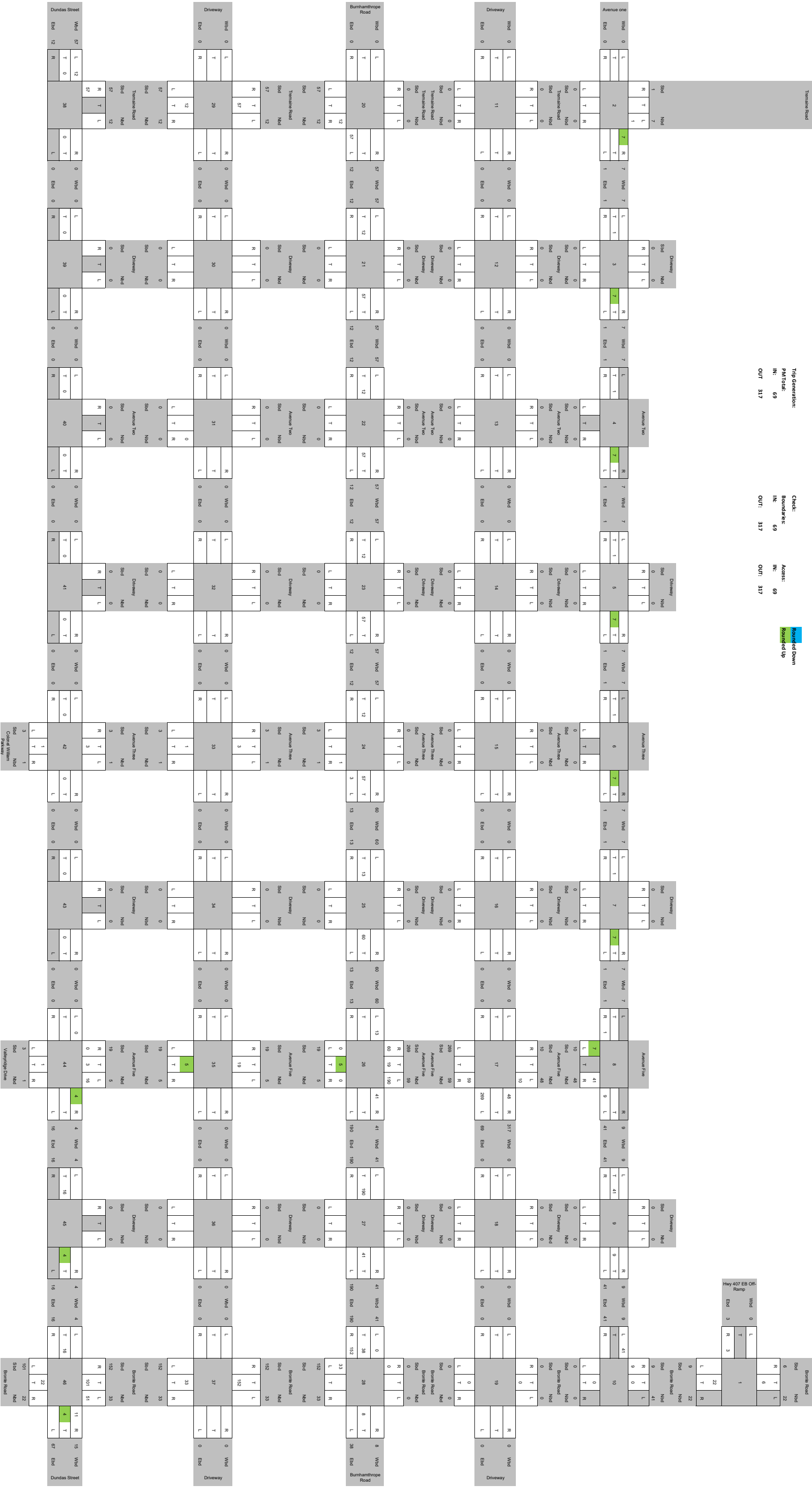


Figure X
407 Lands Background Development Phase 2 Trip Assignment Block Group 20 - Weekday PM Peak Hour
407 Week Employment Lands - North Oakville Transportation Study

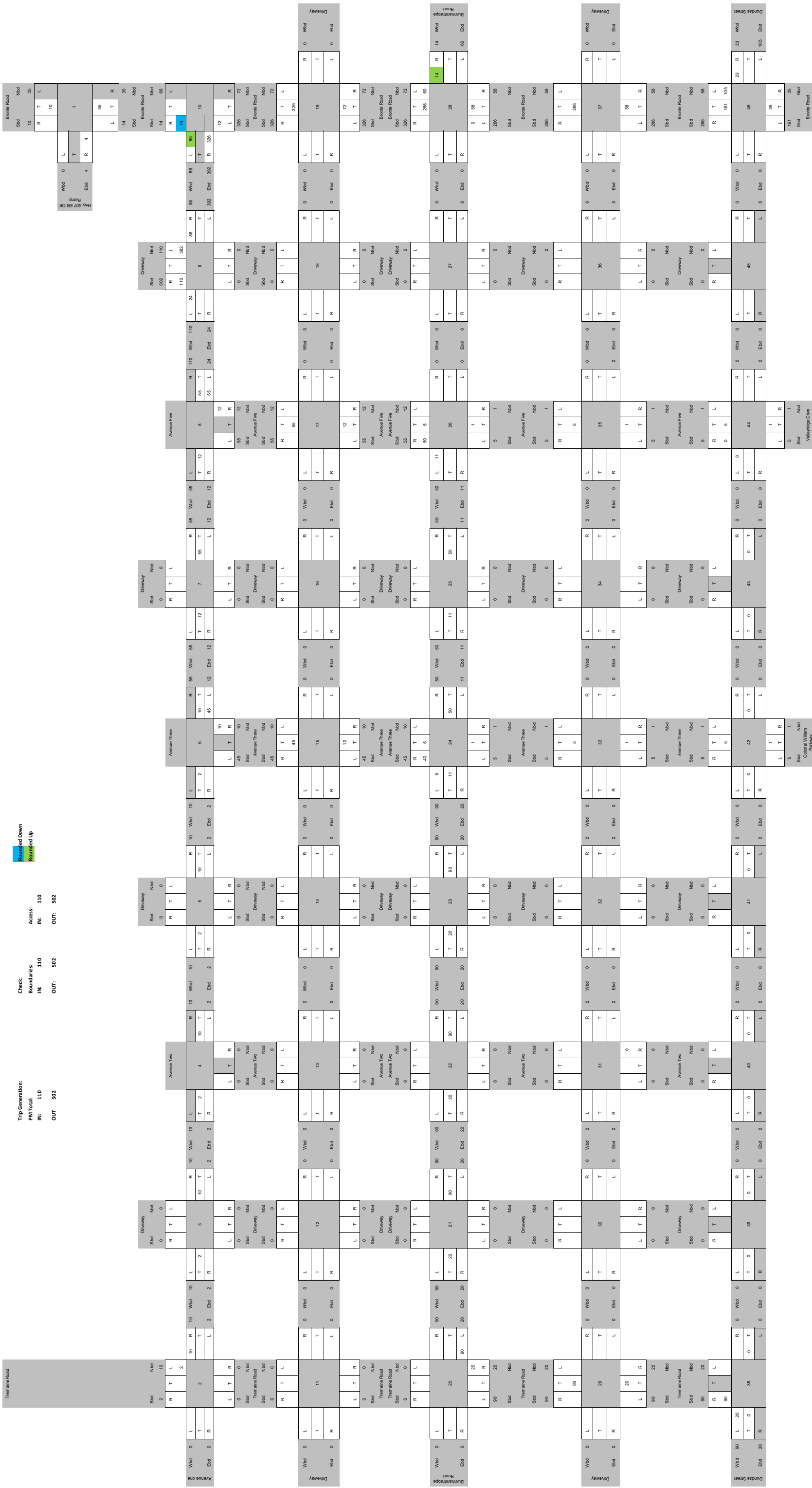
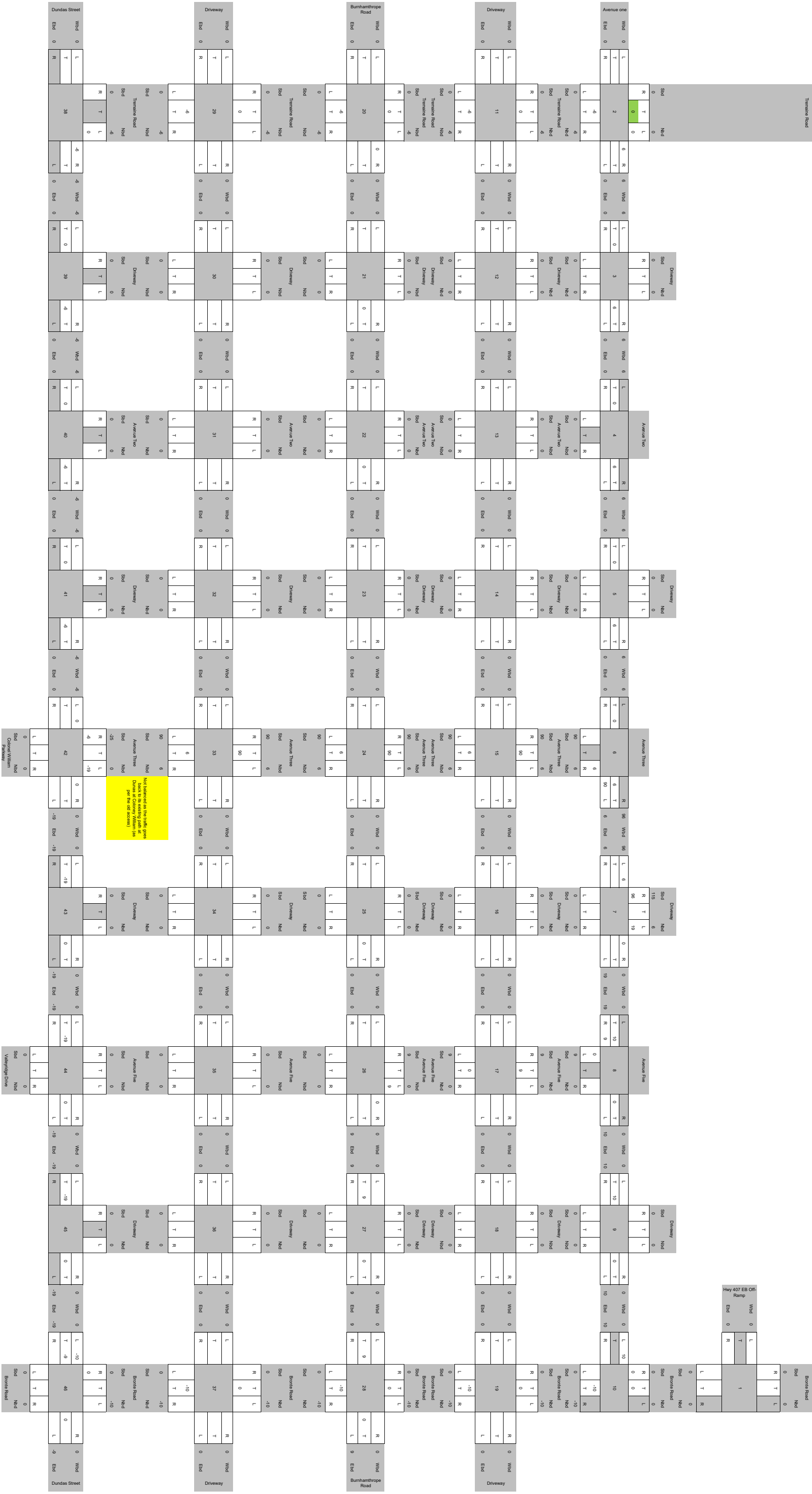
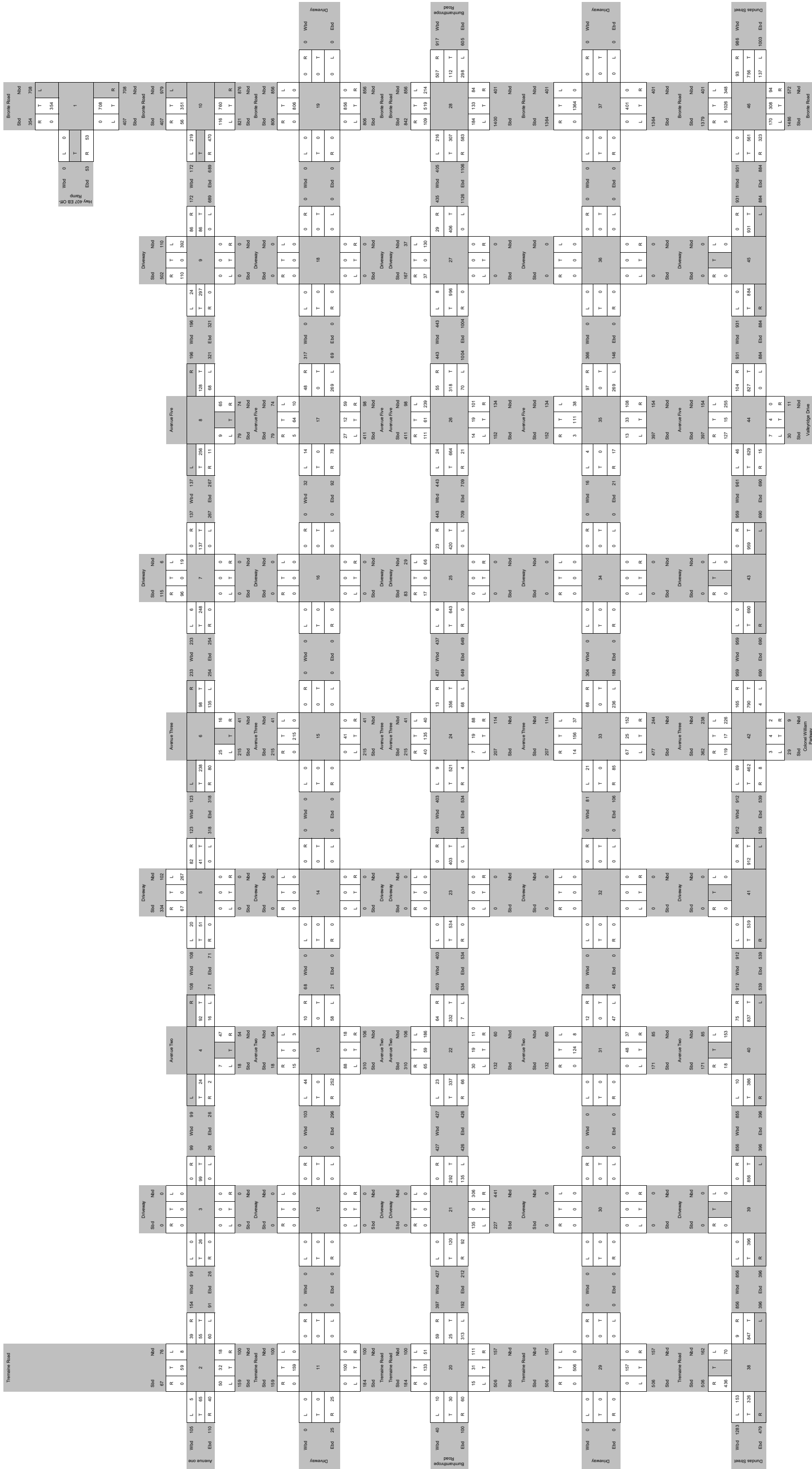


Figure X
407 Lands Background Development Phase 2 Trip Assignment Block Group 22 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw Road										Trenshaw 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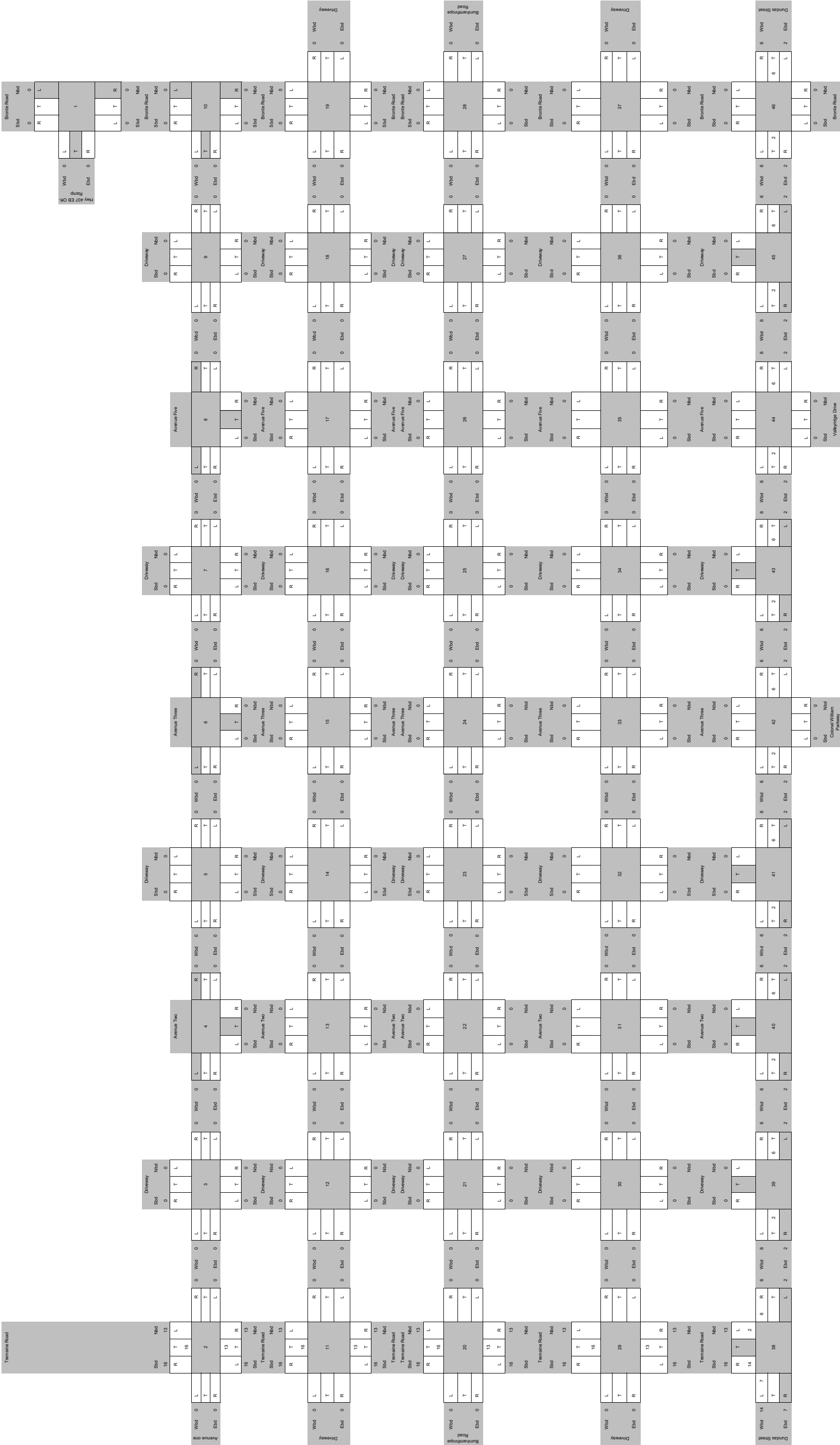


Figure X
Traffic Volumes from 2021 Volumes to 2021 - Wednesday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Scale: NTS

141622_1041626_P4_201622.doc

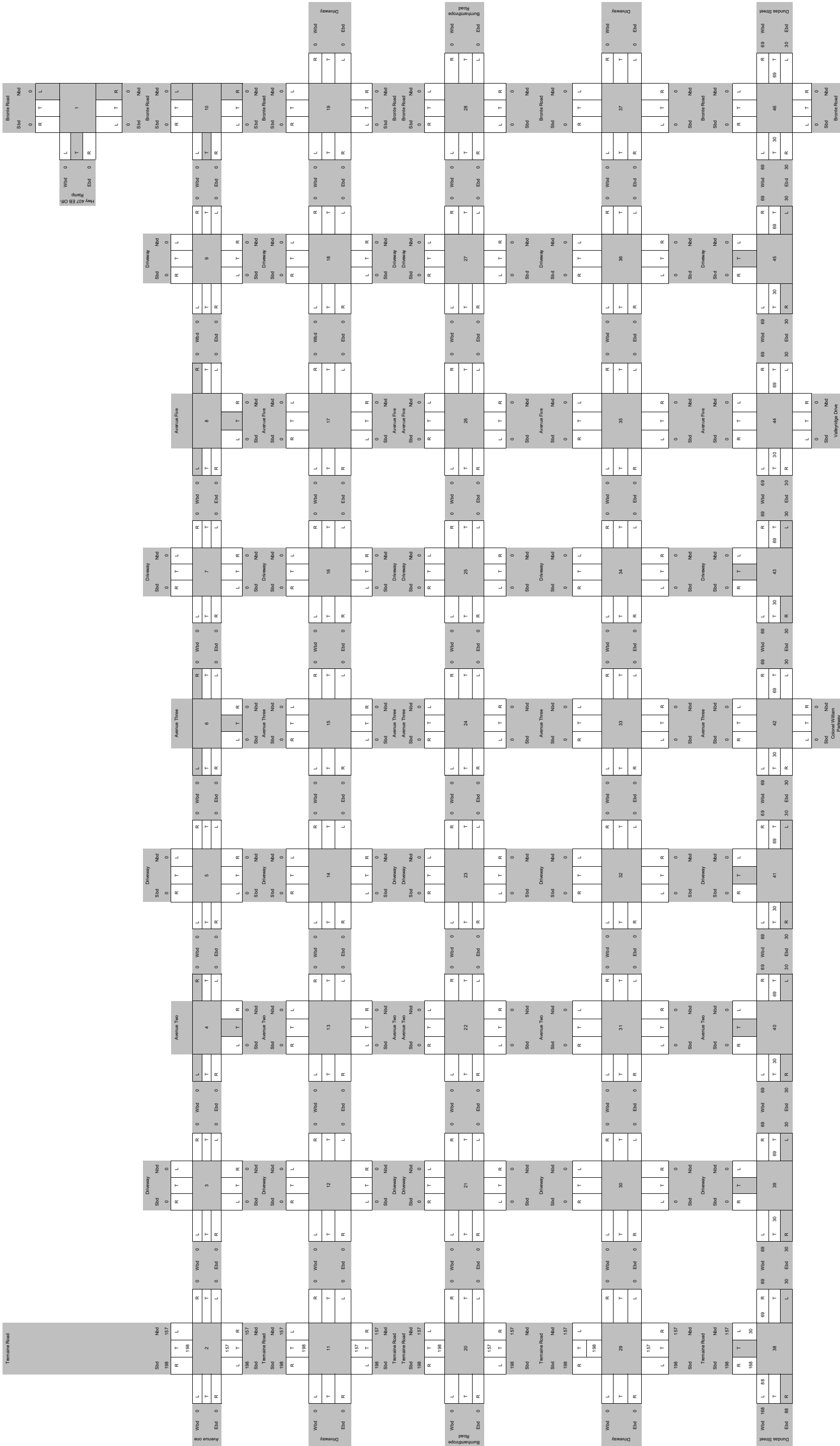


Figure X
Traffic Growth from derived 2021 Volumes (Existing with Applied Growth) to 2030 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

[illegible]

Figure X
Future Background Volumes - Phase 2A (2030) - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

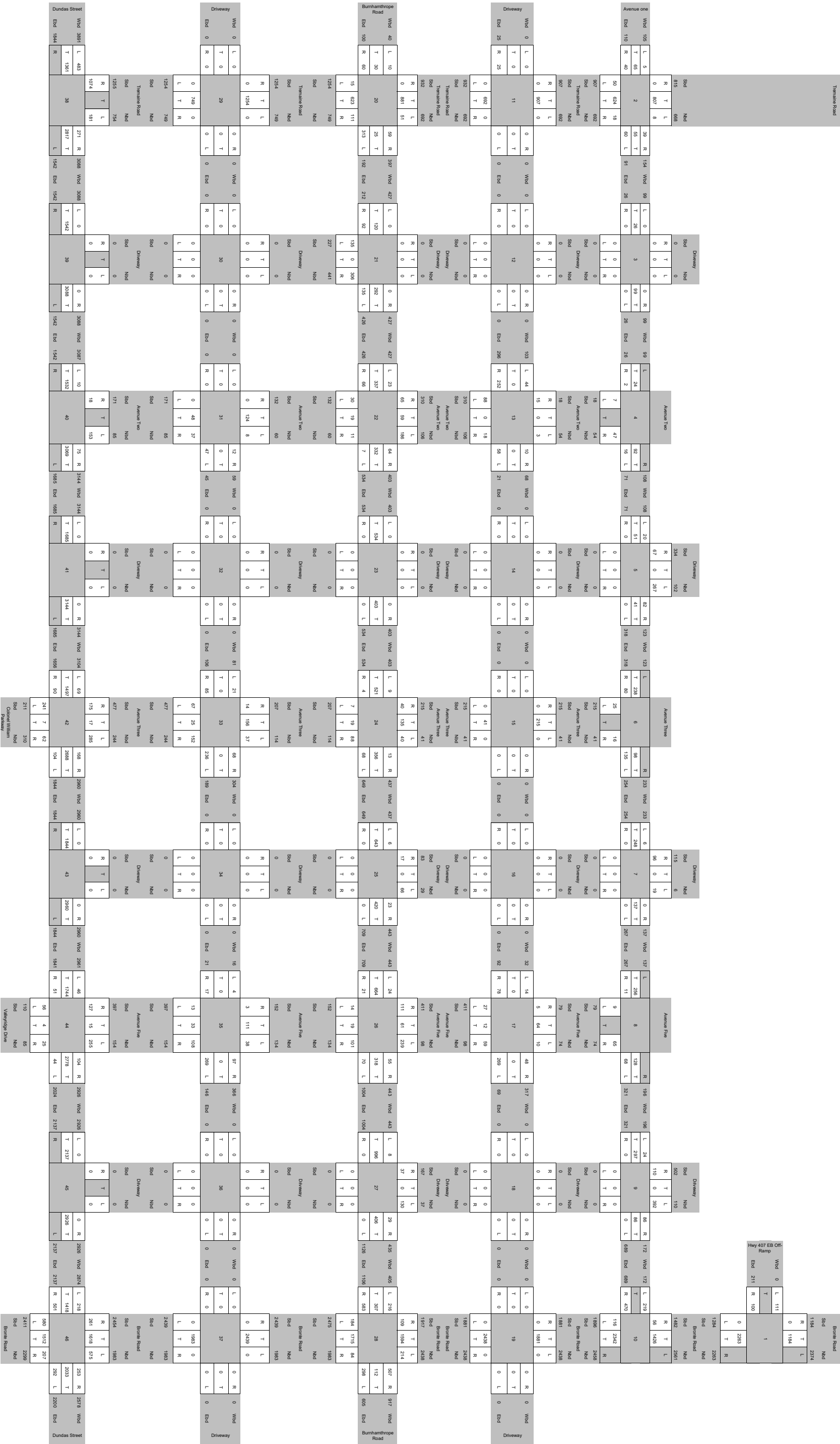


Figure X
Future Background Volumes - Phase 2 (2030) - Weekday PM Peak Hour
407 West Employment Lands - North Okanagan Transportation Study

Subject Lands Trip Generation per Group

Trip Assignment Notes:

The trip assignment for the 407 employments lands (site and surrounding 407 background developments) have been distributed along the driveways based on the Blocks layout. The trip generation for each block is based on a percentage of the overall trip generation (per land use) for the site or surrounding background 407 lands, with the percentage of the trip generation derived based on the percentage of the block GFA compared to the overall GFA used for the trip gen.

Blocks assumed to use the Same Driveways:

For the Phase 1 development (2021 horizon year):

Group 1	Group 2	Group 3	Group 4	Group 5
C3-3	G3-1	C2-2	C4-1	G5-1
C3-5	G4			G5-2
G3-2				C5-1

Percentage of Trip Gen for these blocks: Rounded up to match overall trip gen values
Rounded Down to match overall trip gen values

Group 1										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C3-3	Service Area Employment	Shopping Centre	49,186	37%	50	31	81	71	87	158
		Shopping Centre Pass-By	49,186	37%	0	0	0	40	41	81
		General Office	26,485	37%	37	6	43	6	33	39
C3-5	Light Employment	General Office	105,486	41%	128	18	146	24	109	133
G3-2	General Employment	Business Park	45,811	16%	50	9	59	15	42	57
Total Primary					265	64	329	116	271	387
Total Pass-By					0	0	0	40	41	81

Group 2										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G3-1	Service Area Employment	Shopping Centre	42,539	32%	44	27	71	61	75	136
		Shopping Centre Pass-By	42,539	32%	0	0	0	35	34	69
		General Office	22,906	32%	32	5	37	6	28	34
G4	Employment	Business Park	62,689	22%	68	12	80	20	58	78
Total Primary					144	44	188	87	161	248
Total Pass-By					0	0	0	35	34	69

Group 3										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C2-2	Light Employment	General Office	57,049	22%	70	9	79	13	59	72
Total					70	9	79	13	59	72

Group 4										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C4-1	Service Area Employment	Shopping Centre	40,146	30%	41	25	66	58	70	128
		Shopping Centre								
		Pass-By	40,146	30%	0	0	0	33	33	66
		General Office	21,617	30%	31	3	34	5	27	32
		Total Primary			72	28	100	63	97	160
		Total Pass-By			0	0	0	33	33	66

Group 5										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C5-1	Light Employment	General Office	92,031	36%	112	15	127	21	96	117
G5-1	General Employment	Business Park	73,022	26%	80	14	94	23	68	91
G5-2	Employment	Business Park	97,822	35%	107	19	126	32	89	121
Total					299	48	347	76	253	329

Overall Phase 1															
					Block Trip Gen			Block Trip Gen							
					Weekday AM Peak Hour			Weekday PM Peak Hour							
					IN	OUT	Total	IN	OUT	Total					
					Total Primary					850	193	1043	355	841	1196
					Total Pass-By					0	0	0	108	108	216

Service Area Employment	Shopping Centre			135	83	218	190	232	422
	Shopping Centre Pass-By			0	0	0	108	108	216
	General Office			100	14	114	17	88	105
Light Employment	General Office			310	42	352	58	264	322
General Employment	Business Park			305	54	359	90	257	347

b

For the Phase 1 and 2 development (2031 horizon year):

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
C3-3	G3-1	C2-2	C4-1	G5-1	C4-2	G5-6	P2-1
C3-5	G4			G5-2		G5-5	P2-2
G3-2				C5-1		C5-2	P2-3
							P2-4

Percentage of Trip Gen for these blocks: Rounded up to match overall trip gen values
Rounded Down to match overall trip gen values Manually Rounded

Group 1										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C3-3	Service Area Employment	Shopping Centre	49,186	37%	50	31	81	71	87	158
		Shopping Centre Pass-By	49,186	37%	0	0	0	41	40	81
		General Office	26,485	37%	35	5	40	5	32	37
C3-5	Light Employment	General Office	105,486	12%	102	14	116	19	87	106
G3-2	General Employment	Business Park	45,811	8%	45	9	54	14	35	49
Total Primary					232	59	291	109	241	350
Total Pass-By					0	0	0	41	40	81

Group 2										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
G3-1	Service Area Employment	Shopping Centre	42,539	32%	44	26	70	62	74	136
		Shopping Centre Pass-By	42,539	32%	0	0	0	35	35	70
		General Office	22,906	32%	30	4	34	5	26	31
G4	Employment	Business Park	62,689	11%	62	11	73	18	49	67
Total Primary					136	41	177	85	149	234
Total Pass-By					0	0	0	35	35	70

Group 3										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C2-2	Light Employment	General Office	57,049	6%	54	8	62	11	46	57
Total					54	8	62	11	46	57

Group 4											
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen			
					Weekday AM Peak Hour			Weekday PM Peak Hour			
					IN	OUT	Total	IN	OUT	Total	
C4-1	Service Area Employment	Shopping Centre	40,146	30%	41	26	67	58	70	128	
		Shopping Centre Pass-By	40,146	30%	0	0	0	33	34	67	
		General Office	21,617	30%	28	4	32	5	24	29	
		Total Primary				69	30	99	63	94	157
		Total Pass-By				0	0	0	33	34	67

Group 5										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C5-1	Light Employment	General Office	92,031	10%	89	12	101	17	76	93
G5-1	General Employment	Business Park	73,022	12%	72	14	86	21	58	79
G5-2	Employment	Business Park	97,822	16%	97	17	114	29	77	106
Total					258	43	301	67	211	278

Group 6										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
C4-2	General Employment	Business Park	42,711	7%	42	8	50	13	33	46
Total					42	8	50	13	33	46

Group 7										
Block name	Block Land Use	Land Use for Trip Gen	GFA (sq.ft)	Percentage of Overall Phase 1	Block Trip Gen			Block Trip Gen		
					Weekday AM Peak Hour			Weekday PM Peak Hour		
					IN	OUT	Total	IN	OUT	Total
GS-6	Light Employment	Business Park	96,100	11%	93	13	106	18	79	97
GS-5	General Employment	Business Park	92,656	16%	92	16	108	27	72	99
CS-2	General Employment	Business Park	87,145	15%	86	16	102	25	68	93
Total					271	45	316	70	219	289

Trip Generation:
PM Total: 116
IN: 116
OUT: 271

Check:
Boundaries: 116
IN: 116
OUT: 271

Access:
IN: 116
OUT: 271

Rounded Down
 Rounded Up

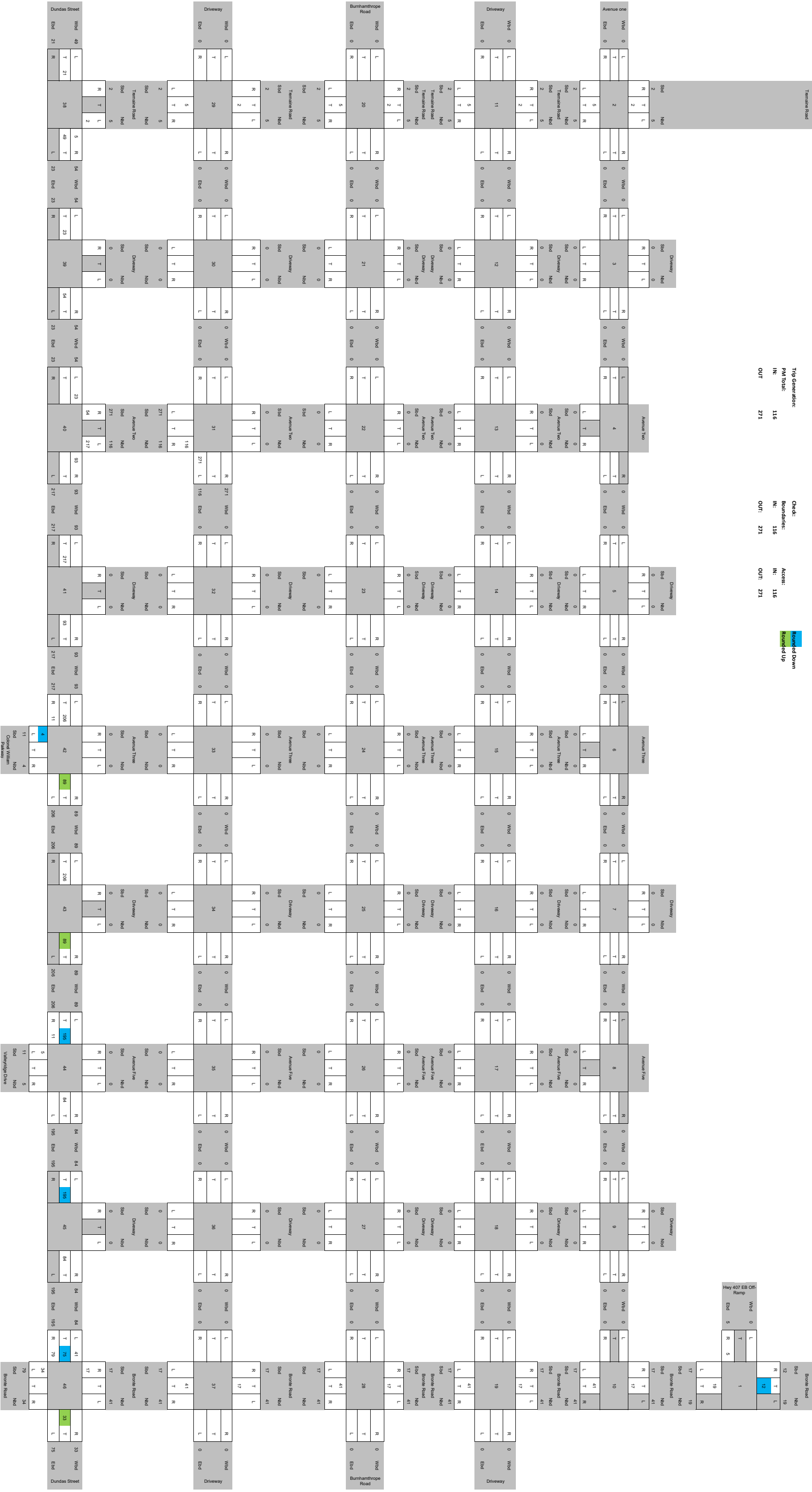


Figure X
Trip Assignment - Block Group 1 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: 40
IN: 0
OUT: 41

Check:
Boundaries:
IN: 0
OUT: 0
Access: 40
OUT: 41

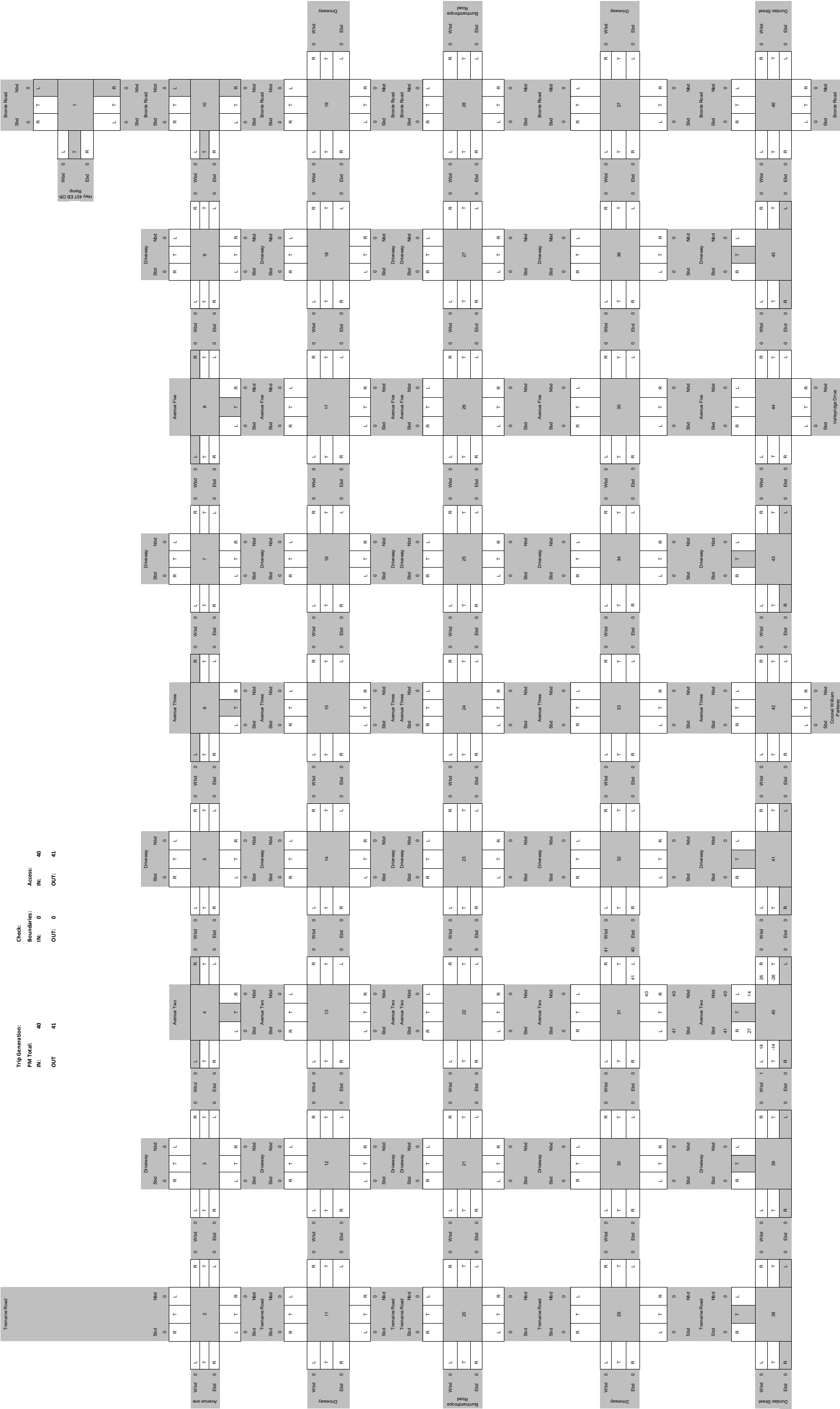


Figure X
Phase 1 Pass-By Trip Assignment - Block Group 1 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

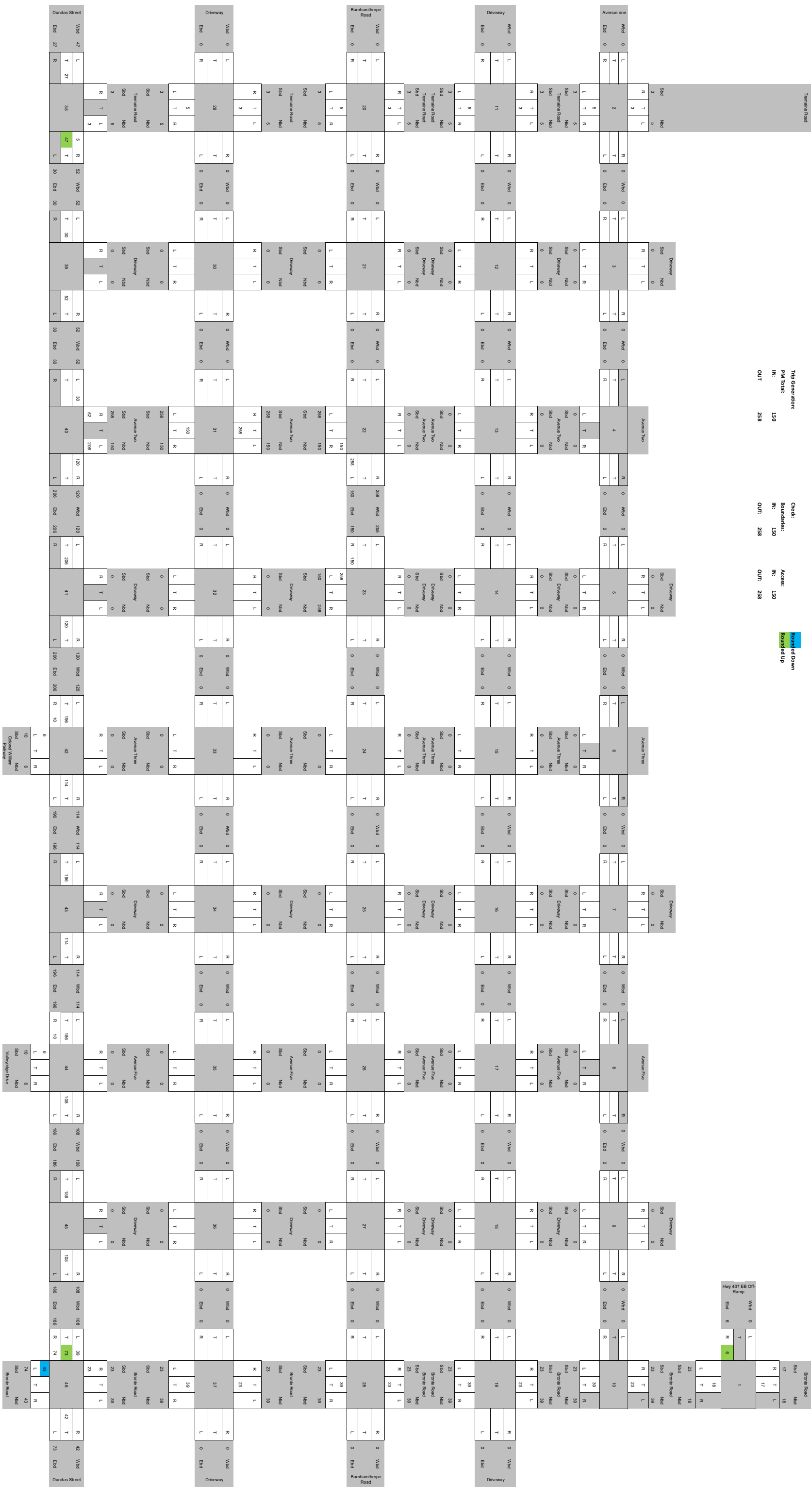


Figure X
Phase 1 Trip Assignment - Block Group 2&4 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

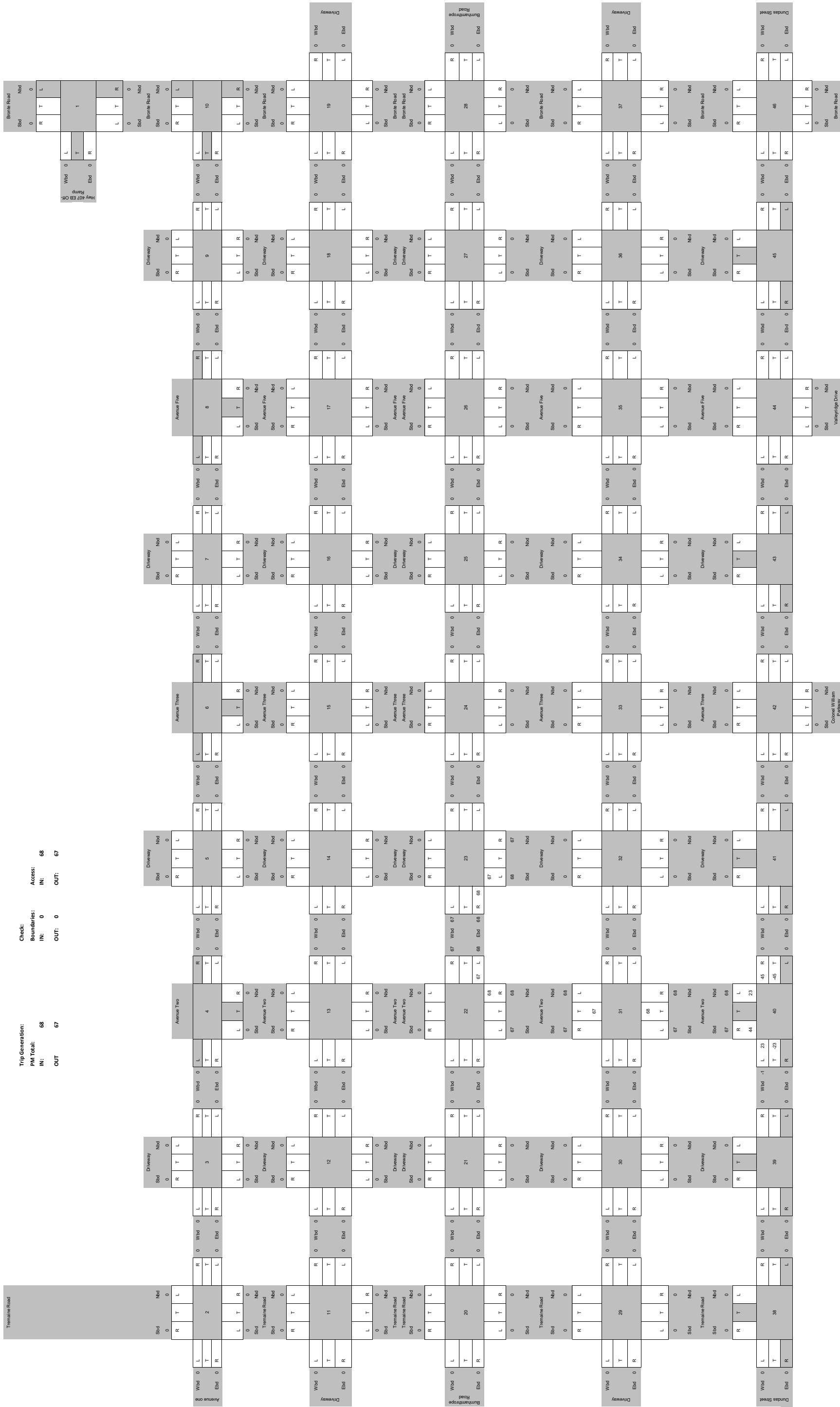
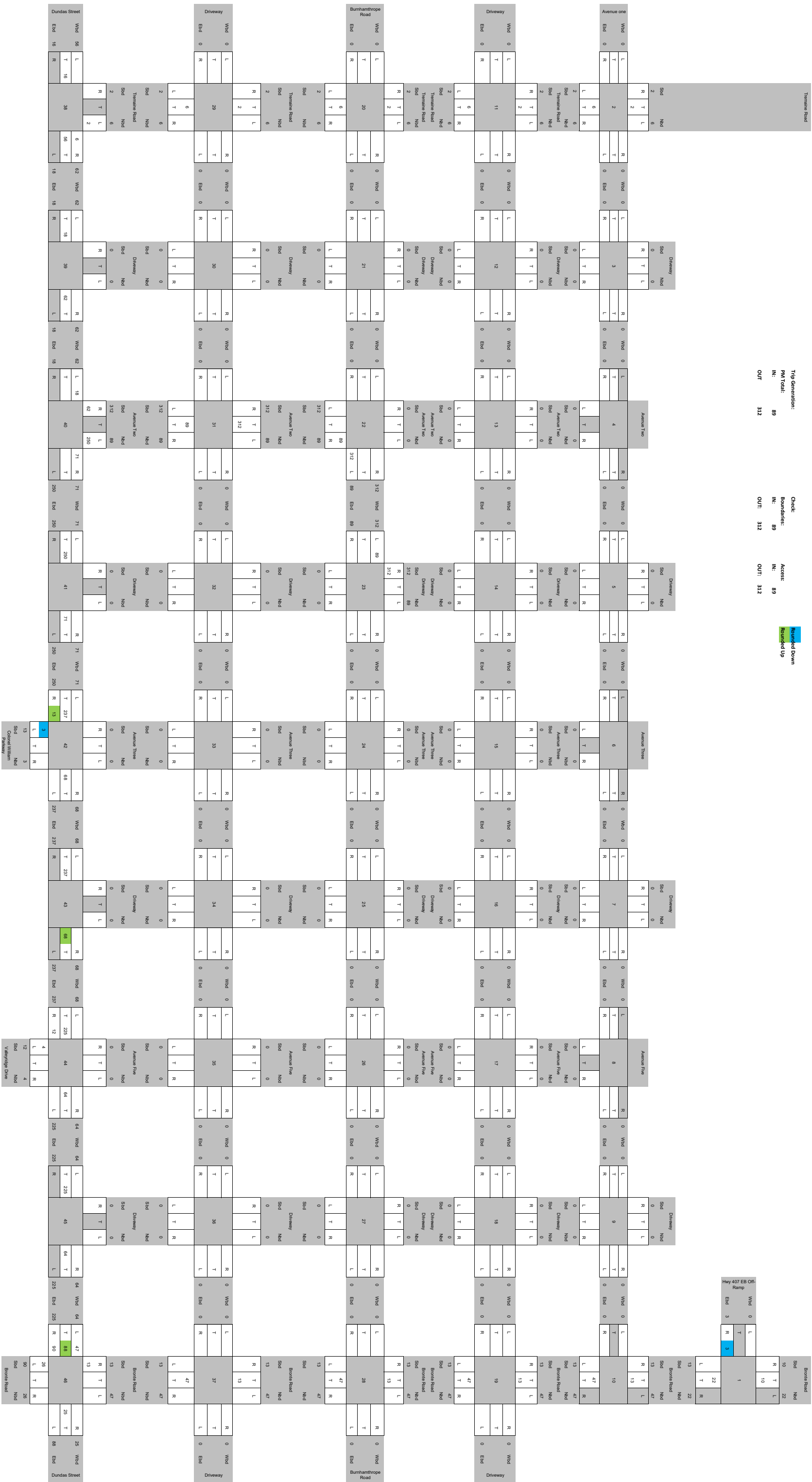


Figure X
Phase 1 Pass-By Trip Assignment - Block Group 2&4 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study



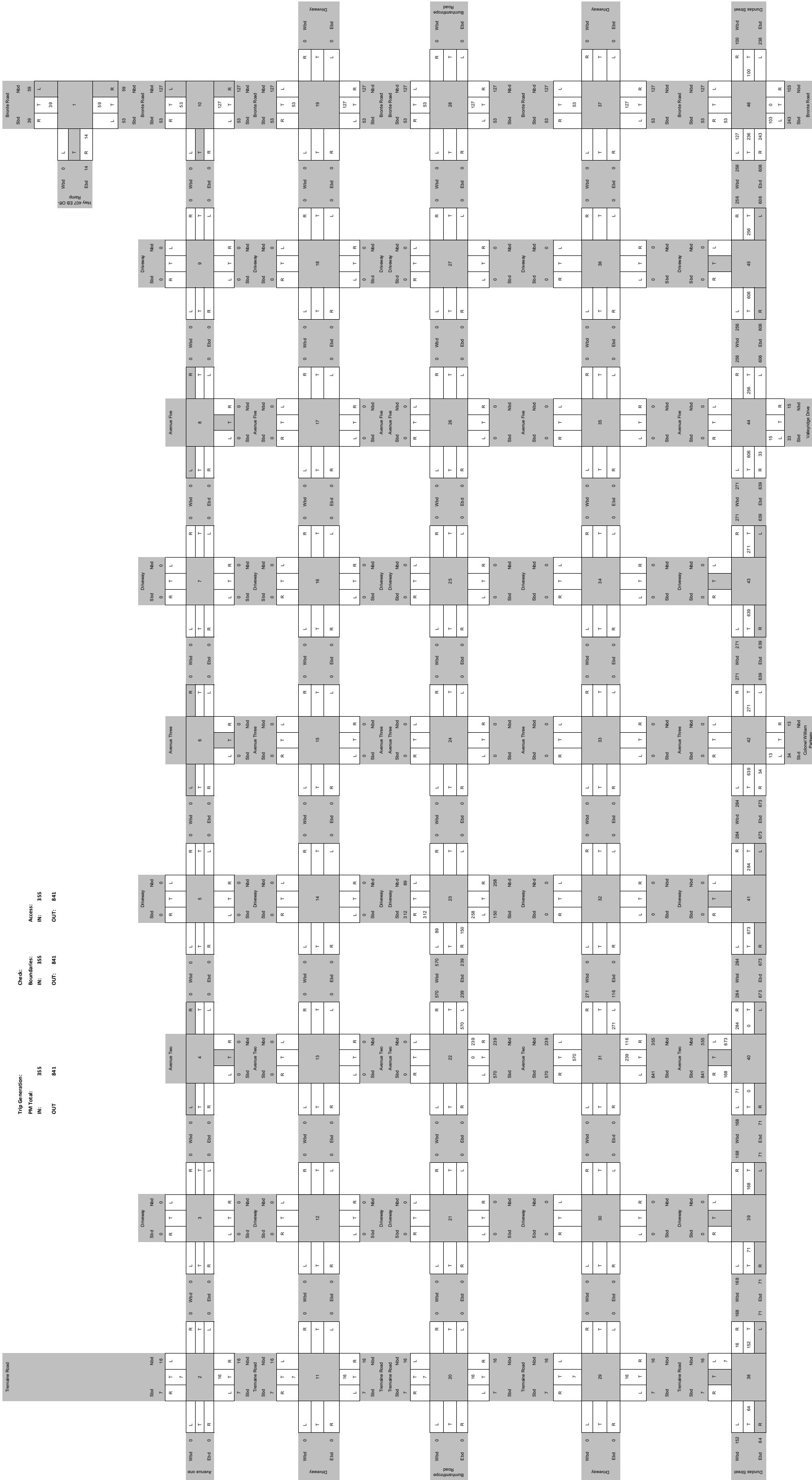


Figure X
Phase 1 Site Generated Traffic - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trenaine Road										Bontle Road									
Sbd 725										Sbd 1081									
Nbd 536										Nbd 2098									
R 725										R 1081									
T 5										T 1081									
L 725										L 1081									
Wbd 60										Wbd 0									
Ebd 70										Ebd 179									
Avenue one										Hay 407 EB Off Ramp									
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2										2									
3										3									
4										4									
5										5									
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Figure X
Phase 1 (2025) Future Total Traffic Volumes - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Tip Generation:
PM Total:
IN: 148
OUT: 243

Check:
Boundaries:
IN: 148
OUT: 243

Access:
IN: 148
OUT: 243

 Rounded Down
 Rounded Up

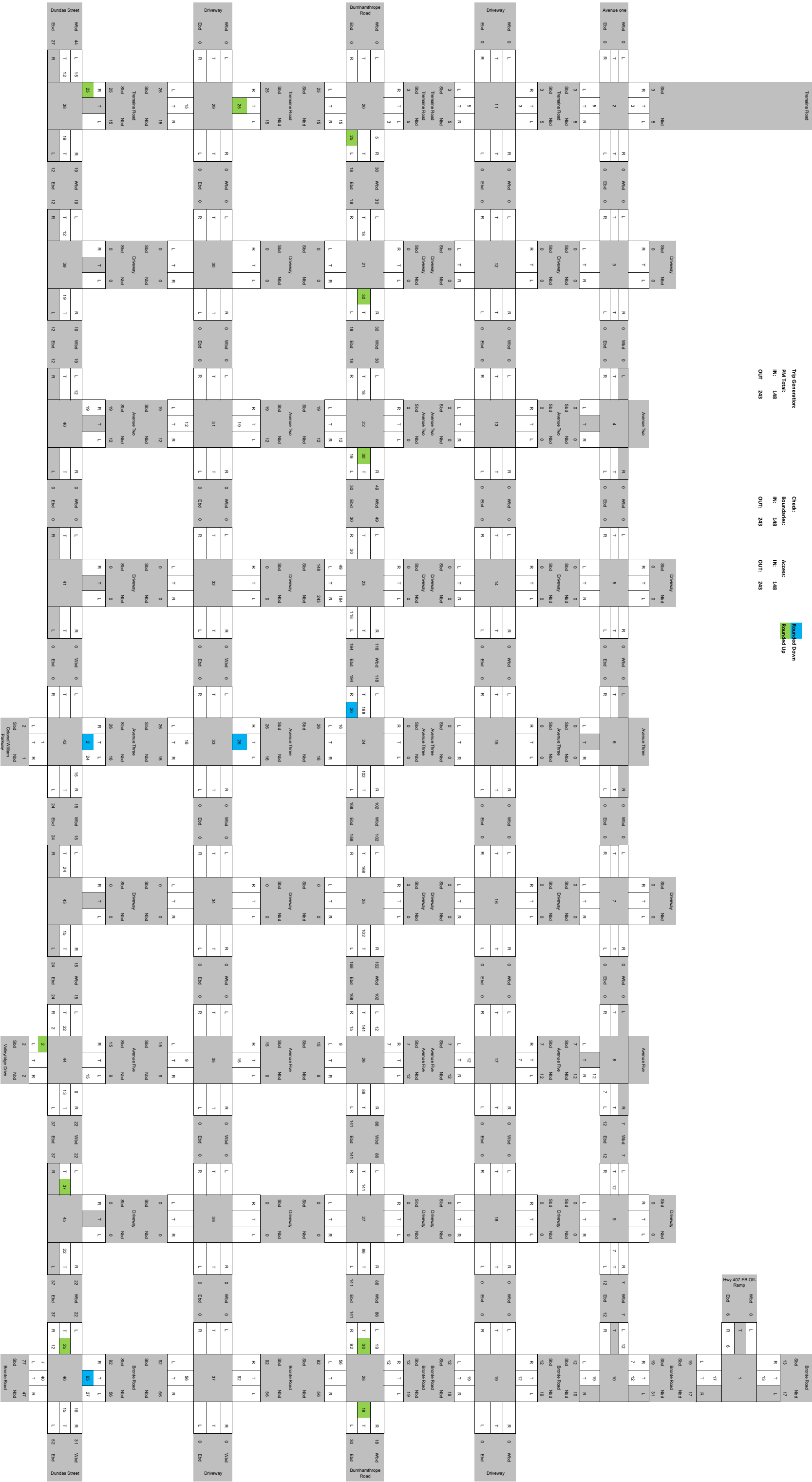


Figure X
PM 24x2 Trip Assignment - Block Group 2&4 - Weekday PM Peak Hour
407 West End/Port Lands - North Oakes Transportation Study

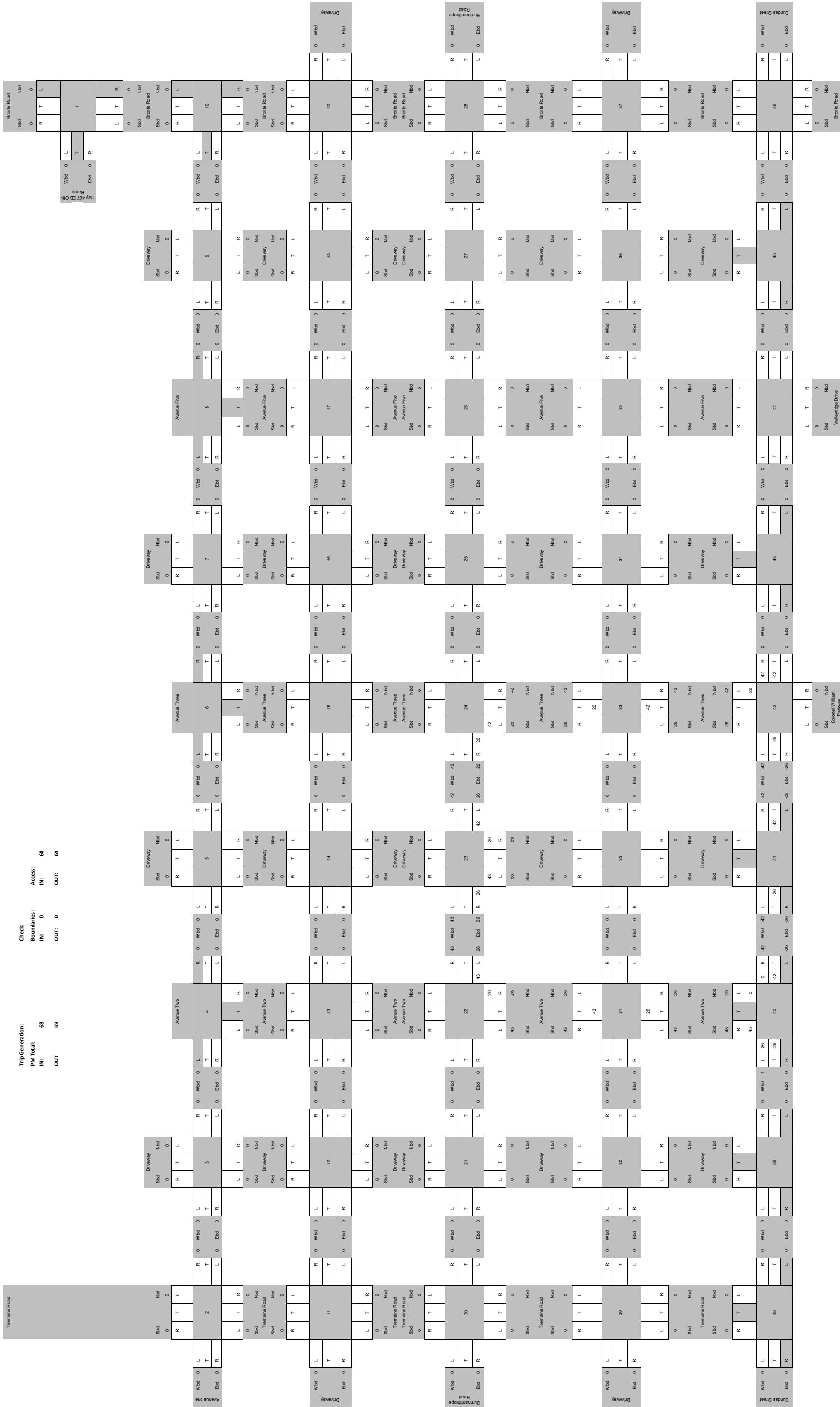


Figure X
Phase 2A&2 Pass-By Trip Assignment - Block Group 2&4 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: 78
IN: 78
OUT: 257

Check:
Boundaries: 78
IN: 78
OUT: 257

Access: 78
IN: 78
OUT: 257

Founded Down
Founded Up

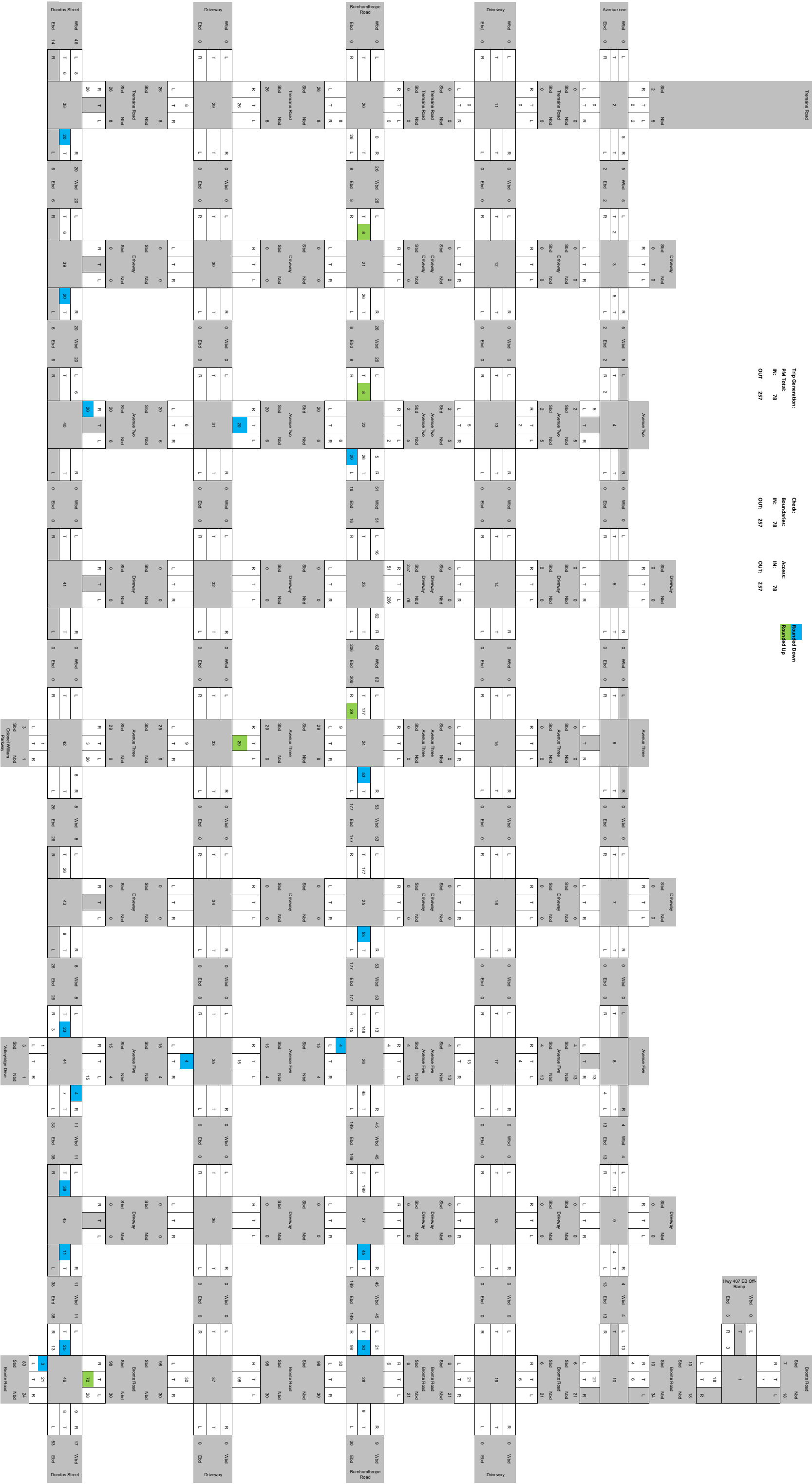


Figure X
Phase 2A Trip Assignment - Block Group 345 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

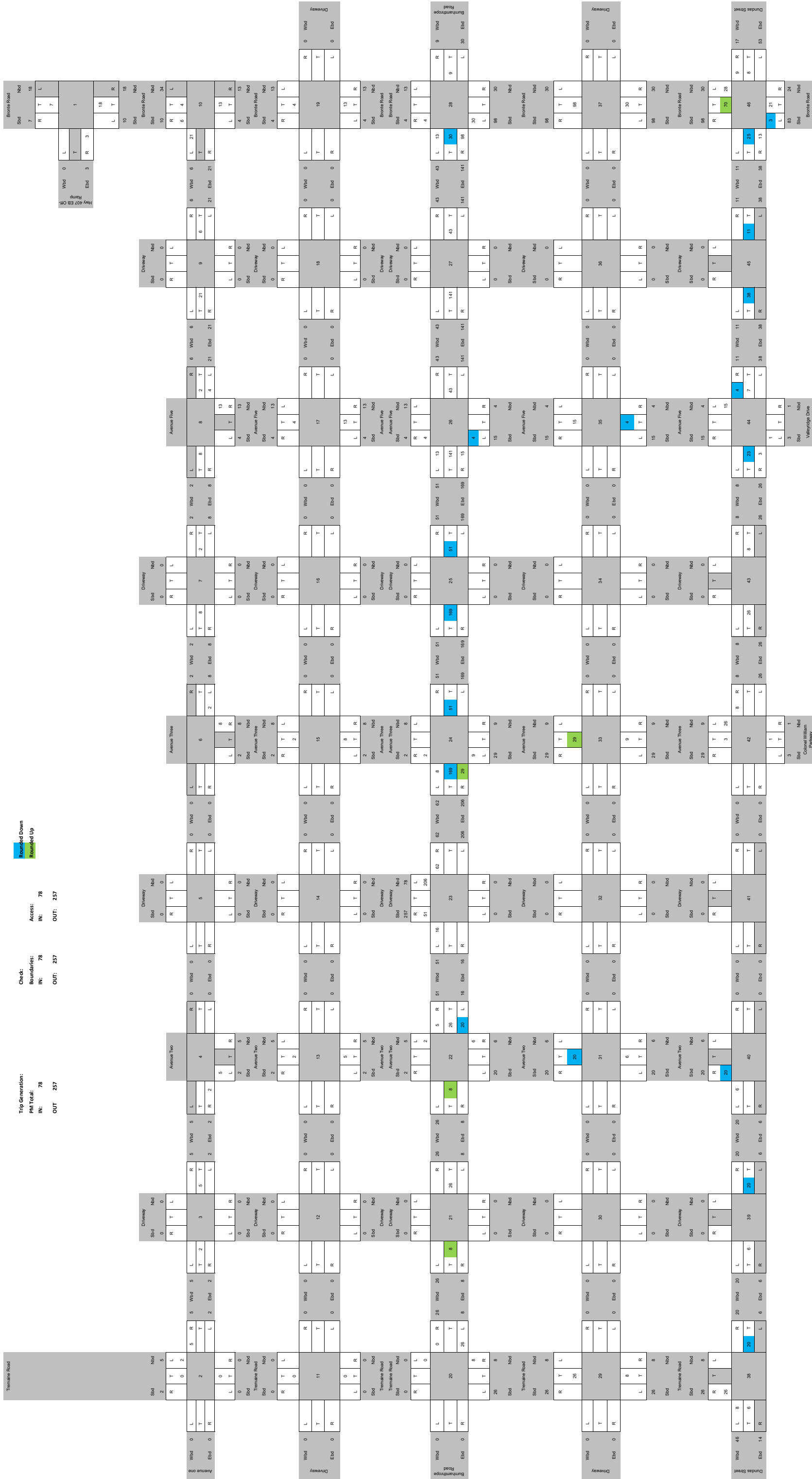


Figure X
Phase 2 Trip Assignment - Block Group 3&5 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: 13
IN: 13
OUT: 33

Check:
Boundaries: 13
IN: 13
OUT: 33

Access: 13
IN: 13
OUT: 33

Found of Down
Found of Up

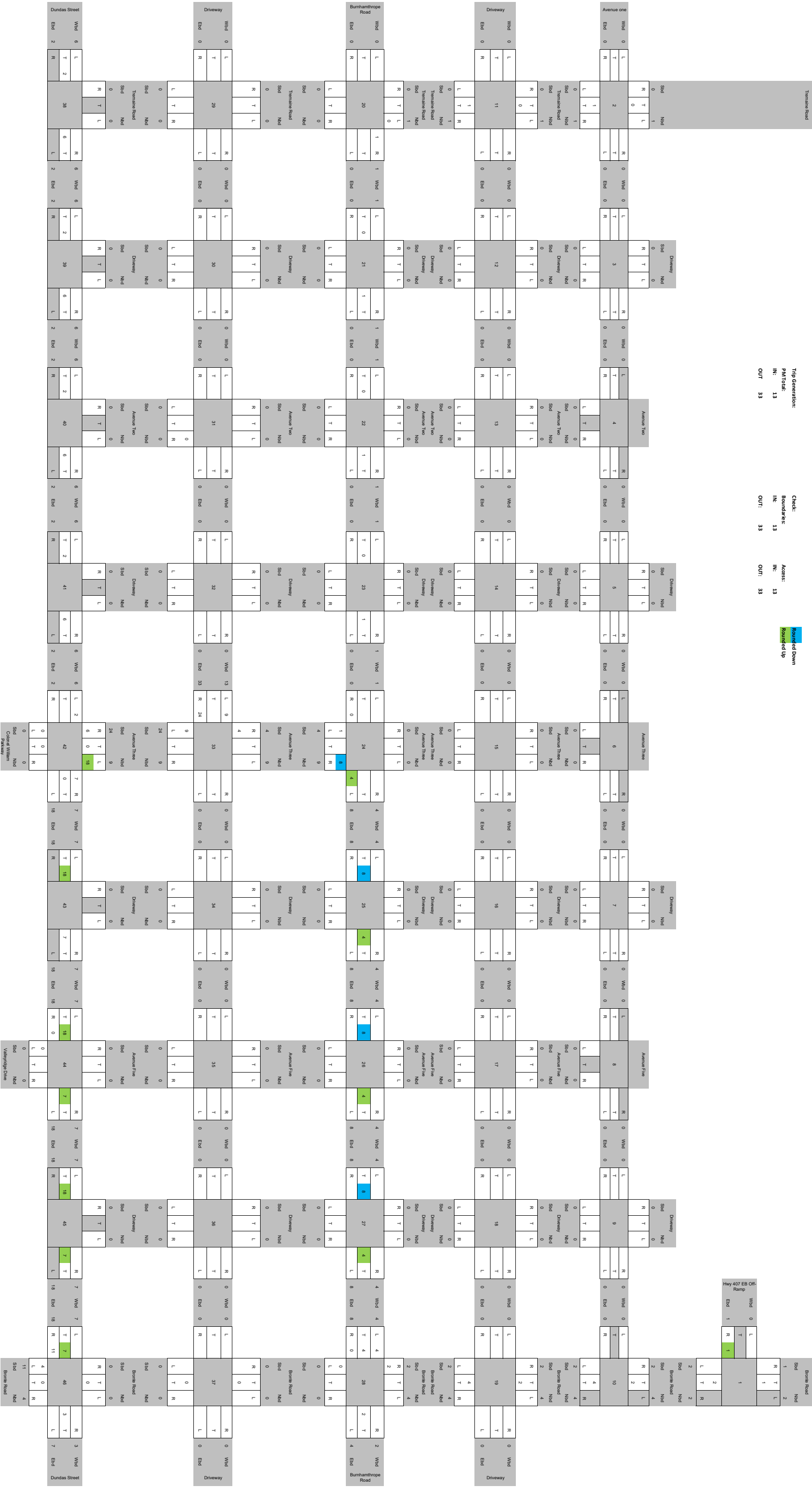


Figure X
Phase 2A&2 Trip Assignment - Buck Group 6 - weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

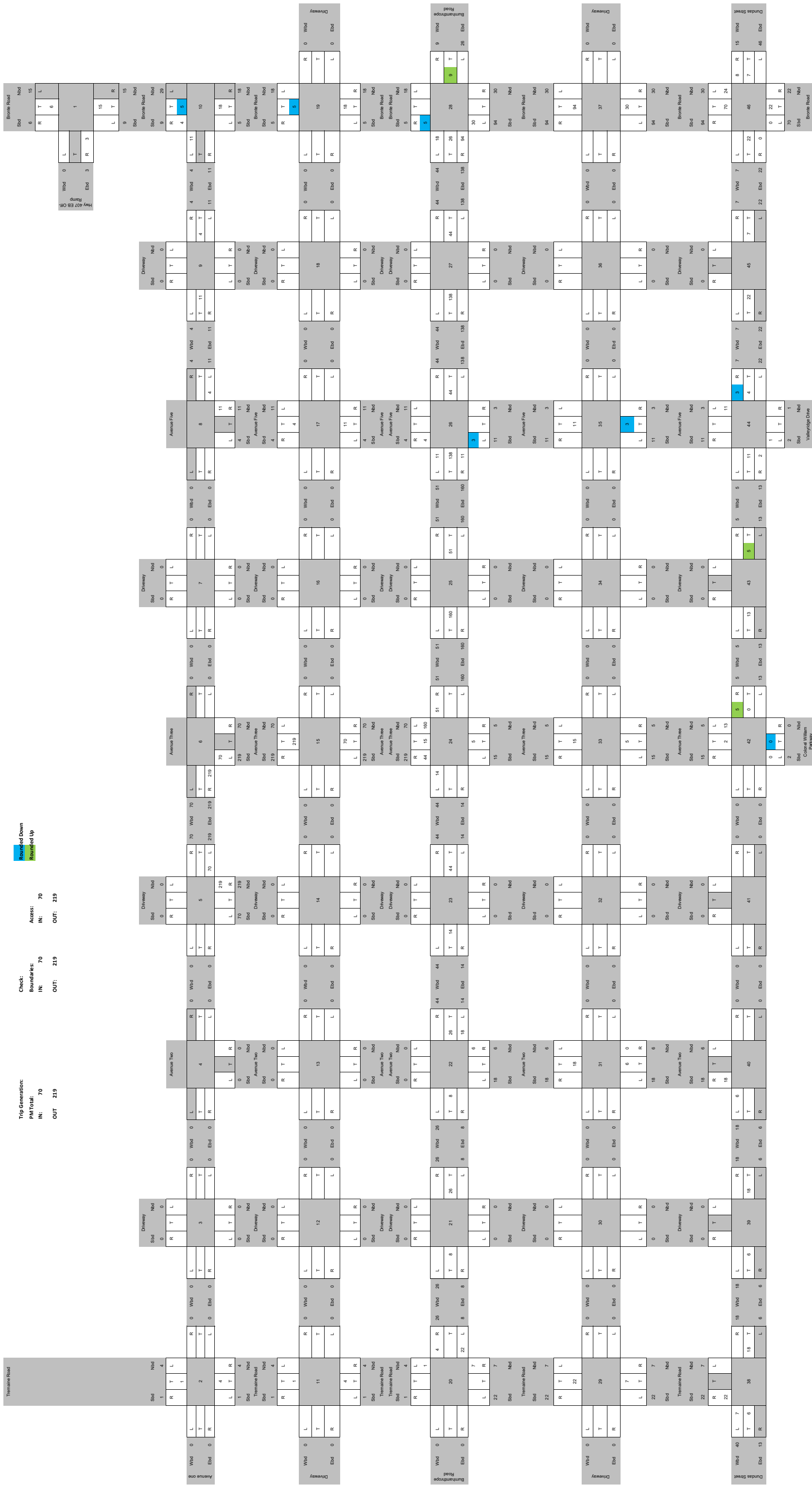


Figure X
Phase 2A Trip Assignment - Block Group 7 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
PM Total: 118
IN: 118
OUT: 545

Check:
Boundaries: 118
IN: 118
OUT: 545

Access:
IN: 118
OUT: 545

Found of Down
Founded Up

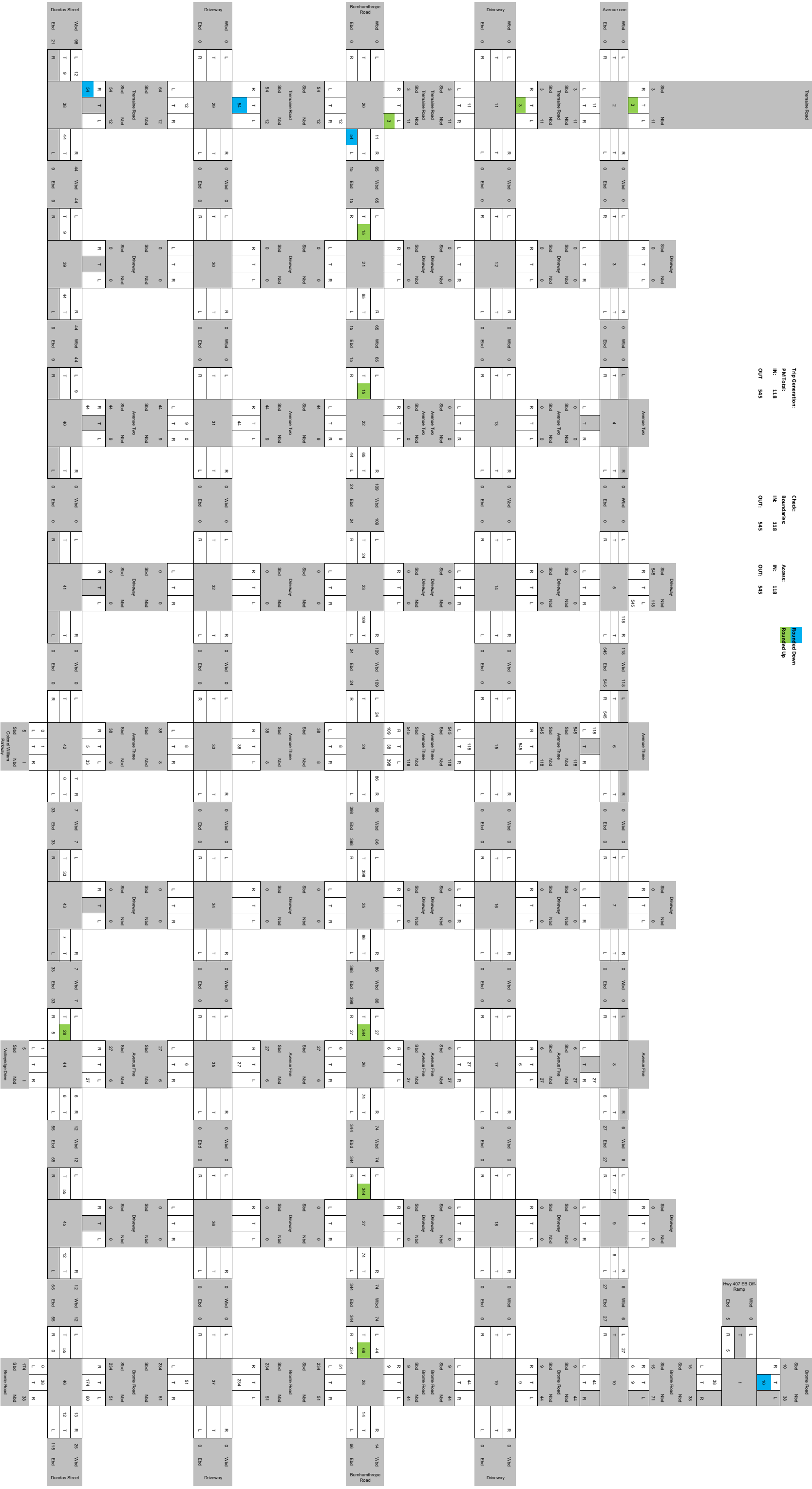


Figure X: Trip Assignment - Block Group 8 - Weekday PM Peak Hour
401 Week Employment Lands - North Okanwa Transportation Study

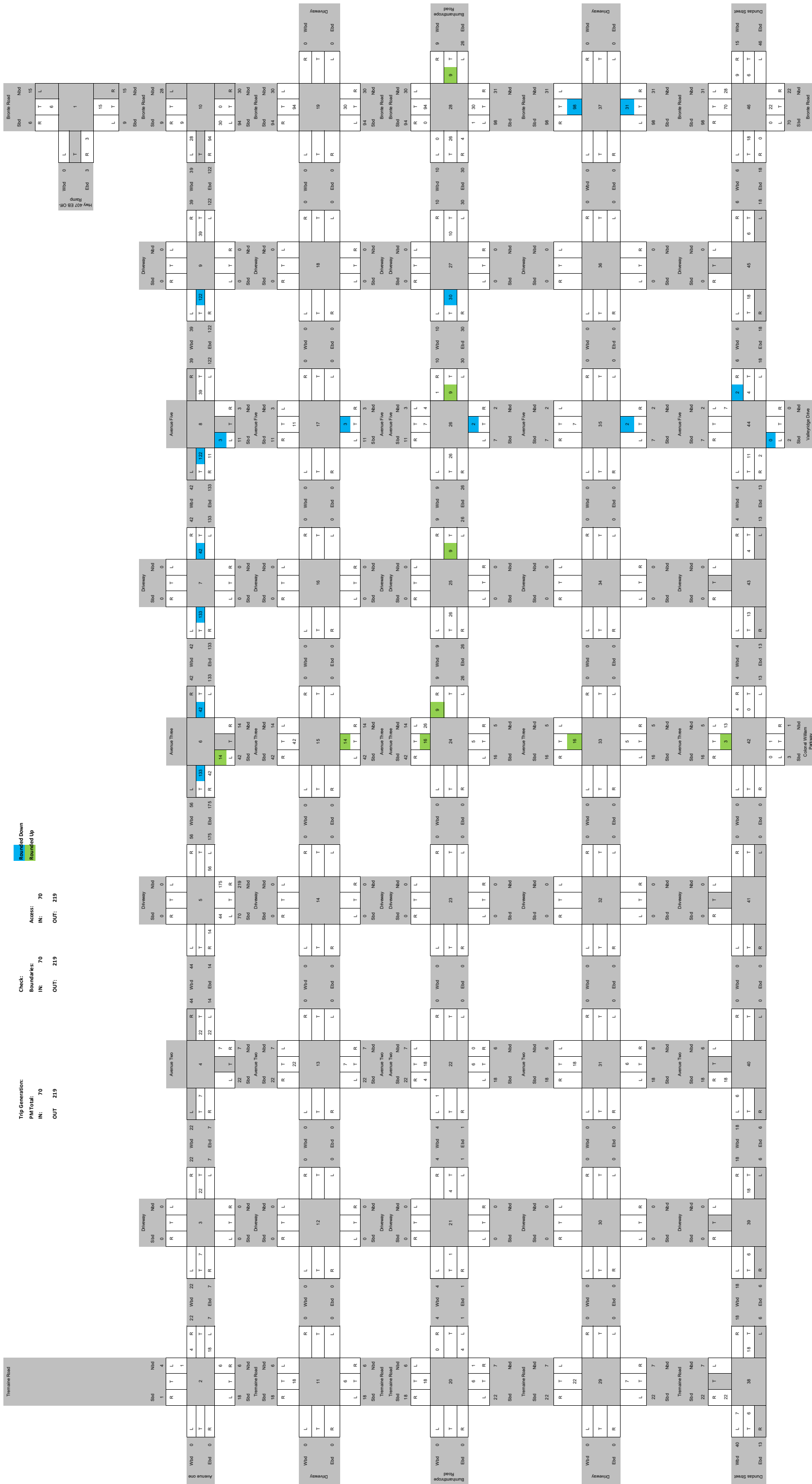


Figure X
Phase 2 Trip Assignment - Block Group 7 - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:
 PM Total: 118
 IN: 118
 OUT: 545
 Check:
 Boundaries: 118
 IN: 118
 OUT: 545
 Access:
 IN: 118
 OUT: 545

Routed Down
 Routed Up

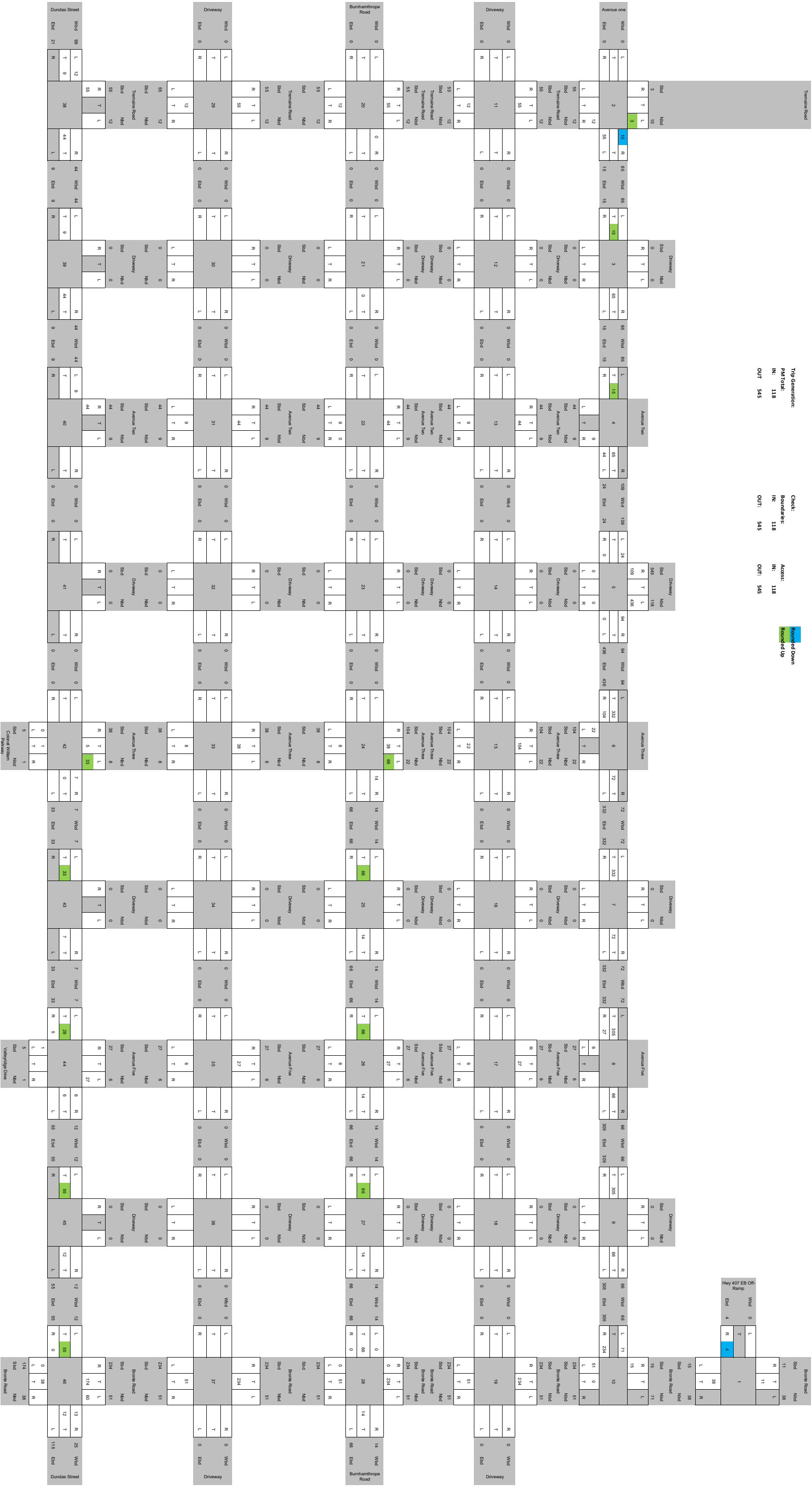


Figure X
 Trip Assignment - Black Group 8 - Weekday PM Peak Hour
 407 Week Employment Lands - North Okanagan Transportation Study

[illegible]

Figure X
Phase 2A Site Traffic - Weekday P/M Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Trip Generation:		Check:		Access:	
PM Total:		Boundaries:		IN:	
IN:	536	IN:	536	IN:	536
OUT	1538	OUT:	1538	OUT:	1538

Hay 407 EB Off-Ramp	Who?	0	L	0	1	48	167	Std	Ned	Brute Road								
											End	21	R	21	R	0	T	L

[illegible]

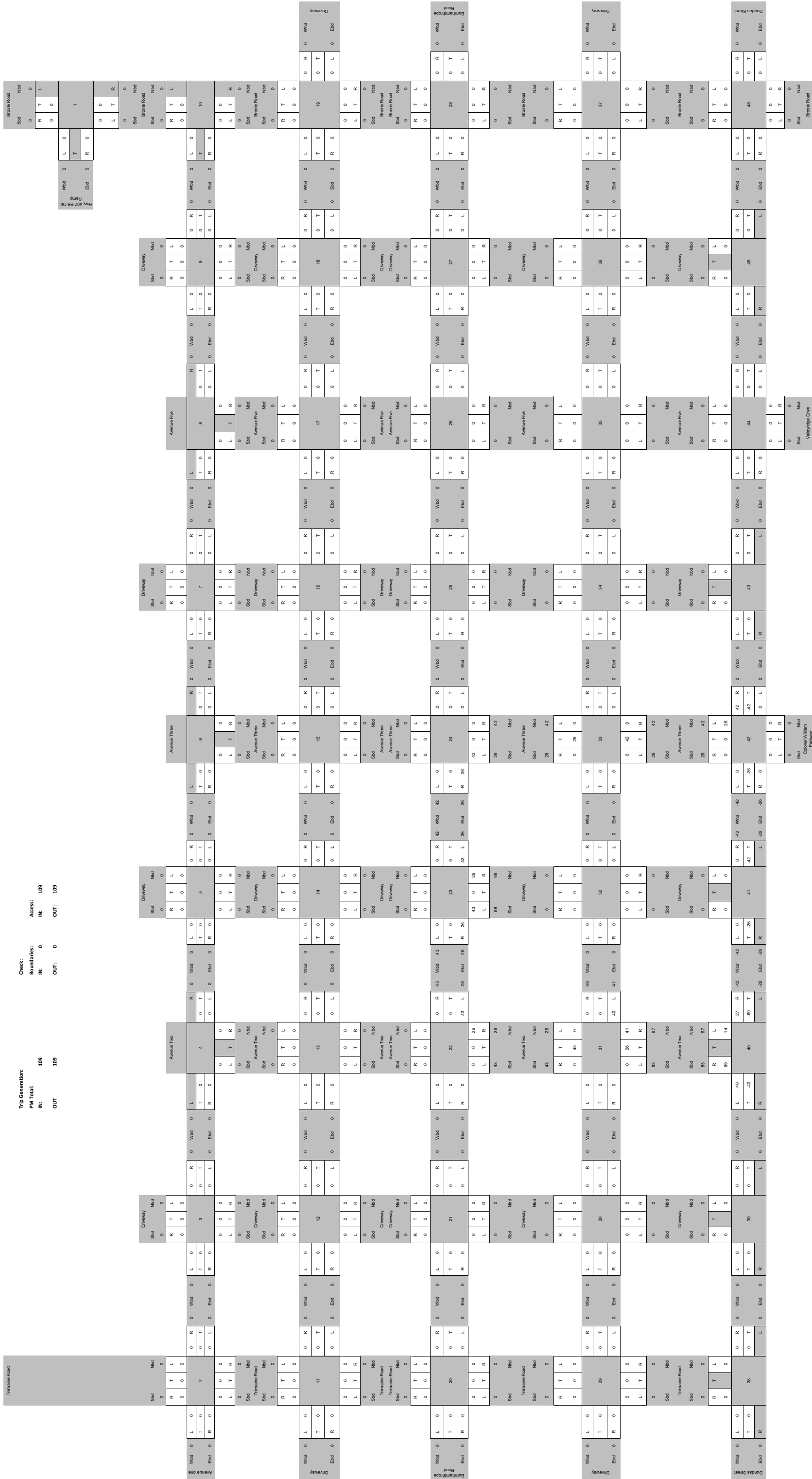


Figure X
Phase 2A&2 Pass-By Site Generated Traffic - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

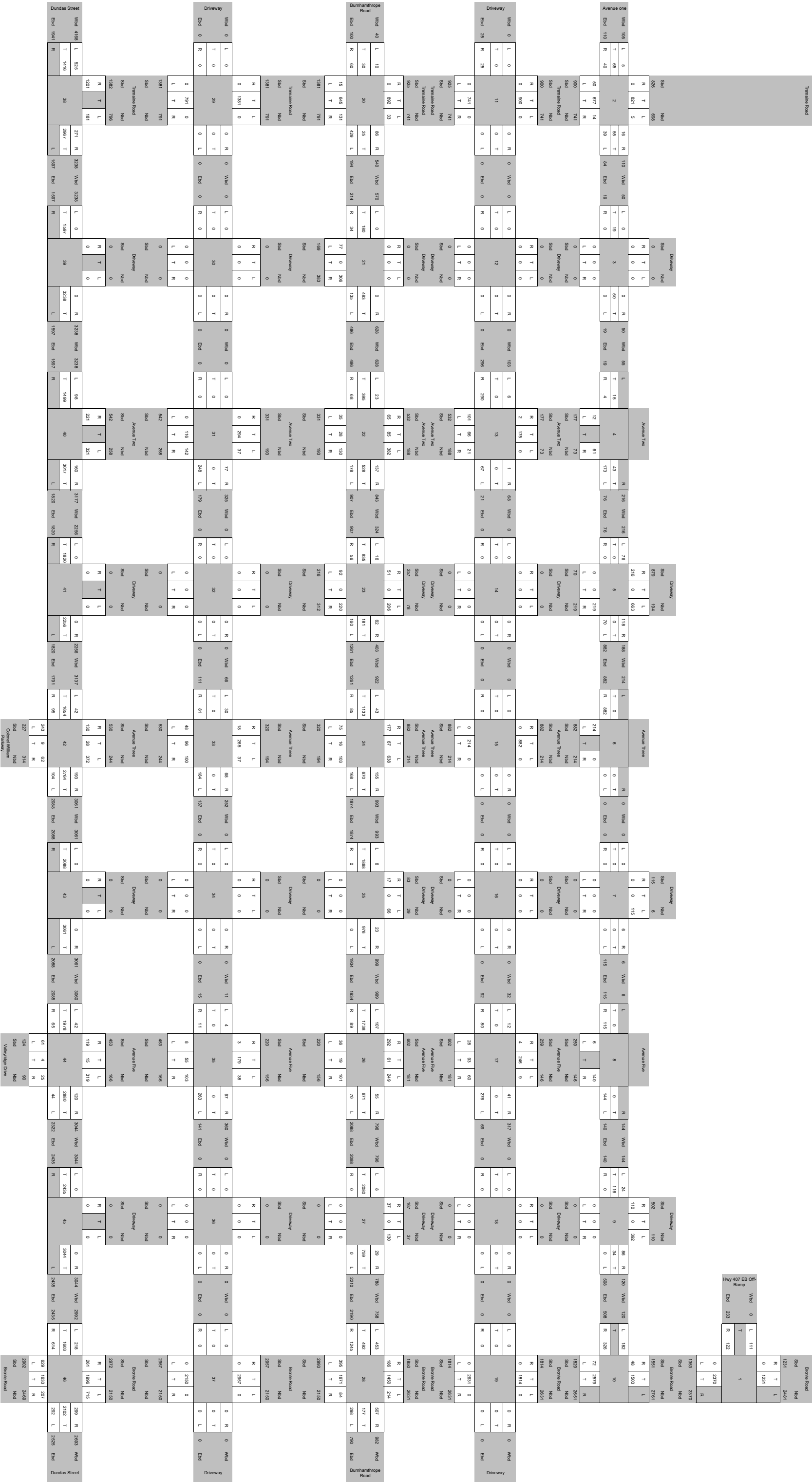


Figure X
Phase 2A (2030) Future Total Traffic Volumes - Weekday PM Peak Hour
407 West Employment Lands - North Okavue Transportation Study



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Nod 698										Nod 2481									
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Wod 105										Wod 0									
Ebd 110										Ebd 232									
R 40										R 121									
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Ebd 110										Ebd 232									
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Wod 105										Wod 0									
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Wod 105										Wod 0									
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Wod 105										Wod 0									
Ebd 110										Ebd 232									
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L 5										L 111									
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L 14										L 111									
Wod 105										Wod 0									

Figure X
Phase 2 (2030) Future Total Traffic Volumes - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

Tremaine Road	Ssd Nsd 698	R T L 0 812	L L L 14	50 R 246 Wsd 99 L 0	T 50 T 0	Bsd 50 R 0	0 0 0 0	R T L L 0 0 0 0	0 99 Wsd 391 L 0	T 46 T 4	4	R 281 Wsd 281 L 44	R T L 0 873	Nsd 220	0 0 0 0	R T L L 0 0 0 0	176 0 703	176 R 273 Wsd 273 L 0	T 703 T 206	6	R 348 Wsd 348 L 6	R T L L 115	Nsd 6	0 0 0 0	R 253 Wsd 253 L 0	T 691 T 49	8	R 314 Wsd 314 L 24	T 757 T 0	9	R T L L 502	Nsd 110	0 0 0 0	R 208 Wsd 200 L 351	T 788 T 0	10	R T L L 95	T 240 T 0	0 205	R T R	746 Ssd Nsd 2235	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111	R T L L 60	0 205	R T R	0 2235	Ssd Nsd 746	Brome Road Ssd Nsd 2440	146	Traffic On On-Ramp	Hay 407 EB Off-Ramp	Wsd 0 L 111

Figure X
Phase 2 (2030) Future Total Traffic Volumes with Sensitivity Adjustment - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

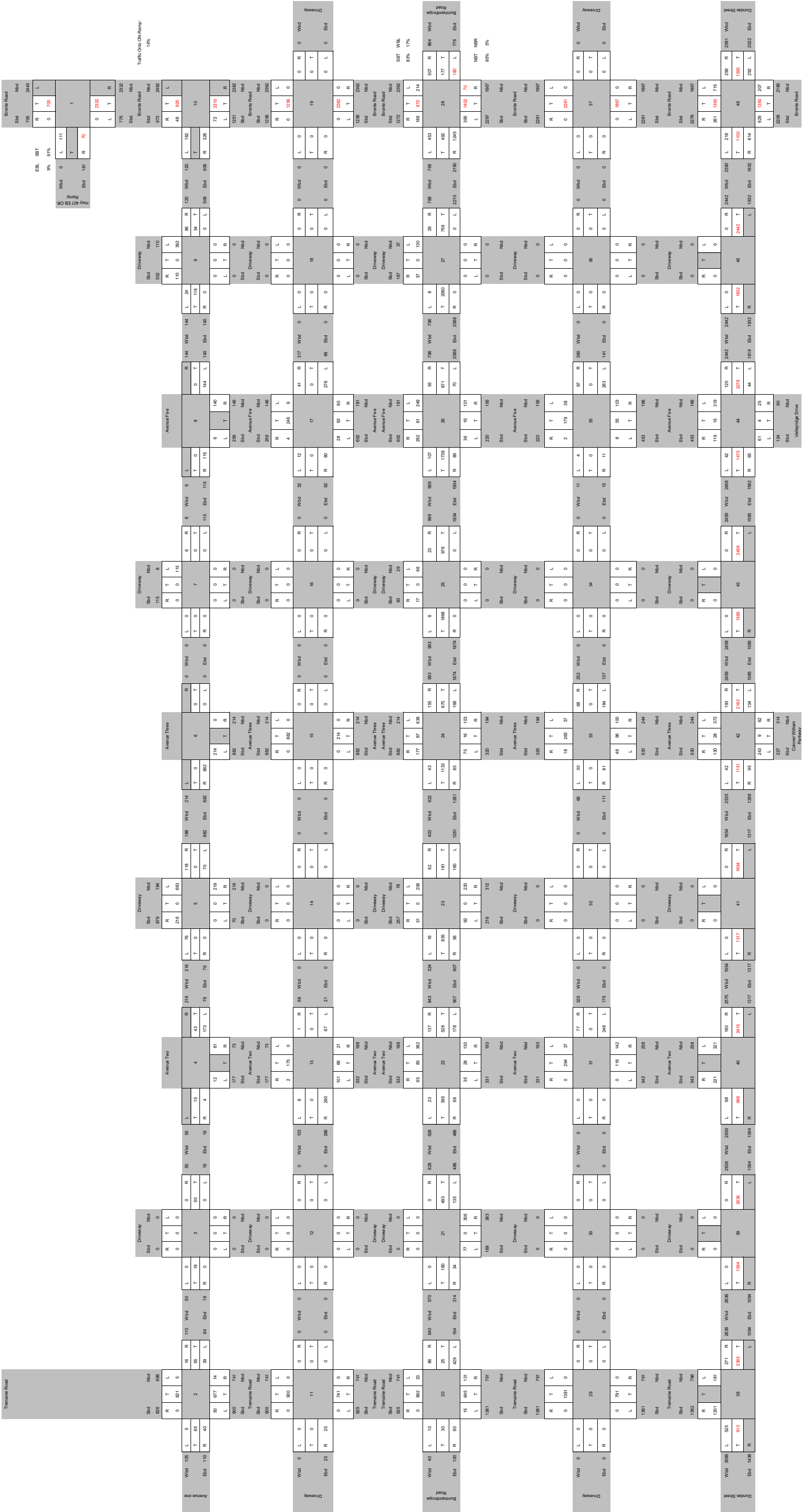


Figure X
Phase 2A (2030) Future Total Traffic Volumes with Sensitivity Adjustment - Weekday PM Peak Hour
407 West Employment Lands - North Oakville Transportation Study

APPENDIX

F

WARRANTS
AND STOP-
CONTROL
OPERATIONS

APPENDIX

APPENDIX

F-1 *TRAFFIC SIGNAL WARRANTS*

APPENDIX

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Avenue One
		North-South Street	Avenue Two
Flow Conditions	Restricted flow (urban) ▼	Major Street	East-West ▼
'T' Intersection	Yes ▼	Approach lanes per direction	1 ▼ Major Street
Existing Intersection	No ▼	Approach lanes per direction	1 ▼ Minor Street
Additional Comments			

TRAFFIC & PEDESTRIAN VOLUMES

Hour Ending	Main Road Approaches							Minor Road Approaches							Pedestrian Crossing Major Road	Pedestrian Crossing Minor Road
	Eastbound			Westbound			Total	Northbound			Southbound			Total		
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT			
AM Peak Hour	0	214	16	74	31	0	335	2	0	89	0	0	0	91		
PM Peak Hour	0	46	4	82	179	0	311	12	0	63	0	0	0	75		
Total	0	260	20	156	210	0	646	14	0	152	0	0	0	166	0	0

Parameter	AM	PM	Average Hourly Volume (AHV)
Vehicle volume, all approaches	426	386	203
Vehicle volume, along minor street	91	75	42
Vehicle volume, along major street	335	311	162
Combined vehicle and pedestrian volume crossing from minor streets	2	12	4

NOTES

1. The traffic control signal justification was done as per criteria defined in Ontario Traffic Manual, Book: 12 (March 2012) Justification 7 - Projected Volumes.

2. Traffic crossing MAJOR street defined as:

- a. Left turns from both minor street approaches
- b. The heaviest through volume from the minor street
- c. 50% of the heavier left turn movement from the major street when both of the following are met:
 1. the left turn volume > 120
 2. the left turn volume + opposing volume > 720
- d. Pedestrians crossing the major street

AM	PM
2	12
0	0
0	0
No	No
No	No
0	0

3. Justifications 1 and 2 are required to be met to 120% in the case of an existing intersection and 150% in the case of a new intersection

4. For 'T' intersection, the threshold values to be increased by 50%

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Avenue One
Flow Conditions	Restricted flow (urban)	North-South Street	Avenue Two
'T' Intersection	Yes	Major Street	East-West
Existing Intersection	No	Approach lanes per direction	1
		Approach lanes per direction	1
Additional Comments			

Justification 1: Minimum Vehicle Volumes

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, all approaches		720			203	19%	19%	No
B. Vehicle volume, along minor streets		170			42	16%	16%	No

Justification 2: Delay To Cross Traffic

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes ¹		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, major street		720			162	15%	15%	No
B. Combined vehicle and pedestrian volume crossing artery from minor streets		75			4	3%	3%	No

CONCLUSION

The results of the calculations show that justifications are **not met**.

Therefore traffic control signal is **not justified at this intersection for the horizon year 2030 (Phase 2) Total**

Note: 1. The minimum volumes were corrected from 120 vehicles and 170 vehicles in OTM, March 2012 to 50 vehicles and 70 vehicles to match Justification 2B.

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Avenue One
		North-South Street	Avenue Three
Flow Conditions	Restricted flow (urban) ▼	Major Street	East-West ▼
'T' Intersection	Yes ▼	Approach lanes per direction	1 ▼ Major Street
Existing Intersection	No ▼	Approach lanes per direction	1 ▼ Minor Street
Additional Comments			

TRAFFIC & PEDESTRIAN VOLUMES

Hour Ending	Main Road Approaches							Minor Road Approaches							Pedestrian Crossing Major Road	Pedestrian Crossing Minor Road
	Eastbound			Westbound			Total	Northbound			Southbound			Total		
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT			
AM Peak Hour	0	156	41	23	853	0	1073	272	0	179	0	0	0	451		
PM Peak Hour	0	703	226	137	212	0	1278	61	0	24	0	0	0	85		
Total	0	859	267	160	1065	0	2351	333	0	203	0	0	0	536	0	0

Parameter	AM	PM	Average Hourly Volume (AHV)
Vehicle volume, all approaches	1524	1363	722
Vehicle volume, along minor street	451	85	134
Vehicle volume, along major street	1073	1278	588
Combined vehicle and pedestrian volume crossing from minor streets	272	130	100

NOTES

1. The traffic control signal justification was done as per criteria defined in Ontario Traffic Manual, Book: 12 (March 2012) Justification 7 - Projected Volumes.

2. Traffic crossing MAJOR street defined as:

- a. Left turns from both minor street approaches
- b. The heaviest through volume from the minor street
- c. 50% of the heavier left turn movement from the major street when both of the following are met:
 1. the left turn volume > 120
 2. the left turn volume + opposing volume > 720
- d. Pedestrians crossing the major street

AM	PM
272	61
0	0
0	69
No	Yes
No	Yes
0	0

3. Justifications 1 and 2 are required to be met to 120% in the case of an existing intersection and 150% in the case of a new intersection

4. For 'T' intersection, the threshold values to be increased by 50%

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Avenue One
Flow Conditions	Restricted flow (urban)	North-South Street	Avenue Three
'T' Intersection	Yes	Major Street	East-West
Existing Intersection	No	Approach lanes per direction	1 Major Street
		Approach lanes per direction	1 Minor Street
Additional Comments			

Justification 1: Minimum Vehicle Volumes

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, all approaches		720			722	67%	67%	No
B. Vehicle volume, along minor streets		170			134	53%	53%	No

Justification 2: Delay To Cross Traffic

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes ¹		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, major street		720			588	54%	54%	No
B. Combined vehicle and pedestrian volume crossing artery from minor streets		75			100	89%	89%	No

CONCLUSION

The results of the calculations show that justifications are **not met**.

Therefore traffic control signal is **not justified at this intersection for the horizon year 2030 (Phase 2) Total**

Note: 1. The minimum volumes were corrected from 120 vehicles and 170 vehicles in OTM, March 2012 to 50 vehicles and 70 vehicles to match Justification 2B.

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Avenue One
		North-South Street	Avenue Five
Flow Conditions	Restricted flow (urban) ▼	Major Street	East-West ▼
'T' Intersection	Yes ▼	Approach lanes per direction	1 ▼ Major Street
Existing Intersection	No ▼	Approach lanes per direction	1 ▼ Minor Street
Additional Comments			

TRAFFIC & PEDESTRIAN VOLUMES

Hour Ending	Main Road Approaches							Minor Road Approaches							Pedestrian Crossing Major Road	Pedestrian Crossing Minor Road
	Eastbound			Westbound			Total	Northbound			Southbound			Total		
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT			
AM Peak Hour	0	186	16	95	838	0	1135	61	0	77	0	0	0	138		
PM Peak Hour	0	691	49	79	235	0	1054	18	0	90	0	0	0	108		
Total	0	877	65	174	1073	0	2189	79	0	167	0	0	0	246	0	0

Parameter	AM	PM	Average Hourly Volume (AHV)
Vehicle volume, all approaches	1273	1162	609
Vehicle volume, along minor street	138	108	62
Vehicle volume, along major street	1135	1054	547
Combined vehicle and pedestrian volume crossing from minor streets	61	18	20

NOTES

1. The traffic control signal justification was done as per criteria defined in Ontario Traffic Manual, Book: 12 (March 2012) Justification 7 - Projected Volumes.

2. Traffic crossing MAJOR street defined as:

- a. Left turns from both minor street approaches
- b. The heaviest through volume from the minor street
- c. 50% of the heavier left turn movement from the major street when both of the following are met:
 1. the left turn volume > 120
 2. the left turn volume + opposing volume > 720
- d. Pedestrians crossing the major street

AM	PM
61	18
0	0
0	0
No	No
No	Yes
0	0

3. Justifications 1 and 2 are required to be met to 120% in the case of an existing intersection and 150% in the case of a new intersection

4. For 'T' intersection, the threshold values to be increased by 50%

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Avenue One
Flow Conditions	Restricted flow (urban)	North-South Street	Avenue Five
'T' Intersection	Yes	Major Street	East-West
Existing Intersection	No	Approach lanes per direction	1
		Approach lanes per direction	1
Additional Comments			

Justification 1: Minimum Vehicle Volumes

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, all approaches		720			609	56%	56%	No
B. Vehicle volume, along minor streets		170			62	24%	24%	No

Justification 2: Delay To Cross Traffic

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes ¹		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, major street		720			547	51%	51%	No
B. Combined vehicle and pedestrian volume crossing artery from minor streets		75			20	18%	18%	No

CONCLUSION

The results of the calculations show that justifications are **not met**.

Therefore traffic control signal is **not justified at this intersection for the horizon year 2030 (Phase 2) Total**

Note: 1. The minimum volumes were corrected from 120 vehicles and 170 vehicles in OTM, March 2012 to 50 vehicles and 70 vehicles to match Justification 2B.

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Street Four
		North-South Street	Avenue Two
Flow Conditions	Restricted flow (urban) ▼	Major Street	North-South ▼
'T' Intersection	Yes ▼	Approach lanes per direction	1 ▼ Major Street
Existing Intersection	No ▼	Approach lanes per direction	1 ▼ Minor Street
Additional Comments			

TRAFFIC & PEDESTRIAN VOLUMES

Hour Ending	Main Road Approaches							Minor Road Approaches							Pedestrian Crossing Major Road	Pedestrian Crossing Minor Road
	Northbound			Southbound			Total	Eastbound			Westbound			Total		
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT			
AM Peak Hour	0	253	191	71	49	0	564	0	0	0	51	0	19	70		
PM Peak Hour	0	107	158	37	268	0	570	0	0	0	263	0	77	340		
Total	0	360	349	108	317	0	1134	0	0	0	314	0	96	410	0	0

Parameter	AM	PM	Average Hourly Volume (AHV)
Vehicle volume, all approaches	634	910	386
Vehicle volume, along minor street	70	340	103
Vehicle volume, along major street	564	570	284
Combined vehicle and pedestrian volume crossing from minor streets	51	263	79

NOTES

1. The traffic control signal justification was done as per criteria defined in Ontario Traffic Manual, Book: 12 (March 2012) Justification 7 - Projected Volumes.

2. Traffic crossing MAJOR street defined as:

- a. Left turns from both minor street approaches
- b. The heaviest through volume from the minor street
- c. 50% of the heavier left turn movement from the major street when both of the following are met:
 1. the left turn volume > 120
 2. the left turn volume + opposing volume > 720
- d. Pedestrians crossing the major street

AM	PM
51	263
0	0
0	0
No	No
No	No
0	0

3. Justifications 1 and 2 are required to be met to 120% in the case of an existing intersection and 150% in the case of a new intersection

4. For 'T' intersection, the threshold values to be increased by 50%

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	NK	Jurisdiction	Town of Oakville
Agency or Company	WSP Canada Inc.	Date	June 24, 2020
Analysis Period	2030 (Phase 2) Total	East-West Street	Street Four
Flow Conditions	Restricted flow (urban)	North-South Street	Avenue Two
'T' Intersection	Yes	Major Street	North-South
Existing Intersection	No	Approach lanes per direction	1 Major Street
		Approach lanes per direction	1 Minor Street
Additional Comments			

Justification 1: Minimum Vehicle Volumes

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, all approaches		720			386	36%	36%	No
B. Vehicle volume, along minor streets								
		170			103	40%	40%	No

Justification 2: Delay To Cross Traffic

JUSTIFIED

No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes ¹		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, major street		720			284	26%	26%	No
B. Combined vehicle and pedestrian volume crossing artery from minor streets		75			79	70%	70%	No

CONCLUSION

The results of the calculations show that justifications are **not met**.

Therefore traffic control signal is **not justified at this intersection for the horizon year 2030 (Phase 2) Total**

Note: 1. The minimum volumes were corrected from 120 vehicles and 170 vehicles in OTM, March 2012 to 50 vehicles and 70 vehicles to match Justification 2B.

APPENDIX

F-2 *TURNING LANE WARRANTS*

APPENDIX

Intersection: Avenue One at Avenue Two
Major Street: Avenue One
Major Street Approach Lanes (Per Direction): 1
Minor Street Approach Lanes (Per Direction): 1
Design Speed (km/h): 50
Scenario: 2030 (Phase 2)

Left-Turn Warrant

Movement	AM Peak Hour					PM Peak Hour					Turning Lane Warranted?	
	Left-Turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	Left-turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage		Reference Figure
WBL	74	105	230	70%	EA-5	NO	82	261	50	31%	EA-4	NO

Right-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?
	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	
EBR	16	230	7%	NO	4	50	8%	NO	NO
NBR	89	91	98%	YES	63	75	84%	YES	YES

Note: Right-Turn lane is warranted if the right-turn volumes is 60 veh/h or more and the right-turn percentage exceeds 10%.

Intersection:

Avenue One at Avenue Three

Major Street:

Avenue One

Major Street Approach Lanes (Per Direction):

1

Minor Street Approach Lanes (Per Direction):

1

Design Speed (km/h):

50

Scenario:

2030 (Phase 2)

Left-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?				
	Left-Turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	Left-turn Volume	Advancing Volume		Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?
WBL	23	876	197	3%	EA-2	YES	137	349	929	39%	EA-5	YES	YES

Right-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?
	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Turning Lane Warranted?
EBR	41	197	21%	NO	226	929	24%	YES	YES
NBR	179	451	40%	YES	24	85	28%	NO	YES

Note: Right-Turn lane is warranted if the right-turn volumes is 60 veh/h or more and the right-turn percentage exceeds 10%.

Intersection: Avenue One at Avenue Five

Major Street: Avenue One

Major Street Approach Lanes (Per Direction): 1

Minor Street Approach Lanes (Per Direction): 1

Design Speed (km/h): 50

Scenario: 2030 (Phase 2)

Left-Turn Warrant

Movement	AM Peak Hour					PM Peak Hour					Turning Lane Warranted?		
	Left-Turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	Left-turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage		Reference Figure	Warranted?
WBL	95	933	202	10%	EA-2	YES	79	314	740	25%	EA-4	YES	YES

Right-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?
	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	
EBR	16	202	8%	NO	49	740	7%	NO	NO
NBR	77	138	56%	YES	90	108	83%	YES	YES

Note: Right-Turn lane is warranted if the right-turn volumes is 60 veh/h or more and the right-turn percentage exceeds 10%.

Intersection: Avenue Two at Street Four
Major Street: Avenue Two
Major Street Approach Lanes (Per Direction): 1
Minor Street Approach Lanes (Per Direction): 1
Design Speed (km/h): 50
Scenario: 2030 (Phase 2)

Left-Turn Warrant

Movement	AM Peak Hour					PM Peak Hour					Turning Lane Warranted?	
	Left-Turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	Left-turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage		Reference Figure
SBL	71	120	444	59%	EA-5	NO	37	305	242	12%	EA-2	NO
NO												

Right-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?
	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	
NBR	191	444	43%	YES	158	265	60%	YES	YES
WBR	19	70	27%	NO	77	340	23%	YES	YES

Note: Right-Turn lane is warranted if the right-turn volumes is 60 veh/h or more and the right-turn percentage exceeds 10%.

Intersection: Burnhamthorpe Road at Avenue Two
Major Street: Burnhamthorpe Road
Major Street Approach Lanes (Per Direction): 2
Minor Street Approach Lanes (Per Direction): 1
Design Speed (km/h): 50
Scenario: 2030 (Phase 2)

Left-Turn Warrant

Movement	AM Peak Hour						PM Peak Hour						Turning Lane Warranted?
	Left-Turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	Left-turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	
EBL	92	N/A	607	N/A	EB-1	YES	24	N/A	574	N/A	EB-1	YES	YES
WBL	76	N/A	472	N/A	EB-1	YES	116	N/A	455	N/A	EB-1	YES	YES
NBL	65	272	90	24%	EA-4	NO	35	184	378	19%	EA-3	NO	NO
SBL	49	90	272	54%	EA-5	NO	188	378	184	50%	EA-5	YES	YES

Right-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?
	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	
EBR	19	472	4%	NO	68	455	15%	YES	YES

Intersection: Burnhamthorpe Road at Avenue Three

Major Street: Burnhamthorpe Road

Major Street Approach Lanes (Per Direction): 2

Minor Street Approach Lanes (Per Direction): 1

Design Speed (km/h): 50

Scenario: 2030 (Phase 2)

Left-Turn Warrant

Movement	AM Peak Hour						PM Peak Hour						Turning Lane Warranted?
	Left-Turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	Left-turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	
EBL	1	N/A	1169	N/A	EB-1	NO	17	N/A	644	N/A	EB-1	YES	YES
WBL	87	N/A	420	N/A	EB-1	YES	72	N/A	1020	N/A	EB-1	YES	YES
NBL	58	356	58	16%	EA-3	NO	75	203	363	37%	EA-5	NO	NO
SBL	23	58	356	40%	EA-5	NO	132	363	203	36%	EA-5	YES	YES

Right-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?
	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	
EBR	21	420	5%	NO	85	1020	8%	NO	NO

Intersection: Burnhamthorpe Road at Avenue Five
Major Street: Burnhamthorpe Road
Major Street Approach Lanes (Per Direction): 2
Minor Street Approach Lanes (Per Direction): 1
Design Speed (km/h): 50
Scenario: 2030 (Phase 2)

Left-Turn Warrant

Movement	AM Peak Hour						PM Peak Hour						Turning Lane Warranted?
	Left-Turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	Left-turn Volume	Advancing Volume	Opposing Volume	Left-Turn Percentage	Reference Figure	Warranted?	
EBL	131	N/A	1538	N/A	EB-1	YES	49	N/A	627	N/A	EB-1	YES	YES
WBL	101	N/A	464	N/A	EB-1	YES	70	N/A	1206	N/A	EB-1	YES	YES
NBL	56	227	100	25%	EA-4	NO	27	155	460	17%	EA-3	NO	NO
SBL	41	100	227	41%	EA-5	NO	243	460	155	53%	EA-5	YES	YES

Right-Turn Warrant

Movement	AM Peak Hour				PM Peak Hour				Turning Lane Warranted?
	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Right-turn Volume	Advancing Volume	Right-Turn Percentage	Warranted?	Turning Lane Warranted?
EBR	18	464	4%	NO	51	1206	4%	NO	NO

APPENDIX

F-3 *STOP-CONTROLLED OPERATIONS AT AVENUE ONE AND AVENUE THREE*

APPENDIX

HCM Unsignalized Intersection Capacity Analysis
6: Avenue Three & Avenue One

<2030 Phase 2 FT Sop-Control> AM Peak Hour

07-07-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	156	41	23	853	272	179
Future Volume (Veh/h)	156	41	23	853	272	179
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	156	41	23	853	272	179
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			197		1055	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			197		1055	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		0	80
cM capacity (veh/h)			1376		246	890
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	156	41	23	853	272	179
Volume Left	0	0	23	0	272	0
Volume Right	0	41	0	0	0	179
cSH	1700	1700	1376	1700	246	890
Volume to Capacity	0.09	0.02	0.02	0.50	1.11	0.20
Queue Length 95th (m)	0.0	0.0	0.4	0.0	90.3	5.7
Control Delay (s)	0.0	0.0	7.7	0.0	132.5	10.1
Lane LOS			A		F	B
Approach Delay (s)	0.0		0.2		83.9	
Approach LOS					F	
Intersection Summary						
Average Delay			24.9			
Intersection Capacity Utilization			66.6%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Avenue Three & Avenue One

<2030 Phase 2 FT Stop-Control> PM Peak Hour

07-07-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	703	226	137	212	61	24
Future Volume (Veh/h)	703	226	137	212	61	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	703	226	137	212	61	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			929		1189	703
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			929		1189	703
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		64	95
cM capacity (veh/h)			736		169	438
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	703	226	137	212	61	24
Volume Left	0	0	137	0	61	0
Volume Right	0	226	0	0	0	24
cSH	1700	1700	736	1700	169	438
Volume to Capacity	0.41	0.13	0.19	0.12	0.36	0.05
Queue Length 95th (m)	0.0	0.0	5.2	0.0	11.6	1.3
Control Delay (s)	0.0	0.0	11.0	0.0	37.9	13.7
Lane LOS			B		E	B
Approach Delay (s)	0.0		4.3		31.0	
Approach LOS					D	
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			58.0%		ICU Level of Service	B
Analysis Period (min)			15			

APPENDIX

G COST- ESTIMATE BREAKDOWN

APPENDIX

Exclusive Westbound Right-Turn at Dundas Street West and Bronte Road Preliminary Construction Cost Estimate For Recommended Roadway/Intersection Improvements					
1. Civil Works					
Item No.	Description	Units	Quantity	Unit Price	Total
00001	Road Construction (including asp. removals, supply asp., Gran A, Gran B, road base)	t	1200	\$ 75.00	\$ 90,000.00
00002	Pavement markings and signage	LS	1	\$ 10,000.00	\$ 10,000.00
00003	Catchbasin (lead and reconstruction)	each	4	\$ 7,000.00	\$ 28,000.00
Subtotal (Civil Works)					\$ 128,000.00
Contingency @ 30% (Including Utilities)					\$ 38,400.00
Total (Civil Works)					\$ 166,400.00
2. Signal and Streetlighting Works					
00004	Signal works at the northwest quadrant of the intersection	each	1	\$ 50,000.00	\$ 50,000.00
00005	Streetlighting relocations	each	1	\$ 30,000.00	\$ 30,000.00
Subtotal (Signal and Streetlighting Works)					\$ 80,000.00
Contingency @ 30% (Including Utilities)					\$ 24,000.00
Total (Signal and Streetlighting Works)					\$ 104,000.00
Total (Civil Works and Signal and Streetlighting Works) Excluding HST					\$ 270,400.00
Total (-25%)					\$ 202,800.00
Total (+25%)					\$ 338,000.00

Conversion of the Existing Single Southbound Left Turn Lane to Double Left Turn Lanes - Dundas Street West and Bronte Road					
Preliminary Construction Cost Estimate For Recommended Roadway/Intersection Improvements					
1. Civil Works					
Item No.	Description	Units	Quantity	Unit Price	Total
00001	Pavement markings and signage	LS	1	\$ 15,000.00	\$ 15,000.00
Subtotal (Civil Works)					\$ 15,000.00
Contingency @ 30% (Including Utilities)					\$ 4,500.00
Total (Civil Works)					\$ 19,500.00
2. Signal Works					
00002	Signal phasing works	each	1	\$ 20,000.00	\$ 20,000.00
Subtotal (Signal Works)					\$ 20,000.00
Contingency @ 30% (Including Utilities)					\$ 6,000.00
Total (Signal Works)					\$ 26,000.00
Total (Civil Works and Signal and Streetlighting Works) Excluding HST					\$ 45,500.00
Total (-25%)					\$ 34,125.00
Total (+25%)					\$ 56,875.00

Channelized Southbound Right-Turn Lane - Dundas Street West and Tremaine Road**Preliminary Construction Cost Estimate For Recommended Roadway/Intersection Improvements****1. Civil Works**

Item No.	Description	Units	Quantity	Unit Price	Total
00001	Road Construction (including asp. removals, supply asp., Gran A, Gran B, road base)	t	1200	\$ 75.00	\$ 90,000.00
00002	Construct channelized refuge island (including curbs, grading and drainage)	LS	1	\$ 60,000.00	\$ 60,000.00
00003	Pavement markings and signage	LS	1	\$ 15,000.00	\$ 15,000.00
Subtotal (Civil Works)					\$ 165,000.00
Contingency @ 30% (Including Utilities)					\$ 49,500.00
Total (Civil Works)					\$ 214,500.00

2. Signal Works

00004	Signal works at the northeast quadrant of the intersection	each	1	\$ 50,000.00	\$ 50,000.00
Subtotal (Signal Works)					\$ 50,000.00
Contingency @ 30% (Including Utilities)					\$ 15,000.00
Total (Signal Works)					\$ 65,000.00
Total (Civil Works and Signal Works) Excluding HST					\$ 279,500.00
Total (-25%)					\$ 209,625.00
Total (+25%)					\$ 349,375.00

Conversion of Existing Two Eastbound Left Turn Lanes to a Left Turn Eastbound Lane and Shared Left/ Right Eastbound Lane - Bronte Road at the Hwy 407 Eastbound Off-Ramp Preliminary Construction Cost Estimate For Recommended Roadway/Intersection Improvements					
1. Civil Works					
Item No.	Description	Units	Quantity	Unit Price	Total
00001	Pavement markings and signage	LS	1	\$ 15,000.00	\$ 15,000.00
Subtotal (Civil Works)					\$ 15,000.00
Contingency @ 30%					\$ 4,500.00
Total (Civil Works) Excluding HST					\$ 19,500.00
Total (-25%)					\$ 14,625.00
Total (+25%)					\$ 24,375.00