303 Cundles Road East
Proposed Residential Development
Traffic Impact Study & Parking Study

City of Barrie

Prepared For: Penady (North Barrie) Limited

July 2022

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1.0 EXECUTIVE SUMMARY

BA Group was retained by Penady (North Barrie) Limited to provide transportation consulting services related to a proposed residential development on a site municipally known as 303 Cundles Road East, in the City of Barrie. This Traffic Impact Study (TIS) has been prepared as part of the **Zoning By-law Amendment (ZBA) application** being submitted to the City. The site is currently undeveloped and is bounded by a retail development to the east (North Barrie Crossing), Cundles Road East to the north, two residential buildings to the west and Highway 400 to the south. This Traffic Impact Study (TIS) has been completed in accordance with the Terms of Reference that was reviewed and approved by the City of Barrie, as well as comments received by the Ministry of Transportation Ontario (MTO).

The development proposal includes the construction of three residential buildings with a combined total of 505 units. Parking is to be provided in below-grade facilities with additional surface parking. Two driveway accesses to the site are proposed along the existing shared North Barrie Crossing driveway that connects to Cundles Road East at Pacific Avenue. The proposal does not include any points of direct access to Cundles Road East. It is estimated that the three residential buildings will be completed by the end of 2025. The location of the site provides convenient travel for vehicles along Cundles Road East, with nearby access to Highway 400. The site is well-served by several local transit routes operated by Barrie Transit (with connections to the GO Transit Allandale Waterfront Station) in proximity to the site. The nearest transit stop to the site is approximately 200 metres away. For active transportation, there are dedicated cycling lanes and sidewalks along Cundles Road East, adjacent to the site.

Vehicle Parking

The City of Barre's Zoning By-law 2009-141 (Section 13.2.72) for the site states that a parking standard of 1.1 spaces per residential unit shall be permitted. Application of this site specific Zoning By-law to the site results in a minimum requirement of 556 parking spaces.

The proposed parking supply for the site includes a total of 632 parking spaces, inclusive of resident and visitor parking spaces. The total proposed parking supply ratio for the site of 1.25 spaces/unit, is expected to meet the demands based on the following:

- Parking demand studies at 3 apartment properties in Barrie indicate a potential parking demand of 0.86 spaces/unit (resident + resident visitor parking). This combined parking demand is well below the proposed parking rate of 1.25 spaces/unit.
- Transportation Demand Management strategies (e.g. transit passes, bike parking, traveller information, walkway connections, unbundled parking from rental/purchase).
- Transportation context (nearby transit service and active transportation facilities).
- Existing area travel characteristics (30% of travel during the peak periods is by non-auto driver mode).
- The site is adjacent to a large retail/commercial area within walking distance.

Transportation Demand Management Framework

The Transportation Demand Management (TDM) framework strives to reduce automobile use as a part of the design and construction of the development by supporting sustainable modes of travel. Proposed TDM strategies under consideration include walkways from the site to the existing sidewalk on Cundles Road East, bicycle parking and a bicycle repair station, travel information screens in each lobby, unbundled parking, and transit passes & travel information packages for new residents.

Travel Demand Forecasts

In May 2012, BA Group completed a Traffic Impact Study (TIS) for a development proposal on the same lands that included 200 residential units and 5,581 m^2 GFA of retail/commercial. Although the proposal was subsequently approved by the City, the development did not proceed. The current proposal is expected to generate in the order of **180 and 220 two-way vehicle trips**, during the weekday morning and afternoon peak hours, respectively. A comparison of the new vehicle trips expected to be generated by the 2012 proposal vs. the current 2022 proposal shows that the current proposal results in **50 and 75 fewer two-way vehicle trips**, during the morning and afternoon peak period, respectively, than the 2012 development proposal.

Traffic Operations Analysis

A detailed traffic analysis was completed at the intersection of Cundles Road East & Pacific Avenue/Site driveway and at Cundles Road East & Lions Gate Boulevard, during the weekday morning and afternoon peak hours for the following analysis scenarios: 2021 Existing Traffic Conditions, 2027 Future Background Traffic Conditions, 2027 Future Total Traffic Conditions, 2032 Future Background Traffic Conditions and 2032 Future Total Traffic Conditions.

Cundles Road East & Lions Gate Boulevard

Under future total conditions for the 5-year horizon (2027), with the site development, the intersection continues to operate under capacity at overall v/c ratios of 0.39 and 0.72 or better, during the weekday morning and afternoon peak hours, respectively. Under future total conditions for the 10-year horizon (2032), with the site development, the intersection continues to operate under capacity at overall v/c ratios of 0.40 and 0.73 or better, during the weekday morning and afternoon peak hours, respectively. No mitigation measures or improvements are recommended at the intersection.

Cundles Road East & Pacific Avenue/Site Driveway

All movements operate at acceptable levels-of-service (LOS) at LOS D or better in both peak hours, with the exception of the northbound left-turning movement during the weekday afternoon peak hour. Westbound trips from the proposed development are assumed to make the required northbound left-turn at Lions Gate Boulevard / Cundles Road East, since vehicles making the northbound left-turn at Pacific Avenue / Cundles Road East already experience delays under future background conditions, due to background traffic increases. No mitigation measures or improvements are recommended at the intersection.

Highway 400 Southbound Off-Ramp at Cundles Road East

Based on meetings and correspondence from MTO regarding the scope of work for the Traffic Impact Study, it was confirmed that a detailed traffic analysis would not be required at the intersection of the Highway 400 southbound ramp at Cundles Road East. As per MTO's request regarding additional travel demand, it was confirmed that the development is expected to result in an additional 105 and 130 vehicles travelling through the intersection, during the weekday morning and afternoon peak hours, respectively

The traffic expected to be generated by the development proposal can be accommodated on the future road network. No road improvements are recommended to accommodate the development proposal.

2.0 INTRODUCTION

BA Group has been retained by Penady (North Barrie) Limited to provide transportation consulting services related to a proposed residential development with 505 units, on a site municipally known as 303 Cundles Road East, in the City of Barrie. The site is currently undeveloped and is bounded by a retail development to the east (North Barrie Crossing), Cundles Road East to the north, two residential buildings to the west and Highway 400 to the south. The site location is illustrated in **Figure 1.**

This Traffic Impact Study (TIS) was prepared as part of the **Zoning By-law Amendment (ZBA) application** being submitted to the City, and was completed in accordance with the terms of reference submitted to the City on March 22, 2022 (**Appendix A**).

As one of the intersections near the site (Highway 400 southbound ramp at Cundles Road East) is operated by the Ministry Transportation Ontario (MTO), the terms of reference was also reviewed by MTO. As per MTO's request, the vehicle volumes expected to be generated by the development, that would travel through the intersection of the Highway 400 southbound ramp at Cundles Road East, was also determined.

2.1 BACKGROUND AND EXISTING SITE CONTEXT

The site is currently undeveloped and is bounded by a retail development to the east (North Barrie Crossing), Cundles Road East to the north, two residential condominium buildings to the west and Highway 400 to the south. The municipal address for the site is 303 Cundles Road East but was formerly a part of the broader lands known as 299 Cundles Road East.

The City of Barre's Zoning By-law 2009-141 (Section 13.2.72), includes a site-specific special provision C4 (SP-383,520,530) for 299 Cundles Road East. This provision states that 196 residential units are permitted on the site with a maximum building height of 6 storeys.

A Traffic Impact Study (TIS) was completed by BA Group in 2012 for the wider North Barrie Crossing shopping centre lands, as part of the original approvals for the lands. At the time of that submission, the TIS considered a residential development for the site with 196 units, as per the Zoning By-Law. As the adjacent recently constructed Junction condominium project has utilized approximately 120 of the permitted 196 units, the 505 residential units now being proposed on the site exceeds what the current Zoning By-law permits by approximately 429 units.

2.2 PROPOSED DEVELOPMENT

The development proposal includes the construction of three residential buildings with a combined total of 505 units. Parking is to be provided in two separate below-grade facilities with additional surface parking. Two driveway accesses to the site are proposed along the existing shared North Barrie Crossing driveway that connects to Cundles Road East at Pacific Avenue. The proposal does not include any points of access to Cundles Road East.

It is estimated that the residential buildings will be completed by the end of 2025.

The proposed development is summarized in **Table 1** and illustrated in **Figure 2**. A reduced scale drawing of the site plan is provided in **Appendix B**.

TABLE 1 DEVELOPMENT PROPOSAL

Use		Proposed Statistics	
	**3 Residential Buildings**	1-bedroom	195
		1-bedroom + den	29
		2-bedroom	195
		2-bedroom + den	55
		2-storey units	31
		Total	**505 units**
	**Vehicle Parking spaces**	Resident	555 spaces
		Visitor	77 spaces
		Total	**632 spaces**
	**Loading Facilities**	One (1) consolidated outdoor waste collection area, generally located within the southwest corner of the site. A lay-by is to be provided in front of each building, close to the main lobby, to service deliveries, moving vans and pick-up/drop-off activities.	
	**Site Access**	Two driveway accesses to the site are proposed along the shared existing North Barrie Crossing driveway that connects to Cundles Road East at Pacific Avenue. The proposal does not include any points of access along a public road.	

Notes:
1. Site statistics based on site plans received by SRN Architects Ltd. dated June 22, 2022.

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FIGURE 1 SITE LOCATION

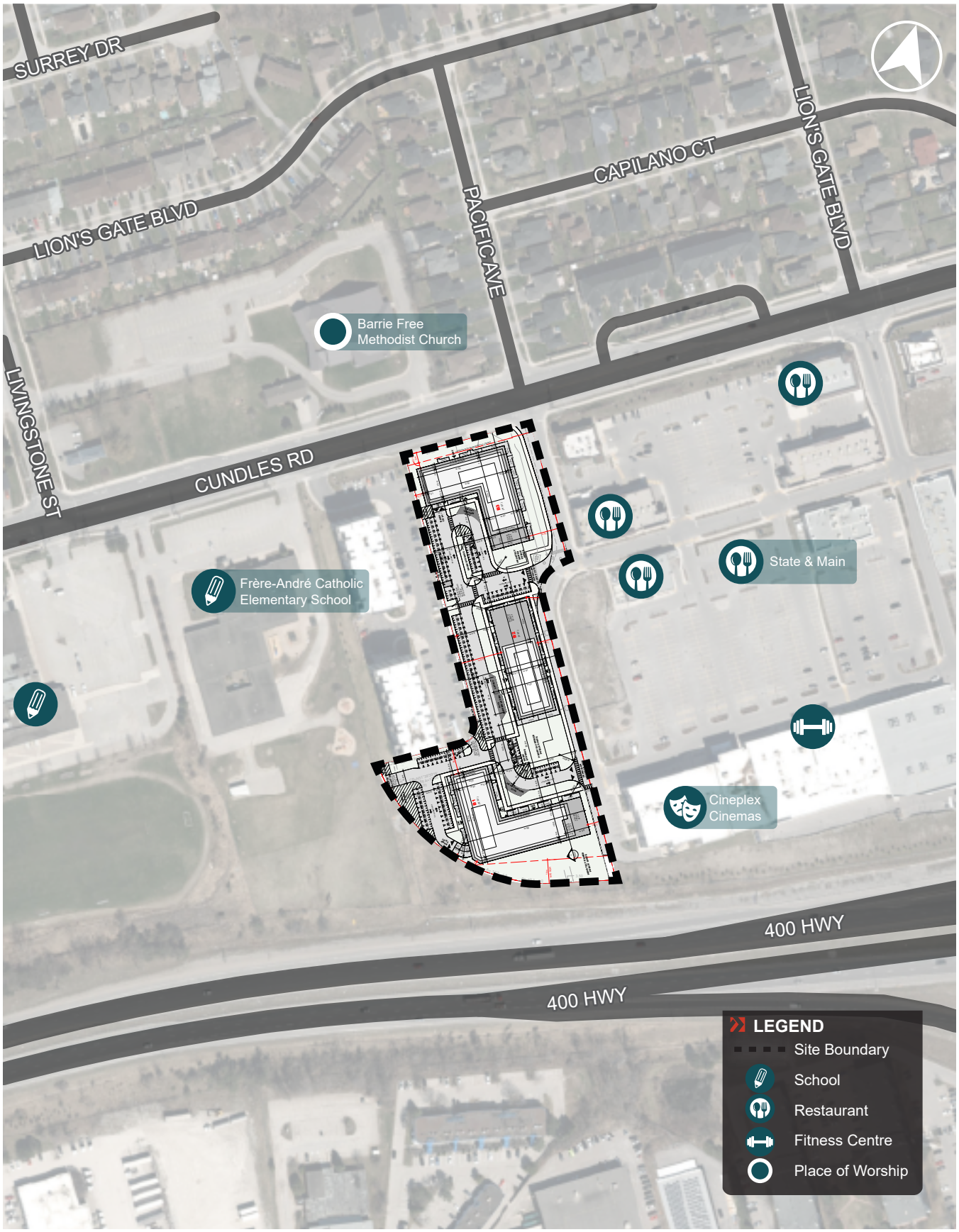

FIGURE 2 PROPOSED DEVELOPMENT

2.3 STUDY SCOPE

Development Proposal

- A summary of the development proposal.
- An overview of the site and the area-wide transportation system that provides for automobiles but encourages a shift towards non-automobile travel for prospective residents and visitors while still being able to meet the practical and operational needs of the proposed development plan.
- A review of the transportation elements of the proposed development plan that includes vehicle access and circulation, loading and parking facilities.

Transportation Context

- A description of the existing transportation context with consideration for the area road network, transit system and active transportation facilities.
- A description of future transportation changes and/or improvements to the area context such as planned road upgrades, transit and active transportation improvements.

Transportation Demand Management Framework

- An overview of potential Transportation Demand Management (TDM) measures and initiatives that are being considered to encourage prospective employees and visitors to use more active and sustainable modes of transportation.

Site Plan

- A review of the adequacy of the vehicle parking supply.
- A review of the adequacy of the loading space provisions.
- A review of the functionality and appropriateness of the access points and vehicle circulation incorporated into the site plan including loading/garbage collection facility arrangements.

Traffic Operations Review

- An assessment of the existing traffic patterns and traffic volumes in the study area during the key weekday morning and afternoon peak hours.
- A comprehensive review of traffic-related changes that may occur in the area with consideration for corridor growth and construction of other area development projects.
- A review of traffic operations at intersections in the area under existing and future conditions, including an assessment of the operational impacts of the proposed development.

Site Access Review

- A review of the proposed accesses at the intersections with the existing private driveway that connects to Cundles Road East.
- Confirmation of the proposed traffic control and lane configuration at the site access points.

- Consideration of the need for road improvements on Cundles Road East at the existing private driveway.

The findings of this review are summarized in the following sections.

3.0 TRANSPORTATION CONTEXT

3.1 AREA ROAD NETWORK

3.1.1 Existing Road Network

The existing road network of arterial roads, collector roads and local roads considered in the study area are described in **Table 2** and illustrated in **Figure 3.** The existing lane configuration and traffic control are shown in **Figure 4.**

TABLE 2 SUMMARY OF EXISTING AREA ROAD NETWORK

Road Cross Section	Parking and Regulations	Roadway Limits	Description
Highways			
Highway 400			
A 6-lane cross-section with 3 lanes in each direction and additional north and south off ramps.	N/A	The highway extends from Highway 69 in Carling in the north and Maple Leaf Drive in Toronto in the south.	Highway 400 runs generally in north-south direction, and provides connections to Highways 401, 11, 12, 124, 69 and the 407 ETR. The site study area includes the southbound off ramp connecting to Cundles Road East.
Arterial Roads			
Cundles Road East			
A 4-lane cross-section with 2 lanes in each direction and center left-turning lanes at key intersections. In the vicinity of the site dedicated bike-lanes are provided.	Parking is prohibited on Cundles Road East in the vicinity of the site.	Roadway extends from J.C. Massie Way in the east and Bayfield Street in the west where it continues as Cundles Road West.	Cundles runs generally in an east-west direction and operates with a speed limit of 50 km/h.
St Vincent Street			
A 4-lane cross-section with 2 lanes in each direction and center left-turning lanes at key intersections.	Parking is prohibited on St Vincent Street in the vicinity of the site.	Roadway extends from Wattie Road (in Midhurst) in the north and Blake Street in the south.	St Vincent Street runs in an north-south direction and operates with a speed limit of 50 km/h.
Major Collector Roads			
Livingstone Street East			
A 4-lane cross-section with 2 lanes in each direction and center left-turning lanes at key intersections.	Parking is prohibited on Livingstone Street East in the vicinity of the site.	Roadway extends from Cundles Road East in the east and Bayfield Street in the west where it continues as Livingstone Street West as an arterial road.	Livingstone Street East runs generally in an east-west direction and operates with a speed limit of 50 km/h.
Local Roads			
Pacific Avenue			
A 2-lane cross-section with 1 lane in each direction.	Parking is permitted on Pacific Avenue in the vicinity of the site.	Roadway extends from Lions Gate Boulevard in the north and Cundles Road East in the south.	Pacific Avenue runs in a north-direction and operates with a speed limit of 50 km/h.

Lions Gate Boulevard			
A 2-lane cross-section with 1 lane in each direction.	Parking is permitted on Lions Gate Boulevard in the vicinity of the site.	Roadway extends from Livingstone Street East in the west and Cundles Road East in the east.	Lions Gate Boulevard runs generally in an east-west direction and operates with a speed limit of 50 km/h.
Capilano Court			
A 2-lane cross-section with 1 lane in each direction.	Parking is permitted on Capilano Court in the vicinity of the site.	Roadway extends from Pacific Avenue in the west and ends as a cul-de-sac in the east.	Capilano Court runs in an east-west direction and operates with a speed limit of 50 km/h.

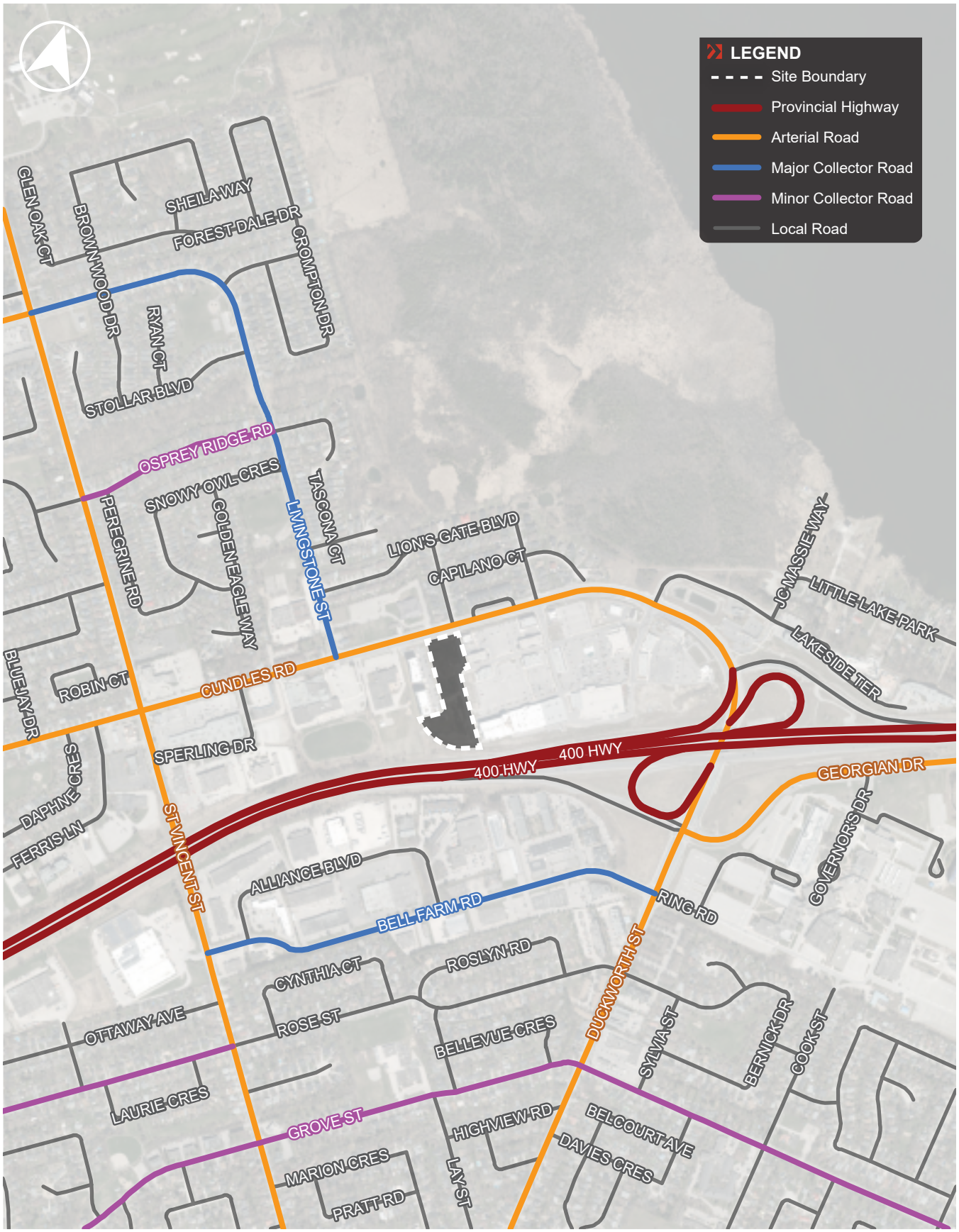

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FIGURE 3 AREA ROAD NETWORK

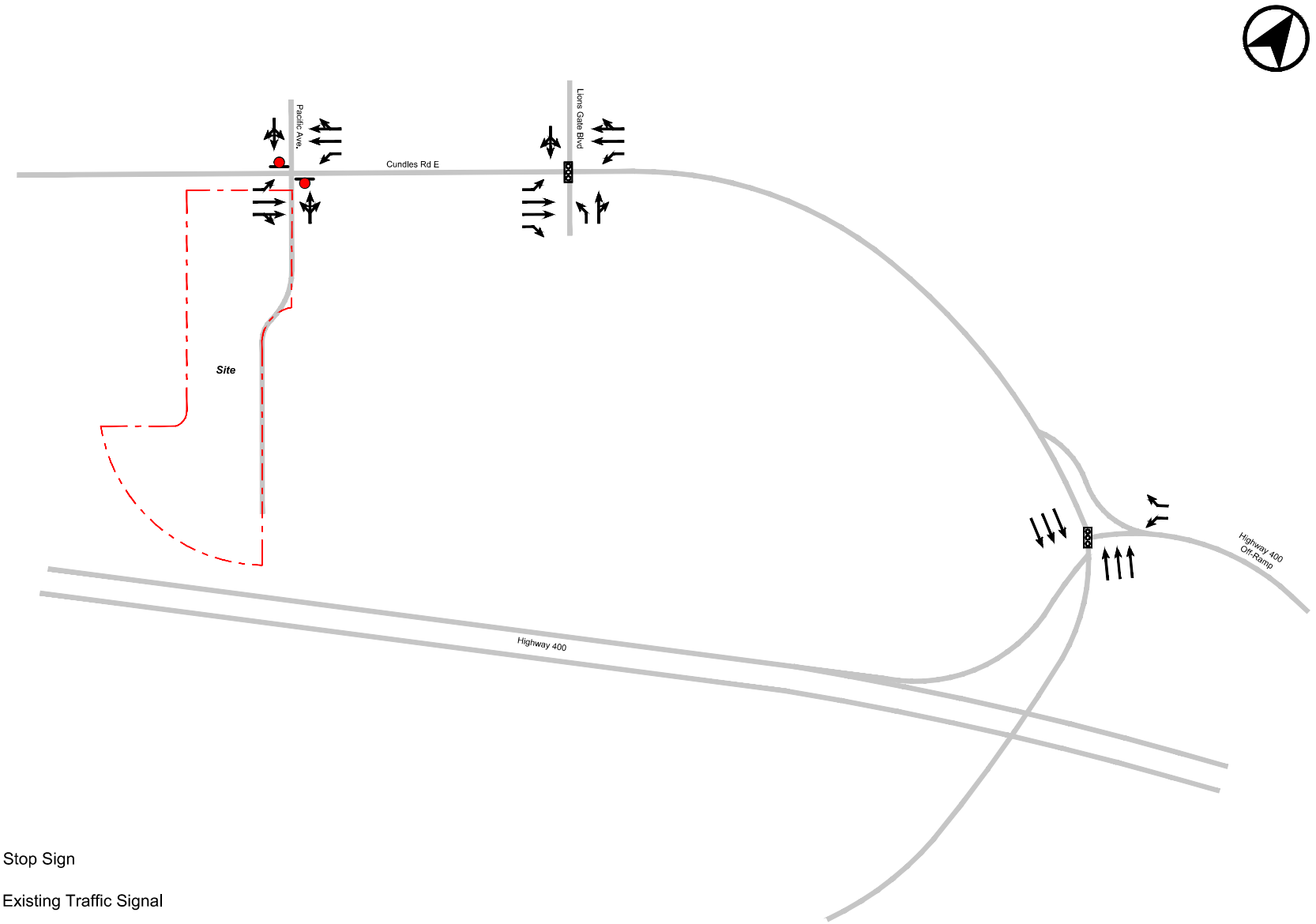

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FIGURE 4 EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

3.1.2 Future Road Network

Duckworth Street

In 2014, the City of Barrie completed a Class Environmental Assessment Study to evaluate alternatives for implementing bike lanes as part of improvements to active transportation on Duckworth Street. The results of the EA were carried through into this detailed design project, which also includes replacement of aging underground infrastructure and other infrastructure improvements. The two-phase project will reconstruct Duckworth Street from Bell Farm Road to St. Vincent Street. The project includes new watermain, sewer replacements, and right-of-way improvements including new sidewalks, new pavement, intersection upgrades and a road widening for bicycle lanes. Phase 1 (Melrose Ave. to St. Vincent St.) of construction has been completed and Phase 2 (Bell Farm Rd to St. Vincent St.) construction is planned for 2023.

Bell Farm Road

In 2017, an environmental assessment was completed and recommended the reconstruction and widening of Bell Farm Road from St. Vincent Street to Duckworth Street, for additional vehicle capacity, as well as pedestrian facilities including sidewalks and bike lanes. The two-year construction project is underway and construction is anticipated to be completed by October 2022.

3.2 AREA TRANSIT NETWORK

3.2.1 Existing Transit Network

The site is well-served by several transit routes operated by Barrie Transit (with connections to the GO Transit Allandale Waterfront Station) in proximity to the site. The site is located:

- approximately 200 meters from the Cundles Road East and Livingstone Street East bus stops (routes 6A and 6B);
- approximately 800 meters from the Cundles Road East and St. Vincent Street bus stops (routes 100 Red/Blue Express, 8A and 8B); and
- approximately 5.8 km from Allandale Waterfront GO Station (Barrie Line - Routes 68, 68B and 68D)

Inter-regional transit is provided by GO Transit with the operation of 3 bus routes in Barrie. There are 2 GO transit stations; Allandale Waterfront GO and Barrie South GO Stations, both provide access to the Barrie Line train which extends southward to Union Station. The closest GO station to the site is the Allandale Waterfront GO Station located at the intersection of Essa Road and Tiffin Street which is approximately 5.8 km away.

The existing transit service in the area is described in detail in **Table 3.** An overview the existing area transit network is illustrated in **Figure 5**.

TABLE 3 EXISTING AREA TRANSIT NETWORK

Route	Peak Period Headways AM (PM)	Closest Stop	Description
Barrie Local Bus Service			
6A Letita & 6B College	30 minutes (30 minutes)	Cundles Rd E / Livingstone St E (200m)	The 6A Leita (northbound) and 6B College (southbound) bus route operates in a loop between the Downtown Terminal, Livingstone St / Anne St and Georgian College, in the northwest region of Barrie. The 6A and 6B routes operate all day with varying weekday, Saturday, and Sunday schedules.
100 Red / Blue Express	22 minutes (23 minutes)	Cundles Rd E / St. Vincent St (800m)	The 100 Red (clockwise) and 100 Blue (counter-clockwise) Express operates in a loop between the Downtown Terminal, Georgian Mall, and Georgian College, in the northwest region of Barrie. Four services are operated, the 100A Red and 100B Blue express which runs along Grove St E and Penetang Street which operates all day every day, and the 100C Red and 100D Blue which runs along Blake Street and only operates on weekdays.
8A RVH / Yonge	30 minutes (30 minutes)	Cundles Rd E / St. Vincent St (800m)	The 8A RVH (northbound) bus route operates between Park Place to Georgian College, with connections to Holly Rec Centre, Allandale GO Station and the Downtown Terminal. The 8A Yonge (southbound) bus route operates Georgian College and Park Place with connections to Livingstone & Bayfield, the Downtown Terminal., Allandale GO Station and Barrie South GO Station. The 8A northbound and southbound routes operate all day with varying weekday, Saturday, and Sunday schedules.
8B Crosstown / Essa	30 minutes (30 minutes)	Cundles Rd E / St. Vincent St (800m)	The 8B Crosstown (northbound) bus route operates between Park Place to Georgian College, with connections to Barrie South GO Station, Allandale GO Station, the Downtown Terminal and Livingstone & Bayfield. The 8B Essa (southbound) bus route operates between Georgian College and Park Place, with connections to the Downtown Terminal, Allandale GO Station, and Holly Rec. Center. The 8B northbound and southbound routes operate all day with varying weekday, Saturday, and Sunday schedules.
GO Stations (Inter-regional transit)			
Allandale Waterfront GO Station	-	Essa Rd / Tiffin St (5.8 km)	Allandale Waterfront GO Station provides inter-regional transit with 3 bus routes: 68 Aurora GO, 68B East Gwillimbury GO, 68D Union Station, and the Barrie (BR) GO train. The Barrie GO train route operates between Allandale Waterfront GO Station and Union Station. Two services are operated, a weekday service and a reduced weekend service.

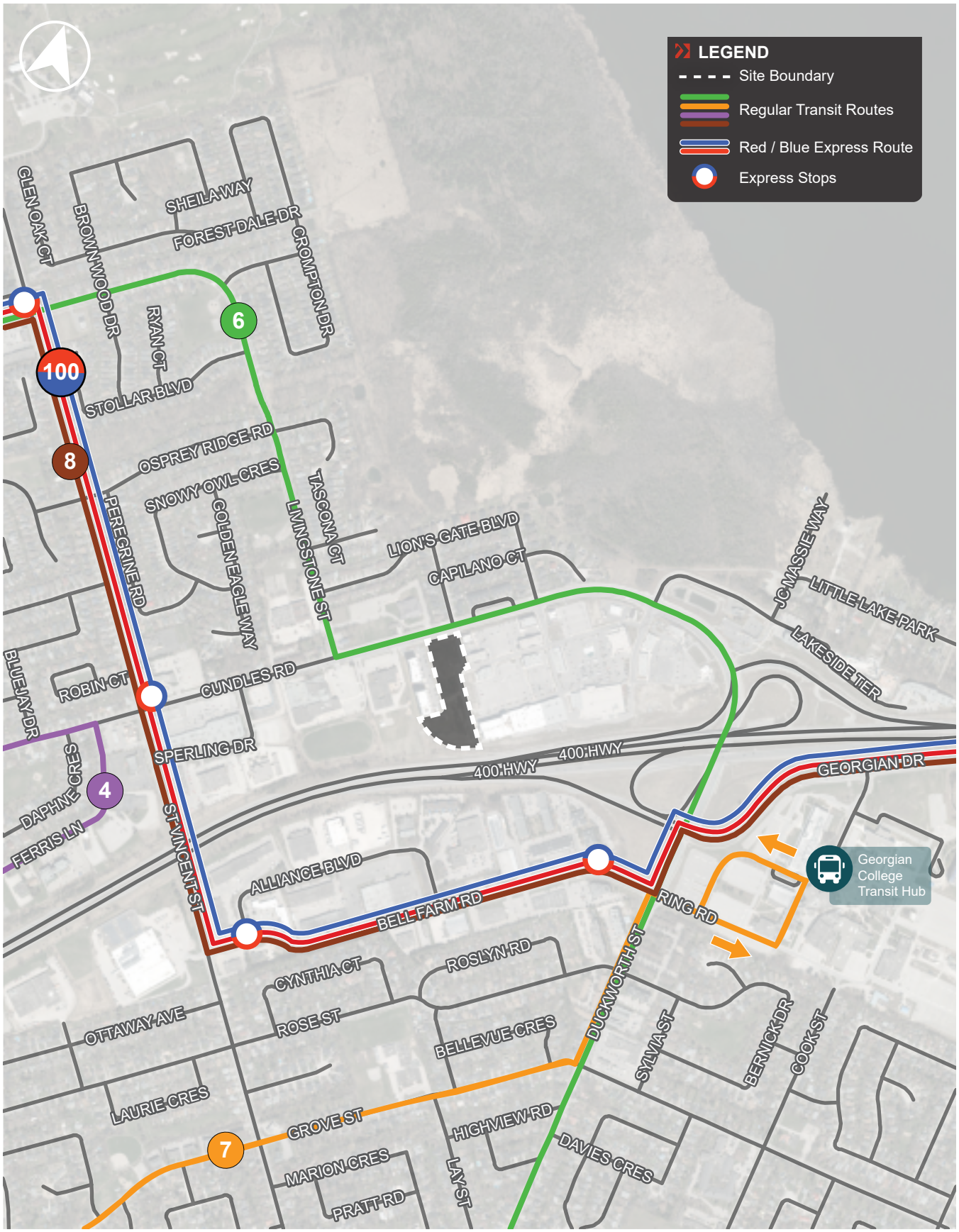

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FIGURE 5 EXISTING AREA TRANSIT NETWORK

3.3 AREA CYCLING NETWORK

3.3.1 Existing Cycling Network

The existing cycling infrastructure in the area of the site is relatively limited at this time. On-street bike lanes currently exist on Cundles Road East, between Livingstone Street East and J.C. Massie Way, and they continue as buffered bike lanes from J.C. Massie Way, along Duckworth Street to Bell Farm Road. There are existing in-boulevard pathways, southeast of the site, along Georgian Drive from Duckworth Street to Johnson Street. However, these bike lanes and in-boulevard pathways are not connected to other cycling infrastructure within the City.

The existing area cycling facilities are illustrated in **Figure 6**.

3.3.2 Future Cycling Network

In June 2019, the City of Barrie released their Transportation Master Plan to serve as the City's roadmap in developing a well-balanced transportation network to serve future needs and development. Within this report, an Active Transportation Strategy outlined the strategic and infrastructure recommendations for walking, cycling and other active transportation for the City.

Within the vicinity of the site, several cycling infrastructure upgrades were included within the TMP report. Bike lanes are proposed along Livingstone Street East from Cundles Road East to St. Vincent Street, and south of the site along Bell Farm Road between St. Vincent Street and Duckworth Street. In-boulevard pathways are proposed along Cundles Road East and Cundles Road West between Anne Street North and Livingstone Street East to provide connectivity between the existing cycling infrastructure on Cundles Road. Along St. Vincent Street from Hammer Street East and Blank Street, a combination of bike lane and buffered bike lanes are proposed. With the addition of the aforementioned cycling infrastructure, the site will be better connected other cycling infrastructure within the City.

Future changes to the area cycling facilities are illustrated in **Figure 7**.

3.4 AREA PEDESTRIAN NETWORK

3.4.1 Existing Pedestrian Network

Pedestrian facilities are provided by means of sidewalks on at least one or both sides of all streets throughout the study area. In the vicinity of the site, along Cundles Road East and Livingstone Street East sidewalks are provided on both sides of the road; Pacific Avenue, Lions Gate Boulevard and Capilano Court provide sidewalks on one-side. Pedestrian signal heads and crosswalks are provided at all the signalized intersections in the study area. The nearest protected pedestrian crossings are provided at the intersection of Cundles Road East and Livingstone Street East (approximately 230 meters west of site), and the intersection Cundles Road East and Lions Gate Boulevard (approximately 230 meters east of site).

The existing area pedestrian facilities are illustrated in **Figure 6**.

3.4.2 Future Pedestrian Network

Within the vicinity of the site, several pedestrian infrastructure upgrades were included within the City of Barrie 2019 Transportation Master Plan report. Additional sidewalks proposed to be added along Lions Gate Boulevard and Duckworth Street. In-boulevard pathways are proposed on the north side of Cundles Road East between Bayfield Street West and Livingstone Street East.

Adjacent to the site, the project development proposal includes a pedestrian walkway along the private drive which will connect to the existing sidewalk on Cundles Road East.

Future changes to the area pedestrian facilities are illustrated in **Figure 7**.

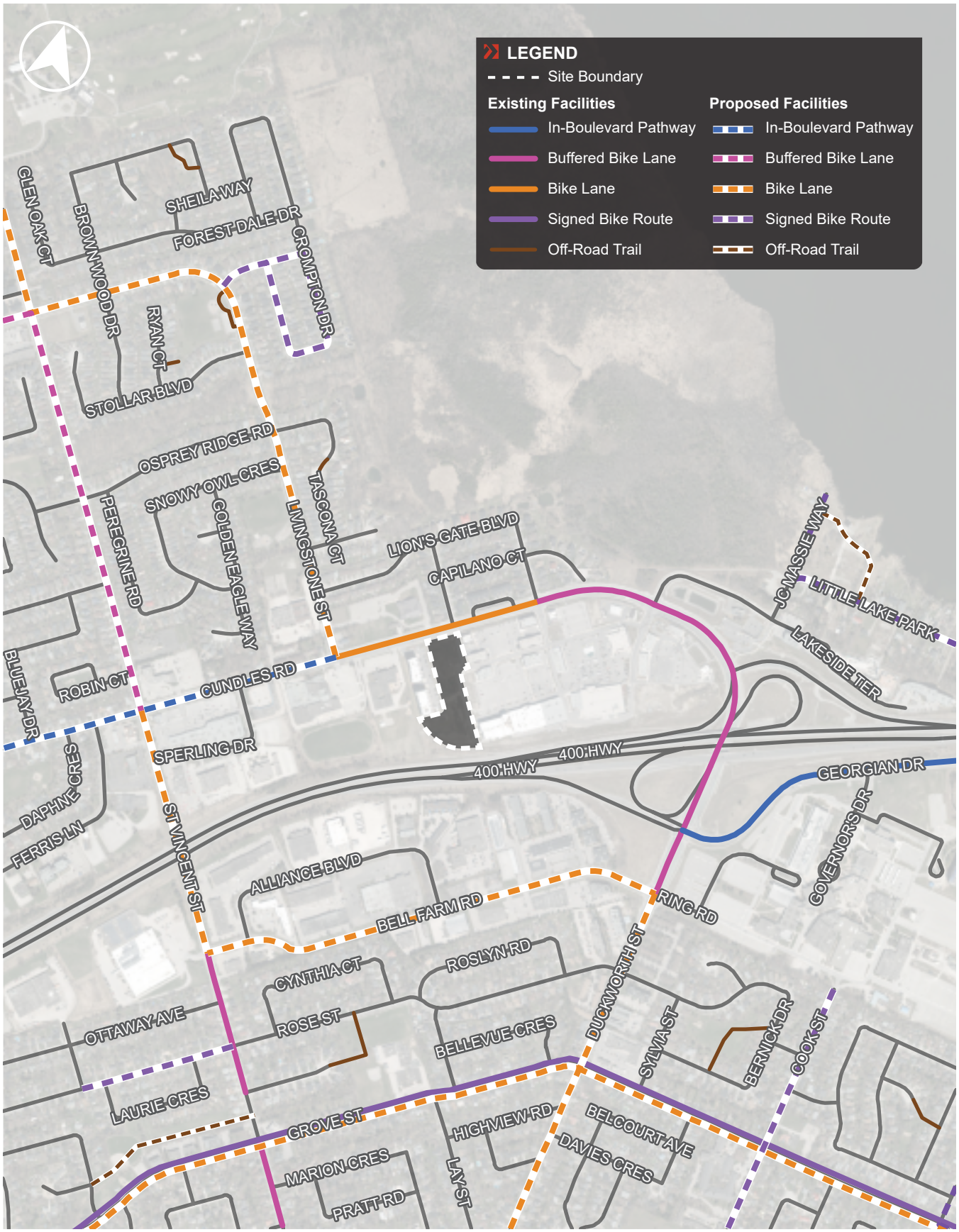

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FIGURE 6 EXISTING AND FUTURE AREA CYCLING NETWORK

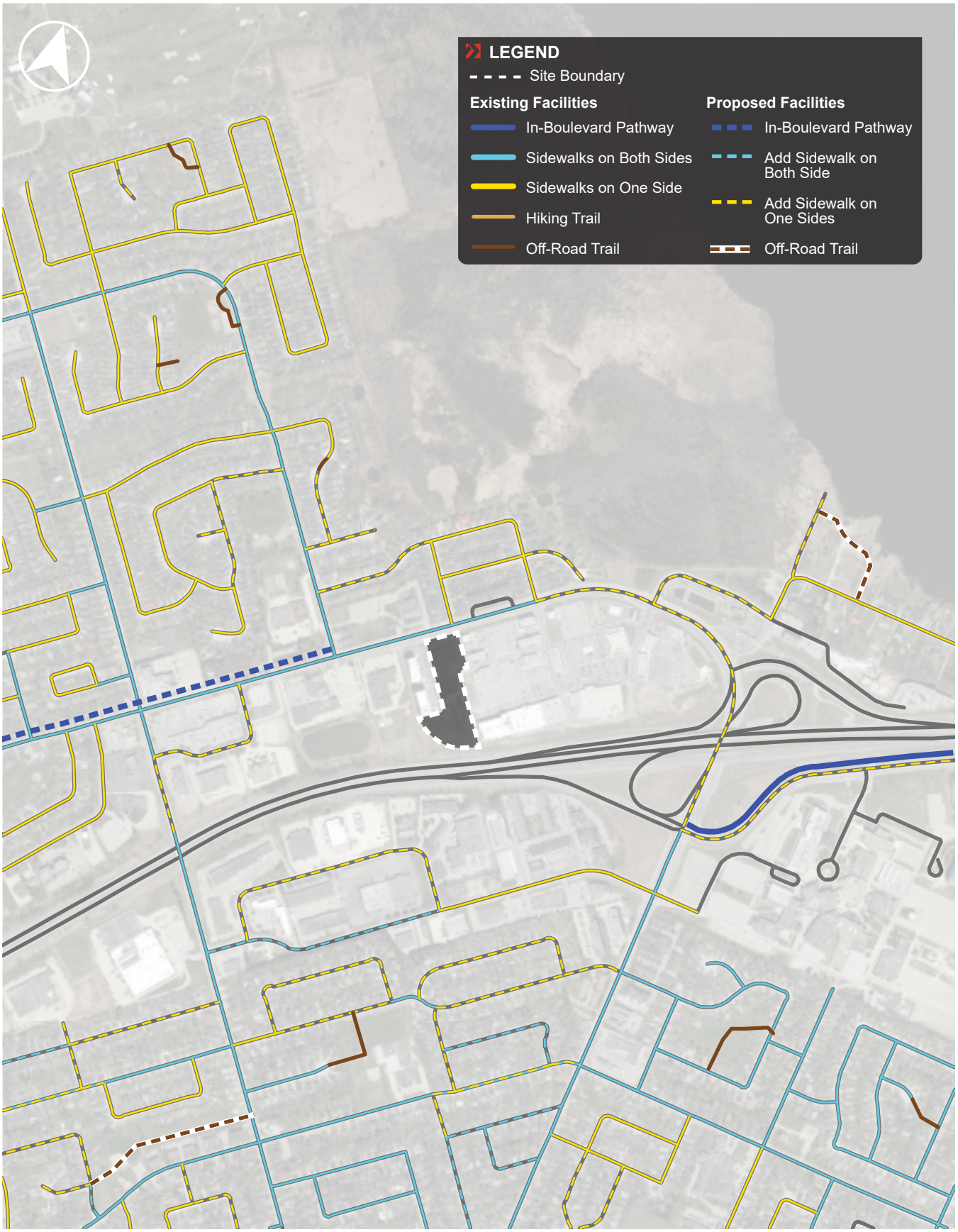

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FIGURE 7 EXISTING AND FUTURE AREA PEDESTRIAN NETWORK

4.0 VEHICLE PARKING CONSIDERATIONS

4.1 CITY OF BARRIE ZONING BY-LAW

The City of Barre's Zoning By-law 2009-141 (Section 13.2.72) includes a site-specific special provision C4 (SP 383) (SP-520) for 299 Cundles Road East (now 303 Cundles Road East for the site). This provision states that a parking standard of 1.1 spaces per residential unit shall be permitted.

The City's Zoning By-law typically requires a minimum of 1.5 spaces/unit for residential apartments. However, a reduced parking ratio was granted that permits a minimum ratio of 1.1 spaces/unit, in accordance with Zoning By-law 2015-115 and reaffirmed by By-law 2016-070 for the site.

As shown in **Table 4**, application of the site specific Zoning By-law to the site results in a requirement of a minimum of 556 parking spaces. As the Zoning By-law does not include a separate requirement for resident visitor parking, it is assumed that the rate of 1.1 spaces per unit is inclusive of resident spaces, as well as resident visitor parking spaces.

TABLE 4 CITY OF BARRIE ZONING BY-LAW - PARKING REQUIREMENTS (SP- 383) (SP-520)

Land Use	Number of Units	Site Specific Zoning By-law Parking Rate[2]	Minimum Parking Requirement (number of spaces)
Residential Buildings	505	1.1 spaces/ unit	**556**

Notes:
1. Site statistics based on site plans by SRN Architects received June 22, 2022.
2. Based on Site Specific Zoning By-law SP-383 and SP-520 in Section 13.2.72 of Zoning By-law 2009-141 and includes resident + resident visitor parking.

4.2 PROPOSED PARKING SUPPLY

4.2.1 Summary of Proposed Parking Supply

The proposed parking supply for the site is summarized in **Table 5** and includes a total of 632 parking spaces, inclusive of resident and visitor parking spaces. The total parking supply ratio for the site is 1.25 spaces/unit, which exceeds the site specific Zoning By-law minimum requirement of 1.1 spaces/unit. The proposed parking supply exceeds the minimum requirements of the site specific Zoning By-law and will meet the parking demands of the site, based on the area transportation context that includes excellent access to transit, active transportation facilities and an adjacent retail/commercial area within walking distance.

TABLE 5 PROPOSED PARKING SUPPLY

Land Use	Number of Units	Proposed Parking Rate	Proposed Parking Supply (number of spaces)
Residential Buildings	505	1.25 spaces/unit	**632**

Notes:
1. Site statistics based on site plans by SRN Architects received June 22, 2022.

4.3 ADEQUACY OF PROPOSED PARKING SUPPLY

The investments being made in sustainable travel alternatives such as transit and active transportation are continuing to make a difference in travel mode and mobility choice. The policies, programs and services implemented by the City in recent years continue to play a key part in the changing parking landscape in transit accessible areas.

The following provides an overview of the factors that influence parking demand at residential buildings in the site area and the adequacy of the proposed parking supply (1.25 spaces per unit).

4.3.1 Ontario's Five-Year Climate Change Action Plan

Ontario's Five-Year Climate Change Action Plan was announced in June 2016. Some of the key transportation / land-use planning actions outlined in the Plan are as follows:

- **Support cycling and walking**: Commuter cycling networks will be established across Ontario, targeting routes with high-commuting volume such as between residential communities, major transit stations and employment areas. There will be more cycling facilities in urban areas, including grade separated routes and cycling signals. There will be more bike parking at transit stations and provincially owned, publicly accessible facilities. Ontario will revise provincial road and highway standards to require commuter cycling infrastructure be considered for all road and highway construction projects where it is safe and feasible. Ontario will do the same for major transit corridors.

- **Reduce single-passenger vehicle trips**: Ontario would provide grants to municipalities and large private employers to implement Transportation Demand Management Plans. The plans will be designed to help increase walking, cycling, carpooling, telecommuting, and flex-work schedules, thereby reducing overall fossil fuel consumption, traffic congestion, and transportation emissions.

- **Eliminate minimum parking requirements**: Minimum parking requirements would be eliminated over the next five years for municipal zoning bylaws, especially in transit corridors and other high density, highly walkable communities. Minimum parking requirements are a barrier to creating complete, compact and mixed-use communities. Instead, bylaws will encourage bike lanes, larger sidewalks, and enhanced tree canopies.

As of the submission date of this report, the website for the Action Plan has the following disclaimer at the top of the page: "*This page was published under a previous government and is available for archival and research purposes*."

The idea to eliminate minimum parking requirements in transit accessible areas is not new in North America. Residential developments proposing zero resident parking are being promoted, approved and developed across North America including Toronto, Edmonton, Calgary, Vancouver, Portland and Boston and in downtown core areas of London, Brampton, Guelph, and Ottawa.

Although zero parking has not been requested for the site, this shift away from providing excess residential parking highlights a changing perspective toward automobile ownership, travel and the cost of living.

4.3.2 Transportation Demand Management (TDM)

Providing additional parking, over and above the essential minimum needs of a building, encourages automobile ownership, which encourages single occupant automobile commuting / usage. In consideration of the broader overall transportation network, one of the most effective and direct ways to induce changes in travel behaviour and reduce automobile use, is to reduce the amount of vehicle parking provided, particularly in transit accessible areas of the City.

While the consideration and implementation of various TDM initiatives has been proposed as a part of the development plan, these are more effectively implemented in tandem with an appropriate vehicle parking supply. Providing a reduced amount of parking is a direct incentive for residents to use sustainable transportation.

4.3.3 Transportation Context

The location of the site will afford future residents a variety of travel options that could decrease the need to own a vehicle and park on-site.

The site is well-served by several transit routes operated by Barrie Transit (with connections to the GO Transit Allandale Waterfront Station) in proximity to the site. The site is located:

- approximately 200 meters from the Cundles Road East and Livingstone Street East bus stops (routes 6A and 6B);
- approximately 800 meters from the Cundles Road East and St. Vincent Street bus stops (routes 100 Red/Blue Express, 8A and 8B); and
- approximately 5.8 km from Allandale Waterfront GO Station (Barrie Line - Routes 68, 68B and 68D)

On-street bike lanes currently exist on Cundles Road East, between Livingstone Street East and J.C. Massie Way, and they continue as buffered bike lanes from J.C. Massie Way, along Duckworth Street to Bell Farm Road. There are existing in-boulevard pathways, southeast of the site, along Georgian Drive from Duckworth Street to Johnson Street.

Within the vicinity of the site, several cycling infrastructure upgrades were included within the City's 2019 Transportation Master Plan (TMP). Bike lanes are proposed along Livingstone Street East from Cundles Road East to St. Vincent Street, and south of the site along Bell Farm Road between St. Vincent Street and Duckworth Street. In-boulevard pathways are proposed along Cundles Road East and Cundles Road West between Anne Street North and Livingstone Street East to provide connectivity between the existing cycling infrastructure on Cundles Road. Along St. Vincent Street from Hammer Street East and Blank Street, a combination of bike lane and buffered bike lanes are proposed. With the addition of the aforementioned cycling infrastructure, the site will be better connected to other cycling infrastructure within the City.

Pedestrian facilities are provided by means of sidewalks on at least one or both sides of all streets throughout the study area. In the vicinity of the site, along Cundles Road East and Livingstone Street East sidewalks are provided on both sides of the road; Pacific Avenue, Lions Gate Boulevard and Capilano Court provide sidewalks on one-side.

Within the vicinity of the site, several pedestrian infrastructure upgrades were included within the City's 2019 Transportation Master Plan t. Additional sidewalks proposed to be added along Lions Gate Boulevard and Duckworth Street. In-boulevard pathways are proposed on the north side of Cundles Road East between Bayfield Street West and Livingstone Street East. Adjacent to the site, the project development proposal includes a pedestrian walkway along the private drive which will connect to the existing sidewalk on Cundles Road East. The site is also adjacent to a large commercial/retail area which will encourage walking trips.

4.3.4 Area Travel Characteristics

BA Group has undertaken a review of existing travel characteristics for the site using the information provided by the 2016 Transportation for Tomorrow Survey ("TTS"). **Table 6** summarizes the peak travel mode share for the morning and afternoon peak periods.

In the study area of the site, 83% and 81% of morning and afternoon peak period trips, respectively, are made by vehicle or by vehicle passenger while 10% and 16% of morning and afternoon peak period trips, respectively, are made by walking or cycling. The transit mode share is 7% for morning peak period trips and 4% for afternoon peak period trips.

The TTS Data is suggestive of a transportation environment where approximately 30% of residents travel during the peak periods of the day by non-auto driver mode of travel.

TABLE 6 AREA TRAVEL MODE SHARES

Travel Mode	Morning Peak Period	Afternoon Peak Period
Auto (driver)	68%	72%
Auto (passenger)	15%	9%
Transit[1]	7%	4%
Cycle	1%	1%
Walk	9%	15%
Total	**100%**	**100%**

Notes:
1. Data from TTS zones 8510, 8511 and 8512
2. The transit mode share is largely related to school bus trips. Transit trips (local and GO) account for approximately 1% of trips during the morning peak period (outbound) and less than 1% in the afternoon peak period (inbound).
3. Peak travel times assumed for resident related trips: 6:00 a.m. to 9:00 a.m., 3:00 p.m. to 6:00 p.m. Peak direction was used for both the AM and PM peak periods.

4.3.5 TDM and Parking Relationships

A TDM strategy has been developed for the site as outlined in **Section 7.0** of this report. One of the main goals of this strategy is to reduce automobile reliance while promoting and accommodating travel through sustainable modes. Key elements of this strategy include the consideration of the following:

- Walkways to be provided between the site and the existing sidewalk on Cundles Road East;
- Provision of transit passes to residents of the building;
- Provision of bicycle parking and a bicycle repair station

- Real-time information screens in the lobby of each building; and
- Unbundled parking from monthly rent/purchase.

Provision of these measures will encourage sustainable modes of travel and reduce the need for parking spaces.

4.3.6 Parking Proxy Studies

To confirm that the proposed parking supply (1.25 spaces/unit) for the site is appropriate, parking demand studies undertaken at three apartment properties in the City of Barrie were reviewed. The surveys were conducted at the following sites in Barrie:

- 37 Johnson Street
- 7 & 15 Vancouver Street
- 262 Rose Street

The surveys documented both resident and resident visitor parking at the three apartment properties.

As the proposed parking rate for the site is 1.25 spaces/unit, inclusive of both resident and resident visitor parking, *for the purpose of a comparison to the parking demand surveys*, it is assumed that the proposed resident rate is 1.1 spaces/unit and the resident visitor rate is 0.15 spaces/unit.

4.3.6.1 Resident Parking Demand Surveys

To determine appropriate resident parking supply, BA Group previously conducted a residential parking survey at the three apartment buildings on weekdays at 3:00 am and on a Saturday between 3:00 pm and 11:00 pm.

As shown in **Table 7**, the peak resident parking demand observed at the three proxy sites ranged from 0.74 to 0.81 spaces per unit, which is well under the proposed 1.1 resident spaces/unit.

TABLE 7 PROXY RESIDENT PARKING DEMANDS (CITY OF BARRIE)

Address	Number of Units	Survey Date	Time of Day	Peak Parking Demand (spaces)	Resident Parking Ratio (spaces/unit)
37 Johnson Street	188[1]	Wednesday June 10, 2015	3:00 am	139	0.74
		Thursday June 18, 2015		134	0.71
		Saturday July 11, 2015	3:00 pm – 11:00 pm	115	0.61
7 & 15 Vancouver Street	67	Tuesday June 2, 2015	3:00 am	53	0.79
		Wednesday June 10, 2015		49	0.73
		Thursday June 18, 2015		47	0.70
		Saturday July 11, 2015	3:00 pm – 11:00 pm	51	0.76
262 Rose Street	84	Tuesday June 2, 2015	3:00 am	59 [2]	0.70
		Wednesday June 10, 2015		55 [2]	0.65
		Thursday June 18, 2015		68 [2]	0.81
		Saturday July 11, 2015	3:00 pm – 11:00 pm	64 [2]	0.76

Notes:
1. Number of units at the time of the study.
2. Parking demands observed at 262 Rose Street include both resident and visitor parking areas. Visitor demands at 3:00 am were unusually high and assumed to include some resident demand.

4.3.6.2 Resident Visitor Parking Demand Surveys

To determine appropriate visitor parking supply, BA Group previously conducted a residential visitor parking survey at the three apartment buildings on a Saturday between 3:00 pm and 11:00 pm (times when visitor parking demands are typically highest).

As shown in **Table 8**, the peak visitor parking demand observed at the three proxy sites ranged from 0.03 to 0.05 spaces per unit, which is well under the proposed 0.15 resident visitor spaces/unit.

TABLE 8 PROXY RESIDENTIAL VISITOR PARKING DEMANDS (CITY OF BARRIE)

Address	Number of Units	Survey Day	Time of Day	Peak Parking Demand (spaces)	Visitor Parking Ratio (spaces/unit)
37 Johnson Street	188	Saturday July 11, 2015	3:00 pm – 11:00 pm	9	0.05
7 & 15 Vancouver Street	67	Saturday July 11, 2015	3:00 pm – 11:00 pm	3	0.03
262 Rose Street	84	Saturday July 11, 2015	3:00 pm – 11:00 pm	3	0.04

4.4 SUMMARY OF PROPOSED PARKING SUPPLY

The proposed parking supply for the site is summarized in **Table 9** and includes a total of 632 parking spaces, inclusive of resident and visitor parking spaces. The total parking supply ratio for the site is 1.25 spaces/unit, which exceeds the site specific Zoning By-law minimum requirement of 1.1 spaces/unit. The location of the proposed parking supply is summarized in **Table 10**.

TABLE 9 PROPOSED PARKING SUPPLY

Land Use	Number of Units	Proposed Parking Rate	Proposed Parking Supply (number of spaces)
Residential Buildings	505	1.25 spaces/unit	**632**

Notes:
1. Site statistics based on site plans by SRN Architects received June 22, 2022.

TABLE 10 LOCATION OF PROPOSED PARKING SUPPLY

Location of Parking	Proposed Parking Supply (number of spaces)
Building 1 & 2	
Surface Parking	75
Below-Grade (P1)	327
Sub-Total	**402**
Building 3	
Surface Parking	20
Below-Grade (P1)	100
Below-Grade (P2)	110
Sub-Total	**230**
SITE TOTAL	**632**

Notes:
1. Site statistics based on site plans by SRN Architects received June 22, 2022.

The proposed parking supply will meet the needs of the site, based on the following:

- If the peak demand of the three apartment proxy sites is combined (resident + resident visitor), the parking demand is 0.81 resident spaces/unit + 0.05 spaces/unit for a **total of 0.86 spaces/unit**, inclusive of resident and resident visitor parking. This combined parking demand rate is well under the proposed parking rate of 1.25 spaces/unit;

- Transportation Demand Management strategies (e.g. transit passes, bike parking, traveller information, walkway connections, unbundled parking from rental/purchase);
- Transportation context (nearby transit service and active transportation facilities);
- Existing area travel characteristics (30% of travel during the peak periods is by non-auto driver mode); and
- The site is adjacent to a large retail/commercial area within walking distance.

4.4.1 Accessible Parking

As per Section 4.6.4 of Zoning By-law 2009-141, if the proposed parking supply includes more than 100 spaces, the minimum number of accessible spaces required is 1 space + 3% of required number of parking spaces. As shown in **Table 11**, to determine the minimum number of accessible parking spaces required, as two separate below-grade parking structures are proposed, the accessible parking supply was calculated for each structure. Based on the total minimum required parking supply of 414 and 218 spaces for each of the below-grade parking facilities (1.25 spaces/unit), the total minimum number of accessible parking spaces required is 22 spaces.

In accordance with the Zoning By-law, where an even number of accessible parking spaces are required, an equal number of Type A and B accessible parking spaces shall be provided. The architectural drawings for the site include 11 Type A and 11 Type B accessible spaces for a total of 22 accessible spaces. The designated accessible parking spaces will be located in proximity to the primary entrances to the buildings and will have direct access to the entrances by a minimum 1.5 metres wide unobstructed access route.

The proposed accessible parking supply will meet the Zoning By-law requirements for the site.

TABLE 11 PROPOSED ACCESSIBLE PARKING SUPPLY

Below-Grade Parking Facility	Total Number of Parking Spaces Proposed (*based on 1.25 spaces/unit*)	Accessible Parking Requirement	Minimum Number of Accessible Spaces Required
Building 1 & 2			
Below-grade	327	1 space + 3% of required	**14**
Surface	75		
Sub-Total	**402**		
Building 3			
Below-grade	210	1 space + 3% of required	**8**
Surface	20		
Sub-Total	**230**		
SITE TOTAL	**632**	**--**	**22**

Notes:
1. Site statistics based on site plans by SRN Architects received June 22, 2022.

5.0 BICYCLE PARKING CONSIDERATIONS

5.1 PROPOSED BICYCLE PARKING SUPPLY

Although the City of Barrie Zoning By-law does not include a requirement for bicycle parking, in order to encourage sustainable transportation, bicycle parking on the site is being proposed.

Further details regarding the bicycle parking will be provided at a subsequent stage of the development planning process.

6.0 LOADING CONSIDERATIONS

The site is subject to the City of Barrie Zoning By-law for loading considerations. Section 4.7.1.2 of Zoning By-law 2009-141 states that any loading space shall have a minimum width of 3 metres, a minimum length of 9 metres with a minimum vertical clearance of 4 metres. There are no specific requirements in the Zoning By-law applicable to apartment buildings related to the number of loading spaces.

As the development proposal includes 505 residential units, it is proposed to include one (1) consolidated outdoor waste collection area, generally located within the southwest corner of the site. Waste storage rooms are to be provided within each building, with the intention that property management personnel would move the bins to the collection area on the day of waste pick-up. Additionally, a lay-by is to be provided in front of each building, close to the main lobby, to service deliveries, moving vans and pick-up/drop-off activities.

Vehicle manoeuvering drawings for the site are attached in **Appendix C**.

7.0 TRANSPORTATION DEMAND MANAGEMENT FRAMEWORK

7.1 TDM OBJECTIVES

The Transportation Demand Management (TDM) framework strives to reduce automobile use through an on-going strategy by supporting and promoting the use of non-auto transportation modes.

The key objective of the TDM framework is to reduce peak hour single occupant automobile traffic by focusing on four specific policy areas:

1. Encourage the use of alternate travel modes (transit, cycling, walking);
2. Increase vehicle occupancy;
3. Shift travel to off-peak periods; and
4. Reduce vehicle kilometres travelled.

The following sections summarize the TDM strategies under consideration which will be refined at the Site Plan Approval (SPA) stage of the project.

7.2 TDM STRATEGIES

Potential TDM strategies have been developed to further support the use of non-auto modes of travel. Potential TDM measures for the site are summarized in **Table 12.**

The physical infrastructure components or ‘hard’ TDM measures outlined in this plan (i.e. pedestrian connections and bicycle parking spaces) will be incorporated into the development design. The implementation of these elements and the associated costs will be the responsibility of the developer. After construction, a qualified engineer or planner will confirm the incorporation of these design elements within the development. The ‘soft’ measures of the TDM plan (i.e. travel mode choice information packages) will be implemented by the developer.

TABLE 12 POTENTIAL TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

Measure	Description	Responsibility	Implementation Strategy
Hard Measures			
Pedestrian Connections	Provide walkways through the site with a connection to the existing sidewalk at Cundles Road East (residents can access transit from this sidewalk).	Applicant	Construct as part of development.
Internal Pedestrian & Cyclist circulation	Consideration within the site design for walkways and cycle travel	Applicant	Construct as part of development.
Bicycle Parking	Details of on-site bicycle parking will be provided at a subsequent stage of the development planning process.	Applicant	Construct as part of development.
Bicycle Repair Station	Consideration for the provision of a bicycle repair station.	Applicant	Construct as part of development.
Real time information screens	Consideration for the inclusion of real time screens in the lobby of each building that provides travel information.	Applicant	Consideration as part of development.
Soft Measures			
Unbundled Parking	Parking to be separated “unbundled” from rental/purchase	Applicant	Offer units without a parking space or with a parking space at a separate cost
Travel Mode Information Packages & Communications/outreach	Implement programs to inform new residents of available travel mode choices and existing mobile apps providing transit information.	City (informational website)	Travel mode information packages could be distributed to residents with information also available on City’s website.
Transit Passes	Consideration for transit passes for new residents.	Applicant	Consideration for transit passes to be provided to new tenants. The amount on each card to be confirmed at Site Plan Approval (SPA) but would likely be a minimum of one card/unit with a minimum value of $100.

8.0 TRAFFIC DEMAND FORECASTING

8.1 EXISTING TRAFFIC VOLUMES

The most recent traffic count information is summarized in **Table 13**. Detailed traffic count data is attached in **Appendix D**.

It is noted that the 2021 traffic volumes were collected during the COVID-19 pandemic when travel patterns were not typical. For this reason, the 2021 traffic volumes were balanced to match 2019 (pre-COVID) traffic volumes. In addition, as the background corridor growth rates over a 10-year horizon are considered to be conservative, the traffic analysis is deemed to appropriately account for atypical traffic patterns during COVID-19.

TABLE 13 EXISTING TRAFFIC COUNT INFORMATION

Intersection	Date of Count	Source
Cundles Road East/ Pacific Avenue	Thursday, July 8th, 2021	Spectrum Traffic Inc.
Cundles Road East / Lions Gate Boulevard		

Existing turning movement volumes were rounded to the nearest 5 vehicles and reviewed to ensure a general consistency in the traffic volumes on links between intersections. Where necessary, minor volume adjustments were made to *conservatively* balance through traffic volumes between intersections to ensure consistency in the corridor.

Existing traffic volumes for the weekday morning and afternoon peak hours adopted for the analysis are illustrated in **Figure 8**.

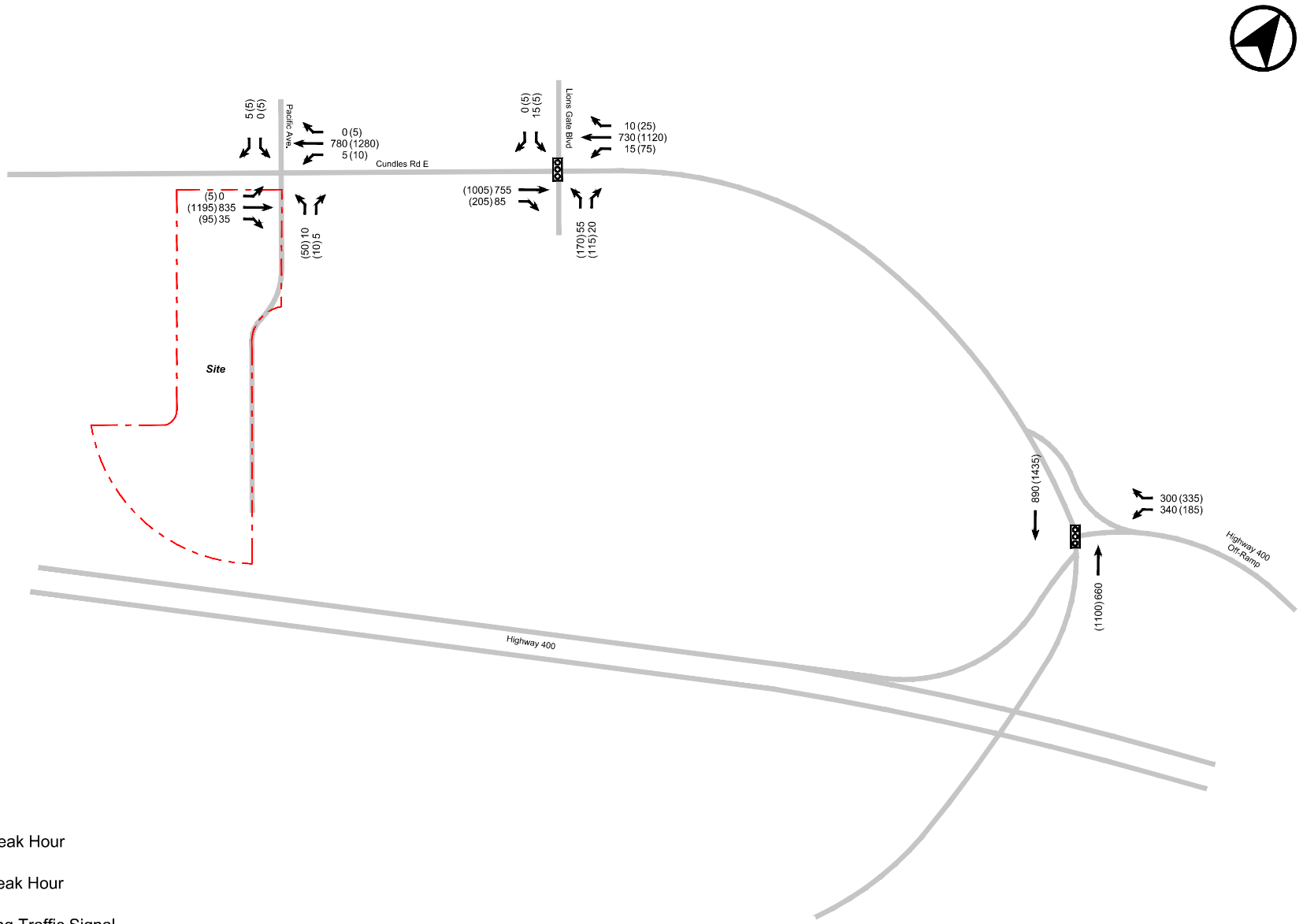

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FIGURE 8 EXISTING TRAFFIC VOLUMES

8.2 FUTURE BACKGROUND TRAFFIC VOLUMES

Future background traffic volumes in the 2027 and 2032 horizon years represent the summation of the baseline existing traffic volumes and additional corridor growth traffic volumes.

The future background traffic volumes for the 2027 and 2032 horizon years are shown in **Figure 11** and **Figure 12**, respectively.

8.2.1 Additional Corridor Growth Traffic Volumes

The City of Barrie's *Transportation Impact Study Guidelines* specify that corridor growth rates should be adopted based on EMME models used by the City. As this information was not available at the time of writing of this report, the City agreed that an annual growth rate of 2% could be applied for the first five years, and an annual growth rate of 0.5% could be applied for the following five years, up to the 10-year analysis horizon.

Corridor growth traffic volumes for the 2027 and 2032 horizon years are shown in **Figure 9** and **Figure 10**, respectively.

A review of development applications on the City's website was reviewed in consideration of future background traffic. A total of 4 developments in the area were listed on the website but as they are located quite far west of the site, the traffic contributions from these and other developments in the area, are assumed to be accounted for by the corridor growth estimates included within the future background traffic calculations.

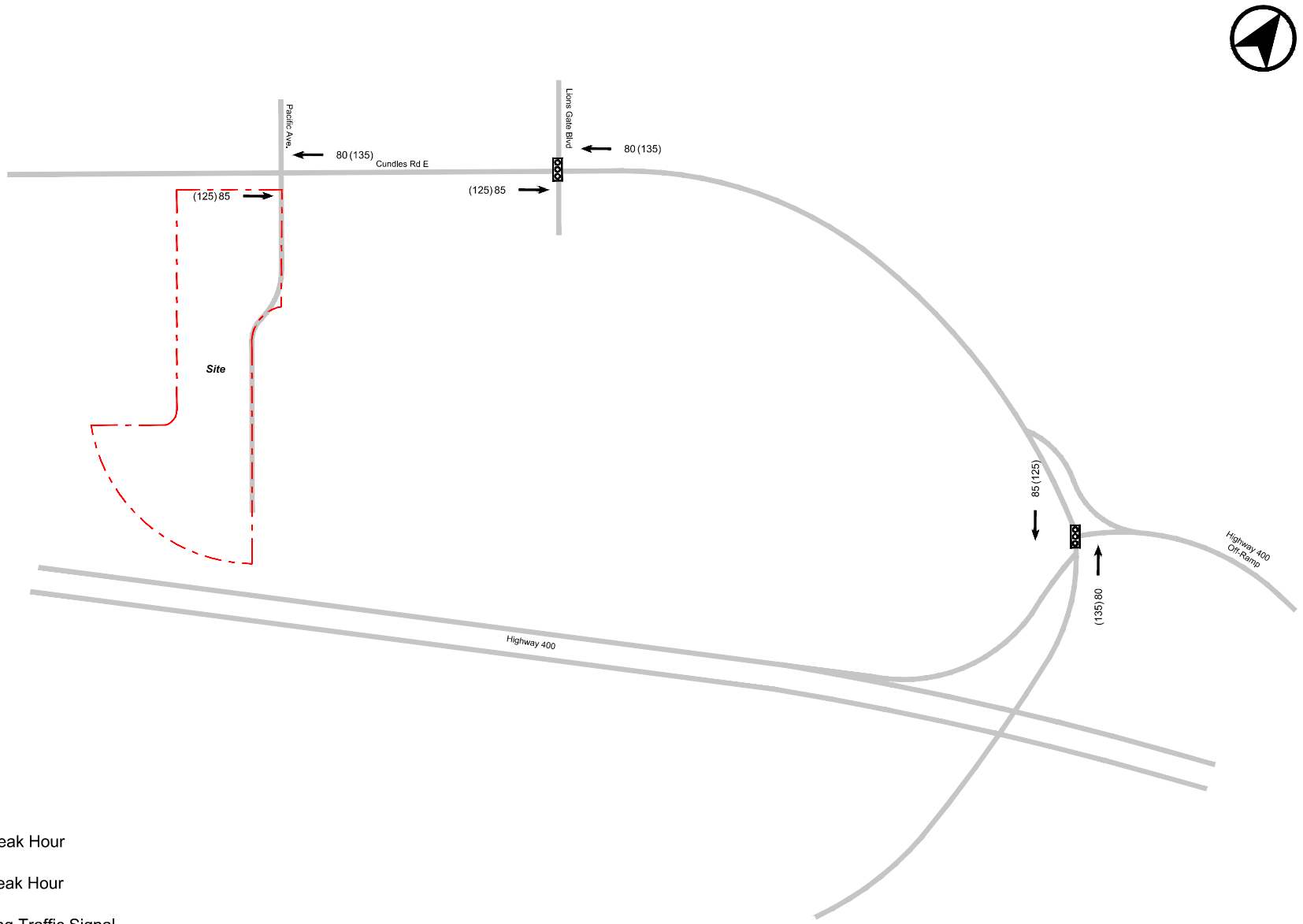

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FIGURE 9 CORRIDOR GROWTH TRAFFIC VOLUMES (2027 HORIZON)

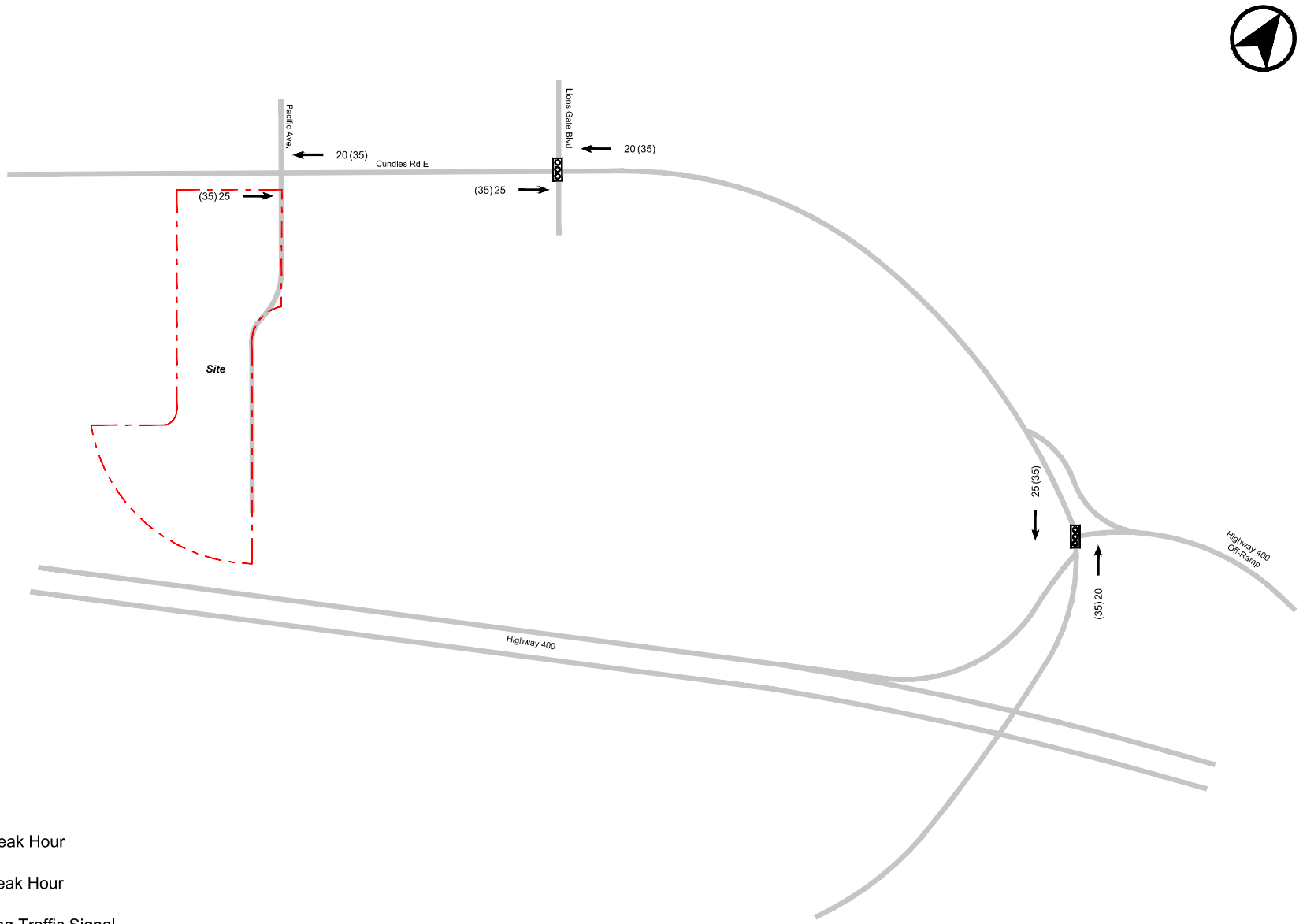

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FIGURE 10 CORRIDOR GROWTH TRAFFIC VOLUMES (2032 HORIZON)

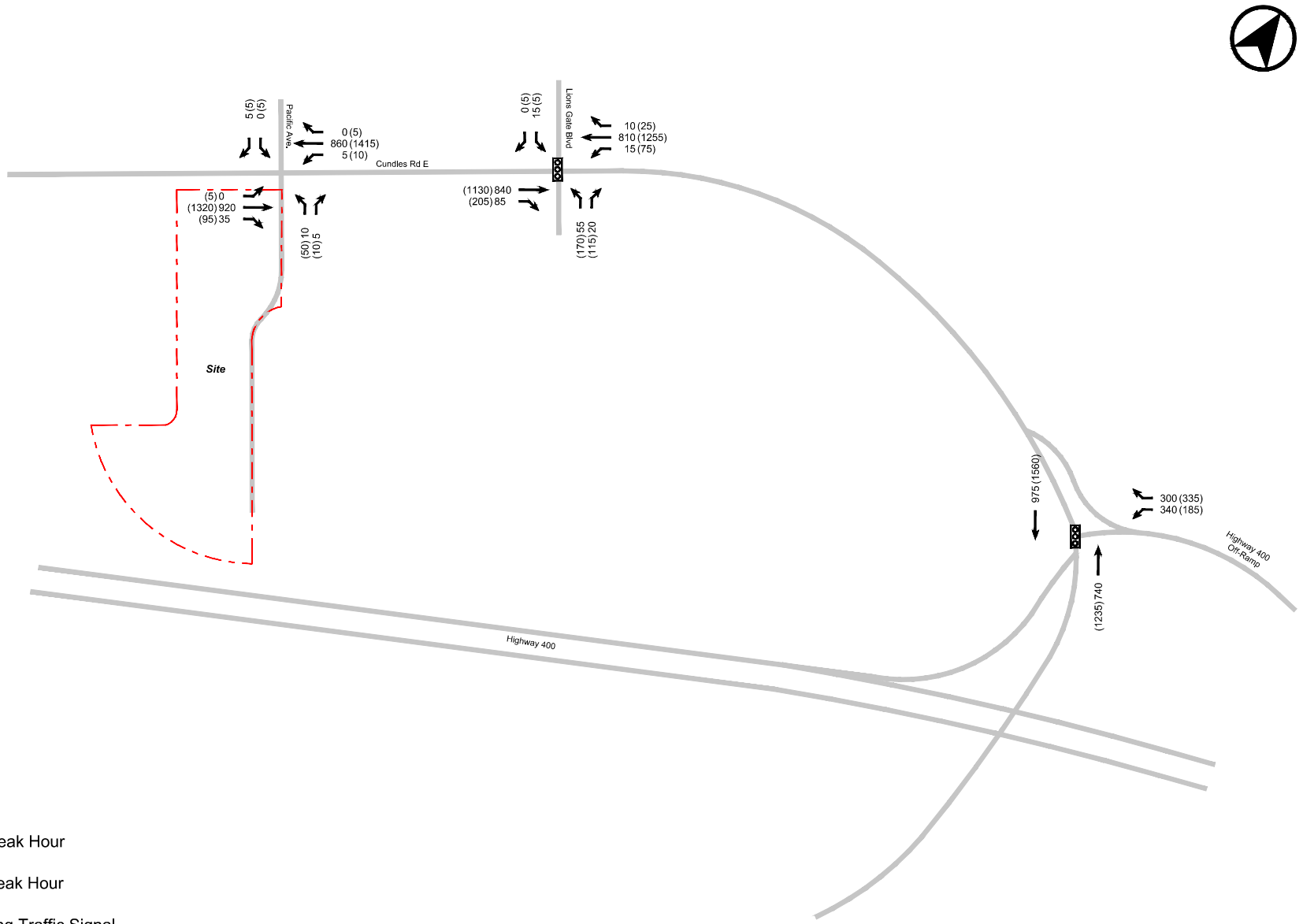

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FIGURE 11 FUTURE BACKGROUND TRAFFIC VOLUMES (2027 HORIZON)

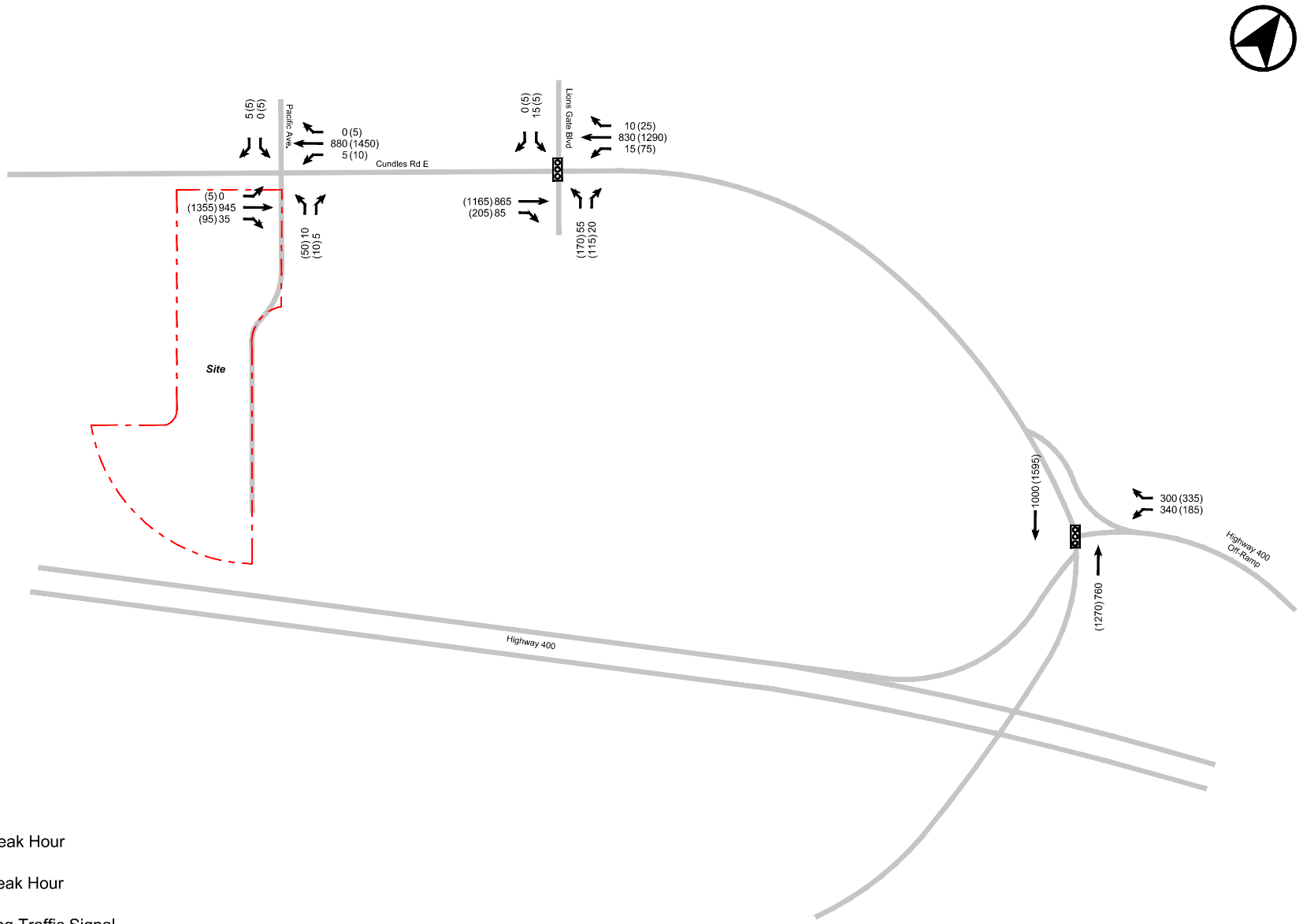

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FIGURE 12 FUTURE BACKGROUND TRAFFIC VOLUMES (2032 HORIZON)

8.3 SITE TRAVEL DEMAND FORECASTING

8.3.1 Site Trip Generation (Current Proposal)

The trip generation potential of the site was forecasted based on trip generation surveys published within the Institute of Transportation Engineers' (ITE) Trip Generation Manual (10th Edition). A summary of the rates used and resulting trip generation for the site is summarized in **Table 14**. In the order of 180 and 220 two-way vehicle trips are anticipated during the weekday morning and afternoon peak hours, respectively.

TABLE 14 SITE TRIP GENERATION POTENTIAL

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Adopted Trip Rate ITE LUC 221 – Multifamily Housing (Mid-Rise)	0.09	0.27	0.36	0.27	0.17	0.44
Residential Site Trips (505 units)	46	133	179	133	85	218
Rounded Site Trips	**45**	**135**	**180**	**135**	**85**	**220**

Notes
1. The total site trips are rounded to the nearest 5 trips.

8.3.2 Site Trip Generation Comparison with May 2012 Proposal

In May 2012, BA Group completed a Traffic Impact Study (TIS) for a development proposal on the same lands that included 200 residential units and 5,581 m^2 GFA of retail/commercial. Although the proposal was subsequently approved by the City, the development did not proceed. As shown in **Table 15**, a comparison of the new vehicle trips expected to be generated by the 2012 proposal vs. the current proposal shows that the current proposal results in 50 and 75 fewer two-way vehicle trips, during the morning and afternoon peak period, respectively, than the 2012 development proposal.

TABLE 15 SITE TRIP COMPARISON: MAY 2012 PROPOSAL VS. CURRENT PROPOSAL

Land Use	May 2012 Proposal		June 2022 Current Proposal		Difference	
Residential units	200 units		505 units		**+305 units**	
Retail/commercial	5,581 m^2 GFA		--		**-5,581 m^2 GFA**	
New Vehicle Trips	**AM Peak 2-Way**	**PM Peak 2-Way**	**AM Peak 2-Way**	**PM Peak 2-Way**	**AM Peak 2-Way**	**PM Peak 2-Way**
	230	**295**	**180**	**220**	**-50**	**-75**

8.3.3 Site Trip Distribution

The distribution of residential site traffic is summarized in **Table 16**. Residential site traffic volumes on the area road network are illustrated in **Figure 13**.

TABLE 16 RESIDENTIAL SITE TRAFFIC DISTRIBUTION

To / From Site	Corridor	Inbound	Outbound
East	Cundles Road East	60%	60%
West	Cundles Road East	40%	40%
Total		**100%**	**100%**

Notes:
1. 2006 TTS zones considered include 8510, 8511 and 8512.
2. Inbound and outbound distributions are based on collected data from the weekday morning and afternoon peak hours, respectively.

8.3.4 MTO Ramp Terminal Impacts

The terminal for the Highway 400 southbound off-ramp is located east of the site and intersects with Cundles Road East. The proposed development is expected to result in an additional **105 and 130 vehicles** travelling through this intersection, during the weekday morning and afternoon peak hours, respectively. These traffic volumes are illustrated in **Figure 13**.

As shown in **Table 17**, a comparison has been made of the additional traffic volumes expected to travel through the intersection of the Highway 400 southbound off-ramp at Cundles Road East, as a result of the 2012 development proposal vs. the current 2022 proposal. This comparison shows that the current proposal results in 3 and 9 additional vehicles at the intersection, during the morning and afternoon peak period, respectively, than the 2012 development proposal.

TABLE 17 COMPARISON OF SITE TRAFFIC VOLUMES AT HIGHWAY 400 SOUTHBOUND/CUNDLES

Land Use	May 2012 Traffic Study Stage 1/ Phase 1		Current Proposal (June 2022)		Difference	
Residential units	200 units		505 units		**+305 units**	
Retail/commercial	5,581 m^2 GFA		--		**-5,581 m^2 GFA**	
Additional Traffic Volume at MTO Intersection (vehicles/hour)	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
	102	**121**	**105**	**130**	**+3**	**+9**

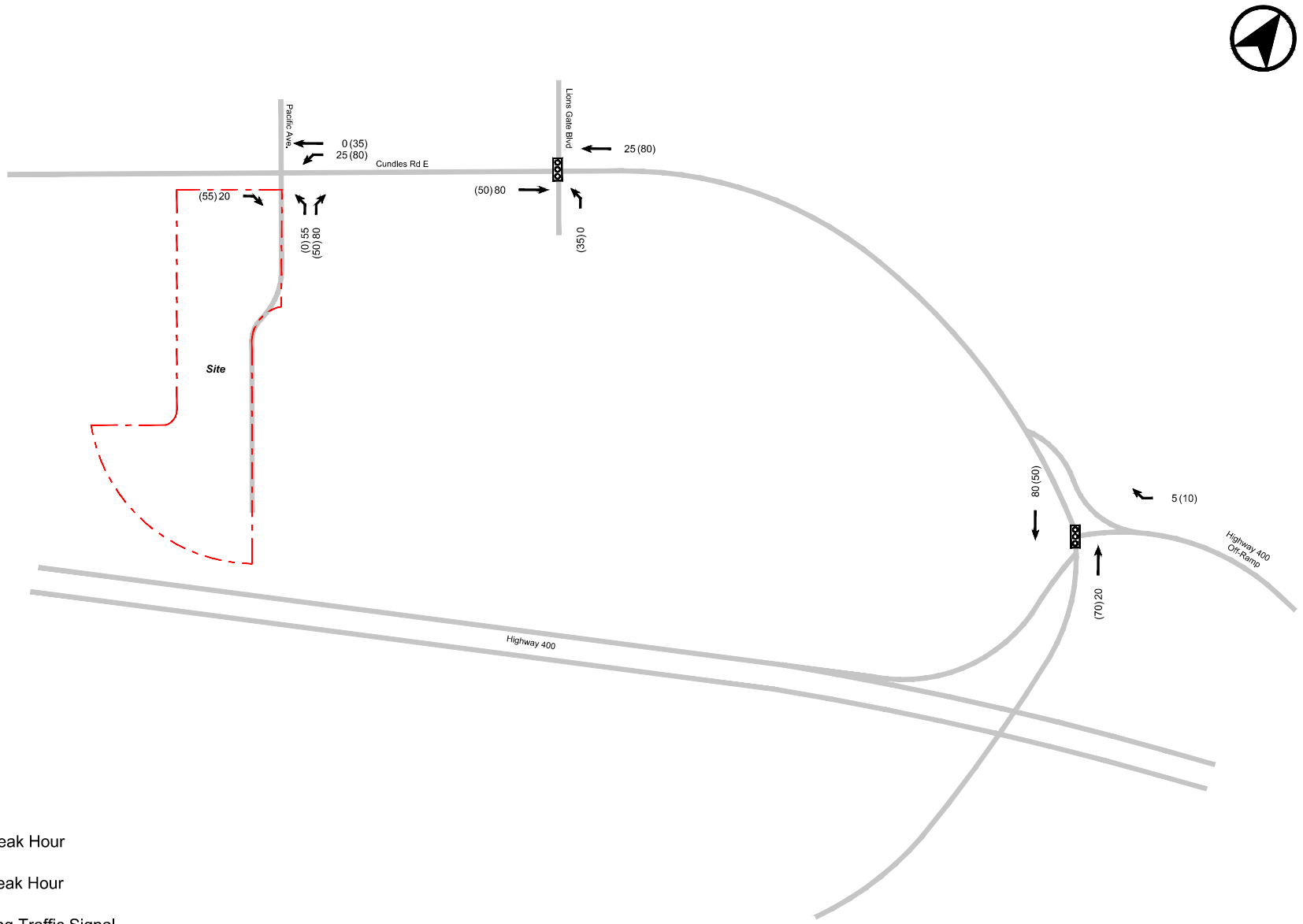

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FIGURE 13 SITE TRAFFIC VOLUMES

8.4 FUTURE TOTAL TRAFFIC VOLUMES

Future total traffic volumes in the 2027 and 2032 horizon years represent the summation of future background traffic volumes and the total site traffic volumes.

The future total traffic volumes for the 2027 and 2032 horizon years are shown in **Figure 14** and **Figure 15**, respectively.

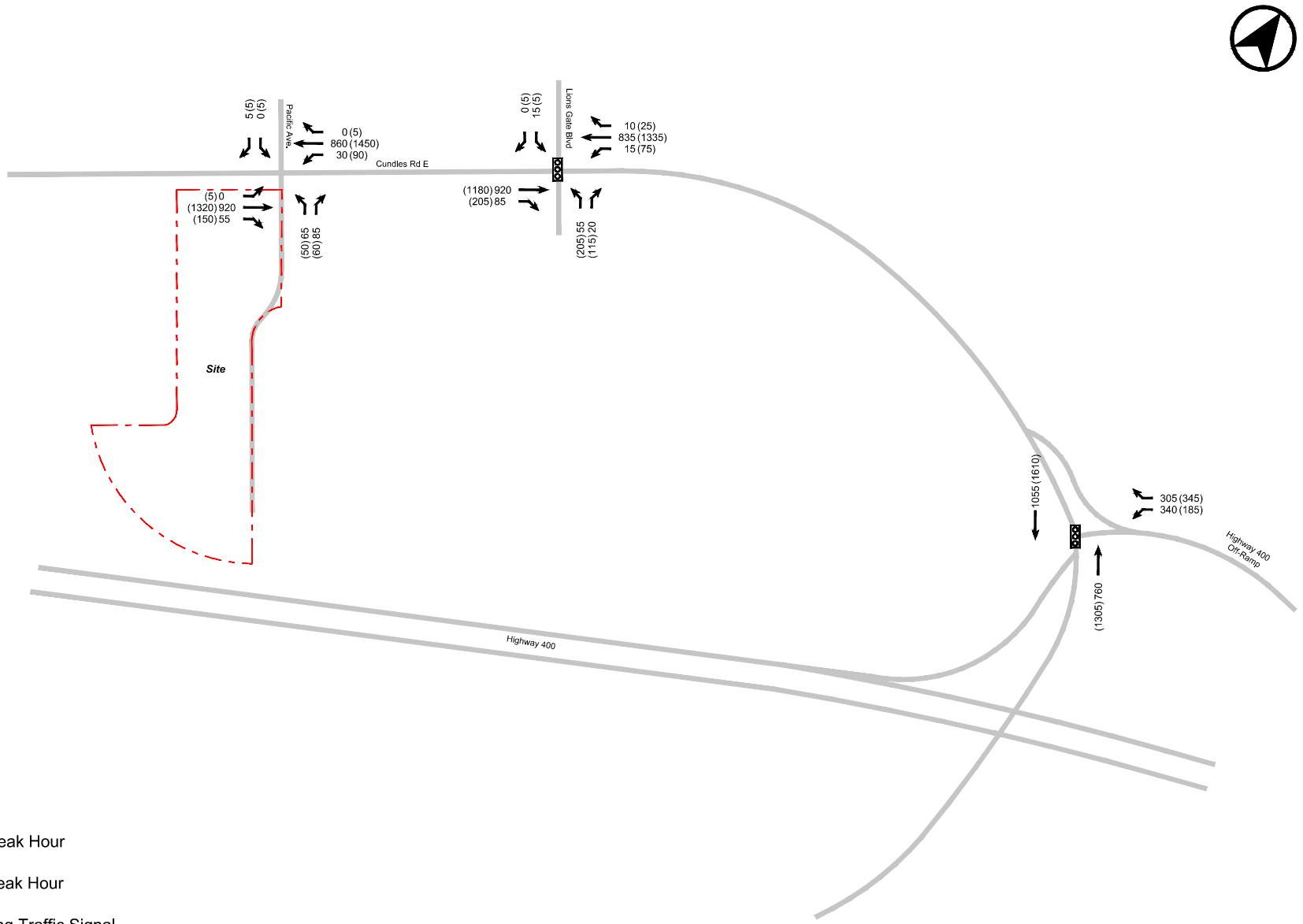

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FIGURE 14 FUTURE TOTAL TRAFFIC VOLUMES (2027 HORIZON)

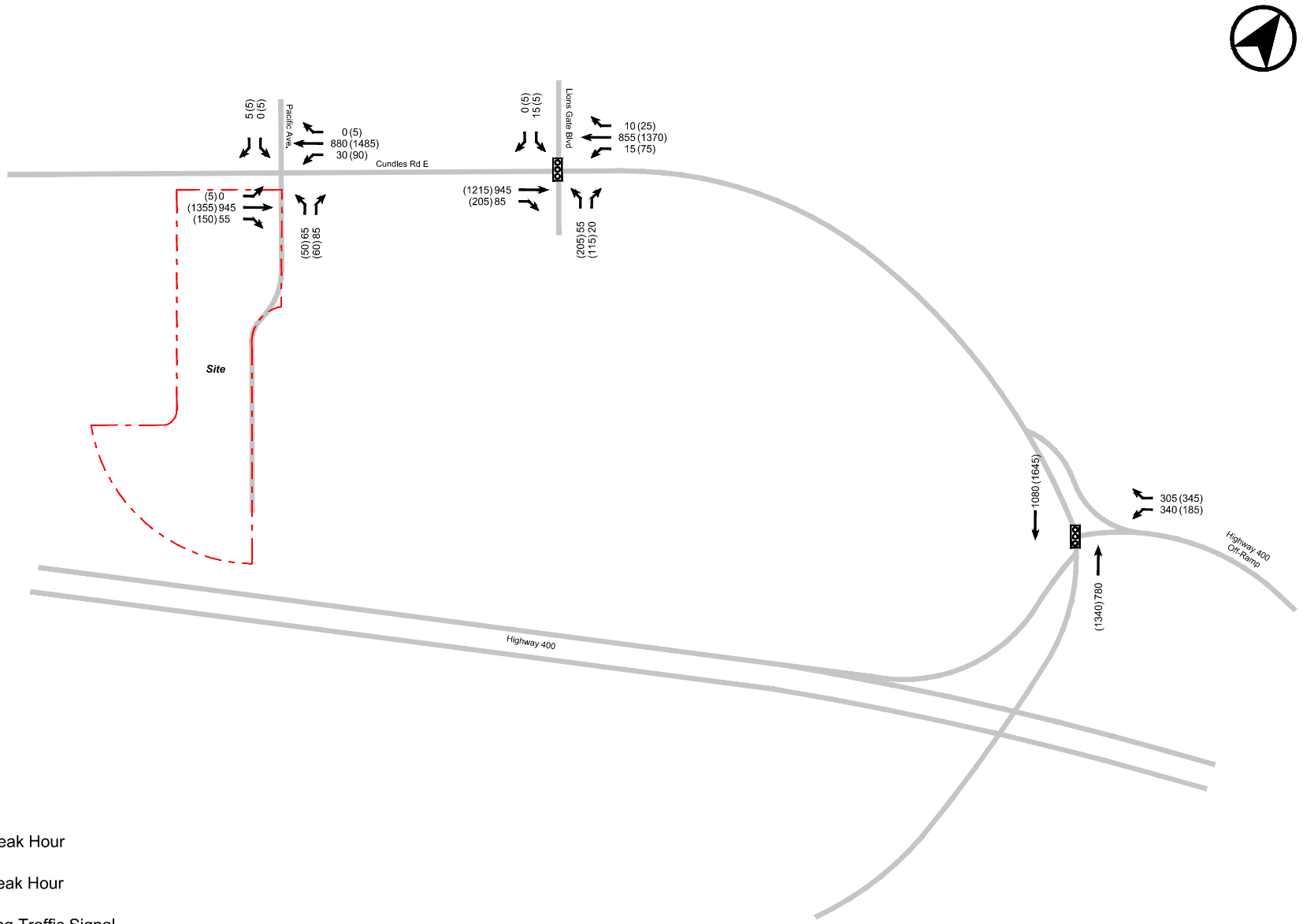

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FIGURE 15 FUTURE TOTAL TRAFFIC VOLUMES (2032 HORIZON)

9.0 TRAFFIC OPERATIONS ANALYSIS

9.1 ANALYSIS METHODOLOGY

The intersection capacity analysis was completed using Synchro Version 11.0 and the Highway Capacity Manual (HCM) methodology.

For signalized intersections, the volume-to-capacity ratio (v/c) is an indicator of the capacity utilization for the key movements in the intersection. A v/c of 1.00 indicates that certain governing traffic movements through the intersection are operating at or near maximum capacity. The primary overall level of service (LOS) indicator is delay, both on individual movements and expressed as an average for all vehicles processed. Many busy urban intersections operate at LOS D to E, which reflects average delays in the range of 35 to 80 seconds

For unsignalized intersections, level of service (LOS) characterizes operational conditions for key movements in terms of delay within the traffic stream. LOS A represents a good level of service with short delays. LOS F represents a poor level of service with long delays. The volume to capacity ratio (v/c) is an indicator of the capacity utilization for key movements at the intersection and resultant residual capacity potential.

The LOS criteria provided by the HCM methodology is summarized as follows:

(i) Signalized Intersection LOS

- LOS A: Control Delay ≤ 10s
- LOS B: 10s < Control Delay ≤ 20s
- LOS C: 20s < Control Delay ≤ 35s
- LOS D: 35s < Control Delay ≤ 55s
- LOS E: 55s < Control Delay ≤ 80s
- LOS F: Control Delay > 80s

(ii) Unsignalized Intersection LOS

- LOS A: Control Delay ≤ 10s
- LOS B: 10s < Control Delay ≤ 15s
- LOS C: 15s < Control Delay ≤ 25s
- LOS D: 25s < Control Delay ≤ 35s
- LOS E: 35s < Control Delay ≤ 50s
- LOS F: Control Delay > 50s

9.2 MODELLING INPUT AND CALIBRATION PARAMETERS

Key parameters used in the analysis include:

Lane Configurations

Under existing and future conditions, the existing lane configurations of the area road network were assumed.

Traffic Signal Timing Plans

The existing traffic signal timing plan at the signalized intersection within the study area was provided by the City of Barrie. Any future signal timing changes are identified in the following sections as "signal timing *optimization*". The existing traffic signal timing plans are attached in **Appendix E**.

Other Data Inputs

Heavy vehicle percentages and pedestrian and bicycle crossing volumes were derived from existing traffic counts, as were intersection Peak Hour Factors. As specified in the City of Barrie's *Transportation Impact Study Guidelines*, a saturation of flow rate of 1900 passenger car units per hour per lane was adopted throughout the study area.

9.3 ANALYSIS SCENARIOS

The following analysis scenarios have been analyzed for the weekday morning and afternoon peak hours:

1. 2021 Existing Traffic Conditions
2. 2027 Future Background Traffic Conditions
3. 2027 Future Total Traffic Conditions
4. 2032 Future Background Traffic Conditions
5. 2032 Future Total Traffic Conditions

Detailed Synchro worksheets are provided in **Appendix F**.

9.4 SIGNALIZED INTERSECTION ANALYSIS

The intersection of **Lions Gate Boulevard / Cundles Road East** currently operates under signal control with cycle lengths of 118 seconds during both the weekday morning and afternoon peak hours. **Table 18** summarizes the results of the traffic operations analysis at the intersection.

Under existing conditions, the intersection operates under capacity at overall v/c ratios of 0.33 and 0.60 during the weekday morning and afternoon peak hours, respectively.

Under future background conditions for the 5-year horizon (2027), the intersection continues to operate under capacity at overall v/c ratios of 0.36 and 0.66 or better during the weekday morning and afternoon peak hours, respectively.

Under all future total conditions for the 5-year horizon (2027), with the site development, the intersection continues to operate under capacity at overall v/c ratios of 0.39 and 0.72 or better during the weekday morning and afternoon peak hours, respectively.

Under future background conditions for the 10-year horizon (2032), the intersection continues to operate under capacity at overall v/c ratios of 0.37 and 0.67 or better during the weekday morning and afternoon peak hours, respectively.

Under all future total conditions for the 10-year horizon (2032), with the site development, the intersection continues to operate under capacity at overall v/c ratios of 0.40 and 0.73 or better during the weekday morning and afternoon peak hours, respectively.

No mitigation measures or improvements are recommended at the intersection.

TABLE 18 LIONS GATE BOULEVARD / CUNDLES ROAD EAST – CAPACITY ANALYSIS

Movement	Existing			2027 Horizon						2032 Horizon					
				Future Background			Future Total			Future Background			Future Total		
	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay
EBL	0.0 (0.0)	A (A)	0.0 (0.0)	0.0 (0.0)	A (A)	0.0 (0.0)	0.0 (0.0)	A (A)	0.0 (0.0)	0.0 (0.0)	A (A)	0.0 (0.0)	0.0 (0.0)	A (A)	0.0 (0.0)
EBT	0.35 (0.62)	A (C)	7.1 (22.3)	0.39 (0.69)	A (C)	7.4 (24.2)	0.43 (0.72)	A (C)	7.6 (25.0)	0.40 (0.71)	A (C)	7.4 (24.8)	0.44 (0.74)	A (C)	7.7 (25.7)
EBR	0.06 (0.19)	A (B)	5.6 (16.3)	0.06 (0.20)	A (B)	5.7 (16.4)	0.06 (0.20)	A (B)	5.7 (16.5)	0.06 (0.20)	A (B)	5.7 (16.5)	0.07 (0.21)	A (B)	5.7 (16.5)
WBL	0.03 (0.25)	A (B)	3.4 (13.9)	0.03 (0.29)	A (B)	3.5 (16.1)	0.03 (0.30)	A (B)	3.6 (17.3)	0.03 (0.30)	A (B)	3.5 (16.9)	0.04 (0.31)	A (B)	3.6 (18.2)
WBTR	0.34 (0.71)	A (C)	7.1 (24.7)	0.38 (0.79)	A (C)	7.3 (27.6)	0.39 (0.84)	A (C)	7.4 (29.9)	0.39 (0.82)	A (C)	7.4 (28.5)	0.40 (0.86)	A (C)	7.4 (31.2)
NBL	0.46 (0.53)	D (D)	42.2 (43.4)	0.46 (0.53)	D (D)	42.2 (43.4)	0.46 (0.64)	D (D)	42.2 (47.5)	0.46 (0.53)	D (D)	42.2 (43.4)	0.46 (0.64)	D (D)	42.2 (47.5)
NBTR	0.01 (0.08)	D (C)	37.9 (33.9)	0.01 (0.08)	D (C)	37.9 (33.9)	0.01 (0.08)	D (C)	37.9 (33.9)	0.01 (0.08)	D (C)	37.9 (33.9)	0.01 (0.08)	D (C)	37.9 (33.9)
SBLTR	0.12 (0.01)	D (C)	38.7 (32.9)	0.12 (0.01)	D (C)	38.7 (32.9)	0.12 (0.01)	D (C)	38.7 (32.9)	0.12 (0.01)	D (C)	38.7 (32.9)	0.12 (0.01)	D (C)	38.7 (32.9)
Overall	**0.33 (0.60)**	**A (C)**	**8.8 (24.5)**	**0.36 (0.66)**	**A (C)**	**8.8 (26.4)**	**0.39 (0.72)**	**A (C)**	**8.9 (28.2)**	**0.37 (0.67)**	**A (C)**	**8.9 (27.0)**	**0.40 (0.73)**	**A (C)**	**9.0 (29.0)**

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All delays are in seconds (s).

Queueing behaviour at the intersection of **Lions Gate Boulevard / Cundles Road East** is summarized in **Table 19**. There are no concerns with the 95th percentile queues in the 2032 Future Total Horizon, with the exception of occasional northbound left-turning queues that slightly exceed the available storage.

TABLE 19 LIONS GATE BOULEVARD / CUNDLES ROAD EAST – QUEUEING ANALYSIS

Movement	Available Storage (m)	Existing		2027 Horizon				2032 Horizon			
				Future Background		Future Total		Future Background		Future Total	
		50th %ile Queue	95th %ile Queue	50th %ile Queue	95th %ile Queue	50th %ile Queue	95th %ile Queue	50th %ile Queue	95th %ile Queue	50th %ile Queue	95th %ile Queue
EBT	165	33.3 (99.8)	48.4 (120.0)	38.4 (119.2)	55.1 (142.3)	43.3 (127.5)	62.0 (151.7)	39.8 (124.8)	57.2 (148.7)	45.0 (133.5)	64.2 (158.5)
EBR	55	0.2 (8.6)	5.7 (22.0)	0.7 (10.8)	6.3 (24.8)	1.2 (11.7)	6.8 (25.9)	0.9 (11.5)	6.5 (25.6)	1.3 (12.1)	7.0 (26.4)
WBL	150	0.5 (6.7)	2.0 (12.3)	0.5 (6.7)	2.0 (12.3)	0.5 (6.7)	2.0 (12.3)	0.5 (6.7)	2.0 (12.3)	0.5 (6.7)	2.0 (12.3)
WBTR	240	32.3 (122.0)	47.0 (145.8)	37.0 (146.6)	53.5 (173.8)	38.7 (162.5)	55.5 (192.2)	38.3 (153.3)	55.1 (181.6)	39.8 (169.8)	57.1 (200.7)
NBL	70	10.6 (40.2)	22.9 (64.1)	10.6 (40.2)	22.9 (64.1)	10.6 (50.0)	22.9 (77.7)	10.6 (40.2)	22.9 (64.1)	10.6 (50.0)	22.9 (77.7)
NBTR	35	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.2)
SBLTR	80	2.8 (0.0)	8.9 (0.0)	2.8 (0.0)	8.9 (0.0)	2.8 (0.0)	8.9 (0.0)	2.8 (0.0)	8.9 (0.0)	2.8 (0.0)	8.9 (0.0)

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All queue lengths are in metres (m).

9.5 UNSIGNALIZED INTERSECTION ANALYSIS

Results of the traffic operations analysis for the intersection of **Pacific Avenue / Cundles Road East** are provided in **Table 20**. All movements operate at acceptable levels-of-service (LOS) at LOS D or better in both peak hours, with the exception of the northbound left-turning movement during the weekday afternoon peak hour. Westbound trips from the proposed development are assumed to make the required northbound left-turn at **Lions Gate Boulevard / Cundles Road East**, since vehicles making the northbound left turn at **Pacific Avenue / Cundles Road East** already experience long delays under future background conditions, due to background traffic increases.

No mitigation measures or improvements are recommended at the intersection.

TABLE 20 PACIFIC AVENUE / CUNDLES ROAD EAST – CAPACITY ANALYSIS

Movement	Existing			2027 Horizon						2032 Horizon					
				Future Background			Future Total			Future Background			Future Total		
	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay
EBL	0.00 (0.01)	A (B)	0.0 (11.1)	0.00 (0.01)	A (B)	0.0 (11.8)	0.00 (0.01)	A (B)	0.0 (11.8)	0.00 (0.01)	A (B)	0.0 (12.0)	0.00 (0.01)	A (B)	0.0 (12.0)
EBT	0.34 (0.51)	A (A)	0.0 (0.0)	0.38 (0.57)	A (A)	0.0 (0.0)	0.38 (0.57)	A (A)	0.0 (0.0)	0.39 (0.58)	A (A)	0.0 (0.0)	0.39 (0.58)	A (A)	0.0 (0.0)
EBTR	0.19 (0.32)	A (A)	0.0 (0.0)	0.21 (0.35)	A (A)	0.0 (0.0)	0.22 (0.38)	A (A)	0.0 (0.0)	0.22 (0.35)	A (A)	0.0 (0.0)	0.23 (0.39)	A (A)	0.0 (0.0)
WBL	0.01 (0.02)	A (B)	9.9 (12.6)	0.01 (0.03)	B (B)	10.3 (13.7)	0.05 (0.24)	B (C)	10.6 (16.8)	0.01 (0.03)	B (B)	10.4 (14.0)	0.05 (0.25)	B (C)	10.7 (17.3)
WBT	0.32 (0.55)	A (A)	0.0 (0.0)	0.35 (0.61)	A (A)	0.0 (0.0)	0.35 (0.62)	A (A)	0.0 (0.0)	0.36 (0.62)	A (A)	0.0 (0.0)	0.36 (0.64)	A (A)	0.0 (0.0)
WBTR	0.16 (0.28)	A (A)	0.0 (0.0)	0.18 (0.31)	A (A)	0.0 (0.0)	0.18 (0.32)	A (A)	0.0 (0.0)	0.18 (0.32)	A (A)	0.0 (0.0)	0.18 (0.32)	A (A)	0.0 (0.0)
NBLTR	0.05 (0.41)	C (E)	16.3 (41.5)	0.05 (0.49)	C (F)	17.7 (55.3)	0.46 (0.69)	C (F)	23.9 (62.5)	0.06 (0.52)	C (F)	18.2 (60.3)	0.47 (0.73)	C (F)	24.9 (69.4)
SBLTR	0.01 (0.03)	A (C)	9.7 (16.8)	0.01 (0.04)	A (C)	9.7 (18.4)	0.01 (0.06)	A (D)	9.7 (29.3)	0.01 (0.04)	A (C)	9.7 (18.9)	0.01 (0.07)	A (D)	9.7 (30.7)

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All delays are in seconds (s).

Queueing behaviour at the intersection of **Pacific Avenue / Cundles Road East** is summarized in **Table 21**. There are no concerns with the 95th percentile queues in the 2032 Future Total Horizon.

TABLE 21 PACIFIC AVENUE / CUNDLES ROAD EAST – QUEUEING ANALYSIS

Movement	Available Storage (m)	Existing	2027 Horizon		2032 Horizon	
			Future Background	Future Total	Future Background	Future Total
		95th %ile Queue	95th %ile Queue	95th %ile Queue	95th %ile Queue	95th %ile Queue
EBL	35	0.0 (0.2)	0.0 (0.2)	0.0 (0.2)	0.0 (0.2)	0.0 (0.2)
WBL	35	0.2 (0.6)	0.2 (0.6)	1.2 (7.6)	0.2 (0.7)	1.2 (7.9)
NBLTR	70	1.2 (14.3)	1.4 (18.3)	18.3 (33.4)	1.4 (19.6)	19.1 (35.8)
SBLTR	85	0.2 (0.8)	0.2 (0.9)	0.2 (1.6)	0.2 (0.9)	0.2 (1.7)

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).
2. All queue lengths are in metres (m).

10.0 CONSIDERATION FOR ROAD IMPROVEMENTS

Based on the detailed traffic analysis, no road improvements are being recommended as part of the development proposal.

The results of the traffic operations analysis for the intersection of Cundles Road East & Pacific Avenue/Site driveway, indicate that all movements operate at acceptable levels-of-service (LOS) at LOS D or better in both peak hours, with the exception of the northbound left-turning movement, during the weekday afternoon peak hour. Westbound trips from the proposed development are assumed to make the required northbound left-turn at the signalized Lions Gate Boulevard / Cundles Road East, since vehicles making the northbound left-turn at Pacific Avenue / Cundles Road East already experience delays under future background conditions, due to background traffic increases.

In addition, as there is an existing traffic signal on Cundles Road East at Lions Gate Boulevard, approximately 180 metres from the site driveway at Pacific Avenue, the City is not supportive of a new traffic signal at Pacific Avenue.

A dedicated right-turn lane on Cundles Road East at Pacific Avenue/Site driveway was also assessed but since the eastbound right-turning volumes are only 55 and 150 vehicles, during the morning and afternoon peak hour period, respectively, and because the right-turning vehicles on the eastbound approach do not create unreasonable delays, a dedicated right-turn lane is not being recommended as part of the development proposal.

11.0 CONCLUSIONS & RECOMMENDATIONS

The development proposal includes the construction of three residential buildings with a combined total of 505 units. It is estimated that the three residential buildings will be completed by the end of 2025.

Parking is to be provided in two separate below-grade facilities with additional surface parking. Two driveway accesses to the site are proposed along the existing shared North Barrie Crossing driveway that connects to Cundles Road East. The proposal does not include any points of direct access to Cundles Road East.

The proposed parking supply for the site includes a total of 632 parking spaces, inclusive of resident and visitor parking spaces. The total proposed parking supply ratio for the site is 1.25 spaces/unit, which exceeds the site specific Zoning By-law minimum requirement of 1.1 spaces/unit. The proposed parking supply exceeds the minimum requirements of the site specific Zoning By-law and will meet the practical requirements of the site.

In accordance with the City's Zoning By-law, the architectural drawings for the site include 11 Type A and 11 Type B accessible spaces for a total of 22 accessible parking spaces.

Proposed TDM strategies under consideration include walkways from the site to the existing sidewalk on Cundles Road East, bicycle parking and a bicycle repair station, travel information screens in each lobby, unbundled parking, and transit passes & travel information packages for new residents.

The site is expected to generate in the order of 180 and 220 two-way vehicle trips, during the weekday morning and afternoon peak hours, respectively.

The terminal for the Highway 400 southbound off-ramp is located east of the site along Cundles Road East. The proposed development results in an additional 105 and 130 vehicles travelling through this intersection, during the weekday morning and afternoon peak hours, respectively.

Based on the detailed traffic analysis, no road improvements are being proposed as part of the development proposal.

The traffic expected to be generated by the development proposal can be accommodated on the future road network. No road improvements are being recommended to accommodate the development proposal.

Appendix A
Terms of Reference

Memorandum

TO:

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City of Barrie
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FROM:	**PROJECT:**	**DATE:**
Deanna Green, MSc.P.Eng.	303 Cundles Road East Proposed Residential Development	March 22, 2022

SUBJECT: Terms of Reference Traffic Impact Study – 303 Cundles Road East, Proposed Residential Development, Barrie (City File# D28-063-2020)

BA Group has been retained by Penady (North Barrie) Limited to provide transportation consulting services related to a proposed residential development at 303 Cundles Road East in the City of Barrie, herein referred to as “the site”.

The site is currently undeveloped and is bounded by a retail development to the east (North Barrie Crossing), Cundles Road East to the north, two residential buildings to the west and Highway 400 to the south.

The development proposal includes the construction of three residential buildings with a combined total of 496 units. Parking is to be provided in below-grade facilities with some surface parking. Two driveway accesses to the site are proposed along the shared existing North Barrie Crossing driveway that connects to Cundles Road East. The proposal does not include any points of access along a public road.

As required by the City of Barrie and the Ministry Transportation Ontario (MTO), this letter outlines the proposed Terms of Reference for the Traffic Impact Study (TIS) that is being prepared as part of the **Zoning By-law Amendment (ZBA) application** being submitted to the City.

The scope of work for the traffic impact study will be completed in accordance with the TIS Guidelines of the City of Barrie and MTO, as outlined in the following sections.

1.0 SCOPE OF WORK

1.1 FULL DESCRIPTION

The study will provide a full description of the proposed development and will include the following:

- Municipal address;
- Proposed land uses;
- Floor space, including a summary of each type of use and number of residential units;
- Expected date of occupancy;
- Planned phasing of the development;
- Nearby City of Barrie and MTO* intersections and access to adjacent developments, including type of traffic control (signalized or unsignalized);
- Number of lanes, width and configuration;
- The requirements for auxiliary turn lanes (i.e. an eastbound right-turn lane) at the driveway access with Cundles Road East will be assessed based on a design speed of 70 km/h;
- All design standards will be in accordance with those outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads and the Ministry of Transportation, Ontario (MTO) Geometric Design Standards for Ontario Highways;
- All intersections in the study area will be evaluated for capacity, safety and adequacy of queue storage capacity;
- Nearby transit facilities/stops;
- Pedestrian facilities;
- Cycling facilities;
- A combination of maps and other documentation, which will identify all relevant information.

1.2 STUDY AREA / TRAFFIC VOLUMES

The traffic analysis is proposed to include the following study area intersections:

- North ramp terminal at Highway 400 southbound at Duckworth Street/Cundles Road; ***(pending confirmation from MTO)***
- Cundles Road East/Duckworth Street/J.C.Massie Way;
- Cundles Road East/Lions Gate Boulevard; and
- Cundles Road East/Pacific Avenue/North Barrie Crossing driveway.

A summary of the traffic counts that have been collected for the TIS are summarized in **Table 1**.

TABLE 1 SUMMARY OF TRAFFIC DATA

Location	Date	Source
North ramp terminal at Highway 400 southbound at Duckworth Street/Cundles Road	Thursday, February 21, 2019	Trans-Plan Transportation Inc.
Cundles Road East/ J.C.Massie Way/North Barrie Crossing Driveway	Tuesday, June 6, 2017	Trans-Plan Transportation Inc.
Cundles Road East/Lions Gate Boulevard	Thursday, October 26, 2017	Trans-Plan Transportation Inc.
	Thursday, July 8, 2021	Spectrum
	Saturday, July 8, 2021	
Cundles Road East/Pacific Avenue/North Barrie Crossing	Thursday, July 8, 2021	Spectrum
	Saturday, July 8, 2021	

Given the current COVID-19 conditions, it is recognized that the traffic data collected in 2021 may not be representative. For this reason, any traffic counts collected in 2021 will be calibrated and balanced utilizing traffic counts from pre-COVID conditions where possible.

1.3 TRAFFIC ANALYSIS SCENARIOS & HORIZON YEARS

As the construction of the 3 residential buildings will likely occur in phases, the following scenarios and horizons are proposed:

- Existing conditions;
- Future background conditions: includes corridor growth and area background development traffic;
- Future total conditions: includes site generated traffic + background traffic
- Future total conditions: **5 years** after completion of final phase and **10 years** after completion of final phase. *The future total horizon will be confirmed based on the phasing of the development and estimated build-out year*.

The City of Barrie and MTO will be contacted regarding appropriate corridor growth rates. The City of Barrie will be contacted to confirm details on surrounding developments in the area that may impact traffic capacity in the planning horizon years.

1.4 MULTIMODAL TRIP GENERATION AND DISTRIBUTION

The multimodal trip distribution and trip generation analysis will include the following:

- Trip generation surveys from similar developments in the City, which have similar operating characteristics as the proposed development, will be considered;
- The latest edition of the Institute of Transportation Engineers (ITE) trip generation rates will be utilized as a reference with the use of the greater of the average rate method or the fitted line equation;

- A table summarizing the trip generation findings; and
- Trip distribution assumptions will be supported by one or more of the following:
    - Transportation Tomorrow Survey (TTS) data;
    - Origin-destination surveys;
    - Comprehensive travel surveys;
    - Existing / anticipated travel patterns; and
    - Output from the city's travel demand forecasting model.

1.5 CAPACITY ANALYSIS

Intersection capacity analysis will be completed using Synchro Version 11.0 and a combination of Highway Capacity Manual (HCM) 2000 and HCM 6 methodologies. The capacity analysis will adhere to the accepted methodologies and assumptions included within the City of Barrie Traffic Impact Study Guidelines.

The traffic analysis will include the following:

- An analysis summary will be provided inclusive of level of service, delay and volume to capacity (v/c) ratios for individual movements and overall intersection operations, and directly impacted roadway links, for all analysis periods and time horizons.
- A separate queuing analysis will be provided for the 50th and 95th percentile queues, inclusive of existing storage lengths.

Signalized intersections will be identified where:

- The signalized intersections where the analysis shows that the level of service (LOS) for overall intersection operations exceeds LOS D;
- The v/c ratios for overall intersection operations, through movements, or shared through/turning movements increase to 0.85 or above;
- The v/c ratios for exclusive movements increase to 0.85 or above;
- Where the 50th and 95th percentile queue length exceed available turning lane storage; and
- Queues for exclusive left and right turn lanes that are inaccessible due to the through lane queue length.

Unsignalized intersections will be identified where:

- LOS, based on average delay per vehicle, on individual movements exceed LOS E; and
- The estimated 95th percentile queue length for an individual movement exceeds the lesser of 5 vehicles or the available queue storage.

Identification of **roadway links** where:

- The peak hour traffic exceeds LOS D (v/c of 0.85) based on the City of Barrie lane capacities by road classification. (*Note: as Cundles Road East is a 4-lane arterial roadway the capacity is assumed to be 750 vehicles per lane per hour*).

Identification of **potential safety or operational issues** associated with:

- Weaving and merging
- Corner clearances and sight distances
- Vehicle-pedestrian conflicts
- Access conflicts
- Traffic infiltration
- Pedestrian movements
- Cyclist movements
- Emergency vehicle response
- Heavy truck movement conflicts, etc.

The TIS will also identify any transit priority measures where the generated traffic will negatively impact transit operations.

If safety and/ or operational concerns are identified, these will be addressed in a safety assessment section within the TIS.

1.6 TRANSIT

If the traffic analysis shows that the site will generate more than 20 transit trips during the peak hour, the scope of work will include the following:

- Identification of impacts on transit operations directly associated with the site generated traffic volumes or operations, and corrective measures;
- Evaluation of the site generated transit demands and impact on the peak point on the route and in the vicinity of the development;
- Identify when demand exceeds residual capacity of the existing transit service (in which case times of day, duration and days of week should be specified as applicable); and
- Estimates of expected service frequency and additional vehicle requirements to accommodate site demand.

1.7 PEDESTRIANS

In relation to the proposed development, the TIS will include the following pedestrian infrastructure assessment, as applicable:

- Assessment of existing facilities and connectivity;
- Identify substandard designs, substandard operations, gaps and missing links on road segments and at intersections; and
- Identification of pedestrian connections required to access the existing City road, transit, and/or trail network.

1.8 CYCLING

In relation to the proposed development, the TIS will include the following cycling infrastructure assessment, as applicable:

- Assessment of existing facilities and connectivity;
- Identify substandard designs, substandard operations, gaps and missing links on road segments and at intersections;
- Identification of cycling connections required to access the existing City road, transit, and/or trail network; and
- Potential impact of long right turn lanes, high left and right turn traffic volumes.

1.9 TRAFFIC SIGNAL ANALYSIS

A traffic signal warrant analysis will be completed for the intersection of Cundles Road East at North Barrie Crossing driveway/Pacific Avenue, based on the Ontario Traffic Manual (OTM) Book 12 methodology.

1.10 PARKING STUDY

The TIS will include a detailed parking assessment that considers the City's Zoning By-law, as well as an existing site-specific Zoning By-law.

If a parking standard is being proposed for the site that is less than the existing site-specific by-law, the parking study will adhere to the City of Barrie's standard which was adopted from the City of Vaughan's Parking Study Guidelines.

1.11 TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN

As the proposed development is greater than 50 residential units, a TDM Plan is required and will be incorporated as part of the TIS. The TDM Plan will include the following:

- Targets
- TDM measures
- Monitoring
- Implementation plan

1.12 CONSTRUCTION STAGING PLAN

If required as part of the development proposal, a construction staging plan will be provided as it relates to the parking of tradespeople, delivery of construction material, impacts to on-street parking, maintenance of adjacent property access, pedestrian movements and City infrastructure.

1.13 FUNCTIONAL DESIGN

A functional design detailing a recommended access configuration and/or proposed intersection geometrics will be provided if requested by staff.

1.14 FINAL REPORT

The final report will include the following:

- Executive Summary
- Site/development description
- Study area, including map
- Existing conditions (with an exhibit)
- Analysis periods
- Background, existing, future background and future total traffic demand (with an exhibit)
- Site generated traffic (with an exhibit)
- Improvement alternatives
- Traffic impacts for future background and total traffic with and without mitigation (tabular summaries)
- Access considerations
- A Transportation Demand Management (TDM) strategy
- Parking review
- Loading facility review

- Safety review
- Recommendations

Recommendations will consider the following issues:

- Timing of short term and longer range network improvements that are already planned and scheduled;
- Anticipated schedule for adjacent developments;
- Size and timing of individual phases of the proposed development;
- Logical sequencing of various improvements or segments;
- Right-of-way needs and availability of additional right-of-way within the appropriate time frames;
- Local priorities for transportation improvements and funding;
- Cost effectiveness of implementing improvements at a given stage of development; and
- Necessary lead time for additional design and construction.

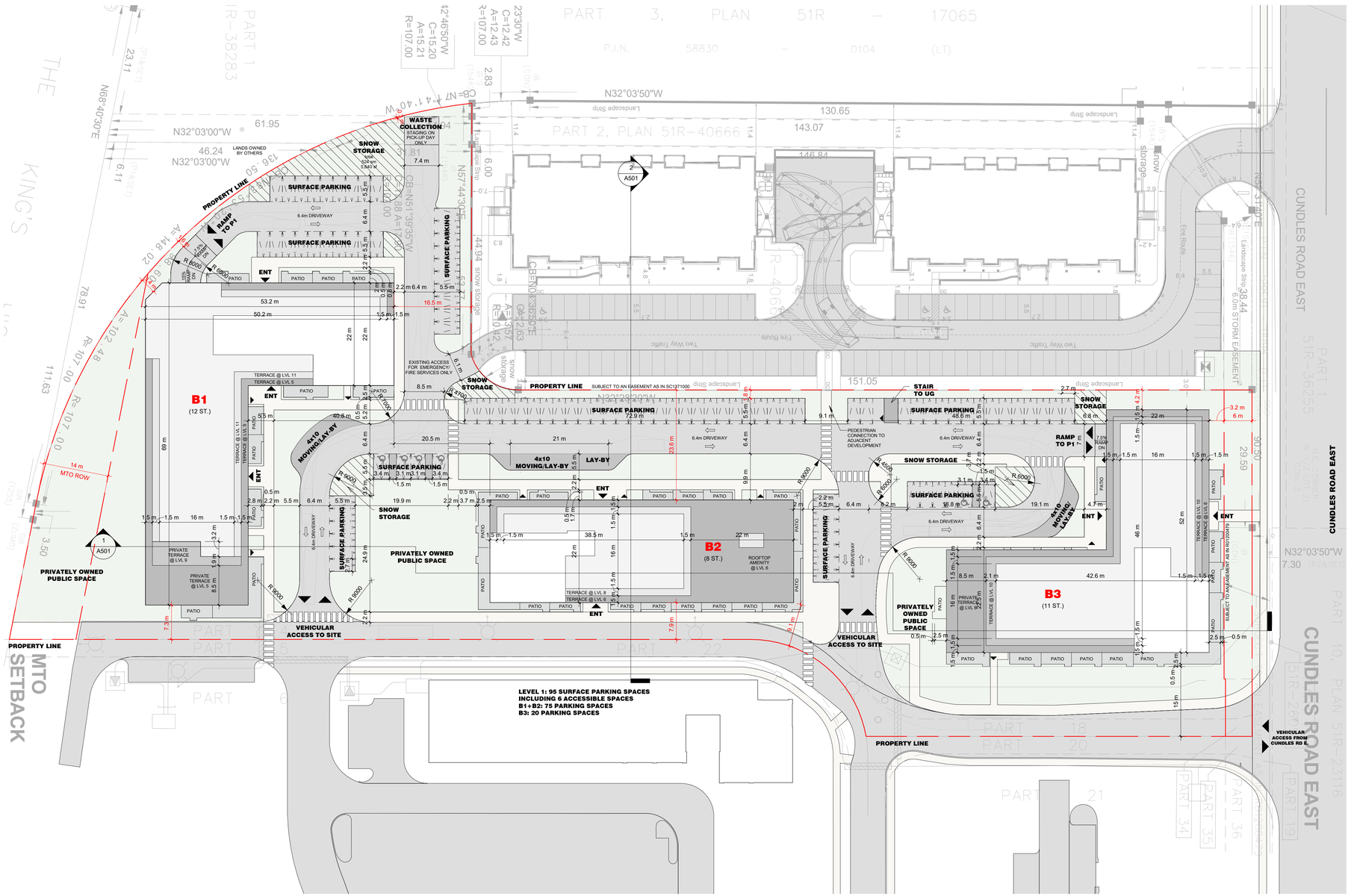
1.15 APPENDICES

The technical appendices will include the detailed analysis along with relevant data utilized in the study such as traffic counts and traffic signal timings.

The appendices will as a minimum include the following:

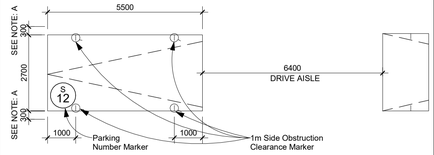
- Vehicle maneuvering diagrams;
- Turning movement counts (including date counted) with breakdown of heavy vehicle counts;
- Traffic signal timing plan(s) for signalized intersections;
- Transportation Tomorrow Survey (TTS) data; and
- Synchro reports showing HCM 2000 results and queuing, as well as electronic Synchro files (CD copy or sent concurrently with the TIS via email).

Appendix B
Reduced Scale Architectural Drawings



TYPICAL PARKING SPACE:

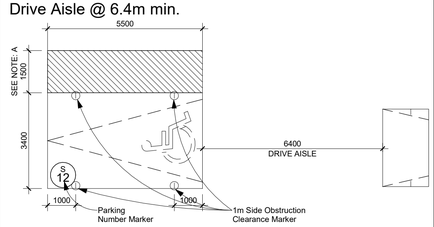
Drive Aisle @ 6.4m min.



NOTE: A- PROVIDE AN ADDITIONAL 300mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1000mm

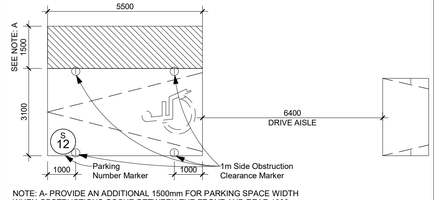
BARRIER-FREE PARKING SPACE TYPE A:

Drive Aisle @ 6.4m min.



NOTE: A- PROVIDE AN ADDITIONAL 1500mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1000mm

BARRIER-FREE PARKING SPACE TYPE B:



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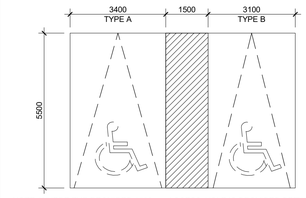

NOTE: WHERE THE REQUIRED 1500mm ACCESS AISLE IS PROVIDED BETWEEN TWO BARRIER-FREE PARKING SPACES, THE AISLE WIDTH CAN BE SHARED.

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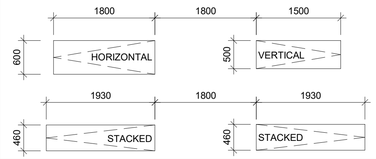

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PHONE: 905.417.5515 FAX: 905.417.5517

STAMP:

CLIENT:

PENADY (NORTH BARRIE) LIMITED

PROJECT:

RESIDENTIAL RENTAL / CONDO
CUNDLES ROAD EAST
BARRIE, ON

DRAWING TITLE:

SITE PLAN

DATE:	01/19/22	SCALE:	As indicated
DRAWN BY:	Author	CHECKED BY:	Checker
PROJECT NUMBER:	S20035	DRAWING NUMBER:	A110

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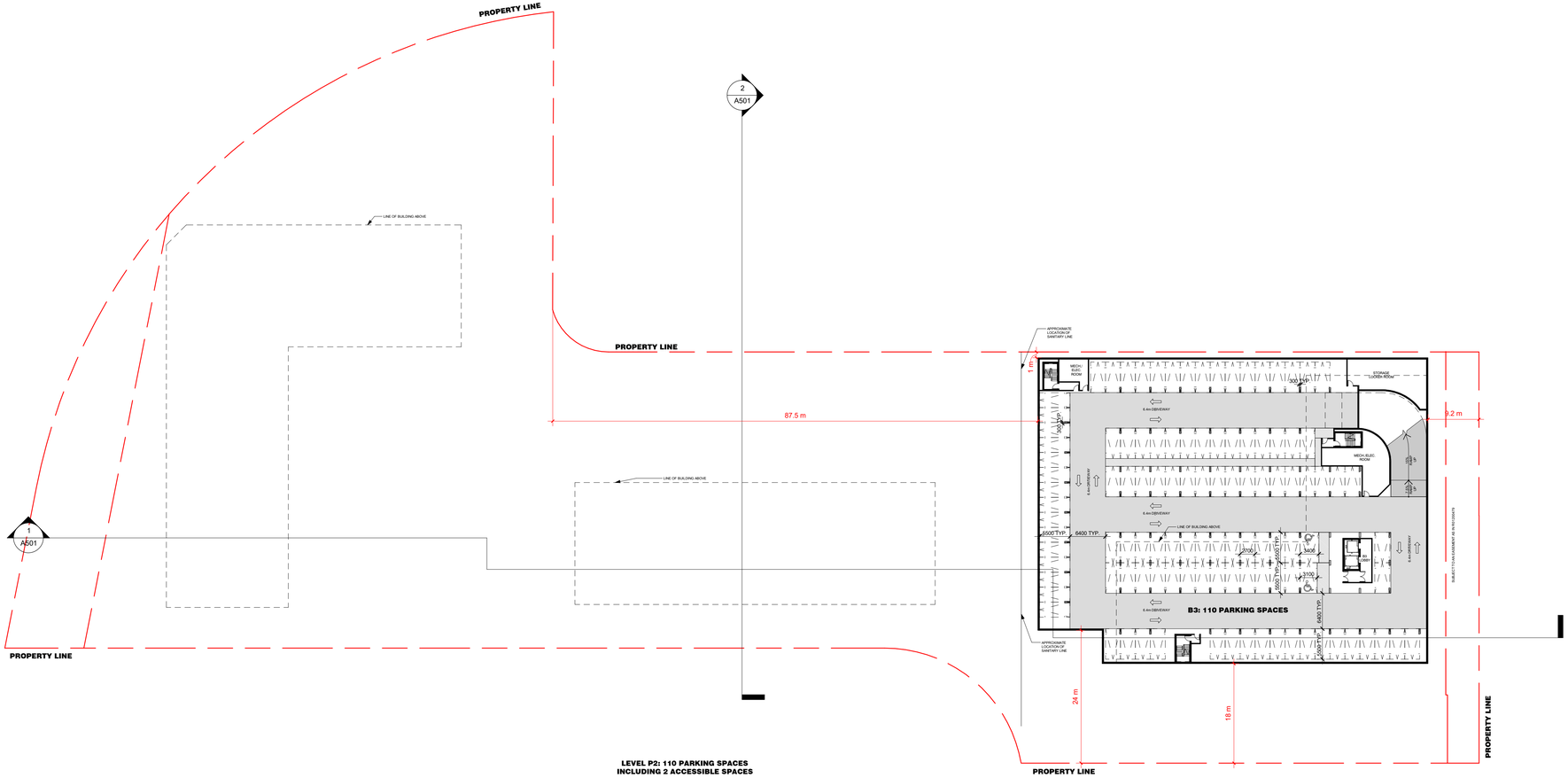

LEVEL P2 FLOOR PLAN

Scale: 1 : 450

1 / A201

TYPICAL PARKING SPACE:

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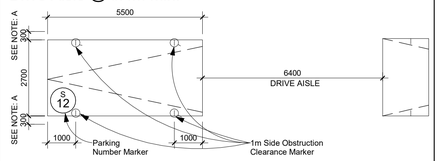

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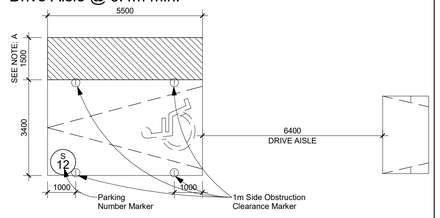
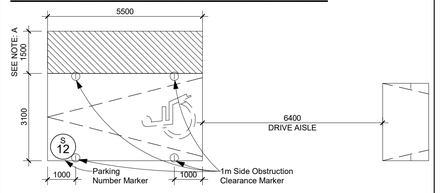
BARRIER-FREE PARKING SPACE TYPE A:

Drive Aisle @ 6.4m min.



NOTE: A- PROVIDE AN ADDITIONAL 1500mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1000mm

BARRIER-FREE PARKING SPACE TYPE B:



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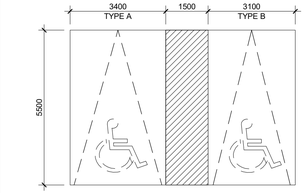
BARRIER-FREE PARKING SPACE TYPE A & B:



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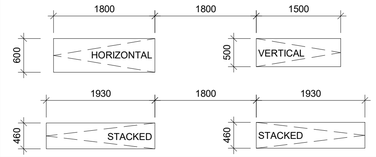

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PHONE: 905.417.5515 FAX: 905.417.5517

STAMP:

CLIENT:

PENADY (NORTH BARRIE) LIMITED

PROJECT:

RESIDENTIAL RENTAL / CONDO
CUNDLES ROAD EAST
BARRIE, ON

DRAWING TITLE:

LEVEL P2 FLOOR PLAN

DATE:	01/19/22	SCALE:	As indicated
DRAWN BY:	Author	CHECKED BY:	Checker
PROJECT NUMBER:	S20035	DRAWING NUMBER:	A201

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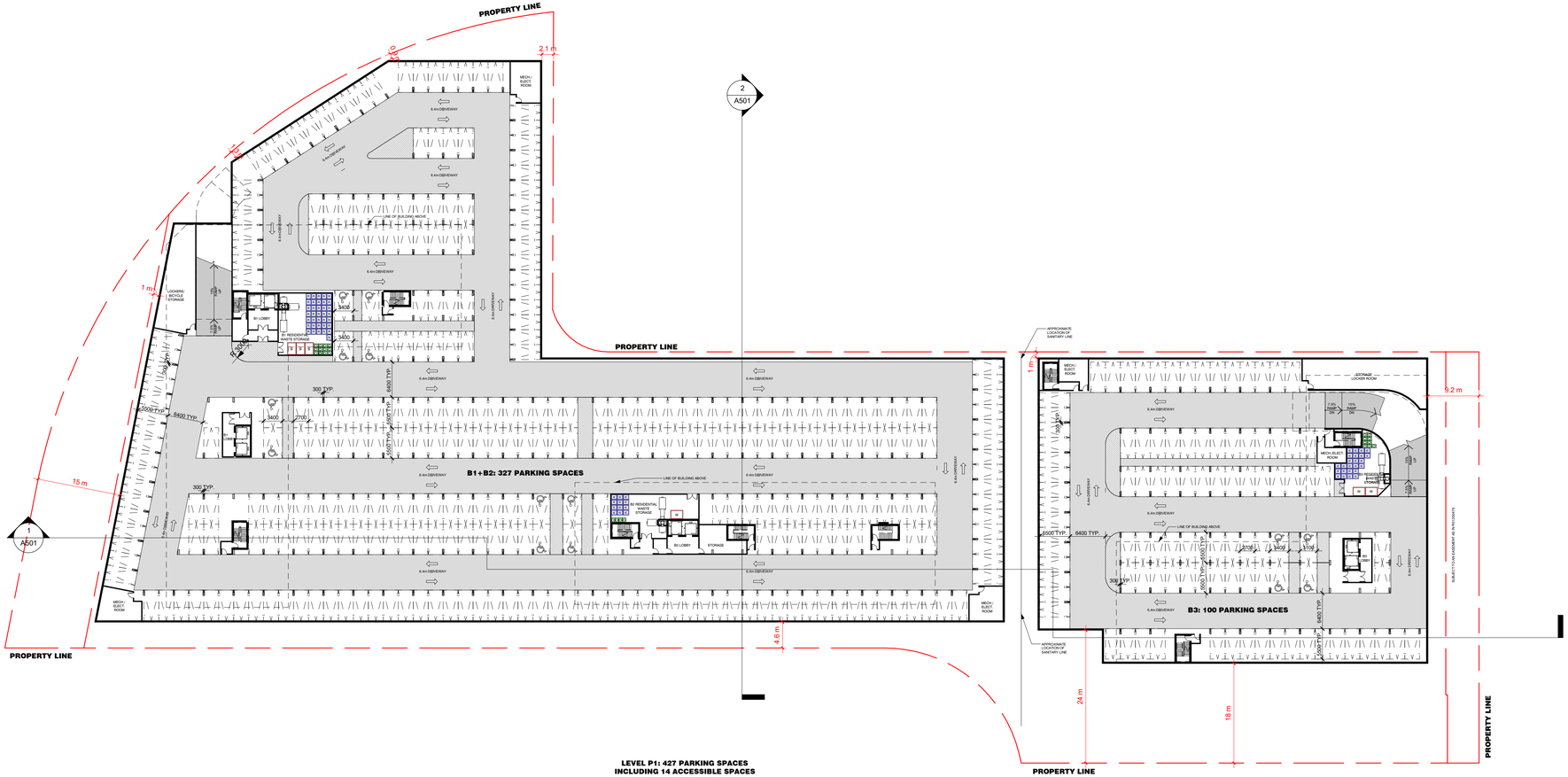


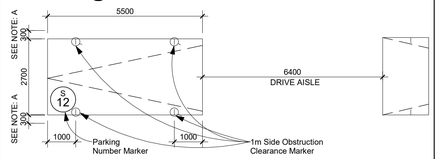
LEVEL P1 FLOOR PLAN

Scale: 1 : 450

1
A202

TYPICAL PARKING SPACE:

Drive Aisle @ 6.4m min.



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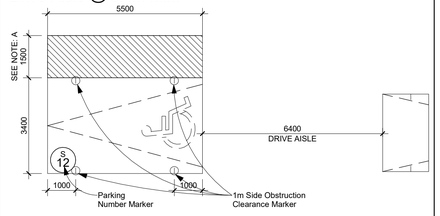
Drive Aisle @ 6.4m min.



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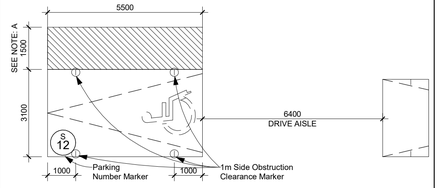
BARRIER-FREE PARKING SPACE TYPE B:



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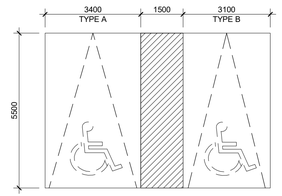

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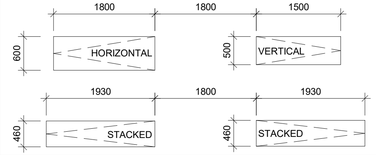

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STAMP:

CLIENT:

PENADY (NORTH BARRIE) LIMITED

PROJECT:

RESIDENTIAL RENTAL / CONDO
CUNDLES ROAD EAST
BARRIE, ON

DRAWING TITLE:

LEVEL P1 FLOOR PLAN

DATE: 01/19/22	SCALE: As indicated
DRAWN BY: Author	CHECKED BY: Checker
PROJECT NUMBER: S20035	DRAWING NUMBER: A202

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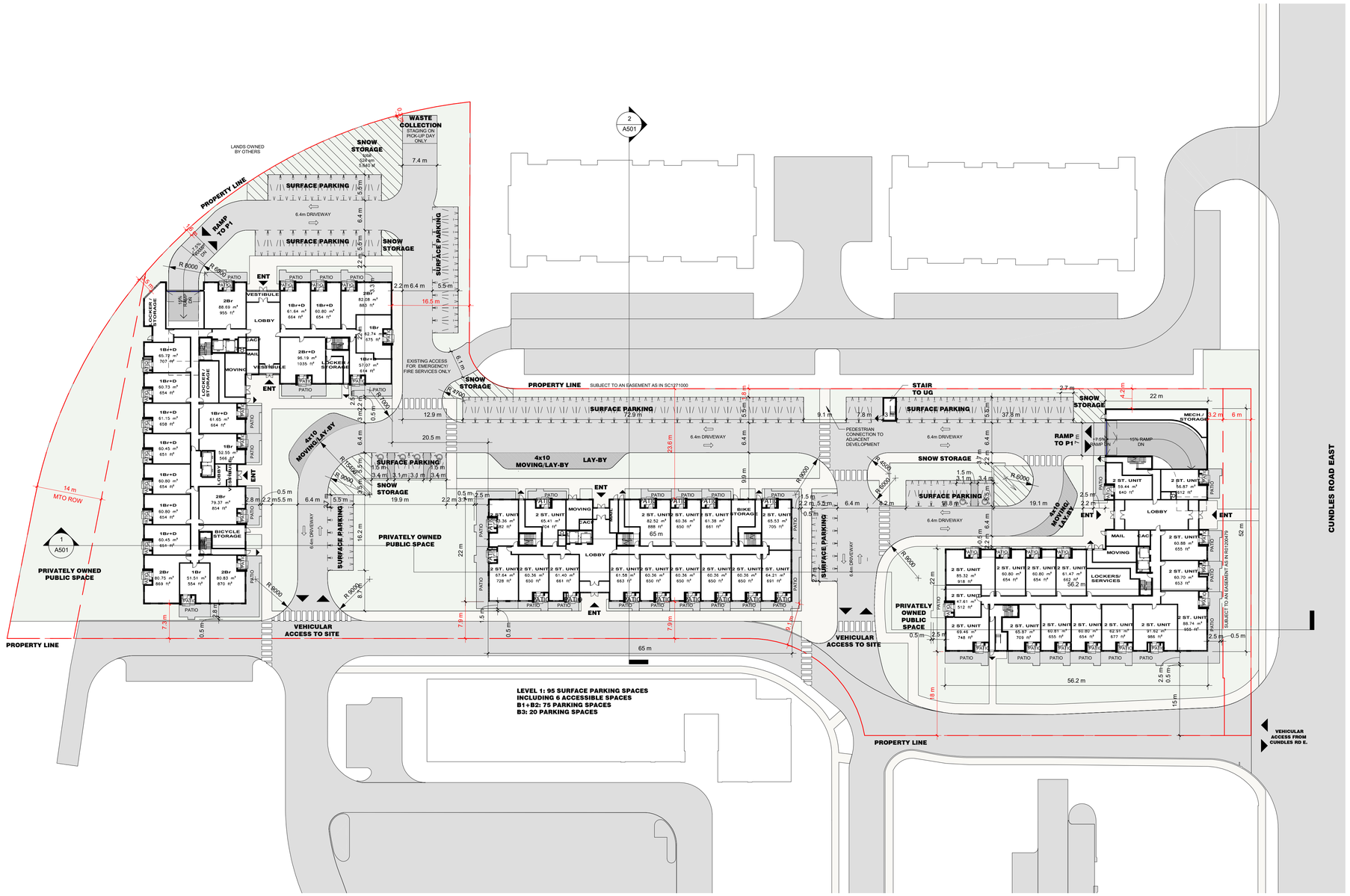


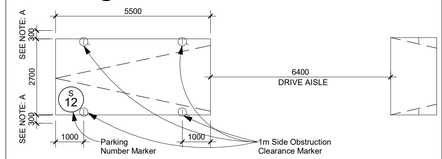
LEVEL 1 - OVERALL FLOOR PLAN

Scale: 1 : 450

1
A301

TYPICAL PARKING SPACE:

Drive Aisle @ 6.4m min.



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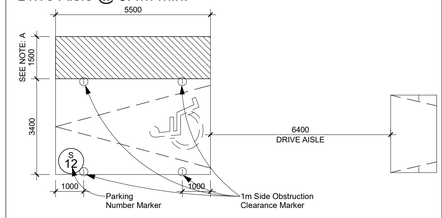
BARRIER-FREE PARKING SPACE TYPE A:

Drive Aisle @ 6.4m min.



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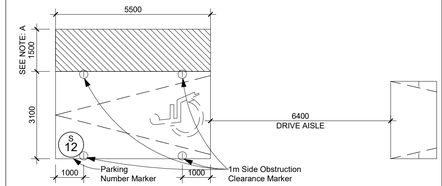
BARRIER-FREE PARKING SPACE TYPE B:



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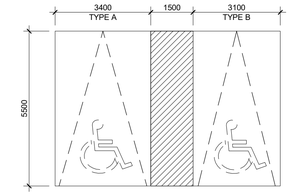

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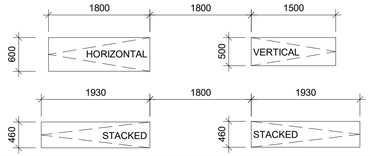

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PROJECT:

RESIDENTIAL RENTAL / CONDO
CUNDLES ROAD EAST
BARRIE, ON

DRAWING TITLE:

LEVEL 1 - OVERALL FLOOR PLAN

DATE:	01/19/22	SCALE:	As indicated
DRAWN BY:	Author	CHECKED BY:	Checker
PROJECT NUMBER:	S20035	DRAWING NUMBER:	A301

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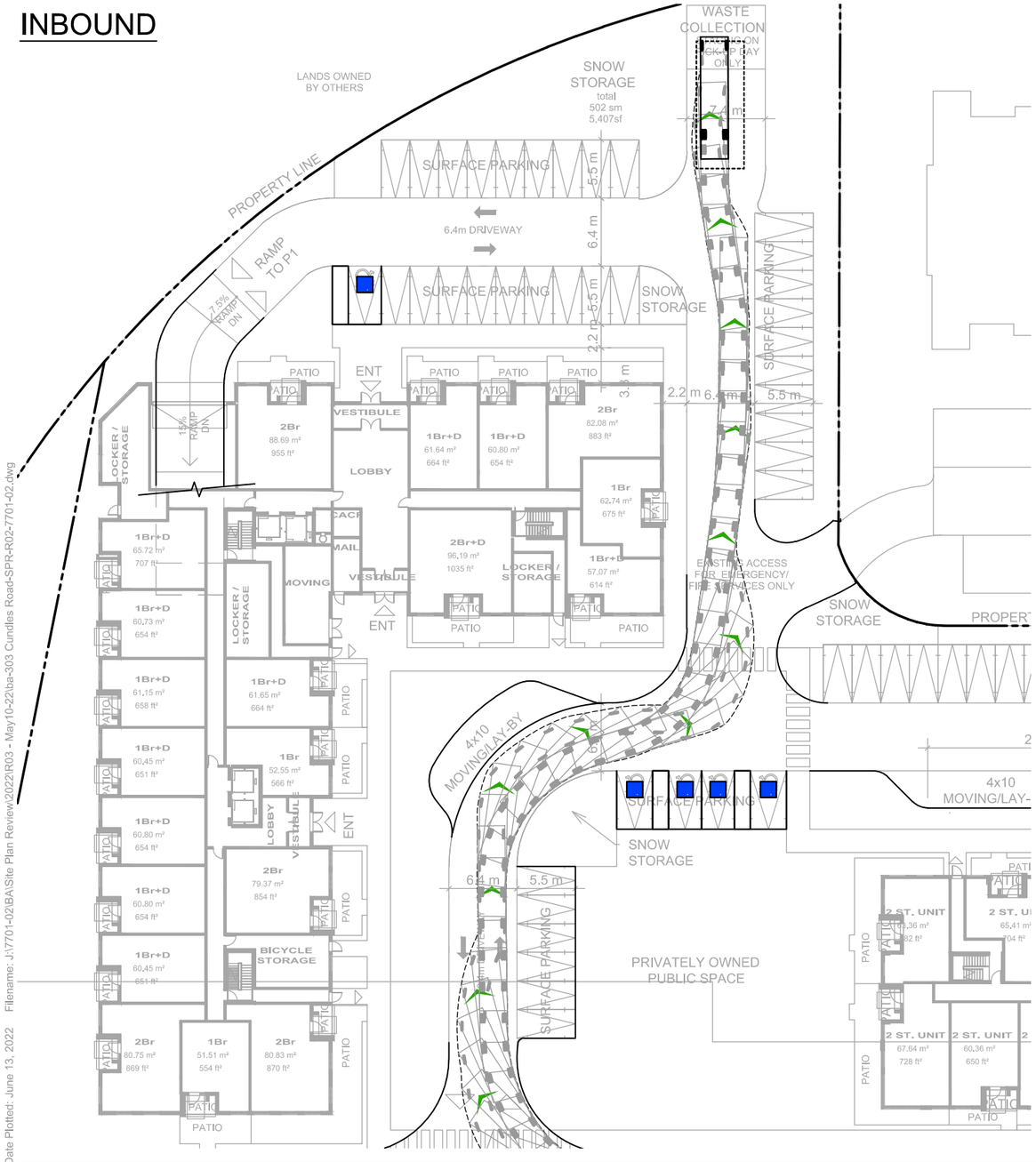
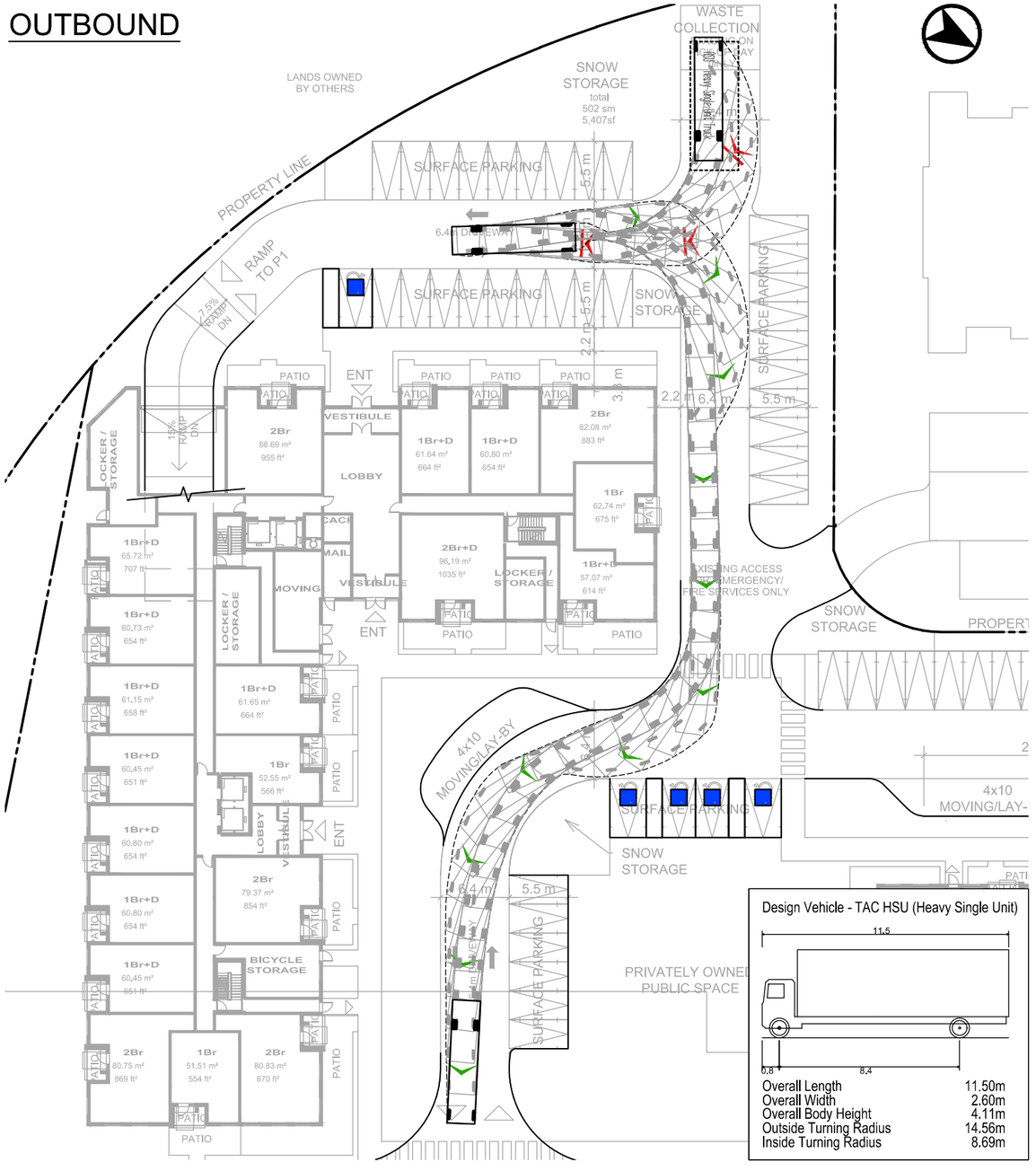
Appendix C
Vehicle Manoeuvring Diagrams

INBOUND



OUTBOUND



Design Vehicle - TAC HSU (Heavy Single Unit)

Overall Length	11.50m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	14.56m
Inside Turning Radius	8.69m

Date Plotted: June 13, 2022 Filename: J:\7701-02\BA\Site Plan Review\2022\R03 - May10-22\ba-303 Cundles Road-SPR-R02-7701-02.dwg

BA Group

303 CUNDLES ROAD

VEHICULAR MANOEUVRING DIAGRAM

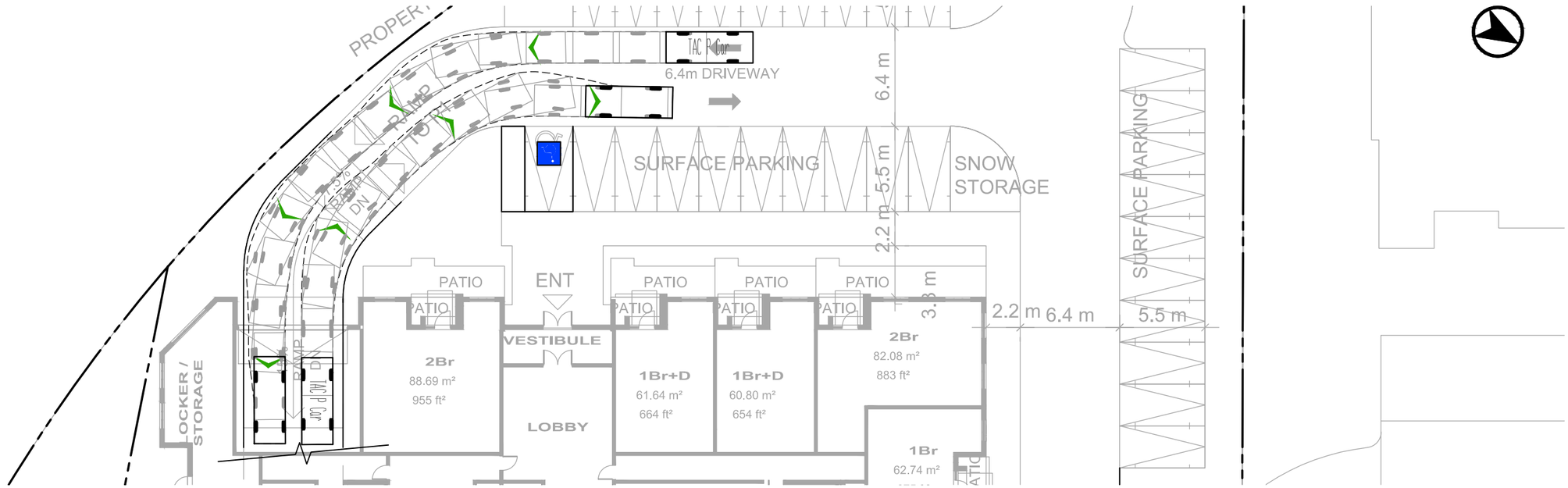
WASTE COLLECTION - TAC HEAVY SINGLE-UNIT VEHICLE

Project:	303 CUNDLES ROAD
Project No.	7701-02
Date:	JUNE 13, 2022
Revised:	–

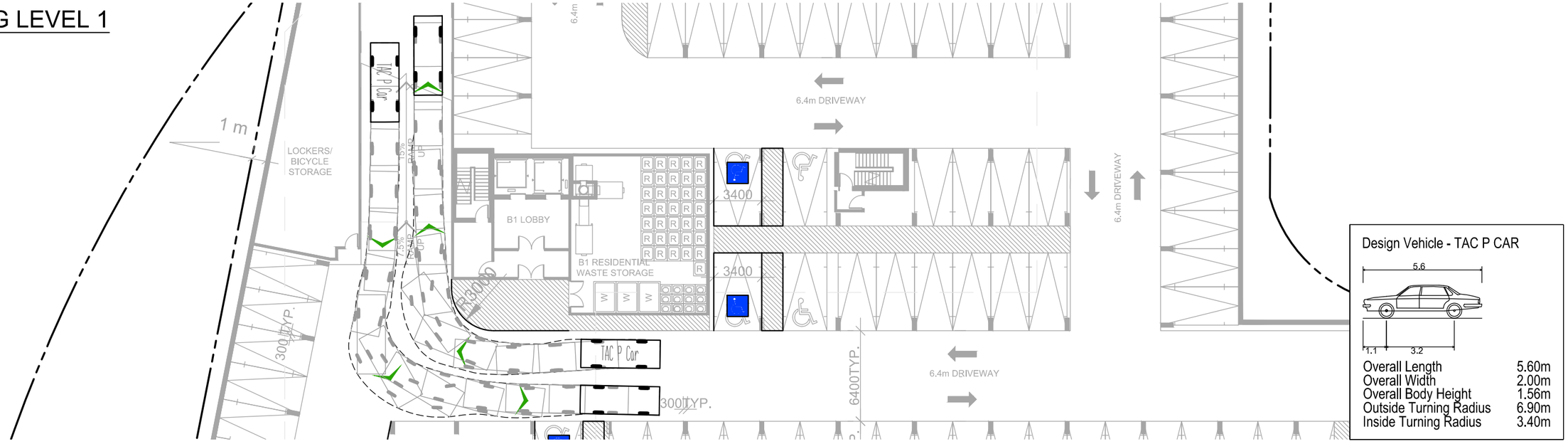
Scale 1:500 (0 5 10 15 20m)

Drawing No. VMD-01

GROUND FLOOR



PARKING LEVEL 1



Design Vehicle - TAC P CAR

Overall Length	5.60m
Overall Width	2.00m
Overall Body Height	1.56m
Outside Turning Radius	6.90m
Inside Turning Radius	3.40m

BA Group

303 CUNDLES ROAD

VEHICULAR MANOEUVRING DIAGRAM

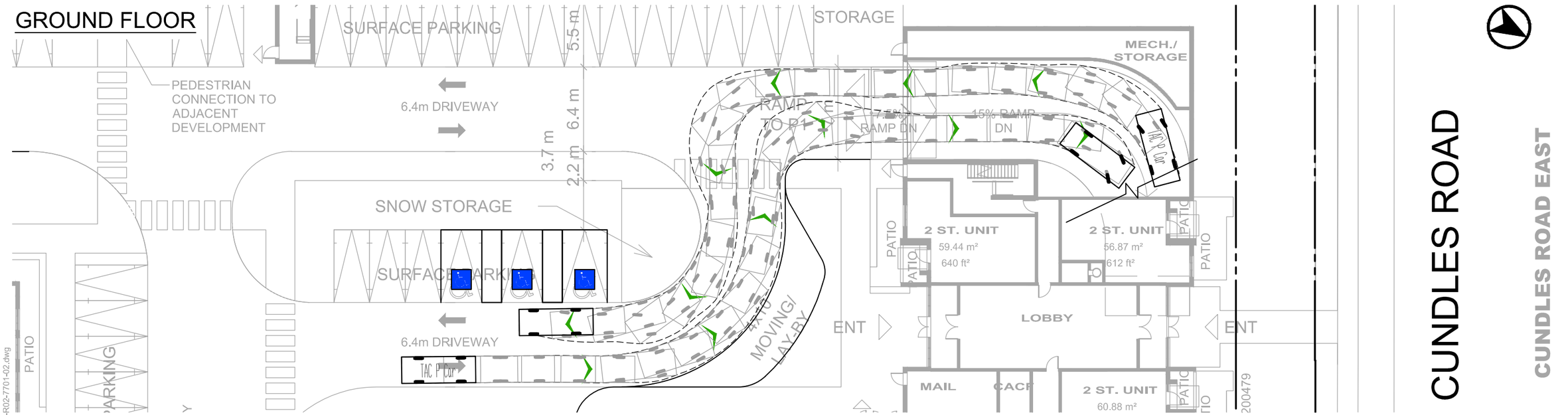
BUILDINGS 1 AND 2 PARKING RAMP - TAC P CAR

Project:	303 CUNDLES ROAD
Project No.	7701-02
Date:	JUNE 13, 2022
Revised:	–

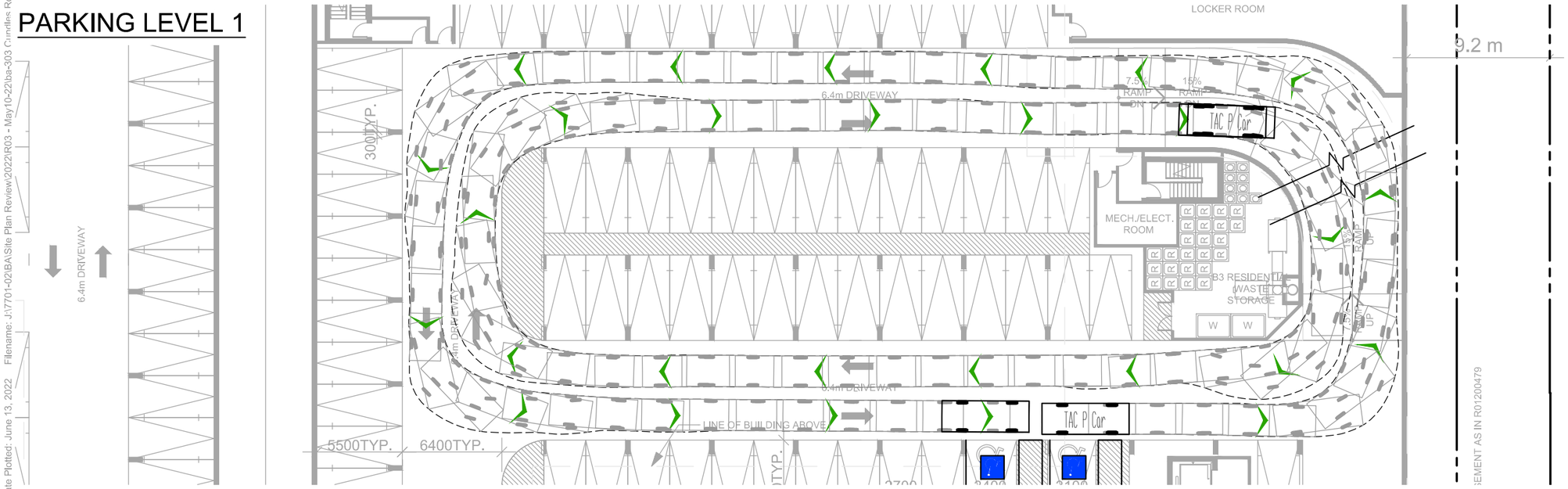
Scale 1:300 (0, 5, 10m)

Drawing No. VMD-02

GROUND FLOOR



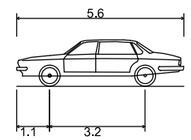
PARKING LEVEL 1



CUNDLES ROAD

CUNDLES ROAD EAST

Design Vehicle - TAC P CAR



Overall Length	5.60m
Overall Width	2.00m
Overall Body Height	1.56m
Outside Turning Radius	6.90m
Inside Turning Radius	3.40m

Date Plotted: June 13, 2022 Filename: J:\7701-02\BA\Site Plan Review\2022\R03 - May10-22\ba-303 Cundles Road-SPR-R02-7701-02.dwg

BA Group

303 CUNDLES ROAD

VEHICULAR MANOEUVRING DIAGRAM

BUILDING 3 PARKING RAMP - TAC P CAR

Project:	303 CUNDLES ROAD
Project No.	7701-02
Date:	JUNE 13, 2022
Revised:	–

Scale 1:300 (0, 5, 10m)

Drawing No. VMD-03

Appendix D
Turning Movement Counts

Spectrum

Turning Movement Count
Location Name: CUNDLES RD E & PACIFIC AVE / NORTH BARRIE CROSSING SC ACCESS
Date: Thu, Jul 08, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (1 . CUNDLES RD E & PACIFIC AVE / NORTH BARRIE CROSSING SC ACCESS)

Start Time	N Approach PACIFIC AVE						E Approach CUNDLES RD E						S Approach NORTH BARRIE CROSSING SC ACCESS						W Approach CUNDLES RD E						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	0	3	0	0	3	0	58	0	0	0	58	0	0	1	0	1	1	1	67	0	0	0	68	130	
07:15:00	0	0	0	0	1	0	1	86	1	0	0	88	0	0	3	0	2	3	0	127	0	0	0	127	218	
07:30:00	1	0	0	0	0	1	0	90	0	0	0	90	1	0	0	0	2	1	1	137	0	0	0	138	230	
07:45:00	0	0	0	0	1	0	0	104	1	0	0	105	1	0	2	0	2	3	6	134	0	0	0	140	248	826
08:00:00	1	0	1	0	0	2	0	121	1	0	0	122	0	0	0	0	1	0	3	119	2	0	0	124	248	944
08:15:00	0	0	1	0	1	1	2	104	0	0	0	106	1	0	1	0	2	2	6	132	0	0	0	138	247	973
08:30:00	1	0	1	0	0	2	0	134	1	0	0	135	1	0	3	0	1	4	4	168	0	0	0	172	313	1056
08:45:00	0	0	0	0	0	0	0	137	1	0	0	138	2	0	1	0	2	3	10	150	0	0	0	160	301	1109
09:00:00	1	1	1	0	2	3	2	145	1	0	0	148	1	0	4	0	3	5	9	126	0	0	0	135	291	1152
09:15:00	2	0	0	0	1	2	0	152	3	0	0	155	0	0	4	0	3	4	12	149	2	0	0	163	324	1229
09:30:00	0	0	0	0	3	0	0	131	0	0	0	131	1	1	4	0	1	6	6	167	1	0	0	174	311	1227
09:45:00	3	0	1	0	3	4	0	152	1	0	0	153	3	0	8	0	2	11	6	151	0	0	0	157	325	1251
10:00:00	1	0	1	0	2	2	1	150	0	0	0	151	3	0	3	0	1	6	14	123	1	0	0	138	297	1257
10:15:00	1	0	0	0	2	1	3	183	0	0	0	186	1	0	5	0	1	6	10	158	0	0	0	168	361	1294
10:30:00	1	0	0	0	0	1	1	160	1	0	0	162	2	0	6	0	1	8	16	162	0	0	0	178	349	1332
10:45:00	2	0	0	0	0	2	2	188	1	0	0	191	0	0	8	0	0	8	11	174	0	0	0	185	386	1393
11:00:00	0	0	0	0	0	0	0	187	1	0	0	188	3	0	2	0	0	5	7	154	0	0	0	161	354	1450
11:15:00	0	0	0	0	0	0	3	188	0	0	0	191	3	0	3	0	1	6	12	153	1	0	0	166	363	1452
11:30:00	0	0	1	0	0	1	1	190	0	0	0	191	5	0	7	0	1	12	18	163	1	0	0	182	386	1489
11:45:00	5	0	0	0	0	5	1	189	2	0	0	192	0	0	6	0	1	6	15	154	0	0	0	169	372	1475
12:00:00	0	0	0	0	0	0	0	163	2	0	0	165	4	0	10	0	1	14	13	140	3	0	0	156	335	1456
12:15:00	0	0	0	0	0	0	0	207	2	0	0	209	0	1	10	0	0	11	21	182	1	0	0	204	424	1517
12:30:00	0	0	1	0	0	1	1	179	2	0	0	182	0	0	9	0	0	9	28	167	2	0	0	197	389	1520
12:45:00	1	0	1	0	0	2	1	190	4	0	0	195	6	0	9	0	0	15	16	170	2	0	0	188	400	1548
13:00:00	1	0	0	0	1	1	1	200	1	0	0	202	3	0	5	0	2	8	19	169	0	0	0	188	399	1612
13:15:00	1	0	1	0	0	2	1	189	5	0	1	195	1	0	15	0	1	16	23	191	0	0	0	214	427	1615
13:30:00	0	0	0	0	3	0	0	182	2	0	0	184	1	0	11	0	1	12	14	196	0	0	0	210	406	1632
13:45:00	1	0	1	0	1	2	0	198	2	0	0	200	3	0	7	0	1	10	15	180	0	0	0	195	407	1639
14:00:00	1	0	1	0	1	2	2	193	4	0	0	199	5	0	10	0	4	15	21	181	0	0	0	202	418	1658
14:15:00	1	0	0	0	0	1	4	195	1	0	0	200	2	0	9	0	1	11	19	200	1	0	0	220	432	1663
14:30:00	0	0	3	0	0	3	1	214	0	0	0	215	5	0	7	0	2	12	20	205	0	0	0	225	455	1712
14:45:00	2	0	1	0	1	3	2	243	1	0	0	246	4	0	3	0	1	7	22	177	0	0	0	199	455	1760
15:00:00	1	0	1	0	2	2	1	230	0	0	0	231	3	0	8	0	3	11	23	189	2	0	0	214	458	1800
15:15:00	0	0	0	0	1	0	0	221	0	0	0	221	3	0	10	0	3	13	17	193	1	0	0	211	445	1813
15:30:00	1	0	0	0	2	1	1	237	2	0	0	240	4	0	4	0	3	8	24	178	0	0	0	202	451	1809
15:45:00	2	0	0	0	1	2	0	243	1	0	0	244	3	0	10	0	2	13	22	169	4	0	0	195	454	1808
16:00:00	4	0	0	0	3	4	2	243	1	0	0	246	2	0	7	0	1	9	23	212	2	0	0	237	496	1846
16:15:00	0	0	0	0	1	0	1	274	1	0	0	276	4	0	10	0	3	14	23	197	4	0	0	224	514	1915
16:30:00	2	0	1	0	0	3	2	233	3	0	0	238	3	0	12	0	1	15	17	225	0	0	0	242	498	1962
16:45:00	1	0	2	0	1	3	1	213	4	0	0	218	1	0	21	0	2	22	27	187	0	0	1	214	457	1965
17:00:00	0	0	0	0	0	0	1	259	1	0	0	261	1	0	6	0	3	7	23	207	0	0	0	230	498	1967
17:15:00	0	0	1	0	4	1	0	280	2	0	0	282	5	0	12	0	0	17	30	216	4	0	0	250	550	2003
17:30:00	0	0	1	0	3	1	2	218	3	0	0	223	3	0	16	0	7	19	21	211	2	0	0	234	477	1982
17:45:00	0	0	0	0	0	0	1	201	1	0	0	203	5	2	8	0	1	15	16	182	1	0	0	199	417	1942
18:00:00	1	0	0	0	0	1	0	189	2	0	0	191	4	0	14	0	13	18	19	178	0	0	0	197	407	1851

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

18:15:00	0	0	0	0	2	0	1	153	3	0	0	157	2	0	8	0	3	10	22	183	0	0	0	205	372	1673
18:30:00	1	0	0	0	0	1	1	144	3	0	0	148	6	0	8	0	4	14	11	151	2	0	0	164	327	1523
18:45:00	0	0	0	0	1	0	1	157	0	0	2	158	3	0	11	0	1	14	23	149	1	0	2	173	345	1451
19:00:00	0	0	0	0	0	0	0	142	1	0	0	143	1	0	14	0	2	15	14	154	2	0	0	170	328	1372
19:15:00	1	0	0	0	2	1	0	177	3	0	0	180	2	1	9	0	2	12	11	132	0	0	0	143	336	1336
19:30:00	2	0	1	0	1	3	0	126	2	0	0	128	1	1	18	0	2	20	18	112	0	0	0	130	281	1290
19:45:00	0	0	0	0	3	0	0	118	4	0	0	122	3	0	11	0	10	14	18	111	1	0	0	130	266	1211
Grand Total	43	1	26	0	50	70	45	9260	78	0	3	9383	121	6	393	0	108	520	800	8562	43	0	3	9405	**19378**	-
Approach%	61.4%	1.4%	37.1%	0%		-	0.5%	98.7%	0.8%	0%		-	23.3%	1.2%	75.6%	0%		-	8.5%	91%	0.5%	0%		-	**-**	-
Totals %	0.2%	0%	0.1%	0%		0.4%	0.2%	47.8%	0.4%	0%		48.4%	0.6%	0%	2%	0%		2.7%	4.1%	44.2%	0.2%	0%		48.5%	**-**	-
Heavy	0	0	0	0		-	2	136	3	0		-	2	0	3	0		-	6	140	0	0		-	**-**	-
Heavy %	0%	0%	0%	0%		-	4.4%	1.5%	3.8%	0%		-	1.7%	0%	0.8%	0%		-	0.8%	1.6%	0%	0%		-	**-**	-
Bicycles	0	0	0	0		-	0	2	0	0		-	0	0	0	0		-	7	6	0	0		-	**-**	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0.9%	0.1%	0%	0%		-	**-**	-

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (12.97 °C)

Start Time	N Approach PACIFIC AVE						E Approach CUNDLES RD E						S Approach NORTH BARRIE CROSSING SC ACCESS						W Approach CUNDLES RD E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	2	0	1	0	0	3	2	233	3	0	0	238	3	0	12	0	1	15	17	225	0	0	0	242	498
16:45:00	1	0	2	0	1	3	1	213	4	0	0	218	1	0	21	0	2	22	27	187	0	0	1	214	457
17:00:00	0	0	0	0	0	0	1	259	1	0	0	261	1	0	6	0	3	7	23	207	0	0	0	230	498
17:15:00	0	0	1	0	4	1	0	280	2	0	0	282	5	0	12	0	0	17	30	216	4	0	0	250	550
Grand Total	3	0	4	0	5	7	4	985	10	0	0	999	10	0	51	0	6	61	97	835	4	0	1	936	**2003**
Approach%	42.9%	0%	57.1%	0%		-	0.4%	98.6%	1%	0%		-	16.4%	0%	83.6%	0%		-	10.4%	89.2%	0.4%	0%		-	**-**
Totals %	0.1%	0%	0.2%	0%		0.3%	0.2%	49.2%	0.5%	0%		49.9%	0.5%	0%	2.5%	0%		3%	4.8%	41.7%	0.2%	0%		46.7%	**-**
PHF	0.38	0	0.5	0		0.58	0.5	0.88	0.63	0		0.89	0.5	0	0.61	0		0.69	0.81	0.93	0.25	0		0.94	**-**
Heavy	0	0	0	0		0	0	10	0	0		10	0	0	0	0		0	0	4	0	0		4	**-**
Heavy %	0%	0%	0%	0%		0%	0%	1%	0%	0%		1%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	**-**
Lights	3	0	4	0		7	4	975	10	0		989	10	0	51	0		61	97	831	4	0		932	**-**
Lights %	100%	0%	100%	0%		100%	100%	99%	100%	0%		99%	100%	0%	100%	0%		100%	100%	99.5%	100%	0%		99.6%	**-**
Single-Unit Trucks	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	2	0	0		2	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	**-**
Buses	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	2	0	0		2	**-**
Buses %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	33.3%		-	-	-	-	0%		-	-	-	-	50%		-	-	-	-	8.3%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	8.3%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: CUNDLES RD E & PACIFIC AVE / NORTH BARRIE CROSSING SC ACCESS
Date: Thu, Jul 08, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Selected Hour: 08:30 AM - 09:30 AM **Weather:**

Start Time	N Approach PACIFIC AVE						E Approach CUNDLES RD E						S Approach NORTH BARRIE CROSSING SC ACCESS						W Approach CUNDLES RD E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	1	0	1	0	0	2	0	134	1	0	0	135	1	0	3	0	1	4	4	168	0	0	0	172	313
08:45:00	0	0	0	0	0	0	0	137	1	0	0	138	2	0	1	0	2	3	10	150	0	0	0	160	301
09:00:00	1	1	1	0	2	3	2	145	1	0	0	148	1	0	4	0	3	5	9	126	0	0	0	135	291
09:15:00	2	0	0	0	1	2	0	152	3	0	0	155	0	0	4	0	3	4	12	149	2	0	0	163	324
Grand Total	4	1	2	0	3	7	2	568	6	0	0	576	4	0	12	0	9	16	35	593	2	0	0	630	**1229**
Approach%	57.1%	14.3%	28.6%	0%		-	0.3%	98.6%	1%	0%		-	25%	0%	75%	0%		-	5.6%	94.1%	0.3%	0%		-	**-**
Totals %	0.3%	0.1%	0.2%	0%		0.6%	0.2%	46.2%	0.5%	0%		46.9%	0.3%	0%	1%	0%		1.3%	2.8%	48.3%	0.2%	0%		51.3%	**-**
PHF	0.5	0.25	0.5	0		0.58	0.25	0.93	0.5	0		0.93	0.5	0	0.75	0		0.8	0.73	0.88	0.25	0		0.92	**-**
Heavy	0	0	0	0		0	0	16	0	0		16	0	0	0	0		0	0	15	0	0		15	**-**
Heavy %	0%	0%	0%	0%		0%	0%	2.8%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	2.5%	0%	0%		2.4%	**-**
Lights	4	1	2	0		7	2	552	6	0		560	4	0	12	0		16	35	578	2	0		615	**-**
Lights %	100%	100%	100%	0%		100%	100%	97.2%	100%	0%		97.2%	100%	0%	100%	0%		100%	100%	97.5%	100%	0%		97.6%	**-**
Single-Unit Trucks	0	0	0	0		0	0	7	0	0		7	0	0	0	0		0	0	8	0	0		8	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.3%	**-**
Buses	0	0	0	0		0	0	7	0	0		7	0	0	0	0		0	0	6	0	0		6	**-**
Buses %	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	1%	0%	0%		1%	**-**
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	1	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	**-**
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	7	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	25%		-	-	-	-	0%		-	-	-	-	58.3%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	16.7%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

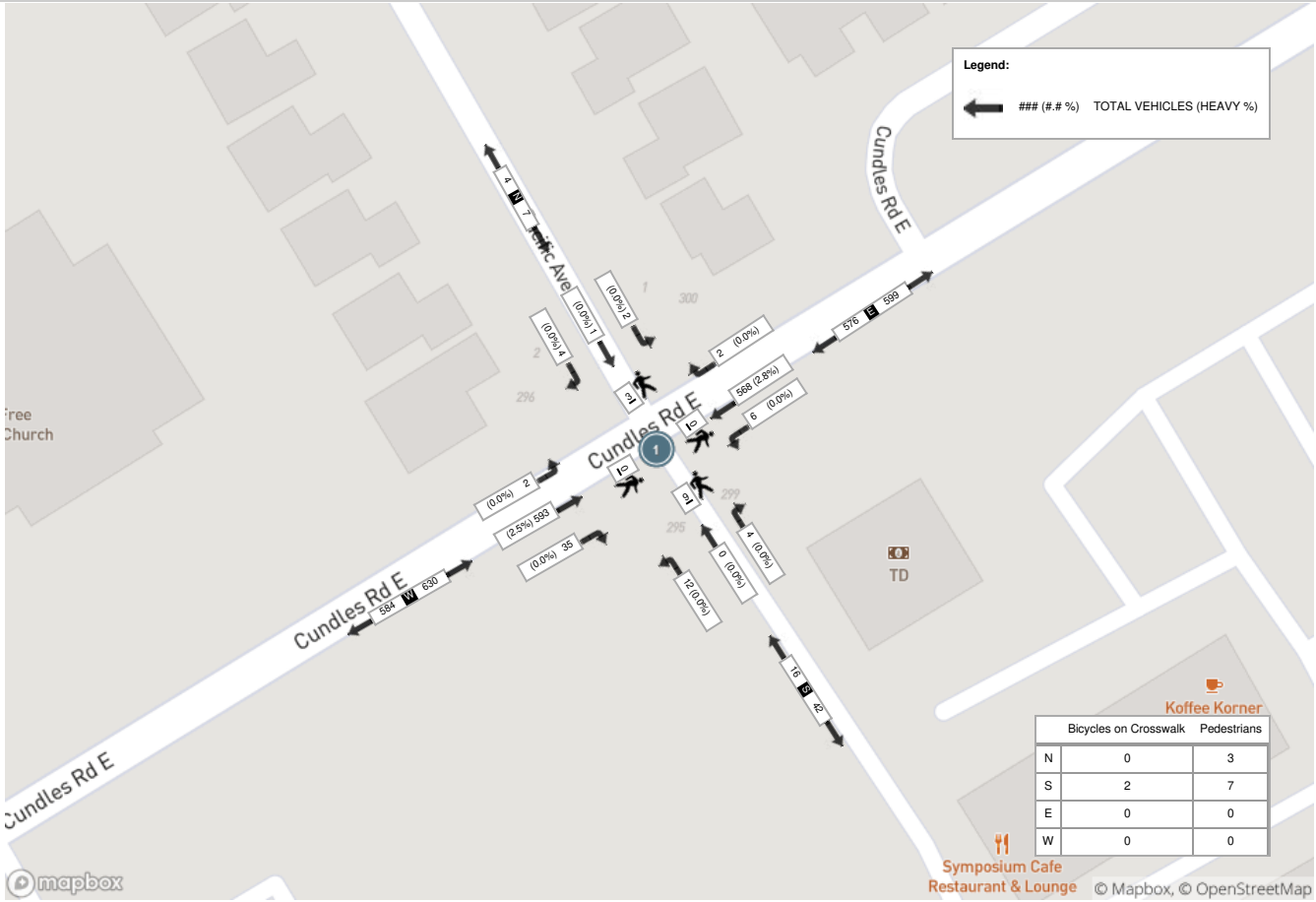
BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM **Weather: Overcast Clouds (12.97 °C)**

	Bicycles on Crosswalk	Pedestrians
N	1	4
S	0	6
E	0	0
W	0	1

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Selected Hour: 08:30 AM - 09:30 AM **Weather:**



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	2	7
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: CUNDLES RD E & LIONS GATE BLVD / NORTH BARRIE CROSSING SC ACCESS
Date: Thu, Jul 08, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (2 . CUNDLES RD E & LIONS GATE BLVD / NORTH BARRIE CROSSING SC ACCESS)

Start Time	N Approach LIONS GATE BLVD						E Approach CUNDLES RD E						S Approach NORTH BARRIE CROSSING SC ACCESS						W Approach CUNDLES RD E						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	1	0	0	1	1	1	55	2	0	0	58	1	0	2	0	1	3	3	62	0	0	0	65	127	
07:15:00	0	0	2	0	0	2	0	87	3	0	0	90	3	0	2	0	1	5	11	118	0	0	0	129	226	
07:30:00	0	0	8	0	0	8	2	80	1	0	0	83	1	1	5	0	1	7	9	128	0	0	0	137	235	
07:45:00	0	0	4	0	2	4	1	99	6	0	0	106	4	0	5	0	2	9	12	119	1	0	0	132	251	839
08:00:00	0	0	1	0	0	1	0	101	4	0	0	105	7	0	9	0	1	16	8	117	0	0	0	125	247	959
08:15:00	0	1	3	0	2	4	0	111	2	0	0	113	3	1	4	0	1	8	8	126	0	0	0	134	259	992
08:30:00	0	0	6	0	0	6	1	117	3	0	0	121	3	0	14	0	1	17	15	153	0	0	0	168	312	1069
08:45:00	1	1	4	0	0	6	2	135	0	0	0	137	3	1	7	0	0	11	20	127	1	0	0	148	302	1120
09:00:00	1	0	3	0	2	4	4	128	5	0	0	137	6	0	9	0	0	15	17	108	1	0	1	126	282	1155
09:15:00	0	0	3	0	2	3	1	135	7	0	0	143	9	1	25	0	0	35	33	117	0	0	0	150	331	1227
09:30:00	1	1	2	0	1	4	0	121	9	0	0	130	6	1	10	0	0	17	31	138	0	0	0	169	320	1235
09:45:00	1	2	4	0	2	7	2	133	8	0	0	143	9	1	18	0	0	28	26	124	1	0	2	151	329	1262
10:00:00	1	2	1	0	3	4	2	116	12	0	0	130	12	1	31	0	0	44	19	103	0	0	1	122	300	1280
10:15:00	0	1	3	0	0	4	2	150	3	0	1	155	20	0	30	0	1	50	37	122	0	0	0	159	368	1317
10:30:00	1	1	2	0	0	4	2	148	10	0	0	160	14	0	26	0	0	40	29	136	1	0	0	166	370	1367
10:45:00	2	0	1	0	0	3	3	159	15	0	0	177	13	0	20	0	0	33	38	135	1	0	0	174	387	1425
11:00:00	1	2	2	0	0	5	2	162	9	0	0	173	17	2	31	0	2	50	29	122	1	0	0	152	380	1505
11:15:00	1	0	0	0	0	1	4	153	7	0	0	164	27	1	27	0	0	55	33	122	0	0	0	155	375	1512
11:30:00	1	1	2	0	0	4	3	168	8	0	0	179	16	1	30	0	1	47	37	129	1	0	0	167	397	1539
11:45:00	1	1	3	0	0	5	3	164	14	0	0	181	12	1	21	0	0	34	42	115	0	0	0	157	377	1529
12:00:00	1	1	2	0	0	4	3	138	19	0	2	160	12	3	26	0	0	41	37	104	0	0	0	141	346	1495
12:15:00	0	0	2	0	0	2	1	180	10	0	0	191	22	2	33	0	0	57	47	135	0	0	0	182	432	1552
12:30:00	0	2	1	0	3	3	0	154	10	0	0	164	25	0	20	0	0	45	47	120	0	0	0	167	379	1534
12:45:00	2	2	3	0	0	7	2	161	15	0	0	178	23	0	37	0	0	60	30	147	0	0	0	177	422	1579
13:00:00	0	0	2	0	1	2	2	158	12	0	0	172	21	1	37	0	1	59	57	114	2	0	1	173	406	1639
13:15:00	0	2	5	0	0	7	5	144	9	0	0	158	23	1	38	0	0	62	42	149	0	0	0	191	418	1625
13:30:00	0	0	3	0	2	3	1	166	13	0	0	180	24	1	33	0	0	58	48	143	0	0	0	191	432	1678
13:45:00	1	1	2	0	2	4	3	163	10	0	2	176	20	2	31	0	2	53	41	144	1	0	0	186	419	1675
14:00:00	1	1	1	0	1	3	5	161	11	0	0	177	20	0	39	0	2	59	51	139	0	0	0	190	429	1698
14:15:00	0	1	4	0	1	5	1	165	6	0	0	172	18	2	31	0	0	51	50	149	0	0	0	199	427	1707
14:30:00	1	1	1	0	0	3	1	171	11	0	0	183	32	0	54	0	0	86	48	159	0	0	0	207	479	1754
14:45:00	2	0	5	0	2	7	4	191	18	0	1	213	24	0	50	0	0	74	48	141	1	0	0	190	484	1819
15:00:00	0	1	1	0	0	2	2	186	14	0	0	202	21	3	41	0	1	65	53	142	1	0	0	196	465	1855
15:15:00	0	2	1	0	0	3	3	194	15	0	0	212	20	1	40	0	1	61	42	150	0	0	0	192	468	1896
15:30:00	1	0	0	0	0	1	2	191	11	1	0	205	18	1	35	0	0	54	50	131	1	0	0	182	442	1859
15:45:00	0	0	4	0	1	4	3	211	13	0	0	227	18	0	47	0	0	65	32	144	0	0	2	176	472	1847
16:00:00	1	0	3	0	1	4	3	197	16	0	0	216	25	2	40	0	0	67	43	165	0	0	2	208	495	1877
16:15:00	0	0	3	0	0	3	4	229	14	0	0	247	32	2	47	0	0	81	56	149	0	0	0	205	536	1945
16:30:00	0	1	2	0	2	3	7	191	18	0	1	216	30	0	44	0	0	74	43	180	0	0	1	223	516	2019
16:45:00	1	1	2	0	0	4	1	175	18	0	0	194	35	0	36	0	2	71	54	137	0	0	1	191	460	2007
17:00:00	0	0	0	0	1	0	10	221	15	0	0	246	19	0	34	0	1	53	50	155	0	0	0	205	504	2016
17:15:00	2	0	3	0	3	5	8	225	23	0	0	256	33	1	55	0	0	89	60	163	1	0	0	224	574	2054
17:30:00	0	1	2	0	0	3	3	187	8	0	0	198	28	1	38	0	0	67	58	159	0	0	0	217	485	2023
17:45:00	0	1	2	0	0	3	3	157	16	0	0	176	33	1	47	0	1	81	42	141	2	0	0	185	445	2008
18:00:00	1	1	4	0	0	6	3	153	13	0	0	169	18	0	42	0	1	60	45	130	0	0	0	175	410	1914

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

18:15:00	3	1	1	0	2	5	2	119	13	0	0	134	25	2	36	0	0	63	47	146	1	0	0	194	396	1736
18:30:00	0	2	2	0	2	4	0	113	14	0	0	127	28	1	36	0	0	65	33	117	3	0	0	153	349	1600
18:45:00	0	1	1	0	3	2	2	126	12	1	0	141	19	2	32	0	0	53	22	130	1	0	1	153	349	1504
19:00:00	1	0	0	0	4	1	0	117	9	0	0	126	16	0	31	0	0	47	35	120	0	0	0	155	329	1423
19:15:00	0	1	2	0	3	3	3	133	12	0	0	148	17	0	36	0	2	53	31	99	0	0	0	130	334	1361
19:30:00	0	1	1	0	1	2	3	97	8	0	0	108	20	0	30	0	1	50	31	87	1	0	0	119	279	1291
19:45:00	0	0	1	0	3	1	3	95	9	0	0	107	29	0	31	0	1	60	22	91	0	0	0	113	281	1223
Grand Total	30	39	120	0	53	189	128	7791	543	2	7	8464	934	41	1533	0	28	2508	1852	6801	23	0	12	8676	**19837**	-
Approach%	15.9%	20.6%	63.5%	0%		-	1.5%	92%	6.4%	0%		-	37.2%	1.6%	61.1%	0%		-	21.3%	78.4%	0.3%	0%		-	**-**	-
Totals %	0.2%	0.2%	0.6%	0%		1%	0.6%	39.3%	2.7%	0%		42.7%	4.7%	0.2%	7.7%	0%		12.6%	9.3%	34.3%	0.1%	0%		43.7%	**-**	-
Heavy	1	1	1	0		-	2	120	7	0		-	18	1	16	0		-	19	126	0	0		-	**-**	-
Heavy %	3.3%	2.6%	0.8%	0%		-	1.6%	1.5%	1.3%	0%		-	1.9%	2.4%	1%	0%		-	1%	1.9%	0%	0%		-	**-**	-
Bicycles	0	0	0	0		-	0	2	0	0		-	0	1	0	0		-	2	2	0	0		-	**-**	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	2.4%	0%	0%		-	0.1%	0%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: CUNDLES RD E & LIONS GATE BLVD / NORTH BARRIE CROSSING SC ACCESS
Date: Thu, Jul 08, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (12.97 °C)

Start Time	N Approach LIONS GATE BLVD						E Approach CUNDLES RD E						S Approach NORTH BARRIE CROSSING SC ACCESS						W Approach CUNDLES RD E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	0	1	2	0	2	3	7	191	18	0	1	216	30	0	44	0	0	74	43	180	0	0	1	223	516
16:45:00	1	1	2	0	0	4	1	175	18	0	0	194	35	0	36	0	2	71	54	137	0	0	1	191	460
17:00:00	0	0	0	0	1	0	10	221	15	0	0	246	19	0	34	0	1	53	50	155	0	0	0	205	504
17:15:00	2	0	3	0	3	5	8	225	23	0	0	256	33	1	55	0	0	89	60	163	1	0	0	224	574
Grand Total	3	2	7	0	6	12	26	812	74	0	1	912	117	1	169	0	3	287	207	635	1	0	2	843	**2054**
Approach%	25%	16.7%	58.3%	0%		-	2.9%	89%	8.1%	0%		-	40.8%	0.3%	58.9%	0%		-	24.6%	75.3%	0.1%	0%		-	**-**
Totals %	0.1%	0.1%	0.3%	0%		0.6%	1.3%	39.5%	3.6%	0%		44.4%	5.7%	0%	8.2%	0%		14%	10.1%	30.9%	0%	0%		41%	**-**
PHF	0.38	0.5	0.58	0		0.6	0.65	0.9	0.8	0		0.89	0.84	0.25	0.77	0		0.81	0.86	0.88	0.25	0		0.94	**-**
Heavy	0	0	0	0		0	0	9	1	0		10	0	0	0	0		0	0	4	0	0		4	**-**
Heavy %	0%	0%	0%	0%		0%	0%	1.1%	1.4%	0%		1.1%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.5%	**-**
Lights	3	2	7	0		12	26	803	73	0		902	117	1	169	0		287	207	631	1	0		839	**-**
Lights %	100%	100%	100%	0%		100%	100%	98.9%	98.6%	0%		98.9%	100%	100%	100%	0%		100%	100%	99.4%	100%	0%		99.5%	**-**
Single-Unit Trucks	0	0	0	0		0	0	4	1	0		5	0	0	0	0		0	0	2	0	0		2	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.5%	1.4%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	**-**
Buses	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	2	0	0		2	**-**
Buses %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	41.7%		-	-	-	-	8.3%		-	-	-	-	25%		-	-	-	-	16.7%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	8.3%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: CUNDLES RD E & LIONS GATE BLVD / NORTH BARRIE CROSSING SC ACCESS
Date: Thu, Jul 08, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Selected Hour: 08:30 AM - 09:30 AM **Weather:**

Start Time	N Approach LIONS GATE BLVD						E Approach CUNDLES RD E						S Approach NORTH BARRIE CROSSING SC ACCESS						W Approach CUNDLES RD E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	0	0	6	0	0	6	1	117	3	0	0	121	3	0	14	0	1	17	15	153	0	0	0	168	312
08:45:00	1	1	4	0	0	6	2	135	0	0	0	137	3	1	7	0	0	11	20	127	1	0	0	148	302
09:00:00	1	0	3	0	2	4	4	128	5	0	0	137	6	0	9	0	0	15	17	108	1	0	1	126	282
09:15:00	0	0	3	0	2	3	1	135	7	0	0	143	9	1	25	0	0	35	33	117	0	0	0	150	331
Grand Total	2	1	16	0	4	19	8	515	15	0	0	538	21	2	55	0	1	78	85	505	2	0	1	592	**1227**
Approach%	10.5%	5.3%	84.2%	0%		-	1.5%	95.7%	2.8%	0%		-	26.9%	2.6%	70.5%	0%		-	14.4%	85.3%	0.3%	0%		-	**-**
Totals %	0.2%	0.1%	1.3%	0%		1.5%	0.7%	42%	1.2%	0%		43.8%	1.7%	0.2%	4.5%	0%		6.4%	6.9%	41.2%	0.2%	0%		48.2%	**-**
PHF	0.5	0.25	0.67	0		0.79	0.5	0.95	0.54	0		0.94	0.58	0.5	0.55	0		0.56	0.64	0.83	0.5	0		0.88	**-**
Heavy	0	0	0	0		0	0	12	0	0		12	2	0	2	0		4	1	14	0	0		15	**-**
Heavy %	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		2.2%	9.5%	0%	3.6%	0%		5.1%	1.2%	2.8%	0%	0%		2.5%	**-**
Lights	2	1	16	0		19	8	503	15	0		526	19	2	53	0		74	84	491	2	0		577	**-**
Lights %	100%	100%	100%	0%		100%	100%	97.7%	100%	0%		97.8%	90.5%	100%	96.4%	0%		94.9%	98.8%	97.2%	100%	0%		97.5%	**-**
Single-Unit Trucks	0	0	0	0		0	0	6	0	0		6	1	0	1	0		2	1	7	0	0		8	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		1.1%	4.8%	0%	1.8%	0%		2.6%	1.2%	1.4%	0%	0%		1.4%	**-**
Buses	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	6	0	0		6	**-**
Buses %	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		1%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	1	0	1	0		2	0	1	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	4.8%	0%	1.8%	0%		2.6%	0%	0.2%	0%	0%		0.2%	**-**
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	66.7%		-	-	-	-	0%		-	-	-	-	16.7%		-	-	-	-	16.7%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (12.97 °C)

	Bicycles on Crosswalk	Pedestrians
N	1	5
S	0	3
E	0	1
W	0	2

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Selected Hour: 08:30 AM - 09:30 AM **Weather:**

	Bicycles on Crosswalk	Pedestrians
N	0	4
S	0	1
E	0	0
W	0	1

Trans-Plan Transportation Inc.

Site ID Code:
Intersection Location: Duckworth Street / Cundles Road & Highway 400 Southbound Off-Ramp
Municipality: Barrie, Ontario
Count Date: Thursday February 21, 2019
Weather and Temperature: Cloudy, 2 Degrees
Surveyor: TP

AM	NORTH APPROACH											EAST APPROACH											SOUTH APPROACH											WEST APPROACH											Grand Total
	CAR			TRUCKS			CYCLISTS			Peds	Total	CAR			TRUCKS			CYCLISTS			Peds	Total	CAR			TRUCKS			CYCLISTS			Peds	Total	CAR			TRUCKS			CYCLISTS			Peds	Total	
	L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			
7:00	0	126	0	0	4	0	0	0	0	0	130	30	0	38	1	0	1	0	0	0	0	70	0	59	0	0	4	0	0	0	0	0	63	0	0	0	0	0	0	0	0	0	0	263
7:15	0	172	0	0	2	0	0	0	0	0	174	42	0	40	1	0	0	0	0	0	0	83	0	98	0	0	7	0	0	0	0	0	105	0	0	0	0	0	0	0	0	0	0	362
7:30	1	259	0	0	13	0	0	0	0	0	273	82	0	69	0	0	3	0	0	0	0	154	0	113	0	0	7	0	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	547
7:45	0	267	0	0	11	0	0	0	0	0	278	103	0	76	1	0	0	0	0	0	0	180	0	102	0	0	6	0	0	0	0	0	108	0	0	0	0	0	0	0	0	0	0	566
8:00	0	202	0	0	6	0	0	0	0	0	208	67	0	66	1	0	0	0	0	0	0	134	0	124	0	0	5	0	0	0	0	0	129	0	0	0	0	0	0	0	0	0	0	471
8:15	0	216	0	0	7	0	0	0	0	0	223	96	0	83	0	0	0	0	0	0	0	179	0	154	0	0	4	0	0	0	0	0	158	0	0	0	0	0	0	0	0	0	0	560
8:30	0	222	0	0	4	0	0	0	0	0	226	83	0	72	0	0	1	0	0	0	0	156	0	188	0	0	7	0	0	0	0	0	195	0	0	0	0	0	0	0	0	0	0	577
8:45	0	249	0	0	6	0	0	0	0	0	255	92	0	78	1	0	0	0	0	0	0	171	0	193	0	0	9	0	0	0	0	0	202	0	0	0	0	0	0	0	0	0	0	628
MD																																												
11:00	0	242	0	0	4	0	0	0	0	0	246	27	0	52	2	0	1	0	0	0	0	82	0	159	0	0	6	0	0	0	0	0	165	0	0	0	0	0	0	0	0	0	0	493
11:15	0	207	0	0	7	0	0	0	0	0	214	41	0	40	0	0	0	0	0	0	0	81	0	149	0	0	4	0	0	0	0	0	153	0	0	0	0	0	0	0	0	0	0	448
11:30	0	234	0	0	4	0	0	0	0	0	238	42	0	42	0	0	0	0	0	0	0	84	0	192	0	0	5	0	0	0	0	0	197	0	0	0	0	0	0	0	0	0	0	519
11:45	0	264	0	0	6	0	0	0	0	0	270	42	0	59	1	0	1	0	0	0	0	103	0	169	0	0	7	0	0	0	0	0	176	0	0	0	0	0	0	0	0	0	0	549
12:00	0	224	0	0	10	0	0	0	0	0	234	28	0	50	1	0	2	0	0	0	0	81	0	221	0	0	3	0	0	0	0	0	224	0	0	0	0	0	0	0	0	0	0	539
12:15	0	246	0	0	6	0	0	0	0	0	252	41	0	54	1	0	2	0	0	0	0	98	0	183	0	0	9	0	0	0	0	0	192	0	0	0	0	0	0	0	0	0	0	542
12:30	0	235	0	0	5	0	0	0	0	0	240	32	0	55	1	0	1	0	0	0	0	89	0	198	0	0	1	0	0	0	0	0	199	0	0	0	0	0	0	0	0	0	0	528
12:45	0	256	0	0	6	0	0	0	0	0	262	44	0	46	1	0	1	0	0	0	0	92	0	189	0	0	2	0	0	0	0	0	191	0	0	0	0	0	0	0	0	0	0	545
13:00	0	237	0	0	6	0	0	0	0	0	243	25	0	48	2	0	2	0	0	0	0	77	0	210	0	0	3	0	0	0	0	0	213	0	0	0	0	0	0	0	0	0	0	533
13:15	0	226	0	0	5	0	0	0	0	0	231	28	0	60	1	0	1	0	0	0	0	90	0	242	0	0	5	0	0	0	0	0	247	0	0	0	0	0	0	0	0	0	0	568
13:30	0	281	0	0	6	0	0	0	0	0	287	25	0	58	1	0	2	0	0	0	0	86	0	233	0	0	8	0	0	0	0	0	241	0	0	0	0	0	0	0	0	0	0	614
13:45	0	272	0	0	4	0	0	0	0	0	276	28	0	62	2	0	1	0	0	0	0	93	0	224	0	0	6	0	0	0	0	0	230	0	0	0	0	0	0	0	0	0	0	599
PM																																												
15:00	0	320	0	0	5	0	0	0	0	0	325	22	0	49	2	0	1	0	0	0	1	75	0	251	0	0	7	0	0	0	0	0	258	0	0	0	0	0	0	0	0	0	0	658
15:15	0	325	0	0	6	0	0	0	0	0	331	20	0	48	1	0	2	0	0	0	0	71	0	292	0	0	7	0	0	0	0	1	300	0	0	0	0	0	0	0	0	0	0	702
15:30	0	300	0	0	3	0	0	0	0	0	303	23	0	52	1	0	1	0	0	0	0	77	0	264	0	0	5	0	0	0	0	0	269	0	0	0	0	0	0	0	0	0	0	649
15:45	0	326	0	0	4	0	0	0	0	0	330	26	0	48	2	0	1	0	0	0	0	77	0	242	0	0	4	0	0	0	0	0	246	0	0	0	0	0	0	0	0	0	0	653
16:00	0	336	0	0	5	0	0	0	0	0	341	41	0	67	1	0	0	0	0	0	0	109	0	252	0	0	5	0	0	0	0	2	259	0	0	0	0	0	0	0	0	0	0	709
16:15	0	301	0	0	5	0	0	0	0	0	306	29	0	73	1	0	0	0	0	0	0	103	0	271	0	0	4	0	0	0	0	0	275	0	0	0	0	0	0	0	0	0	0	684
16:30	0	409	0	0	3	0	0	0	0	0	412	50	0	93	0	0	0	0	0	0	0	143	0	248	0	0	0	0	0	0	0	1	249	0	0	0	0	0	0	0	0	0	0	804
16:45	0	419	0	0	4	0	0	0	0	0	423	48	0	84	1	0	1	0	0	0	0	134	0	250	0	0	3	0	0	0	0	2	255	0	0	0	0	0	0	0	0	0	0	812
17:00	0	311	0	0	2	0	0	0	0	0	313	37	0	85	0	0	0	0	0	0	0	122	0	287	0	0	1	0	0	0	0	0	288	0	0	0	0	0	0	0	0	0	0	723
17:15	0	298	0	0	3	0	0	0	0	0	301	50	0	74	0	0	0	0	0	0	0	124	0	315	0	0	0	0	0	0	0	0	315	0	0	0	0	0	0	0	0	0	0	740
17:30	0	308	0	0	3	0	0	0	0	0	311	45	0	73	1	0	1	0	0	0	0	120	0	300	0	0	2	0	0	0	0	0	302	0	0	0	0	0	0	0	0	0	0	733
17:45	0	346	0	0	0	0	0	0	0	0	346	21	0	53	0	0	0	0	0	0	0	74	0	257	0	0	2	0	0	0	0	0	259	0	0	0	0	0	0	0	0	0	0	679

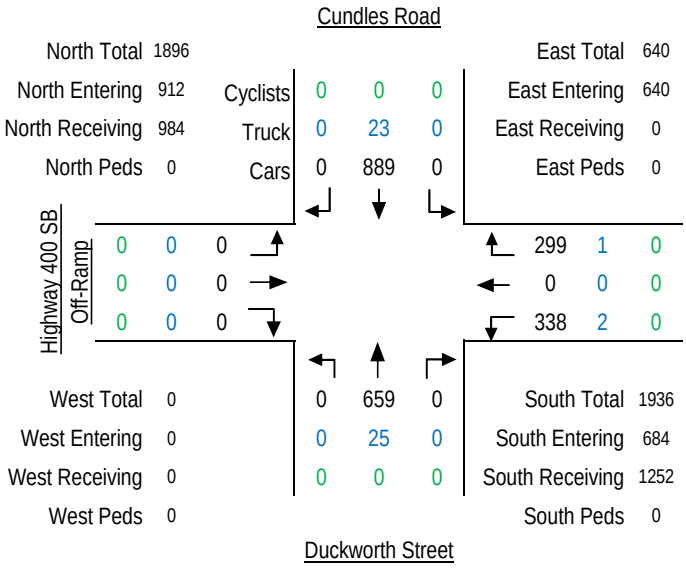
TRANS-PLAN
transportation engineering

Turning Movement Count Diagram

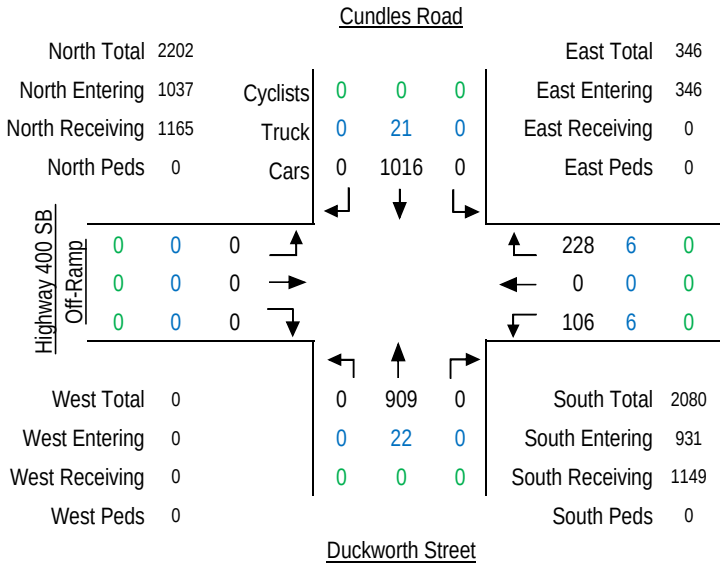
Intersection: Duckworth Street / Cundles Road & Highway 400 Southbound Off-Ramp Intersection ID:

Municipality: Barrie, Ontario Date: Thursday February 21, 2019

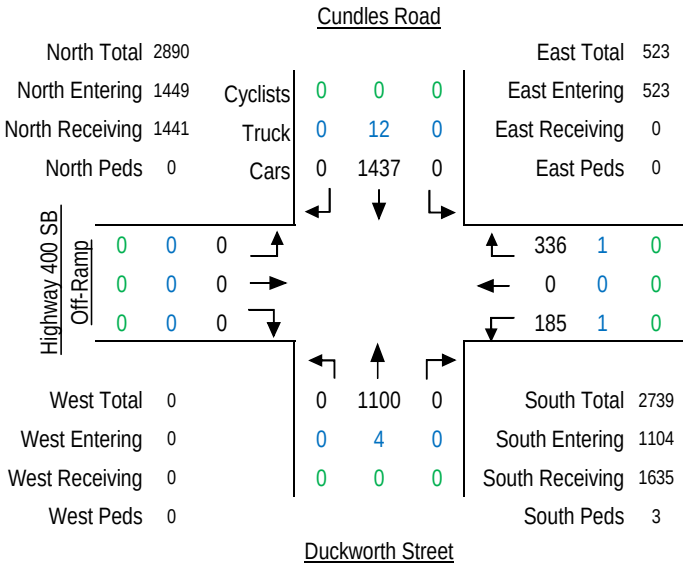
AM Peak Hour: 8:00 to 9:00



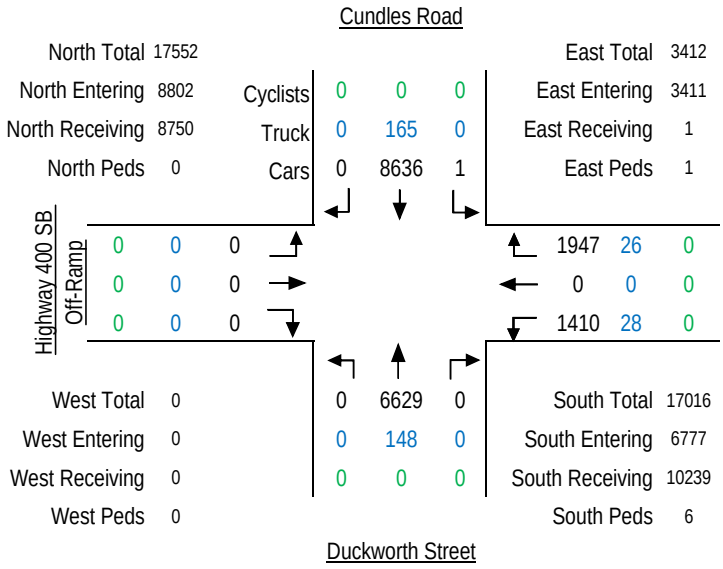
MD Peak Hour: 13:00 to 14:00



PM Peak Hour: 16:30 to 17:30



Total 8-Hour Count



Appendix E
Traffic Signal Timing Plans

Cundles Road East & Lions Gate Boulevard – FREE PLAN (NO COORDINATION)

		Vehicular Indications				Pedestrian Indications	
Roadway	**Direction**	**Minimum Green**	**Maximum Green**	**Amber**	**All Red**	**Walk**	**Flashing Don't Walk**
Cundles Road (main street)	Advanced Eastbound Left Turn	7	12	3	1	N/A	N/A
Cundles Road (main street)	Advanced Westbound Left Turn	7	12	3	1	N/A	N/A
Cundles Road (main street)	Eastbound	60	60	4	2	42	18
Cundles Road (main street)	Westbound	60	60	4	2	42	18
Barrie North Crossing Shopping Centre Entrance (side street)	Northbound	10	20	4	2	12	18
Lions Gate Boulevard (side street)	Southbound	10	20	4	2	12	18

NOTE: All times are recorded in seconds, based on full demand.

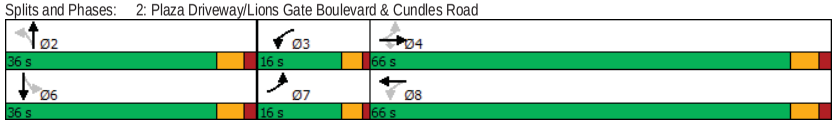
Appendix F
Synchro Worksheets

2: Plaza Driveway/Lions Gate Boulevard & Cundles Road

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	755	85	15	730	55	0	15	0	
Future Volume (vph)	755	85	15	730	55	0	15	0	
Lane Group Flow (vph)	812	91	16	796	59	22	0	16	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Detector Phase	4	4	3	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	60.0	60.0	7.0	60.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	Min	Min	Min	Min	None	None	None	None	Min
v/c Ratio	0.34	0.08	0.03	0.34	0.36	0.05		0.10	
Control Delay	7.8	1.9	2.7	7.8	45.0	0.2		38.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	7.8	1.9	2.7	7.8	45.0	0.2		38.4	
Queue Length 50th (m)	33.3	0.2	0.5	32.3	10.6	0.0		2.8	
Queue Length 95th (m)	48.4	5.7	2.0	47.0	22.9	0.0		8.9	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	2359	1072	656	2355	458	688		470	
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	0.34	0.08	0.02	0.34	0.13	0.03		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 90.6
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



1: Site Access/Pacific Avenue & Cundles Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	835	35	5	780	0	10	0	5	0	0	5
Future Volume (Veh/h)	0	835	35	5	780	0	10	0	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	879	37	5	821	0	11	0	5	0	0	5
Pedestrians								7			3	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	824			923			1330	1738	465	1278	1757	414
vC1, stage 1 conf vol							904	904		834	834	
vC2, stage 2 conf vol							426	834		444	923	
vCu, unblocked vol	617			923			1171	1618	465	1114	1639	167
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			96	100	99	100	100	99
cM capacity (veh/h)	886			744			284	283	546	344	277	778

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	586	330	5	547	274	16	5
Volume Left	0	0	0	5	0	0	11	0
Volume Right	0	0	37	0	0	0	5	5
cSH	1700	1700	1700	744	1700	1700	334	778
Volume to Capacity	0.00	0.34	0.19	0.01	0.32	0.16	0.05	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.2	0.0	0.0	1.2	0.2
Control Delay (s)	0.0	0.0	0.0	9.9	0.0	0.0	16.3	9.7
Lane LOS				A			C	A
Approach Delay (s)	0.0			0.1			16.3	9.7
Approach LOS							C	A

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	38.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Existing (PM)
1: Site Access/Pacific Avenue & Cundles Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1195	95	10	1280	5	50	0	10	5	0	5
Future Volume (Veh/h)	5	1195	95	10	1280	5	50	0	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	1313	104	11	1407	5	55	0	11	5	0	5
Pedestrians		1						6			4	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.72						0.72	0.72		0.72	0.72	0.72
vC, conflicting volume	1416			1423			2112	2819	714	2113	2868	711
vC1, stage 1 conf vol							1381	1381		1436	1436	
vC2, stage 2 conf vol							732	1438		678	1433	
vCu, unblocked vol	794			1423			1764	2748	714	1765	2817	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			62	100	97	97	100	99
cM capacity (veh/h)	598			482			146	157	376	198	147	780

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	5	875	542	11	938	474	66	10
Volume Left	5	0	0	11	0	0	55	5
Volume Right	0	0	104	0	0	5	11	5
cSH	598	1700	1700	482	1700	1700	163	315
Volume to Capacity	0.01	0.51	0.32	0.02	0.55	0.28	0.41	0.03
Queue Length 95th (m)	0.2	0.0	0.0	0.6	0.0	0.0	14.3	0.8
Control Delay (s)	11.1	0.0	0.0	12.6	0.0	0.0	41.5	16.8
Lane LOS	B			B			E	C
Approach Delay (s)	0.0			0.1			41.5	16.8
Approach LOS							E	C

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	48.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Existing (AM)
2: Plaza Driveway/Lions Gate Boulevard & Cundles Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	755	85	15	730	10	55	0	20	15	0	0
Future Volume (vph)	0	755	85	15	730	10	55	0	20	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	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	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			1.00	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)		3539	1566	1805	3532		1751	1482			1805	
Flt Permitted		1.00	1.00	0.32	1.00		0.75	1.00			0.74	
Satd. Flow (perm)		3539	1566	615	3532		1377	1482			1412	
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)	0	812	91	16	785	11	59	0	22	16	0	0
RTOR Reduction (vph)	0	0	30	0	1	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	812	61	16	795	0	59	2	0	0	16	0
Confl. Peds. (#/hr)	4		1	1		4	1					1
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	3%	0%	9%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Effective Green, g (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Actuated g/C Ratio		0.66	0.66	0.73	0.66		0.09	0.09			0.09	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2325	1029	541	2321		127	137			130	
v/s Ratio Prot		c0.23		c0.00	0.23			0.00				
v/s Ratio Perm			0.04	0.02			c0.04				0.01	
v/c Ratio		0.35	0.06	0.03	0.34		0.46	0.01			0.12	
Uniform Delay, d1		7.0	5.6	3.4	7.0		39.5	37.9			38.3	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1	0.0	0.0	0.1		2.7	0.0			0.4	
Delay (s)		7.1	5.6	3.4	7.1		42.2	37.9			38.7	
Level of Service		A	A	A	A		D	D			D	
Approach Delay (s)		7.0			7.0			41.1			38.7	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.33				
Actuated Cycle Length (s)	91.9	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	78.0%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1005	205	75	1120	25	170	0	115	5	0	5
Future Volume (vph)	0	1005	205	75	1120	25	170	0	115	5	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes		1.00	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			0.93	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)		3610	1578	1787	3561		1801	1594			1715	
Flt Permitted		1.00	1.00	0.16	1.00		0.75	1.00			0.90	
Satd. Flow (perm)		3610	1578	296	3561		1421	1594			1575	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1129	230	84	1258	28	191	0	129	6	0	6
RTOR Reduction (vph)	0	0	78	0	1	0	0	96	0	0	9	0
Lane Group Flow (vph)	0	1129	152	84	1285	0	191	33	0	0	3	0
Confl. Peds. (#/hr)	5		3	3		5	2		1	1		2
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Effective Green, g (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Actuated g/C Ratio		0.51	0.51	0.61	0.51		0.25	0.25			0.25	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Grp Cap (vph)		1835	802	332	1810		361	405			400	
v/s Ratio Prot		0.31		c0.03	c0.36			0.02				
v/s Ratio Perm			0.10	0.13			c0.13				0.00	
v/c Ratio		0.62	0.19	0.25	0.71		0.53	0.08			0.01	
Uniform Delay, d1		20.7	15.8	12.0	22.3		37.9	33.5			32.9	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.6	0.5	1.8	2.4		5.5	0.4			0.0	
Delay (s)		22.3	16.3	13.9	24.7		43.4	33.9			32.9	
Level of Service		C	B	B	C		D	C			C	
Approach Delay (s)		21.3			24.0			39.6			32.9	
Approach LOS		C			C			D			C	

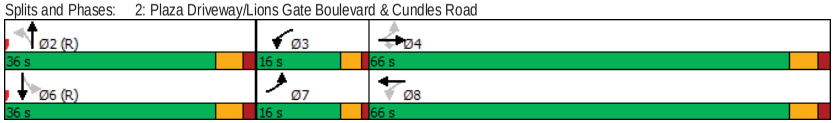
Intersection Summary				
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	94.2%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1005	205	75	1120	170	0	5	0	
Future Volume (vph)	1005	205	75	1120	170	0	5	0	
Lane Group Flow (vph)	1129	230	84	1286	191	129	0	12	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
v/c Ratio	0.62	0.26	0.25	0.71	0.53	0.22		0.03	
Control Delay	22.6	6.1	9.1	25.0	44.2	0.9		0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	22.6	6.1	9.1	25.0	44.2	0.9		0.1	
Queue Length 50th (m)	99.8	8.6	6.7	122.0	40.2	0.0		0.0	
Queue Length 95th (m)	120.0	22.0	12.3	145.8	64.1	0.0		0.0	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	1835	880	336	1812	361	574		448	
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	0.62	0.26	0.25	0.71	0.53	0.22		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 118
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Pretimed

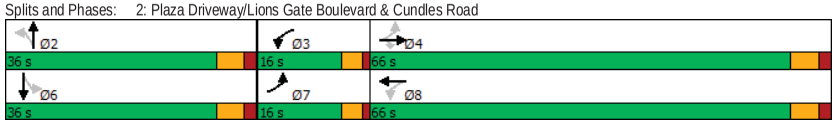
Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	840	85	15	810	55	0	15	0	
Future Volume (vph)	840	85	15	810	55	0	15	0	
Lane Group Flow (vph)	903	91	16	882	59	22	0	16	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Detector Phase	4	4	3	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	60.0	60.0	7.0	60.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	Min	Min	Min	Min	None	None	None	None	Min
v/c Ratio	0.38	0.09	0.03	0.37	0.36	0.05		0.10	
Control Delay	8.2	2.3	2.7	8.1	45.0	0.2		38.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	8.2	2.3	2.7	8.1	45.0	0.2		38.4	
Queue Length 50th (m)	38.4	0.7	0.5	37.0	10.6	0.0		2.8	
Queue Length 95th (m)	55.1	6.3	2.0	53.5	22.9	0.0		8.9	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	2359	1069	611	2355	458	672		470	
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	0.38	0.09	0.03	0.37	0.13	0.03		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 90.6
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	920	35	5	860	0	10	0	5	0	0	5
Future Volume (Veh/h)	0	920	35	5	860	0	10	0	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	968	37	5	905	0	11	0	5	0	0	5
Pedestrians								7			3	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	908			1012			1461	1912	510	1407	1930	456
vC1, stage 1 conf vol							994	994		918	918	
vC2, stage 2 conf vol							468	918		489	1012	
vCu, unblocked vol	663			1012			1280	1784	510	1220	1804	157
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			96	100	99	100	100	99
cM capacity (veh/h)	835			689			251	256	511	314	250	774

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	645	360	5	603	302	16	5
Volume Left	0	0	0	5	0	0	11	0
Volume Right	0	0	37	0	0	0	5	5
cSH	1700	1700	1700	689	1700	1700	299	774
Volume to Capacity	0.00	0.38	0.21	0.01	0.35	0.18	0.05	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.2	0.0	0.0	1.4	0.2
Control Delay (s)	0.0	0.0	0.0	10.3	0.0	0.0	17.7	9.7
Lane LOS				B			C	A
Approach Delay (s)	0.0			0.1			17.7	9.7
Approach LOS							C	A

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	40.8%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Future Background (PM)
1: Site Access/Pacific Avenue & Cundles Road — 2027 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1320	95	10	1415	5	50	0	10	5	0	5
Future Volume (Veh/h)	5	1320	95	10	1415	5	50	0	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	1451	104	11	1555	5	55	0	11	5	0	5
Pedestrians		1						6			4	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.66						0.66	0.66		0.66	0.66	0.66
vC, conflicting volume	1564			1561			2324	3105	784	2330	3154	785
vC1, stage 1 conf vol							1519	1519		1584	1584	
vC2, stage 2 conf vol							806	1586		746	1571	
vCu, unblocked vol	817			1561			1973	3160	784	1981	3235	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			54	100	97	97	100	99
cM capacity (veh/h)	537			427			120	135	339	173	125	715

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	5	967	588	11	1037	523	66	10
Volume Left	5	0	0	11	0	0	55	5
Volume Right	0	0	104	0	0	5	11	5
cSH	537	1700	1700	427	1700	1700	134	278
Volume to Capacity	0.01	0.57	0.35	0.03	0.61	0.31	0.49	0.04
Queue Length 95th (m)	0.2	0.0	0.0	0.6	0.0	0.0	18.3	0.9
Control Delay (s)	11.8	0.0	0.0	13.7	0.0	0.0	55.3	18.4
Lane LOS	B			B			F	C
Approach Delay (s)	0.0			0.1			55.3	18.4
Approach LOS							F	C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	51.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Future Background (AM)
2: Plaza Driveway/Lions Gate Boulevard & Cundles Road — 2027 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	840	85	15	810	10	55	0	20	15	0	0
Future Volume (vph)	0	840	85	15	810	10	55	0	20	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	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	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			1.00	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)		3539	1566	1805	3532		1751	1482			1805	
Flt Permitted		1.00	1.00	0.29	1.00		0.75	1.00			0.74	
Satd. Flow (perm)		3539	1566	547	3532		1377	1482			1412	
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)	0	903	91	16	871	11	59	0	22	16	0	0
RTOR Reduction (vph)	0	0	27	0	1	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	903	64	16	881	0	59	2	0	0	16	0
Confl. Peds. (#/hr)	4		1	1		4	1					1
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	3%	0%	9%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Effective Green, g (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Actuated g/C Ratio		0.66	0.66	0.73	0.66		0.09	0.09			0.09	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2325	1029	496	2321		127	137			130	
v/s Ratio Prot		c0.26		c0.00	0.25			0.00				
v/s Ratio Perm			0.04	0.02			c0.04				0.01	
v/c Ratio		0.39	0.06	0.03	0.38		0.46	0.01			0.12	
Uniform Delay, d1		7.2	5.6	3.5	7.2		39.5	37.9			38.3	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1	0.0	0.0	0.1		2.7	0.0			0.4	
Delay (s)		7.4	5.7	3.5	7.3		42.2	37.9			38.7	
Level of Service		A	A	A	A		D	D			D	
Approach Delay (s)		7.2			7.2			41.1			38.7	
Approach LOS		A			A			D			D	

Intersection Summary				
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	91.9	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1130	205	75	1255	25	170	0	115	5	0	5
Future Volume (vph)	0	1130	205	75	1255	25	170	0	115	5	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes		1.00	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			0.93	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)		3610	1578	1787	3563		1801	1594			1715	
Flt Permitted		1.00	1.00	0.12	1.00		0.75	1.00			0.90	
Satd. Flow (perm)		3610	1578	218	3563		1421	1594			1575	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1270	230	84	1410	28	191	0	129	6	0	6
RTOR Reduction (vph)	0	0	70	0	1	0	0	96	0	0	9	0
Lane Group Flow (vph)	0	1270	160	84	1437	0	191	33	0	0	3	0
Confl. Peds. (#/hr)	5		3	3		5	2		1	1		2
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Effective Green, g (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Actuated g/C Ratio		0.51	0.51	0.61	0.51		0.25	0.25			0.25	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Grp Cap (vph)		1835	802	292	1811		361	405			400	
v/s Ratio Prot		0.35		c0.03	c0.40			0.02				
v/s Ratio Perm			0.10	0.15			c0.13				0.00	
v/c Ratio		0.69	0.20	0.29	0.79		0.53	0.08			0.01	
Uniform Delay, d1		22.0	15.9	13.7	23.9		37.9	33.5			32.9	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.2	0.6	2.5	3.7		5.5	0.4			0.0	
Delay (s)		24.2	16.4	16.1	27.6		43.4	33.9			32.9	
Level of Service		C	B	B	C		D	C			C	
Approach Delay (s)		23.0			26.9			39.6			32.9	
Approach LOS		C			C			D			C	

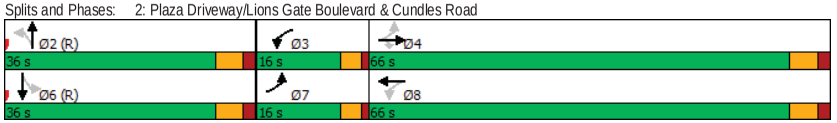
Intersection Summary				
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	94.2%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1130	205	75	1255	170	0	5	0	
Future Volume (vph)	1130	205	75	1255	170	0	5	0	
Lane Group Flow (vph)	1270	230	84	1438	191	129	0	12	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
v/c Ratio	0.69	0.26	0.28	0.79	0.53	0.23		0.03	
Control Delay	24.5	7.1	9.7	28.0	44.2	0.9		0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	24.5	7.1	9.7	28.0	44.2	0.9		0.1	
Queue Length 50th (m)	119.2	10.8	6.7	146.6	40.2	0.0		0.0	
Queue Length 95th (m)	142.3	24.8	12.3	173.8	64.1	0.0		0.0	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	1835	872	296	1812	361	564		448	
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	0.69	0.26	0.28	0.79	0.53	0.23		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 118
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Pretimed

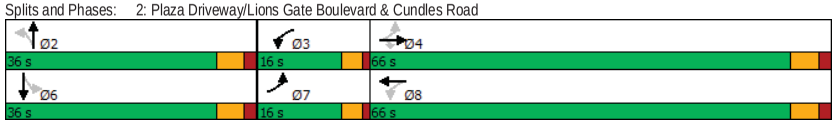
Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	920	85	15	835	55	0	15	0	
Future Volume (vph)	920	85	15	835	55	0	15	0	
Lane Group Flow (vph)	989	91	16	909	59	22	0	16	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Detector Phase	4	4	3	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	60.0	60.0	7.0	60.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	Min	Min	Min	Min	None	None	None	None	Min
v/c Ratio	0.42	0.09	0.03	0.39	0.36	0.06		0.10	
Control Delay	8.5	2.6	2.8	8.2	45.0	0.2		38.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	8.5	2.6	2.8	8.2	45.0	0.2		38.4	
Queue Length 50th (m)	43.3	1.2	0.5	38.7	10.6	0.0		2.8	
Queue Length 95th (m)	62.0	6.8	2.0	55.5	22.9	0.0		8.9	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	2359	1067	571	2355	458	660		470	
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	0.42	0.09	0.03	0.39	0.13	0.03		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 90.6
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	920	55	30	860	0	65	0	85	0	0	5
Future Volume (Veh/h)	0	920	55	30	860	0	65	0	85	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	968	58	32	905	0	68	0	89	0	0	5
Pedestrians								7			3	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.89						0.89	0.89		0.89	0.89	0.89
vC, conflicting volume	908			1033			1526	1976	520	1545	2005	456
vC1, stage 1 conf vol							1004	1004		972	972	
vC2, stage 2 conf vol							522	972		573	1033	
vCu, unblocked vol	658			1033			1350	1854	520	1371	1886	152
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			72	100	82	100	100	99
cM capacity (veh/h)	837			677			244	242	503	247	223	778

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	645	381	32	603	302	157	5
Volume Left	0	0	0	32	0	0	68	0
Volume Right	0	0	58	0	0	0	89	5
cSH	1700	1700	1700	677	1700	1700	345	778
Volume to Capacity	0.00	0.38	0.22	0.05	0.35	0.18	0.46	0.01
Queue Length 95th (m)	0.0	0.0	0.0	1.2	0.0	0.0	18.3	0.2
Control Delay (s)	0.0	0.0	0.0	10.6	0.0	0.0	23.9	9.7
Lane LOS				B			C	A
Approach Delay (s)	0.0			0.4			23.9	9.7
Approach LOS							C	A

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	49.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Future Total (PM)
1: Site Access/Pacific Avenue & Cundles Road — 2027 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1320	150	90	1450	5	50	0	60	5	0	5
Future Volume (Veh/h)	5	1320	150	90	1450	5	50	0	60	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	1451	165	99	1593	5	55	0	66	5	0	5
Pedestrians		1						6			4	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.63						0.63	0.63		0.63	0.63	0.63
vC, conflicting volume	1602			1622			2550	3350	814	2599	3430	804
vC1, stage 1 conf vol							1550	1550		1798	1798	
vC2, stage 2 conf vol							1000	1800		802	1632	
vCu, unblocked vol	770			1622			2282	3558	814	2360	3685	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			76			51	100	80	94	100	99
cM capacity (veh/h)	533			405			112	99	324	89	52	681

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	5	967	649	99	1062	536	121	10
Volume Left	5	0	0	99	0	0	55	5
Volume Right	0	0	165	0	0	5	66	5
cSH	533	1700	1700	405	1700	1700	174	158
Volume to Capacity	0.01	0.57	0.38	0.24	0.62	0.32	0.69	0.06
Queue Length 95th (m)	0.2	0.0	0.0	7.6	0.0	0.0	33.4	1.6
Control Delay (s)	11.8	0.0	0.0	16.8	0.0	0.0	62.5	29.3
Lane LOS	B			C			F	D
Approach Delay (s)	0.0			1.0			62.5	29.3
Approach LOS							F	D

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	64.1%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Future Total (AM)
2: Plaza Driveway/Lions Gate Boulevard & Cundles Road — 2027 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	920	85	15	835	10	55	0	20	15	0	0
Future Volume (vph)	0	920	85	15	835	10	55	0	20	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	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	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			1.00	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)		3539	1566	1805	3533		1751	1482			1805	
Flt Permitted		1.00	1.00	0.26	1.00		0.75	1.00			0.74	
Satd. Flow (perm)		3539	1566	488	3533		1377	1482			1412	
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)	0	989	91	16	898	11	59	0	22	16	0	0
RTOR Reduction (vph)	0	0	25	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	989	66	16	909	0	59	2	0	0	16	0
Confl. Peds. (#/hr)	4		1	1		4	1					1
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	3%	0%	9%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Effective Green, g (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Actuated g/C Ratio		0.66	0.66	0.73	0.66		0.09	0.09			0.09	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2325	1029	458	2322		127	137			130	
v/s Ratio Prot		c0.28		c0.00	0.26			0.00				
v/s Ratio Perm			0.04	0.02			c0.04				0.01	
v/c Ratio		0.43	0.06	0.03	0.39		0.46	0.01			0.12	
Uniform Delay, d1		7.5	5.6	3.6	7.3		39.5	37.9			38.3	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1	0.0	0.0	0.1		2.7	0.0			0.4	
Delay (s)		7.6	5.7	3.6	7.4		42.2	37.9			38.7	
Level of Service		A	A	A	A		D	D			D	
Approach Delay (s)		7.5			7.3			41.1			38.7	
Approach LOS		A			A			D			D	

Intersection Summary				
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	91.9	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1180	205	75	1335	25	205	0	115	5	0	5
Future Volume (vph)	0	1180	205	75	1335	25	205	0	115	5	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes		1.00	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			0.93	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)		3610	1578	1787	3563		1801	1594			1715	
Flt Permitted		1.00	1.00	0.10	1.00		0.75	1.00			0.90	
Satd. Flow (perm)		3610	1578	190	3563		1421	1594			1575	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1326	230	84	1500	28	230	0	129	6	0	6
RTOR Reduction (vph)	0	0	66	0	1	0	0	96	0	0	9	0
Lane Group Flow (vph)	0	1326	164	84	1527	0	230	33	0	0	3	0
Confl. Peds. (#/hr)	5		3	3		5	2		1	1		2
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Effective Green, g (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Actuated g/C Ratio		0.51	0.51	0.61	0.51		0.25	0.25			0.25	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Grp Cap (vph)		1835	802	278	1811		361	405			400	
v/s Ratio Prot		0.37		c0.03	c0.43			0.02				
v/s Ratio Perm			0.10	0.15			c0.16				0.00	
v/c Ratio		0.72	0.20	0.30	0.84		0.64	0.08			0.01	
Uniform Delay, d1		22.5	15.9	14.5	25.0		39.2	33.5			32.9	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.5	0.6	2.8	5.0		8.3	0.4			0.0	
Delay (s)		25.0	16.5	17.3	29.9		47.5	33.9			32.9	
Level of Service		C	B	B	C		D	C			C	
Approach Delay (s)		23.8			29.3			42.6			32.9	
Approach LOS		C			C			D			C	

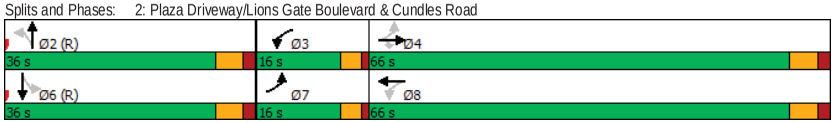
Intersection Summary				
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	94.2%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1180	205	75	1335	205	0	5	0	
Future Volume (vph)	1180	205	75	1335	205	0	5	0	
Lane Group Flow (vph)	1326	230	84	1528	230	129	0	12	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
v/c Ratio	0.72	0.26	0.30	0.84	0.64	0.23		0.03	
Control Delay	25.4	7.5	10.1	30.4	48.4	1.0		0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	25.4	7.5	10.1	30.4	48.4	1.0		0.1	
Queue Length 50th (m)	127.5	11.7	6.7	162.5	50.0	0.0		0.0	
Queue Length 95th (m)	151.7	25.9	12.3	192.2	77.7	0.0		0.0	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	1835	868	281	1812	361	560		448	
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	0.72	0.26	0.30	0.84	0.64	0.23		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 118
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Pretimed

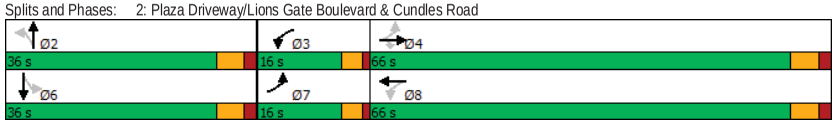
Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	865	85	15	830	55	0	15	0	
Future Volume (vph)	865	85	15	830	55	0	15	0	
Lane Group Flow (vph)	930	91	16	903	59	22	0	16	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Detector Phase	4	4	3	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	60.0	60.0	7.0	60.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	Min	Min	Min	Min	None	None	None	None	Min
v/c Ratio	0.39	0.09	0.03	0.38	0.36	0.05		0.10	
Control Delay	8.3	2.4	2.7	8.2	45.0	0.2		38.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	8.3	2.4	2.7	8.2	45.0	0.2		38.4	
Queue Length 50th (m)	39.8	0.9	0.5	38.3	10.6	0.0		2.8	
Queue Length 95th (m)	57.2	6.5	2.0	55.1	22.9	0.0		8.9	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	2359	1069	598	2355	458	668		470	
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	0.39	0.09	0.03	0.38	0.13	0.03		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 90.6
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	945	35	5	880	0	10	0	5	0	0	5
Future Volume (Veh/h)	0	945	35	5	880	0	10	0	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	995	37	5	926	0	11	0	5	0	0	5
Pedestrians								7			3	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.89						0.89	0.89		0.89	0.89	0.89
vC, conflicting volume	929			1039			1498	1960	523	1442	1978	466
vC1, stage 1 conf vol							1020	1020		939	939	
vC2, stage 2 conf vol							478	939		502	1039	
vCu, unblocked vol	674			1039			1314	1831	523	1250	1852	154
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			95	100	99	100	100	99
cM capacity (veh/h)	823			673			242	249	501	306	243	773

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	663	369	5	617	309	16	5
Volume Left	0	0	0	5	0	0	11	0
Volume Right	0	0	37	0	0	0	5	5
cSH	1700	1700	1700	673	1700	1700	289	773
Volume to Capacity	0.00	0.39	0.22	0.01	0.36	0.18	0.06	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.2	0.0	0.0	1.4	0.2
Control Delay (s)	0.0	0.0	0.0	10.4	0.0	0.0	18.2	9.7
Lane LOS				B			C	A
Approach Delay (s)	0.0			0.1			18.2	9.7
Approach LOS							C	A

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	41.5%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Future Background (PM)
1: Site Access/Pacific Avenue & Cundles Road — 2032 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1355	95	10	1450	5	50	0	10	5	0	5
Future Volume (Veh/h)	5	1355	95	10	1450	5	50	0	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	1489	104	11	1593	5	55	0	11	5	0	5
Pedestrians		1						6			4	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.64						0.64	0.64		0.64	0.64	0.64
vC, conflicting volume	1602			1599			2382	3181	802	2387	3230	804
vC1, stage 1 conf vol							1557	1557		1622	1622	
vC2, stage 2 conf vol							824	1624		766	1609	
vCu, unblocked vol	818			1599			2035	3282	802	2043	3360	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			52	100	97	97	100	99
cM capacity (veh/h)	523			413			113	129	329	167	120	696

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	5	993	600	11	1062	536	66	10
Volume Left	5	0	0	11	0	0	55	5
Volume Right	0	0	104	0	0	5	11	5
cSH	523	1700	1700	413	1700	1700	127	270
Volume to Capacity	0.01	0.58	0.35	0.03	0.62	0.32	0.52	0.04
Queue Length 95th (m)	0.2	0.0	0.0	0.7	0.0	0.0	19.6	0.9
Control Delay (s)	12.0	0.0	0.0	14.0	0.0	0.0	60.3	18.9
Lane LOS	B			B			F	C
Approach Delay (s)	0.0			0.1			60.3	18.9
Approach LOS							F	C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	52.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Future Background (AM)
2: Plaza Driveway/Lions Gate Boulevard & Cundles Road — 2032 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	865	85	15	830	10	55	0	20	15	0	0
Future Volume (vph)	0	865	85	15	830	10	55	0	20	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	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	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			1.00	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)		3539	1566	1805	3533		1751	1482			1805	
Flt Permitted		1.00	1.00	0.28	1.00		0.75	1.00			0.74	
Satd. Flow (perm)		3539	1566	528	3533		1377	1482			1412	
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)	0	930	91	16	892	11	59	0	22	16	0	0
RTOR Reduction (vph)	0	0	26	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	930	65	16	903	0	59	2	0	0	16	0
Confl. Peds. (#/hr)	4		1	1		4	1					1
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	3%	0%	9%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Effective Green, g (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Actuated g/C Ratio		0.66	0.66	0.73	0.66		0.09	0.09			0.09	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2325	1029	484	2322		127	137			130	
v/s Ratio Prot		c0.26		c0.00	0.26			0.00				
v/s Ratio Perm			0.04	0.02			c0.04				0.01	
v/c Ratio		0.40	0.06	0.03	0.39		0.46	0.01			0.12	
Uniform Delay, d1		7.3	5.6	3.5	7.3		39.5	37.9			38.3	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1	0.0	0.0	0.1		2.7	0.0			0.4	
Delay (s)		7.4	5.7	3.5	7.4		42.2	37.9			38.7	
Level of Service		A	A	A	A		D	D			D	
Approach Delay (s)		7.3			7.3			41.1			38.7	
Approach LOS		A			A			D			D	

Intersection Summary						
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service		A		
HCM 2000 Volume to Capacity ratio	0.37					
Actuated Cycle Length (s)	91.9	Sum of lost time (s)		16.0		
Intersection Capacity Utilization	78.0%	ICU Level of Service		D		
Analysis Period (min)	15					

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1165	205	75	1290	25	170	0	115	5	0	5
Future Volume (vph)	0	1165	205	75	1290	25	170	0	115	5	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes		1.00	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			0.93	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)		3610	1578	1787	3563		1801	1594			1715	
Flt Permitted		1.00	1.00	0.11	1.00		0.75	1.00			0.90	
Satd. Flow (perm)		3610	1578	198	3563		1421	1594			1575	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1309	230	84	1449	28	191	0	129	6	0	6
RTOR Reduction (vph)	0	0	67	0	1	0	0	96	0	0	9	0
Lane Group Flow (vph)	0	1309	163	84	1476	0	191	33	0	0	3	0
Confl. Peds. (#/hr)	5		3	3		5	2		1	1		2
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Effective Green, g (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Actuated g/C Ratio		0.51	0.51	0.61	0.51		0.25	0.25			0.25	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Grp Cap (vph)		1835	802	282	1811		361	405			400	
v/s Ratio Prot		0.36		c0.03	c0.41			0.02				
v/s Ratio Perm			0.10	0.15			c0.13				0.00	
v/c Ratio		0.71	0.20	0.30	0.82		0.53	0.08			0.01	
Uniform Delay, d1		22.4	15.9	14.2	24.3		37.9	33.5			32.9	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.4	0.6	2.7	4.2		5.5	0.4			0.0	
Delay (s)		24.8	16.5	16.9	28.5		43.4	33.9			32.9	
Level of Service		C	B	B	C		D	C			C	
Approach Delay (s)		23.5			27.9			39.6			32.9	
Approach LOS		C			C			D			C	

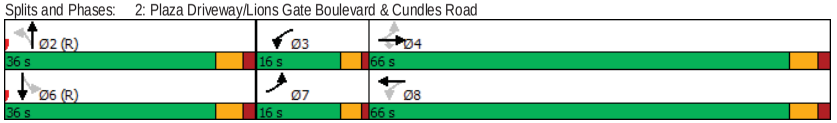
Intersection Summary				
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	94.2%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1165	205	75	1290	170	0	5	0	
Future Volume (vph)	1165	205	75	1290	170	0	5	0	
Lane Group Flow (vph)	1309	230	84	1477	191	129	0	12	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
v/c Ratio	0.71	0.26	0.29	0.82	0.53	0.23		0.03	
Control Delay	25.1	7.4	10.0	28.9	44.2	1.0		0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	25.1	7.4	10.0	28.9	44.2	1.0		0.1	
Queue Length 50th (m)	124.8	11.5	6.7	153.3	40.2	0.0		0.0	
Queue Length 95th (m)	148.7	25.6	12.3	181.6	64.1	0.0		0.0	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	1835	869	285	1812	361	561		448	
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	0.71	0.26	0.29	0.82	0.53	0.23		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 118
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Pretimed

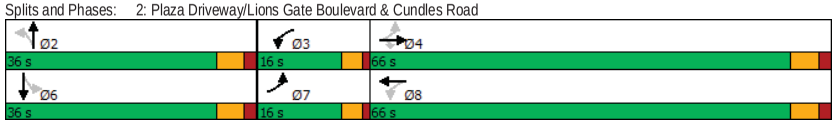
Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	945	85	15	855	55	0	15	0	
Future Volume (vph)	945	85	15	855	55	0	15	0	
Lane Group Flow (vph)	1016	91	16	930	59	22	0	16	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Detector Phase	4	4	3	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	60.0	60.0	7.0	60.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	Min	Min	Min	Min	None	None	None	None	Min
v/c Ratio	0.43	0.09	0.03	0.39	0.36	0.06		0.10	
Control Delay	8.6	2.7	2.8	8.3	45.0	0.2		38.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	8.6	2.7	2.8	8.3	45.0	0.2		38.4	
Queue Length 50th (m)	45.0	1.3	0.5	39.8	10.6	0.0		2.8	
Queue Length 95th (m)	64.2	7.0	2.0	57.1	22.9	0.0		8.9	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	2359	1066	559	2355	458	657		470	
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	0.43	0.09	0.03	0.39	0.13	0.03		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 90.6
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	945	55	30	880	0	65	0	85	0	0	5
Future Volume (Veh/h)	0	945	55	30	880	0	65	0	85	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	995	58	32	926	0	68	0	89	0	0	5
Pedestrians								7			3	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.89						0.89	0.89		0.89	0.89	0.89
vC, conflicting volume	929			1060			1563	2024	534	1580	2053	466
vC1, stage 1 conf vol							1031	1031		993	993	
vC2, stage 2 conf vol							532	993		586	1060	
vCu, unblocked vol	670			1060			1383	1902	534	1402	1934	149
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			71	100	82	100	100	99
cM capacity (veh/h)	824			661			236	235	493	240	216	778

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	663	390	32	617	309	157	5
Volume Left	0	0	0	32	0	0	68	0
Volume Right	0	0	58	0	0	0	89	5
cSH	1700	1700	1700	661	1700	1700	335	778
Volume to Capacity	0.00	0.39	0.23	0.05	0.36	0.18	0.47	0.01
Queue Length 95th (m)	0.0	0.0	0.0	1.2	0.0	0.0	19.1	0.2
Control Delay (s)	0.0	0.0	0.0	10.7	0.0	0.0	24.9	9.7
Lane LOS				B			C	A
Approach Delay (s)	0.0			0.4			24.9	9.7
Approach LOS							C	A

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	50.1%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Future Total (PM)
1: Site Access/Pacific Avenue & Cundles Road — 2032 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1355	150	90	1485	5	50	0	60	5	0	5
Future Volume (Veh/h)	5	1355	150	90	1485	5	50	0	60	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	1489	165	99	1632	5	55	0	66	5	0	5
Pedestrians		1						6			4	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)					192							
pX, platoon unblocked	0.61						0.61	0.61		0.61	0.61	0.61
vC, conflicting volume	1641			1660			2608	3426	833	2657	3506	824
vC1, stage 1 conf vol							1588	1588		1836	1836	
vC2, stage 2 conf vol							1020	1839		820	1670	
vCu, unblocked vol	766			1660			2355	3701	833	2436	3833	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			75			48	100	79	94	100	99
cM capacity (veh/h)	519			391			106	94	314	85	47	661

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	5	993	661	99	1088	549	121	10
Volume Left	5	0	0	99	0	0	55	5
Volume Right	0	0	165	0	0	5	66	5
cSH	519	1700	1700	391	1700	1700	166	150
Volume to Capacity	0.01	0.58	0.39	0.25	0.64	0.32	0.73	0.07
Queue Length 95th (m)	0.2	0.0	0.0	7.9	0.0	0.0	35.8	1.7
Control Delay (s)	12.0	0.0	0.0	17.3	0.0	0.0	69.4	30.7
Lane LOS	B			C			F	D
Approach Delay (s)	0.0			1.0			69.4	30.7
Approach LOS							F	D

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	65.1%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Future Total (AM)
2: Plaza Driveway/Lions Gate Boulevard & Cundles Road — 2032 Horizon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	945	85	15	855	10	55	0	20	15	0	0
Future Volume (vph)	0	945	85	15	855	10	55	0	20	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	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	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			1.00	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)		3539	1566	1805	3533		1751	1482			1805	
Flt Permitted		1.00	1.00	0.25	1.00		0.75	1.00			0.74	
Satd. Flow (perm)		3539	1566	471	3533		1377	1482			1412	
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)	0	1016	91	16	919	11	59	0	22	16	0	0
RTOR Reduction (vph)	0	0	24	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	1016	67	16	930	0	59	2	0	0	16	0
Confl. Peds. (#/hr)	4		1	1		4	1					1
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	3%	0%	9%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Effective Green, g (s)		60.4	60.4	67.4	60.4		8.5	8.5			8.5	
Actuated g/C Ratio		0.66	0.66	0.73	0.66		0.09	0.09			0.09	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2325	1029	447	2322		127	137			130	
v/s Ratio Prot		c0.29		c0.00	0.26			0.00				
v/s Ratio Perm			0.04	0.02			c0.04				0.01	
v/c Ratio		0.44	0.07	0.04	0.40		0.46	0.01			0.12	
Uniform Delay, d1		7.6	5.6	3.6	7.3		39.5	37.9			38.3	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1	0.0	0.0	0.1		2.7	0.0			0.4	
Delay (s)		7.7	5.7	3.6	7.4		42.2	37.9			38.7	
Level of Service		A	A	A	A		D	D			D	
Approach Delay (s)		7.5			7.4			41.1			38.7	
Approach LOS		A			A			D			D	

Intersection Summary						
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A			
HCM 2000 Volume to Capacity ratio	0.40					
Actuated Cycle Length (s)	91.9	Sum of lost time (s)	16.0			
Intersection Capacity Utilization	78.0%	ICU Level of Service	D			
Analysis Period (min)	15					

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1215	205	75	1370	25	205	0	115	5	0	5
Future Volume (vph)	0	1215	205	75	1370	25	205	0	115	5	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes		1.00	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			0.93	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)		3610	1578	1787	3564		1801	1594			1715	
Flt Permitted		1.00	1.00	0.09	1.00		0.75	1.00			0.90	
Satd. Flow (perm)		3610	1578	171	3564		1421	1594			1575	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1365	230	84	1539	28	230	0	129	6	0	6
RTOR Reduction (vph)	0	0	65	0	1	0	0	96	0	0	9	0
Lane Group Flow (vph)	0	1365	165	84	1566	0	230	33	0	0	3	0
Confl. Peds. (#/hr)	5		3	3		5	2		1	1		2
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Effective Green, g (s)		60.0	60.0	72.0	60.0		30.0	30.0			30.0	
Actuated g/C Ratio		0.51	0.51	0.61	0.51		0.25	0.25			0.25	
Clearance Time (s)		6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Grp Cap (vph)		1835	802	268	1812		361	405			400	
v/s Ratio Prot		0.38		c0.03	c0.44			0.02				
v/s Ratio Perm			0.10	0.16			c0.16				0.00	
v/c Ratio		0.74	0.21	0.31	0.86		0.64	0.08			0.01	
Uniform Delay, d1		22.9	15.9	15.2	25.4		39.2	33.5			32.9	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.8	0.6	3.0	5.8		8.3	0.4			0.0	
Delay (s)		25.7	16.5	18.2	31.2		47.5	33.9			32.9	
Level of Service		C	B	B	C		D	C			C	
Approach Delay (s)		24.4			30.5			42.6			32.9	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	94.2%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1215	205	75	1370	205	0	5	0	
Future Volume (vph)	1215	205	75	1370	205	0	5	0	
Lane Group Flow (vph)	1365	230	84	1567	230	129	0	12	
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	4		3	8		2		6	7
Permitted Phases		4	8		2		6		
Minimum Split (s)	66.0	66.0	11.0	66.0	36.0	36.0	36.0	36.0	11.0
Total Split (s)	66.0	66.0	16.0	66.0	36.0	36.0	36.0	36.0	16.0
Total Split (%)	55.9%	55.9%	13.6%	55.9%	30.5%	30.5%	30.5%	30.5%	14%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
v/c Ratio	0.74	0.27	0.31	0.86	0.64	0.23		0.03	
Control Delay	26.1	7.7	10.5	31.7	48.4	1.2		0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	26.1	7.7	10.5	31.7	48.4	1.2		0.1	
Queue Length 50th (m)	133.5	12.1	6.7	169.8	50.0	0.0		0.0	
Queue Length 95th (m)	158.5	26.4	12.3	200.7	77.7	0.2		0.0	
Internal Link Dist (m)	168.4			248.6		64.1		77.3	
Turn Bay Length (m)		45.0	150.0						
Base Capacity (vph)	1835	867	271	1812	361	558		448	
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	0.74	0.27	0.31	0.86	0.64	0.23		0.03	

Intersection Summary
Cycle Length: 118
Actuated Cycle Length: 118
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 115
Control Type: Pretimed

Splits and Phases: 2: Plaza Driveway/Lions Gate Boulevard & Cundles Road