The Ottawa Hospital | L'Hôpital d'Ottawa

New Civic Development for The Ottawa Hospital

Transportation Impact Assessment Addendum #1
Phase 2: Parking Garage and Green Roof

October 2021

PARSONS

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TIA Addendum #1 – Phase 2: Parking Garage and Green Roof

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8 October 2021

477458 - 01000

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering ☑ or transportation planning ☐.

[1,2] **License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

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Signature of Individual certifier that s/he meets the above four criteria

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1.0 INTRODUCTION

The Ottawa Hospital (TOH) is undertaking a Master Site Plan process for establishing a new Civic development (NCD) and replacing the ageing Civic Campus located at 1053 Carling Avenue. The new Civic development is intended to replace the existing 1053 Carling Avenue Civic Hospital functions and become the major referral centre for Eastern Ontario, Western Quebec, and parts of Nunavut. It will be the home of the Eastern Ontario Trauma Centre with a range of specialized services, research, and education facilities, along with related ancillary uses such as resident care stay facilities, and retail service uses.

The "New Civic Development for the Ottawa Hospital TIA and Mobility Study Report" (TIA and Mobility Study) was prepared by Parsons on behalf of The Ottawa Hospital to address the requirements of the City of Ottawa's current Transportation Impact Assessment (TIA) Guidelines (2016), as well as addressing a number of important transportation issues identified by the local community. The latest report revision was submitted in July 2021.

The ensuing Addendum has been provided to support a Site Plan Application (SPA) for the proposed approximate 2,523-space on-site parking garage and green roof park space.

1.1 Background Previous TIA & Mobility Study

1.1.1 Site Context

TOH is proposing to relocate the existing Civic Campus approximately 1 km east of its current location at the corner of Parkdale Avenue and Carling Avenue. The new site will be bound by Carling Avenue to the north, Preston Street to the east, Prince of Wales Drive to the south and Maple Drive to the west as seen in **Figure 1.** An illustrative site plan has been provided in **Figure 2**.

Figure 1: Site Context

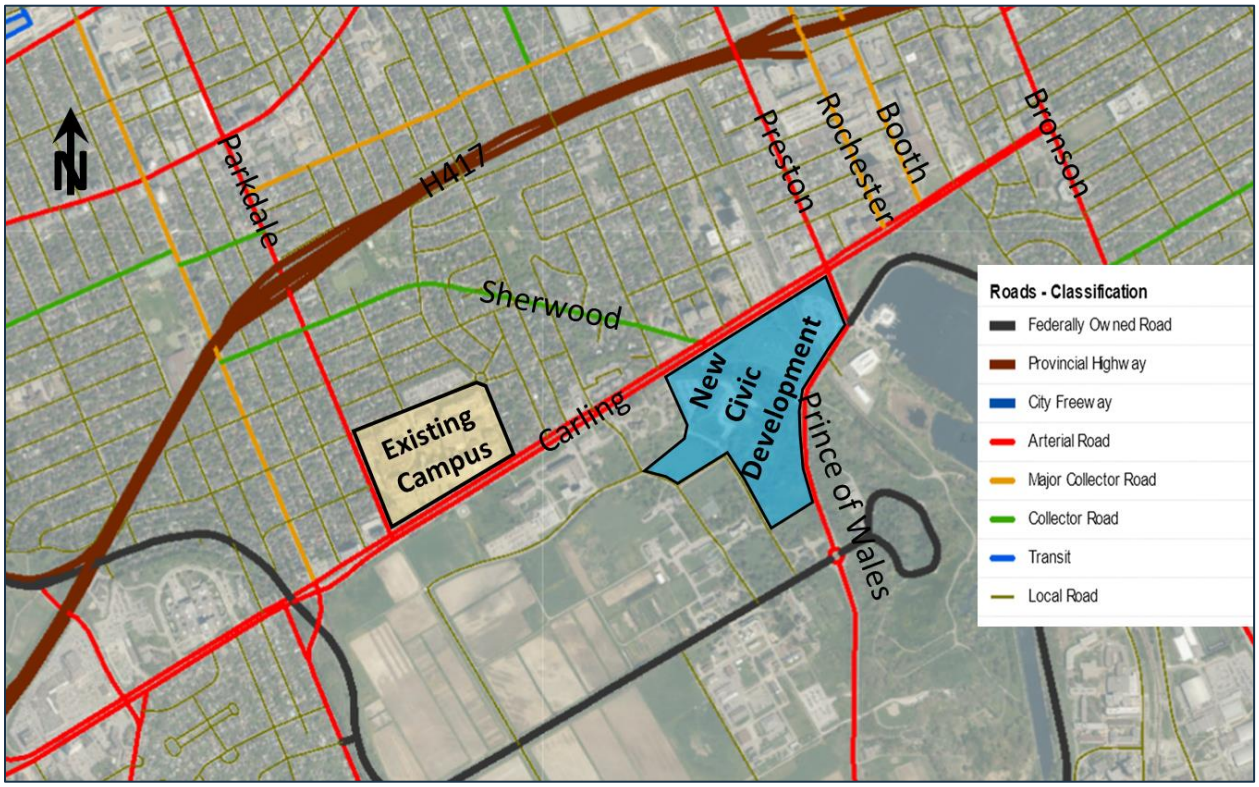


Figure 2: Illustrative Site Plan for Parking Garage at Full Buildout of Phase 2

Site Area Take-Offs	Square Meters	Percent of Total Site
Site Area	38,619.4	87%
O-Train ROW	5,550.9	13%
Total Site Area	44,170.3	100%
Impervious (Hardscape & Buildings)	25,714.1	58%
Pervious (At-Grade Softscape)	18,456.2	42%
Vegetated Rooftops	23,297.4	53%

1.1.2 General Statistics

Table 1 summarizes general statistics for the existing Civic Campus and the new Civic development. For more in-depth discussion about these statistics, please refer to the "New Civic development for the Ottawa Hospital TIA and Mobility Study Report" prepared by Parsons in July 2021.

Table 1: General Existing and Future New Civic Development Statistics

Independent Variable	Existing Civic Campus	New Civic Development
Total Number of Beds	559	1,246
Number of Employees	3,473	10,439
GFA x1,000 ft²	2,125	4,950

This report will consider the transportation impacts associated with time period in advance of the opening of the main hospital building in year 2028, namely the activity associated with constructing the parking structure and its interim use to support the construction of the main hospital building by providing on-site parking for the construction workers. The impacts of the full hospital development, which includes all subsidiary buildings and facilities, and the intended use by hospital visitors and employees, has been addressed in the original TIA and Mobility Study.

1.2 Focus of this Study

1.2.1 Key Assumptions

The following list of key assumptions have been provided to give insight to the scope of this Addendum, and how it differentiates from the TIA and Mobility Study. The context and implications of the individual assumptions will be discussed in further detail throughout this report.

- Two distinct construction phases were reviewed in this report:

1. The parking garage construction, which is expected to begin construction by 2023 and be fully constructed by 2024.
2. The main hospital building construction, will begin construction following the completion of the parking garage and is expected to be completed by 2028. It is expected that during this period the parking structure would be used by workers constructing the main hospital building.

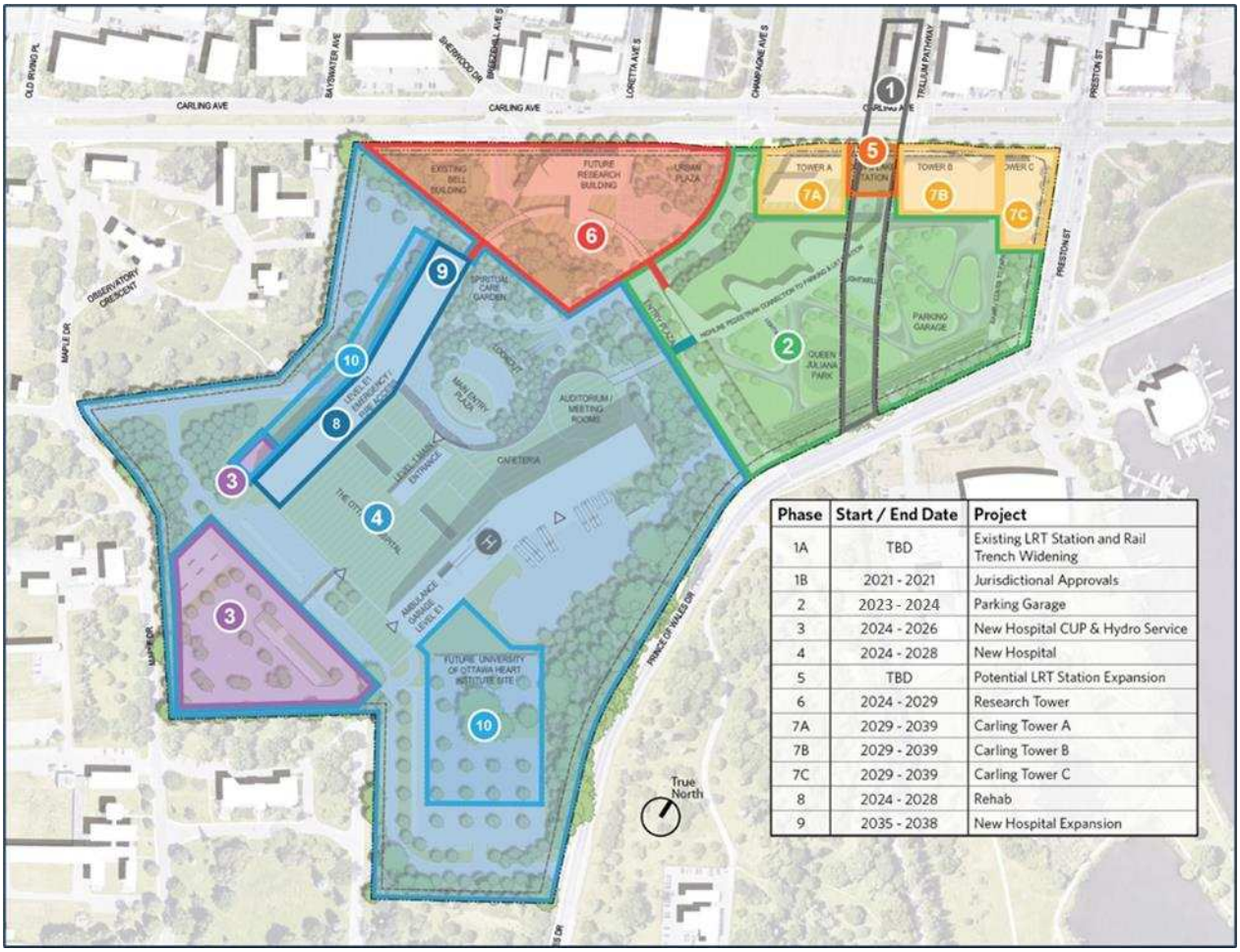
- The City of Ottawa plans to implement Transit Priority Measures with median bus lanes along Carling Avenue. City staff confirmed this project would be only partially completed prior to starting the parking garage construction, including interim repurposing of curbside general traffic lanes to bus only travel lanes at certain locations along Carling Avenue. Full buildout of median transit lanes is not expected prior to 2026-2028.
- The Dow's Lake parking lot will not be maintained at its current location during construction of the parking garage. There are ongoing discussions between National Capital Commission and The Ottawa Hospital to formulate a parking strategy at Dow's Lake both during and post construction of the parking garage.
- The Trillium Pathway will be disrupted by the parking garage construction. A proposed realignment will be required prior to the start of the parking garage construction in 2022 as a component of the parking garage.
- During the construction of the proposed parking garage, up to 250 construction workers may be expected on site each workday.
- During the construction of the main hospital building, an average of 1,700 construction workers are expected on site each workday.

1.2.2 Phasing Plan

The new Civic development phasing plan is shown in **Figure 3**. This addendum will focus on traffic impacts associated with Phases 2, 3 and 4 to support the Site Plan Control application for the proposed Parking Garage.

While these phases are being constructed, the existing Civic Campus will remain operational. The parking garage will displace the existing National Capital Commission Dow's Lake public surface parking lot that accommodates approximately 200 general stalls and 7 tour bus stalls. There are ongoing discussions between the National Capital Commission and The Ottawa Hospital to formulate a strategy to accommodate Dow's Lake parking and tour bus staging during and post construction of the parking garage.

Figure 3: New Civic Development Phasing Plan



Phase	Start / End Date	Project
1A	TBD	Existing LRT Station and Rail Trench Widening
1B	2021 - 2021	Jurisdictional Approvals
2	2023 - 2024	Parking Garage
3	2024 - 2026	New Hospital CUP & Hydro Service
4	2024 - 2028	New Hospital
5	TBD	Potential LRT Station Expansion
6	2024 - 2029	Research Tower
7A	2029 - 2039	Carling Tower A
7B	2029 - 2039	Carling Tower B
7C	2029 - 2039	Carling Tower C
8	2024 - 2028	Rehab
9	2035 - 2038	New Hospital Expansion

1.2.3 Study Area

The study area intersections assessed in the "New Civic development for the Ottawa Hospital TIA and Mobility Study Report" prepared by Parsons in July 2021 will also be assessed in this addendum. For more details, refer to **Section 3.1.3.2.** in the TIA and Mobility Study.

1.2.4 Existing Study Area Conditions

Please refer to **Section 3.1.3.** in the TIA and Mobility Study for more details.

2.0 SCOPING

A thorough description of planned conditions at Opening Day and 2048 of the new Civic development has been provided in **Section 3.0** of the TIA and Mobility Study.

This addendum focuses on the period prior to Opening Day: the years leading up to the construction of the proposed Parking Garage (2023 to 2024), and the years leading up to the construction of the main hospital building (2024 to 2028).

The notable changes in planned conditions during these time periods from the TIA and Mobility Study have been summarized below.

2.1 Planned Conditions

2.1.1 Carling Avenue Transit Priority Measures

The City of Ottawa has confirmed the target implementation schedule of the Carling Avenue Transit Priority Measures. The first phase is already underway and includes the repurposing of curbside general travel lanes to bus lanes on Carling Avenue. Design plans have been provided in **Appendix A**. These modifications are expected to be completed by 2022. City of Ottawa also confirmed additional repurposing beyond the scope noted in the design to be completed by 2022. A summary of the interim curbside travel lane conversion is provided below:

- Eastbound curbside bus lane between Lincoln Fields Station and Bronson Avenue
- Westbound curbside lane between Bronson Avenue and Booth Street
- Westbound curbside lane between Bayswater Avenue and Lincoln Fields Station

For the purpose of this study, it was assumed that the above noted curbside bus lanes will be completed prior to starting construction of the parking garage and remain as such until Opening Day (2028).

The fully constructed transit priority measures will include bus lanes in the centre median, which is expected by Opening Day (2028). This future condition was assessed in detail in the TIA and Mobility Study.

2.1.2 LRT Construction

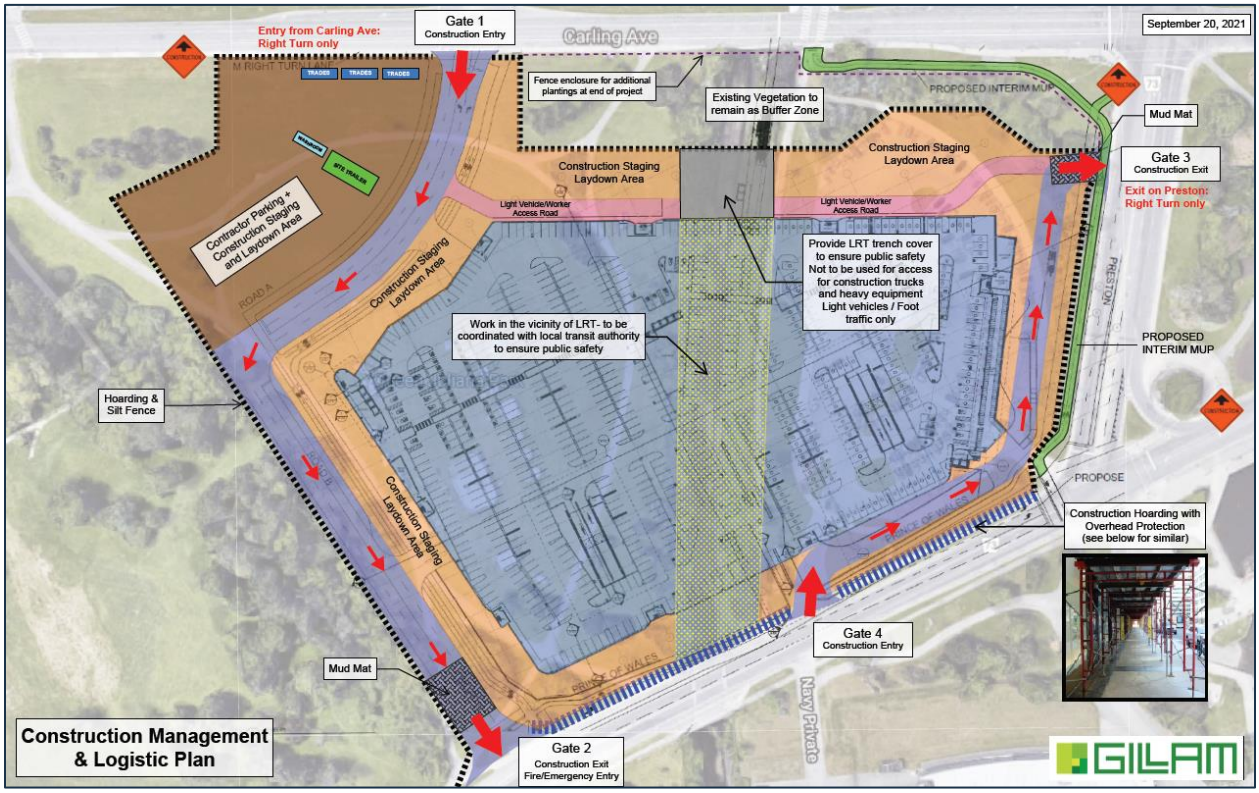
The Stage 2 LRT plan will still be under construction during the analysis period. It is anticipated that the Trillium LRT Line crossing through the site will be operational by 2022 with east Confederation LRT Line extension completed by 2024 and west Confederation LRT Line extension by 2025.

2.2 Planned On-Site Conditions

2.2.1 Construction Staging Plan

A preliminary construction staging plan has been provided in **Figure 4**, which represents a condition during the construction of the parking garage. It is important to highlight that this is an early concept that will require further consultation between the eventual Contractor and City staff as the detailed design of the parking garage evolves. The Contractor is expected to prepare a construction management plan to assess the operations, implications, and appropriate interventions both on site and on the adjacent network during construction.

Figure 4: Preliminary Staging Plan During Garage Construction



During Construction of the Parking Garage:

The preliminary construction staging plan proposes the following four construction vehicle and fire access locations with one-way traffic flow through site:

- Champagne Avenue/Carling Avenue (right-in only),
- Road B/Prince of Wales Drive,
- Garage Access/Navy Private/Prince of Wales Drive, and
- Preston Street, approximately 40 m south of Carling Avenue (right-out only)

Two separate construction vehicle paths have been provided on each side of the Trillium Line. These two hemispheres will be connected by a minor access for light vehicles (assumed to accommodate two-way travel) at the north end of the construction area. Note that this cross-over connection may not be available during the early construction stages. The access points will accommodate anticipated construction vehicles. The contractor parking area will be located in the southwest quadrant of the Road A/Champagne/Carling intersection. The intersection requirements and potential interventions during construction will be confirmed in the Construction Management Plan to be prepared by the Contractor.

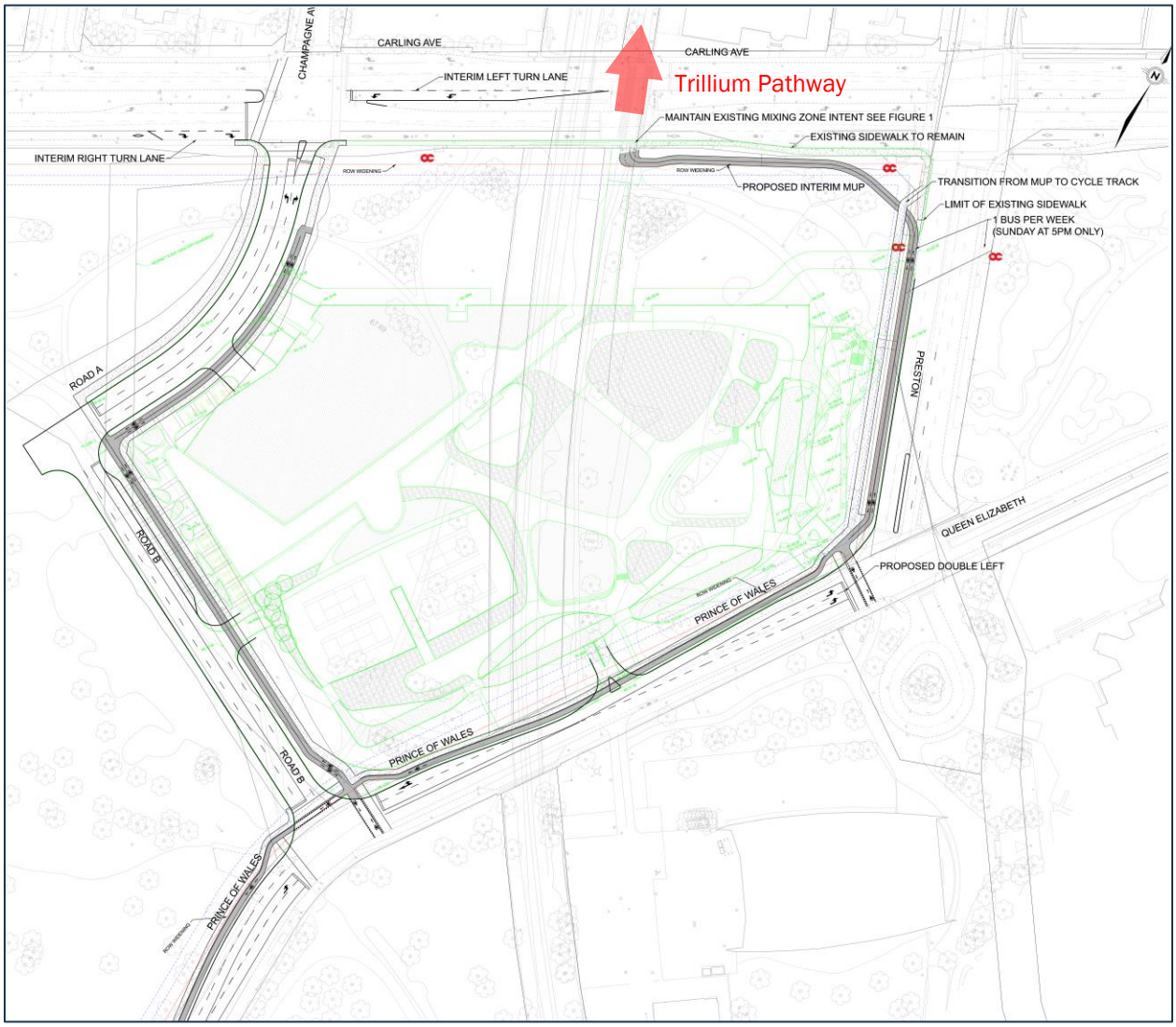
During Construction of the Main Hospital:

Once the parking garage is complete, it will serve as contractor parking when work begins on the main hospital building. It is expected that the Champagne Avenue/Carling Avenue, Road B/Prince of Wales Drive, and Garage Access/Navy Private/Prince of Wales Drive accesses will all be constructed prior to commencing the construction of the main hospital building, to ensure adequate capacity is provided for the higher number of workers expected during this phase of construction. Entrances will have multiple gates for redundancy and extended clear throat lengths to reduce the potential queue spillback on to Carling Avenue or Prince of Wales Drive.

2.2.2 Roads

Figure 5 shows the proposed Parking Garage Site Plan, including planned transportation facilities to be completed as part of the parking garage construction by 2024.

Figure 5: Parking Garage Site Plan including Transportation Components (2024)



During Construction of the Parking Garage:

Internal roads will be constructed to adequately accommodate construction vehicles and fire trucks during the parking garage construction.

During Construction of the Main Hospital:

Both Roads A and B will be built to their full design by the completion of the parking garage (2024); however, at this time these internal roads are not expected to be accessible to the public until Opening Day 2028.

The full design of Road A includes a 4-lane cross-section with sidewalks on both sides and a bidirectional cycle facility from Carling Avenue to Road B on the south side of the road.

The full design of Road B includes a 4-lane cross-section between Prince of Wales Drive and the planned parking garage access, a 3-lane cross-section between the parking garage access and Road A, and a sidewalk and a bidirectional cycle facility provided on the east side of the road.

Further details regarding the ultimate function of these roads within the new Civic development have been provided **Section 5.3.1** of TIA and Mobility Study.

2.2.3 Pedestrian and Cycling Facilities

The construction of the parking garage will have implications to existing multi-use pathways (MUPs) in proximity to the subject site.

Trillium Pathway

The Trillium Pathway is a regional pathway within the City and within the study area; it borders the east side of the Trillium LRT corridor, bisecting the new Civic development site from Carling Avenue to Prince of Wales Drive. The TIA and Mobility Study recommends the future Trillium Pathway be realigned once it crosses Carling Avenue, heading east towards Preston Street, then south along the west side of Preston Street, to eventually connect to proposed active transportation facilities on Prince of Wales Drive, completing the original MUP circuit.

During Construction of the Parking Garage:

Prior to starting construction of the parking garage, an interim asphalt MUP is proposed on the south side of Carling Avenue from the Trillium MUP to Preston Street. From there, the ultimate active transportation facilities will be constructed on the west side of Preston Street commencing at the northeast corner of the parking garage and connecting to the south side of Prince of Wales Drive, completing the Trillium Pathway loop.

During Construction of the Main Hospital:

The state of the Trillium Pathway is expected to remain the same during construction of the main hospital building.

Queen Juliana Park Multi-Use Pathway

The Queen Juliana Park MUP is predominantly used as a connection for the local community that currently extends southeast from Sherwood Drive, bordering the bottom of the escarpment to Prince of Wales Drive. This connection will be disrupted once construction of the parking garage begins.

During Construction of the Parking Garage:

Pedestrians and cyclists will not have access through the site during this phase of construction. Alternate routes between Carling Avenue and Prince of Wales Drive include the realigned Trillium MUP to the east or Maple Drive through the Central Experimental Farm to the west.

During Construction of the Main Hospital:

Several key transportation components will also be constructed with the completed parking garage, prior to starting construction of the main hospital building, as described in **Figure 5**. The completed sections of Road A and Road B will be constructed to their ultimate buildout, including full active transportation facilities (as discussed in **Section 5.1.1.1.** of the TIA and Mobility Study), in addition to the realigned Trillium Pathway. However, it has yet to be confirmed if Roads A and B will be available for public use during the construction of the main hospital building. The future Construction Management Plan will confirm whether public access will be provided during this phase of construction.

Prince of Wales Drive Facilities

During Construction of the Parking Garage:

There will be no changes to existing facilities on Prince of Wales Drive south/west of Preston Street.

During Construction of the Main Hospital:

Upon completion of the parking garage, a unidirectional cycle facility and sidewalk will be provided on the north side of Prince of Wales Drive, connecting the realigned Trillium Pathway at Preston Street to the future bidirectional cycle facility and sidewalk at Road B.

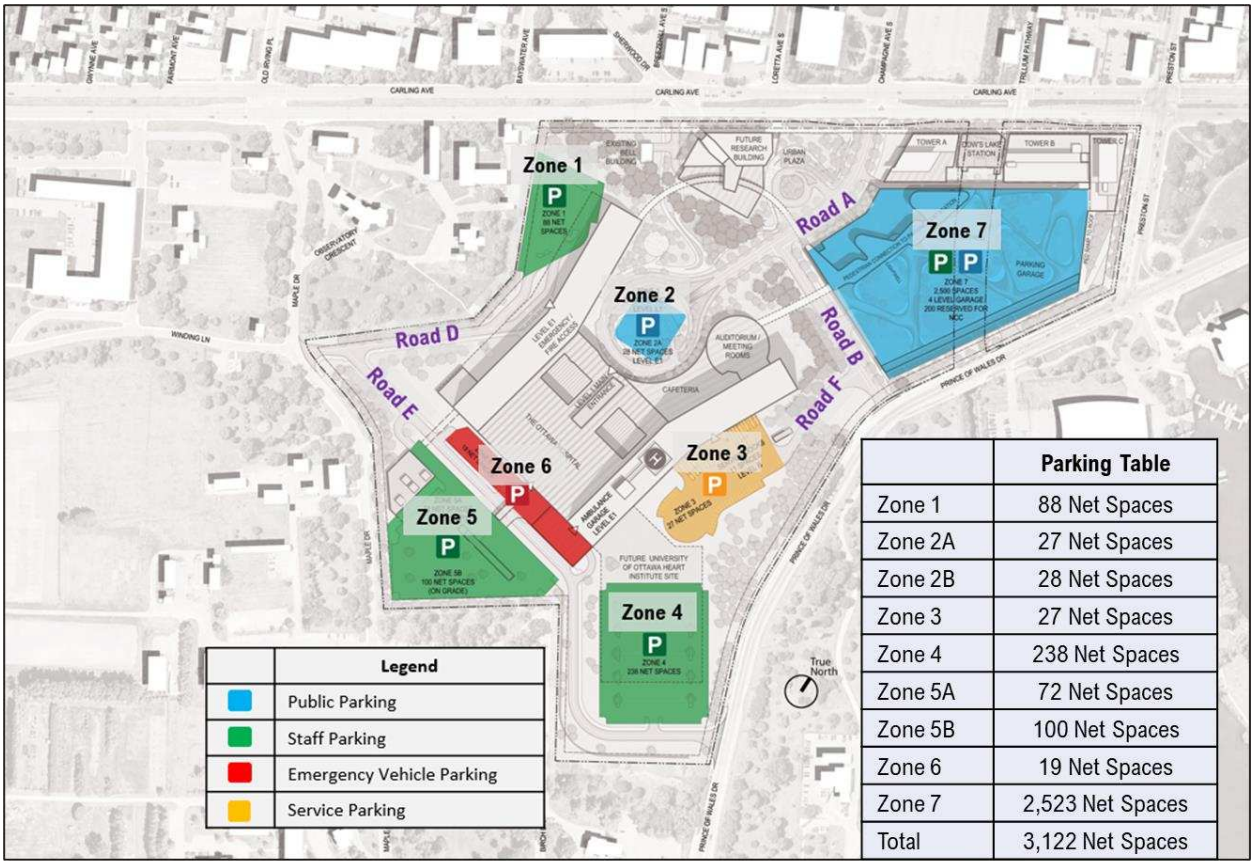
3.0 PARKING GARAGE FORECASTING

3.1 Parking Garage Plan

The new Civic development parking plan, including the parking structure denoted as "Zone 7" has been provided in Figure 6.

The proposed parking garage will contain approximately 2,523 parking spaces. The design has one and a half storeys below ground and two and a half storeys above ground with a rooftop green park accessible for public use. Considering the grade-changes between Carling Avenue and Prince of Wales Drive, the ability to add an additional half level of subsurface parking spaces to the parking garage on the west side of the LRT trench is currently being considered. The rooftop will ultimately serve as a connectivity portal between Dow's Lake LRT Station and the main hospital building.

Figure 6: New Civic Development Parking Plan



The parking garage (Zone 7) will be the first structure built, between the years 2023-2024. Once complete, the main hospital structure will begin construction, with the parking garage functioning as the main parking area for

construction workers and potentially up to 200 public parking spaces replacing the existing Dow's Lake surface parking lot. Discussions are currently ongoing between The Ottawa Hospital and National Capital Commission to formalize the parking strategy for Dow's Lake during and post construction of the parking garage.

3.2 Trip Generation and Mode Shares

Construction of the parking garage is anticipated to generate up to 250 construction workers on site each workday, while the construction of the main hospital building is expected to generate on average 1,700 workers on-site each workday. The anticipated shift for the majority of workers will be from 7AM to 4PM.

During Construction of the Parking Garage:

The trip generation assumptions for construction traffic included an 80% auto-driver mode share, and 100% of morning trips will arrive within the AM peak hour while 80% will depart during the PM peak hour. The rationale for these assumptions has been provided in the trip generation during construction of the main hospital, in the following section.

The distribution assumed during this phase of construction was 80% of all trips generated will enter Gate 1 since the main contractor parking area is located very close to this intersection, and exit Gate 2 which permits left-turns onto Prince of Wales Drive. The remainder of construction traffic will enter and exit via Gates 3 and 4.

Overall, the number of workers anticipated during construction of the parking garage is relatively low compared to the estimates for the main hospital building construction. Therefore, the impacts to the wider area road network (beyond the site access intersections) will not be based on this scenario. Whatever mitigation is needed to accommodate construction traffic for the main hospital building will dictate the off-site road modifications needed to support the parking garage.

During Construction of the Main Hospital:

The main hospital building construction will have an average of 1,700 construction workers on site each workday, but may fluctuate at times.

Conservatively, it was assumed that all workers will arrive on site within a single hour in the morning (i.e. the AM peak hour of the generator), while 80% of workers will leave the site within a single hour in the afternoon (PM peak hour of the generator). It has been assumed that most construction workers drive to work in a personal vehicle given the need to transport/store specialized tools and equipment and for some the vehicle functions as a mobile office. As such, the typical North American auto occupancy rate for passengers, mode share assumptions were generated and applied to the person trip rates as shown in **Table 2**. Note that "other" refers to all non-auto alternative modes of travel, such as transit, cycling and walking.

Table 2: Projected Site Generated Peak Hour Trips for Main Hospital Building Construction

	Travel Mode	Modal Share	Total	IN	OUT
AM	Auto Driver	80%	1,360	1,360	0
	Passenger	18%	306	306	0
	Other	2%	34	34	0
	Total Person Trips	100%	1,700	1,700	0
PM	Auto Driver	80%	1,088	0	1,088
	Passenger	18%	245	0	245
	Other	2%	27	0	27
	Total Person Trips	100%	1,360	0	1,360

3.3 Trip Distribution & Assignment

The trip distribution for the construction phase will remain the same as the trip distribution for the ultimate hospital site as discussed in **Section 4.1.5** in the TIA and Mobility Study Report. The general distribution assumes

35% of all trips to and from the west and east, and 15% to and from the north and south. Since various access alternatives will be explored, the trips will be individually added to each scenario within **Section 4.3** of this report.

3.4 Forecasted Background Volumes

Estimated future background peak hour traffic volumes during construction were derived by adding together existing study area traffic volumes and other area developments traffic volumes (as referenced in **Section 3.1.4.2.** of the TIA and Mobility Study).

The anticipated construction worker schedule was assumed to be 7AM to 4PM on a typical day. City of Ottawa traffic count data tracks vehicle movements between 7AM to 10AM and 3PM to 6PM. Therefore, the anticipated arrival times in the morning will be outside the typical peak period, while the afternoon departure times fall within the typical peak period.

To estimate traffic conditions on the adjacent network prior to the morning peak period, traffic count data between 7AM to 7:30AM were factored by two to develop a full hour count. It is expected that this value will still be higher than the true peak hour of the generator conditions but provides a more conservative analysis. For the afternoon departures, City traffic data between the hours of 4PM to 5PM were used to derive background traffic volumes.

The resulting background peak hour traffic volumes during construction (prior to 2028) have been provided in **Appendix B.**

4.0 ANALYSIS

4.1 Parking

4.1.1 Parking During Construction

During Construction of the Parking Garage:

A discussion of the construction staging plan for the parking garage, including the proposed contractor parking location on site was provided in **Section 2.2** of this Addendum. The proposed contractor parking area is expected to accommodate all parking needs for the estimated 250 construction workers each workday.

As previously noted, the public parking spaces located at Dow's Lake (approximately 200 of them) will be removed during the construction of the parking garage. There are ongoing discussions between National Capital Commission and The Ottawa Hospital to formulate a parking strategy during construction of the parking garage.

During Construction of the Main Hospital:

Similarly, **Section 2.2** of this Addendum noted the construction of the main hospital building is planned after the completion of the parking garage. It is expected that all construction workers will have access to the parking garage for the duration of construction of the main hospital building.

There is an opportunity to provide designated public parking in the parking garage to accommodate the Dow's Lake parking spaces lost due to the construction of the parking garage. National Capital Commission and The Ottawa Hospital are currently in discussion regarding the parking strategy leading up to Opening Day of the new Civic development in 2028.

4.1.2 Parking Garage Statistics

The current parking garage statistics have been summarized in **Table 3**, with the proposed site plan provided in **Appendix C**.

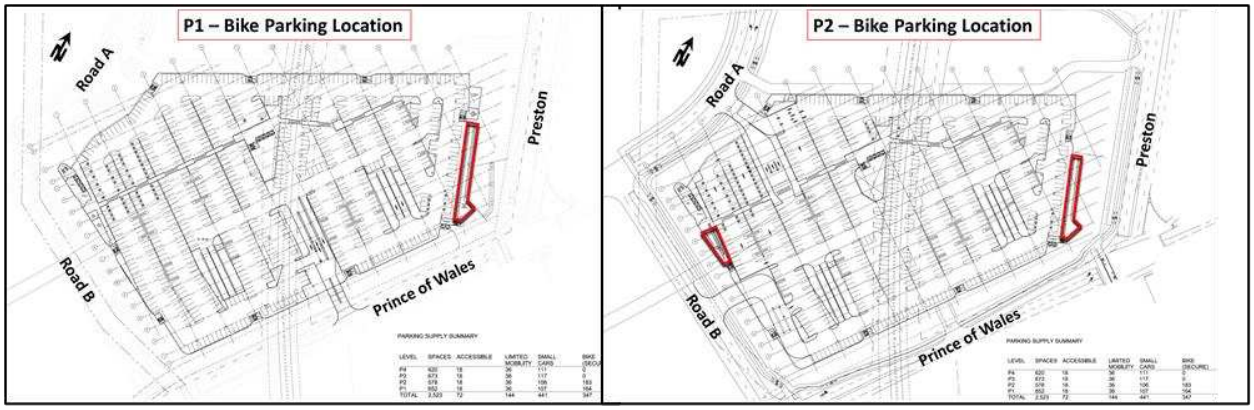
Table 3: TOH Parking Garage Statistics

Parking Garage Level	Vehicle Parking			
	Spaces	Accessible	Limited Mobility	Secure Bike Parking
P4	620	18	36	0
P3	673	18	36	0
P2	578	18	36	183
P1	652	18	36	164
TOTAL	2,523	72	144	347

As noted previously, considering the grade-changes between Carling Avenue and Prince of Wales Drive, the ability to add an additional half level of subsurface parking spaces to the parking garage on the west side of the LRT trench is currently being considered.

There are three locations proposed for bike parking within the parking garage as shown in **Figure 7** and in detail in **Appendix C**. The first is located near the Preston Street/Prince of Wales Drive intersection within the 1st and 2nd levels of the parking garage. The second is located north of the driveway access from Road B near the Road A/Road B intersection within the 2nd level of the parking garage which is located at ground level at this location.

Figure 7: Location of Bike Parking Areas within The Ottawa Hospital Parking Garage



The bike storage facilities near the Road A/Road B intersection were placed as close as possible to the main hospital building, while the location near Preston Street/Prince of Wales Drive was located adjacent to cycling facilities on Prince of Wales Drive/Preston Street. All locations offer convenient connection to the elevated pedestrian walkway (the "Highline") that connects directly to the hospital.

4.2 Potential Access Options

The TIA and Mobility Study provided detailed descriptions of proposed access locations, their function, and recommended design at Opening Day of the new Civic development (**Sections 5.1.3** and **5.4** as well as **Figure 20**). However, not all proposed accesses are needed during construction leading up to Opening Day in 2028.

During Construction of the Parking Garage:

As discussed in **Section 2.2** within this addendum, during construction of the parking garage, two entry points into the site will be provided:

- Gate 1: Road A/Champagne Avenue/Carling Avenue
- Gate 4: Garage Access/Navy Private/Prince of Wales Drive

The one-way traffic within site will have egresses at two different locations:

- Gate 2: Road B/Prince of Wales Drive
- Gate 3: Preston Street mid-block

The entry points will provide one-way traffic into the site, for both the east and west sides of the site, separated by the Trillium Line LRT trench. Once the trench is covered over, light vehicles will be able to cross from the east to the west side and vice versa. Gate 1 will provide access to the west side of the LRT trench, with egress at Gate 2. Gate 4 will provide access to the east side of the LRT trench with egress at Gate 3, as previously depicted in the preliminary construction staging plan (**Figure 4**).

During Construction of the Main Hospital:

It was identified early that the two Prince of Wales Drive accesses will be required at minimum to accommodate construction traffic to/from the parking garage.

The question remained whether the Road A/Champagne Avenue/Carling Avenue intersection would also need to be provided prior to the start of construction of the main hospital building. The key issue was the City planned Carling Avenue Transit Priority Measures, which are not expected to be completed until 2026-2028. Constructing this access early would cause additional disruptions to traffic, noise pollution and other implications on Carling Avenue, only to have the City reconstruct the intersection within 2-4 years.

Therefore, two different scenarios were analyzed or discussed to identify the appropriate access requirements during the construction.

- **Scenario 1**: Road B/Prince of Wales Drive and Garage Access/Navy Private/Prince of Wales Drive accesses only
- **Scenario 2**: Road B/Prince of Wales Drive, Garage Access/Navy Private/Prince of Wales Drive, and Champagne Avenue/Carling Avenue accesses

4.3 Intersection Performance

During Construction of the Parking Garage:

It is anticipated that the greater network of intersections will not be noticeably impacted by the low number of worker trips generated by the construction of the parking garage. The direct access locations were individually assessed to determine possible impacts to the forecasted new trips in and out of the site.

Overall, the intersections labelled Gates 1 to 4 are expected to perform well during peak hour periods. Gate 2 (Road B/Prince of Wales Drive access) is the lone exception that may experience moderate levels of congestion in the PM peak hour. The Gate 2 access was assumed to operate as STOP-controlled on the hospital approach and while the intersection is expected to operate well, some delays and queues may occur when the majority of construction traffic leave the site in the PM peak hour. This congestion may be reduced with the use of flag people or temporary signals during the peak departure hour, to provide smoother egress for construction workers. There should be minimal to no delays from the site the remainder of the day. Potential interventions during construction will be confirmed in the construction management plan to be prepared by the Contractor.

During Construction of the Main Hospital:

The following key assumptions were incorporated into the main hospital building construction analysis:

- All construction workers for the main hospital building will park in the completed parking garage;
- Active transportation facilities on Road A, Road B, Preston Street and Prince of Wales Drive will be completed to full buildout (Road A and B active facilities may not be open to public until Opening Day 2028);
- Preston Street/Prince of Wales Drive will implement a 10 second time separated phase advance for active transportation, including no-right on red restriction for the southbound and eastbound movements.

4.3.1 Scenario 1: Access via Prince of Wales Drive/Road B and Garage Access/Navy Private

Scenario 1 proposes access to and from Prince of Wales Drive only, via Road B and the Garage right-in right-out (RIRO), which has the benefit of reducing potential throw-away costs associated with constructing an interim Road A/Champagne Avenue/Carling Avenue intersection.

However, this approach requires all of construction worker traffic to travel on Prince of Wales Drive. Preliminary traffic forecasts of this scenario have more than 400 new eastbound left-turning vehicles at Preston Street/Carling Avenue in the morning peak hour or upwards of 700 new northbound approach vehicles at Preston Street/Carling Avenue in the afternoon peak hour, both of which create significant congestion at these locations. The Prince of Wales Drive/Preston Street would also experience a significant increase in vehicular volumes upwards of 800 new vehicles (predominantly turning movements), while Prince of Wales Drive southbound traffic towards the Scenic Driveway would experience more than 200 new vehicle trips.

The analysis results clearly showed Prince of Wales Drive and the proposed access intersections would not be able to accommodate the added vehicle demand during construction of the main hospital building even if they were constructed to their ultimate design.

Therefore, Scenario 1 is not a viable option. Access to/from Carling Avenue is required.

4.3.2 Scenario 2: Access via Prince of Wales Drive/Road B, Garage Access/Navy Private and Road A/Champagne Avenue/Carling Avenue

Scenario 2 adds the Road A/Champagne Avenue/Carling Avenue intersection to the previous Prince of Wales Drive access intersections. The intersection performance results for Scenario 2 have been provided in **Table 4** with detailed outputs in **Appendix D.**

Table 4: Scenario 2 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LoS	Max Delay (s) or v/c	Movement	Delay (s)	LoS	Max v/c
Signalized Intersections						
Parkdale/Carling*	D(F)	0.81(1.08)	SBL(WBT)	28.9(64.1)	A(F)	0.58(1.04)
Civic/Carling	A(E)	0.44(0.93)	SBL(WBT)	5.0(21.8)	A(D)	0.37(0.90)
Maple-Old Irvine/Carling	A(B)	0.40(0.68)	EBT(NBT)	9.4(13.7)	A(B)	0.37(0.64)
Sherwood/Carling	B(B)	0.65(0.70)	SBL(SBL)	10.3(16.4)	A(B)	0.38(0.64)
Road A/Champagne/Carling[1]	D(D)	0.85(0.88)	WBL(SBL)	26.4(36.0)	A(B)	0.58(0.70)
Trillium MUP/Carling	A(A)	0.30(0.47)	WBT(EBT)	7.0(6.6)	A(A)	0.30(0.47)
Preston/Carling*	E(F)	0.96(1.24)	WBL(NBL)	41.0(84.7)	C(F)	0.77(1.09)
Booth/Carling	B(C)	0.61(0.79)	EBL(EBL)	20.8(24.6)	A(B)	0.55(0.68)
Bronson/Carling*	D(F)	0.89(1.17)	SBT(NBL)	39.4(88.9)	D(F)	0.87(1.14)
Hwy 417 WB on-off/Parkdale	E(D)	0.91(0.87)	SBT(SBT)	38.1(44.8)	D(D)	0.83(0.82)
Hwy 417 EB on-off/Parkdale	C(D)	0.71(0.85)	EBT(SBL)	29.4(40.8)	A(C)	0.56(0.73)
Sherwood/Parkdale	B(A)	0.65(0.55)	SBT(NBT)	8.7(9.7)	B(A)	0.63(0.50)
Ruskin/Parkdale	A(A)	0.53(0.56)	SBT(WBL)	9.9(12.8)	A(A)	0.49(0.31)
Preston/Prince of Wales*[2]	D(E)	0.82(0.98)	SBR(EBL)	29.4(50.2)	B(E)	0.62(0.94)
Hwy 417 on Raymond/Rochester	A(C)	0.56(0.74)	WBL(WBT)	12.6(19.1)	A(A)	0.39(0.52)
Hwy 417 off Orangeville/Rochester	C(C)	0.71(0.72)	EBT(EBT)	11.4(15.9)	A(A)	0.55(0.43)
Hwy 417 on-off Catherine/Bronson	E(E)	0.94(0.93)	NBL(WBL)	40.1(36.8)	D(D)	0.87(0.89)
Hwy 417 EB off/Bronson	D(C)	0.82(0.78)	EBR(EBR)	15.4(12.6)	B(B)	0.62(0.65)
Road B/Prince of Wales[2]	A(C)	0.43(0.78)	EBT(SBL)	5.4(18.0)	A(B)	0.43(0.64)
Unsignalized Intersections						
Melrose/Carling	C(F)	19(486)	SB(SB)	1(11)	A(B)	-
Rochester/Carling	F(F)	185(54)	SB(SB)	13(5)	B(A)	-
Bayswater/Sherwood	A(B)	8(12)	SB(SB)	8(11)	A(B)	-
Garage RIRO/Navy/Prince of Wales[2]	E(B)	40(13)	NB(NB)	1(1)	A(A)	-
Roundabout Intersections (SIDRA)						
NCC Driveway/Prince of Wales	B(F)	13(177)	WB(EB)	6(36)	A(D)	-

Note: Analysis of intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
*Intersections with an * had their signal timing optimized for better performance.*
1.) Champagne Avenue/Carling Avenue modelled as interim design, refer to Appendix E
2.) intersection modelled as final recommended design in TIA and Mobility Study (Section 5.9.7

Site Access Intersections

In order for the site access intersections to function adequately, the Prince of Wales Drive intersections with Road B and the Garage RIRO must be constructed to their ultimate design, as outlined in the TIA and Mobility Study.

The Road A/Champagne Avenue/Carling Avenue intersection shall be constructed to an interim state, providing an eastbound right-turn lane within the curbside transit priority lane, and adding a new westbound left-turn lane to the existing intersection configuration. This interim state will be maintained until the City completes the Carling Avenue Transit Priority Measures with median bus lanes as referenced in the TIA and Mobility Study (**Section 3.1.4.1**).

The interim functional design for Road A/Champagne Avenue/Carling Avenue along with ultimate designs for Road B/Prince of Wales Drive and Preston Street/Prince of Wales Drive have been provided in **Appendix E**.

Adjacent Intersections

The wider network (beyond site access intersections) is anticipated to perform similarly to existing conditions (refer to **Table 39** within TIA and Mobility Study). The anticipated morning arrival time will occur before the peak hour of existing background traffic, and the afternoon will be less aggressive given potentially flexible departure times. Additionally, optimizing the signal timing plans was effective in increasing capacity to allow more green time to critical movements where needed.

The recommended design of the Prince of Wales Drive/Preston Street as described in the TIA and Mobility Study (**Section 5.9.7**) will be required prior to starting construction of the main hospital building. This includes the addition of a new eastbound left-turn lane, to provide dual left-turn lanes. The additional left-turn lane will help to accommodate new vehicle trips generated by construction workers as well as to provide additional intersection capacity to allow more green time to be given to active transportation modes, in particular, the west leg of the intersection which will receive a new bi-directional cross-ride. The functional design of this intersection has also been provided in **Appendix E**.

Three signalized intersections were shown to perform worse than existing conditions in the afternoon peak hour, which were mainly triggered by the curbside lane conversion for the interim Carling Avenue Transit Priority Measures.

- Parkdale/Carling Avenue,
- Preston Street/Carling Avenue and
- Bronson/Carling Avenue.

The traffic volumes provided by the City of Ottawa for the above intersections were all completed when six travel lanes were available on Carling Avenue, prior to the implementation of transit priority measures. Therefore, it is expected that some traffic on Carling Avenue would redirect to alternative routes (such as Hwy 417) with the loss of a travel lane in each direction (33% of corridor capacity). The analysis confirmed that with a 15% reduction in background traffic volumes on Carling Avenue, the above intersections would operate acceptably overall.

Some unsignalized intersections will experience an increase in delays compared to existing conditions, again mainly triggered by the reallocation of travel lanes along Carling Avenue, such as Melrose Avenue/Carling Avenue and Rochester/Carling Avenue. Additional capacity is available at nearby signalized intersections that provide an alternative option during the critical peak hours. There were no excessively long queues at these unsignalized intersections, confirming that the critical failure occurs from a small number of vehicles having longer waits to exit the minor street.

Therefore, no further intersection modifications are recommended within the study area network.

4.4 TDM Measures

Transportation Demand Management (TDM) measures are normally incorporated to large trip generator developments to mitigate impacts to the adjacent network and communities while providing a more sustainable transportation system. TDM measures are typically implemented as part of a long-term strategy with programs such as priced parking, transit passes, TDM coordinator, etc.

In this particular phase of the new Civic development, the people trips generated to the site are all temporary staff, in most cases, construction workers that traditionally have a high auto-usage due to the requirements of their trade (such as needing their vehicles to carry tools and equipment). Therefore, it may be unrealistic to expect meaningful reductions in the number of drivers during construction. That said, there are potential opportunities to encourage some workers who do not need to bring tools on a daily basis to use transit or practice carpooling/ridesharing with colleagues.

4.5 Neighbourhood Traffic Management

Section 5.6 within the TIA and Mobility Study provides a detailed plan to mitigate potential shortcutting in the local community. The recommended interim design for Road A/Champagne Avenue/Carling Avenue intersection will prohibit northbound travel, similar to the ultimate design, to dissuade northbound cut-through traffic on Champagne Avenue.

Parking infiltration within the adjacent neighbourhoods will be mitigated by ensuring sufficient onsite parking is provided during the parking garage construction. The completed parking garage is expected to have ample supply to accommodate all construction workers during construction of the main hospital building.

5.0 FINDINGS AND RECOMMENDATIONS

The following discussion outlines key findings and recommendations of this TIA for the new Civic development Parking Garage.

5.1.1 Background Assumptions

- Anticipated construction worker schedule predominantly 7am to 4pm.
- Discussion between National Capital Commission and The Ottawa Hospital are ongoing to finalize a strategy for the existing Dow's Lake parking and tour bus area during and post construction of the parking garage.
- It was assumed the Carling Avenue Transit Priority Measures will be only partially completed during construction of the parking garage:
    - Converted curbside travel lanes to transit lanes in both directions on Carling Avenue will be completed with the exception of westbound between Booth Street and Bayswater Avenue.
    - Median transit lanes between Sherwood Drive and Bronson Avenue will also not be completed.
- There will be two key analysis stages:
    - Construction of the parking garage (250 workers) by 2024
    - Construction main hospital building (1,700 workers) by 2028

5.1.2 Construction Plan

- The Trillium Pathway will be realigned prior to construction of the parking garage. Interim asphalt Multi-Use Pathway will be provided on south side of Carling Avenue, between the Trillium Pathway and Preston Street, and full buildout of the ultimate sidewalk and bidirectional cycling facility on west side of Preston Street south to Prince of Wales Drive.
- The Queen Juliana Multi-Use Pathway between Sherwood Drive/Carling Avenue and Prince of Wales Drive will be discontinued once construction of the parking garage commences. Users may travel east to the realigned Trillium Pathway or west to Maple Dr within the Experimental Farm to navigate around the site during the parking garage and main hospital building construction.
- The contractor parking area for workers will be located at the southwest quadrant of the Road A/Champagne Avenue/Carling Avenue intersection.
- Four construction accesses will be provided during construction of the parking garage:
    - A right-in only entry access at Road A/Champagne Avenue/Carling Avenue with egress at Road B/Prince of Wales Drive.
    - Entry access at Garage Access/Navy Private/Prince of Wales Drive with a right-out only egress at Preston Street approximately 40m south of Carling Avenue.
- Two separate construction vehicle paths have been provided on each side of the Trillium Line. These two hemispheres will be connected by a minor access for light vehicles (assumed to accommodate two-way travel) at the north end of the construction area.
- Upon completion of the parking garage, the construction of the main hospital building will begin. It is expected construction workers would park within the completed garage that will be accessible via Road A, Road B, and Prince of Wales Drive.
- The proposed intersection designs as described in this report for the Garage Access/Navy Private/Prince of Wales Drive, Road B/Prince of Wales Drive, Preston Street/Prince of Wales Drive and, will be fully constructed prior to starting construction of the main hospital building.

- The intersection of Champagne Avenue/Carling Avenue will be an interim design that will be reconstructed by the City of Ottawa to its full design, including median transit lanes, at some point between 2026 and 2028.

5.1.3 Performance

- During construction of the parking garage, the wider study area intersections (i.e. not located along the New Civic Development frontage) are expected to operate similar to existing conditions during the construction of the parking garage. Overall, all proposed gates (i.e. site accesses) are anticipated to operate well during construction, although Gate 2 may encounter some delays and queues on the hospital approach during the PM peak period. Possible interventions such as flag people or temporary signals will be confirmed in the future Construction Management Plan to be prepared by the Contractor.
- During construction of the main hospital building, the majority of intersections are expected to perform similar to existing conditions during the peak hour periods with the proposed designs at Garage Access/Navy Private/Prince of Wales Drive, Road B/Prince of Wales Drive, Preston Street/Prince of Wales Drive, and Preston Street/Prince of Wales Drive.
- The following three intersections are expected to operate above capacity during the PM peak hour period, which are mainly triggered by the curbside lane conversion for the interim Carling Avenue Transit Priority Measures:
    - Parkdale Avenue/Carling Avenue
    - Preston Street/Carling Avenue
    - Bronson Avenue/Carling Avenue
- The traffic volumes provided by the City of Ottawa for the above intersections were all completed when six travel lanes were available on Carling Avenue, prior to the implementation of transit priority measures. Therefore, it is expected that some traffic on Carling Avenue would redirect to alternative routes (such as Highway 417) with the loss of a travel lane in each direction to transit (33% of corridor capacity). The analysis confirmed that with a 15% reduction in background traffic volumes on Carling Avenue, the above intersections would operate overall acceptably.

5.1.4 Additional Considerations

- Upon completion of the parking garage, there will be approximately 2,523 parking spaces including 70 accessible and 145 limited mobility spaces. There will also be approximately 350 secure bike parking spaces located indoors, in the garage.
- Considering the grade-changes between Carling Avenue and Prince of Wales Drive, the ability to add an additional half level of subsurface parking spaces to the parking garage on the west side of the LRT trench is currently being considered.
- Implementation of potential Transportation Demand Management measures during the construction phases will be limited given the primary workforce are tradespeople/construction workers that historically have high auto-usage. That said, The Ottawa Hospital and the Contractor may consider transit and rideshare/carpooling incentives to reduce auto-usage where possible.
- All efforts will be made by TOH and the Contractor to reduce neighbourhood traffic impacts during construction. Potential mitigation options were outlined in the TIA and Mobility Study for the Master Site Plan for the new Civic development

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