BURNSIDE

# 10th Avenue Estates
# Transportation Study
# Owen Sound, Ontario

**Tenth Avenue Estates Inc.**
**1260 2nd Avenue East, Unit 2**
**Owen Sound, ON, N4K 2J3**

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## 1260 2nd Avenue East, Unit 2
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**R.J. Burnside & Associates Limited**
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## Record of Revisions

| Revision | Date | Description |
|---|---|---|
| 0 | May 31, 2024 | Initial Submission to Tenth Avenue Estates Inc. |
| 1 | June 3, 2024 | Final Submission to Tenth Avenues Estates Inc. |

**R.J. Burnside & Associates Limited**

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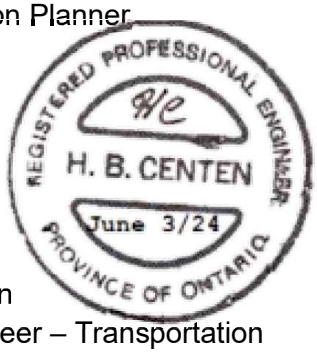


Henry Centen
Senior Engineer – Transportation

## Executive Summary

R.J. Burnside & Associates Limited (Burnside) was retained by Tenth Avenue Estates Inc. to undertake a Transportation Study for a proposed retirement community at the east end of 10th Avenue East (2300 block) located within the East Bluffs Planning Area. East of 9th Avenue East, a future north-south collector road is identified in the Official Plan (OP) to provide a connection between 26th Street (to the north) and 23rd Street (to the south). The future collector road is referred to as the "10th Avenue Extension". The subject site is currently vacant to be developed as residential land uses. The property owner (Tenth Avenue Estates Inc.) is seeking approval to develop a retirement community with two potential options that may be considered, as follows:

- Option A – Development of 54 dwelling units via the extension of 10th Avenue East across the subject lands northerly, to connect at the south-western boundary of the Greyfair subdivision
- Option B – Development of 85 dwelling units via the extension of a private road, connecting to the existing 10th Avenue cul-de-sac.

The option that Tenth Avenue Estates Inc. is looking to pursue is "Option B", consisting of 63 Life lease (55+) apartment units and 22 (55+) 2-bedroom townhouse units for a total of 85 dwelling units.

During pre-consultation with the City, the City retained their peer review consultant (Paradigm Transportation Solutions Inc.) to provide the Terms of Reference (TOR) for completing the Transportation Study for both options of this development, which were outlined in a letter dated April 8, 2024. Therefore, the scope set out in this report is based on the completion of the TOR set out by Paradigm for Option B which was confirmed at the start of the project with City staff.

Based on the analysis in this study, the main conclusions and recommendations are as follows:

- The property owner (Tenth Avenue Estates Inc.) is seeking approval to develop a retirement community consisting of a total of 85 dwelling units.
- Existing concrete sidewalks are provided on at least one side of each road external to the site, which provides a connection to the sidewalks that have been proposed internal to the site. Sidewalks are provided on the west side of 10th Avenue connecting to the sidewalks on the north side of 23rd Street A East which connect to the sidewalks on 9th Avenue East. Concrete sidewalks are provided on the west side of 9th Avenue with limited sidewalks provided on the east side.
- In the study area, the City operates the East Bayshore transit route which runs north-south on 9th Avenue East, with the nearest stop located at the corner of 9th Avenue East and 25th Street East.

- By not providing the local road connection identified in the Official Plan, the ability for the surrounding lands to be developed, vehicular connection, active transportation connection, servicing connection and emergency access of the proposed developments is not restricted and/or adversely impacted.
- Policy 4.1.3.1 requires that lands be developed in general conformity with the schematic road system in the Official Plan with changes permitted as long as the proposed configuration does not adversely impact the development ability of adjoining lands or the general traffic flow provided. It is concluded that the proposed road network will meet Policy 4.1.3.1 requirements and the impacts to public services and utilities/linear infrastructure are not considered to be significant.
- Option 3 presented in the 2021 transit study is identified as the preferred default network which includes the East Bayshore route being modified so that it runs as far north as 23rd Street East on 9th Avenue. As a result of this route being proposed to terminate at the intersection of 9th Avenue and 23rd Street East and not travel any further north, not providing the local road connection between the existing Adasha Subdivision (i.e., located south of the site) and the proposed Greyfair Subdivision will not impact transit, assuming an active transportation connection is provided through the subject development to access 23rd Street East more directly. Under the future modification, the City has proposed to only run fixed service transit south of the study area while leaving the areas to the north as on-demand transit.
- With the proposed development, the total dwelling unit count along 10th Avenue East will increase by 75 units to a total of 98 units. As per the City's Residential Subdivision Policies, a total of 98 dwelling units served by a 200 m roadway exceeds the maximum without providing a secondary emergency vehicle access. An emergency vehicle access lane has been proposed from the south of the subject site, connecting to 23rd Street.
- Based on a review of the firehall / emergency service locations with regards to distance and time of response, not providing the local road connection will not adversely impact the emergency access of surrounding lands when they are developed as the nearby Greyfair Subdivision has two planned access points that could be used for access purposes in the event of an emergency.
- Under existing and future total conditions, all movements at the study intersections (9th Avenue East / 23rd Street East and 9th Avenue East / 23rd Street A East) are forecast to operate with excess capacity at a LOS C or better and delays under 20.6 seconds. Existing queues and projected queues are forecasted to be within the available storage.
- The peak delay for the intersection of 9th Avenue and 23rd Street A is 17.4 seconds (LOS C) in the a.m. and 13.2 seconds (LOS B) in the p.m. under existing conditions. The peak delay is forecast to rise to 20.6 seconds (LOS C) in the a.m. and 15.1 seconds (LOS B) in the p.m. under Option A, or 19.0 seconds (LOS C) in the a.m. and 14.1 seconds (LOS B) in the p.m. under Option B. Similarly, the peak delay for the intersection of 9th Avenue and 23rd Street is 10.6 seconds (LOS B) in the a.m. and 11.2 seconds (LOS B) in the p.m. under existing conditions. The peak delay is

forecast to rise to 10.9 seconds (LOS B) in the a.m. and 11.7 seconds (LOS B) in the p.m. under Option A and 10.9 seconds (LOS B) in the a.m. and 11.6 seconds (LOS B) in the p.m. under Option B. Therefore, it can be concluded that although Option B consists of more housing (i.e., 85 dwelling units vs 54 units) the additional trips do not add significant delays to the existing intersections. Instead, it can be concluded that Option B, provides more housing with reduced delays on a per vehicle basis when compared to Option A which includes the extension of 10th Avenue. Based on the delays experienced, it can be assumed that the trips destined for the Greyfair Subdivision that are anticipated to utilize the 10th Avenue extension would not cause significant delays by having to utilize one of the two proposed access points.

In conclusion, it has been determined that the existing road network can accommodate the proposed development, based on operational parameters (i.e., capacity, delay, queueing, etc.). Additionally, this study has provided the technical justification to support the development of Option B which includes not establishing the local road connection as per the City's Official Plan.

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# 1.0 Introduction

## 1.1 Background

R.J. Burnside & Associates Limited (Burnside) was retained by Tenth Avenue Estates Inc.to undertake a Transportation Study for a proposed retirement community at the east end of 10th Avenue East (2300 block) located within the East Bluffs Planning Area. East of 9th Avenue East, a future north-south collector road is identified in the Official Plan (OP) to provide a connection between 26th Street (to the north) and 23rd Street (to the south). The future collector road is referred to as the "10th Avenue Extension". The subject site is currently vacant to be developed as residential land uses. The property owner (Tenth Avenue Estates Inc.) is seeking approval to develop a retirement community with two potential options that may be considered, as follows:

- Option A – Development of 54 dwelling units via the extension of 10th Avenue East across the subject lands northerly, to connect at the south-western boundary of the Greyfair subdivision.
- Option B – Development of 85 dwelling units via the extension of a private road, connecting to the existing 10th Avenue cul-de-sac.

The option that Tenth Avenue Estates Inc. is looking to pursue is "Option B", consisting of 63 Life lease (55+) apartment units and 22 (55+) 2-bedroom townhouse units for a total of 85 dwelling units. The location of the site is illustrated in Figure 1.

**Figure 1: Site Location Figure**


## 1.2 Scope of Work

During pre-consultation with the City, the City retained their peer review consultant (Paradigm Transportation Solutions Inc.) to provide the Terms of Reference (TOR) for completing the Transportation Study for both options of this development, which were outlined in a letter dated April 8, 2024. Therefore, the scope set out in this report is based on the completion of the TOR set out by Paradigm for Option B.

The following scope of work was confirmed with the City of Owen Sound planning staff before conducting this study.

| | |
|---|---|
| Analysis Scenarios | • Existing Traffic Conditions<br>• Total Traffic Conditions (including both Option A and Option B and the adjacent Greyfair Subdivision) |
| Analysis Periods | • Weekday a.m. peak hour (peak hour in 7:00 a.m. to 9:00 a.m. period)<br>• Weekday p.m. peak hour (peak hour in 3:00 p.m. to 6:00 p.m. period) |
| Analysis Intersections | • 9th Avenue East / 23rd Street A East<br>• 9th Avenue East / 23rd Street East |

## 1.3 Intersection Analysis Methodology

Stop-controlled traffic operations were assessed for the study intersections using the software program Synchro 12, which employs methodology from the *Highway Capacity Manual* (HCM 2000, HCM 2010 and HCM 6th Edition), published by the Transportation Research Board National Research Council.

Synchro 12 can analyze signalized and unsignalized intersections in a road corridor or network, accounting for the spacing, interaction, queues, and operations between intersections. The analysis in this study utilizes the HCM 2000 methodology.

### Analysis Methodology for Stop-Controlled Intersections

Stop-controlled intersection analysis considers two separate measures of performance:

- The Capacity of the intersection's critical movement, which is based on a volume-to-capacity (v/c) ratio.
- The Level of Service (LOS) for the critical movements within the intersection. The link between LOS and delay (in seconds) for stop-controlled intersections is summarized below.

| LOS | Control Delay per Vehicle (seconds) |
|---|---|
| A | 0 – 10 |
| B | > 10 – 15 |
| C | > 15 – 25 |
| D | > 25 – 35 |
| E | > 35 – 50 |
| F | > 50 |

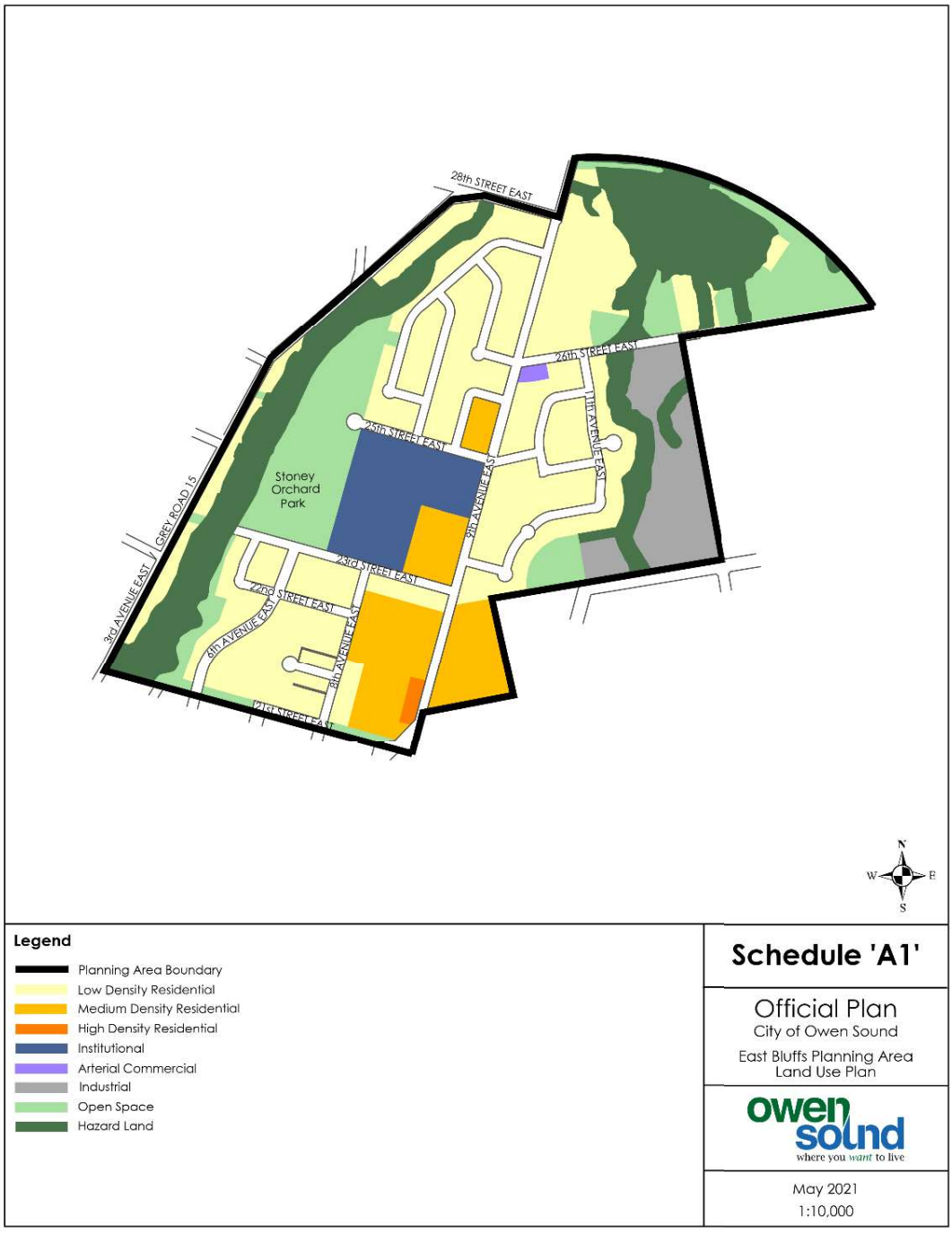
# 2.0 Existing Site Conditions

## 2.1 Site Context

As mentioned above, the site is located in the East Bluffs Planning Area and currently sits vacant with the intention of being developed as residential land uses. The site is also surrounded by existing and proposed residential and institutional (school) land uses.

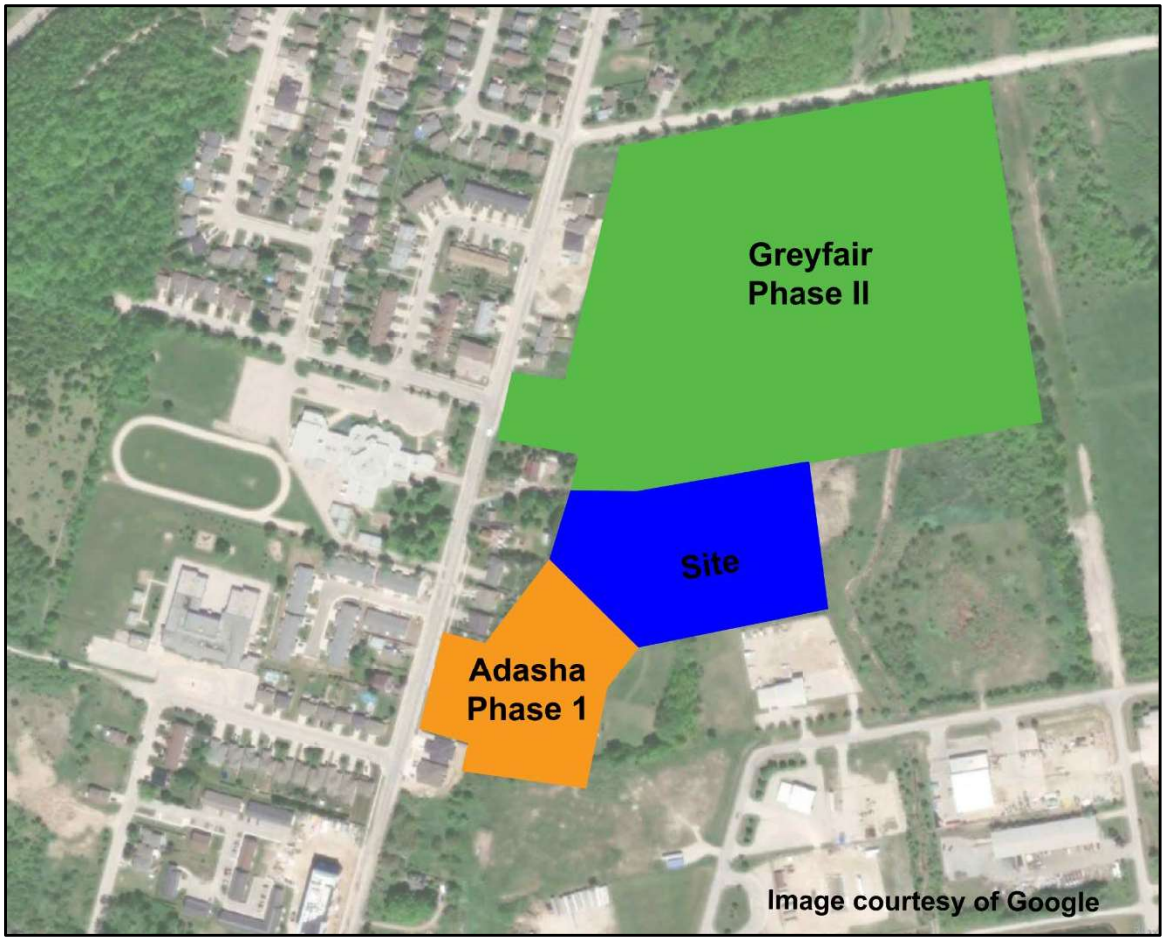
The East Bluffs Planning Area (East Bluffs) covers the northeastern part of the City which includes the lands east and west of 9th Avenue East, to the north of 21st Street and 23rd Street east-west alignments. The lands to the west are mostly developed now and include residential and institutional (school) land uses and the Stoney Orchard Park. Figure 2 includes Schedule A1 of the Official Plan, illustrating the East Bluffs Planning Area.

**Figure 2: Official Plan Schedule A1 - East Bluffs Planning Area**




The Adasha Subdivision (developed south of the site) and the Greyfair Subdivision (approved draft plan of subdivision) exist east of 9th Avenue East. Phase 1 of the Adasha Subdivision, consisting of 31 single and semi-detached lots, is located along the portion of 10th Avenue with the Phase 2 lands (subject site) undeveloped. Figure 3 illustrates the location of the Adasha and Greyfair Subdivisions.

## Figure 3: Subdivision Location Figure

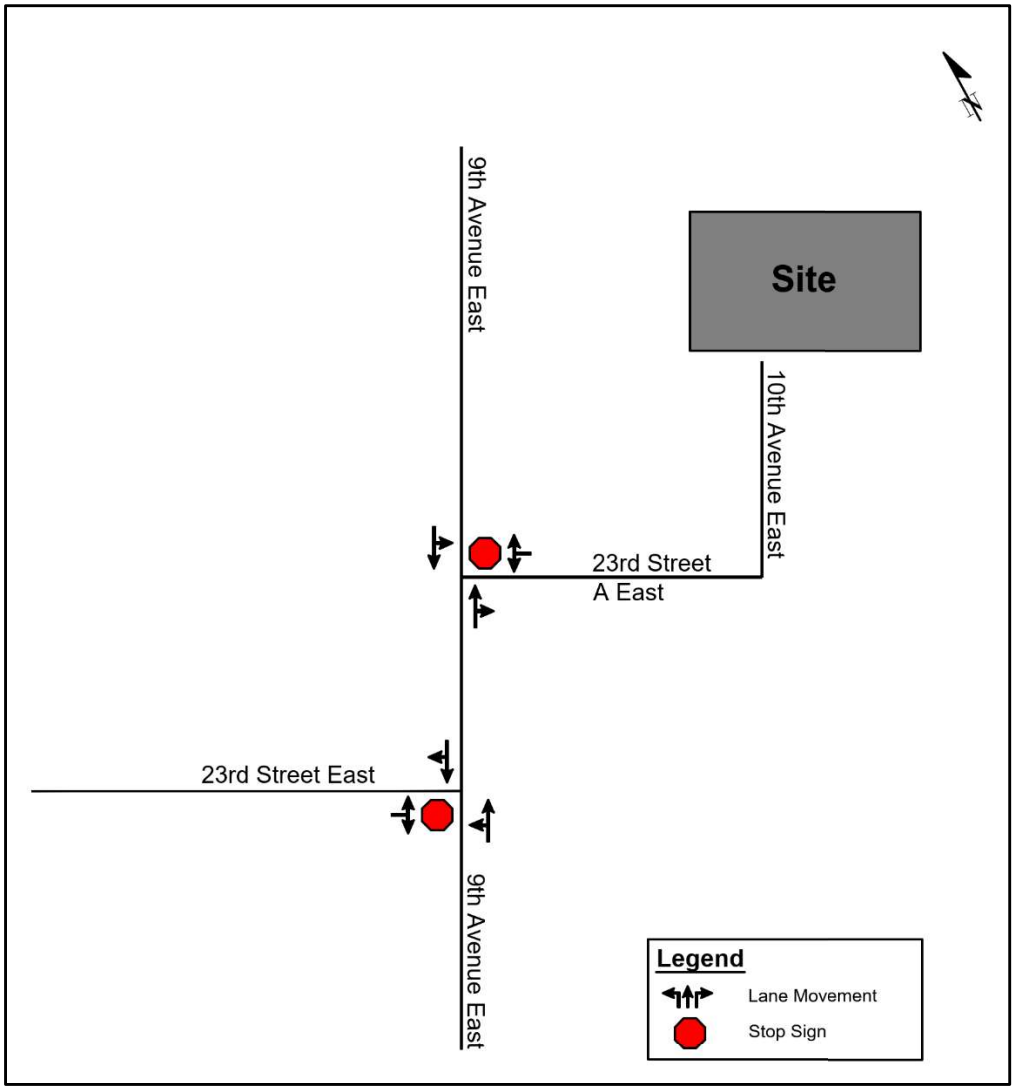


## 2.2 Existing Road Network

The existing road network is described below and is illustrated in Figure 4, including existing traffic control.

| | |
|---|---|
| 9th Avenue East | 9th Avenue is a north-south collector road under the jurisdiction of the City of Owen Sound. 9th Avenue has been identified as a future arterial road in Schedule C of the City's OP (Transportation Plan). The roadway has a four-lane cross-section in the area of the site, which turns into a three-lane cross-section north and a two-lane cross-section south of the site. The roadway has an assumed (unposted) speed limit of 50 km/h. |
| 10th Avenue East | 10th Avenue is a north-south local road under the jurisdiction of the City of Owen Sound. The roadway has a typical residential cross-section which currently terminates with a cul-de-sac at the east end. The roadway has an assumed (unposted) speed limit of 50 km/h. |
| 23rd Street East | 23rd Street East is an east-west collector road west of 9th Avenue under the jurisdiction of the City of Owen Sound. The roadway has a typical residential cross-section with an assumed (unposted) speed limit of 50 km/h. |
| 23rd Street A East | 23rd Street A East is an east-west local road east of 9th Avenue under the jurisdiction of the City of Owen Sound. The roadway has a typical residential cross-section with an assumed (unposted) speed limit of 50 km/h. |

**Figure 4: Existing Road Network**




## 2.3 Existing Active Transportation Infrastructure

The City of Owen Sound provides a variety of Active Transportation Infrastructure which according to the City's Transportation Master Plan consists of:

- Hard and soft surface trails and on-road connections.
- Sidewalks, typically adjacent to public roadways.
- On-road cycling is permitted on local, collector and arterial roadways (but not marked as formal cycling routes).

In the study area of this report, 9th Avenue is currently listed as a bicycle route from 23rd Street East to 25th Street East, whereas all other roads in the study area are not defined as Active Transportation routes.

Existing concrete sidewalks are provided on at least one side of each road external to the site which provides a connection to the sidewalks that have been proposed internal to the site. Sidewalks are provided on the west side of 10th Avenue connecting to the sidewalks on the north side of 23rd Street A East which connect to the sidewalks on 9th Avenue East. Concrete sidewalks are provided on the west side of 9th Avenue with limited sidewalks provided on the east side.

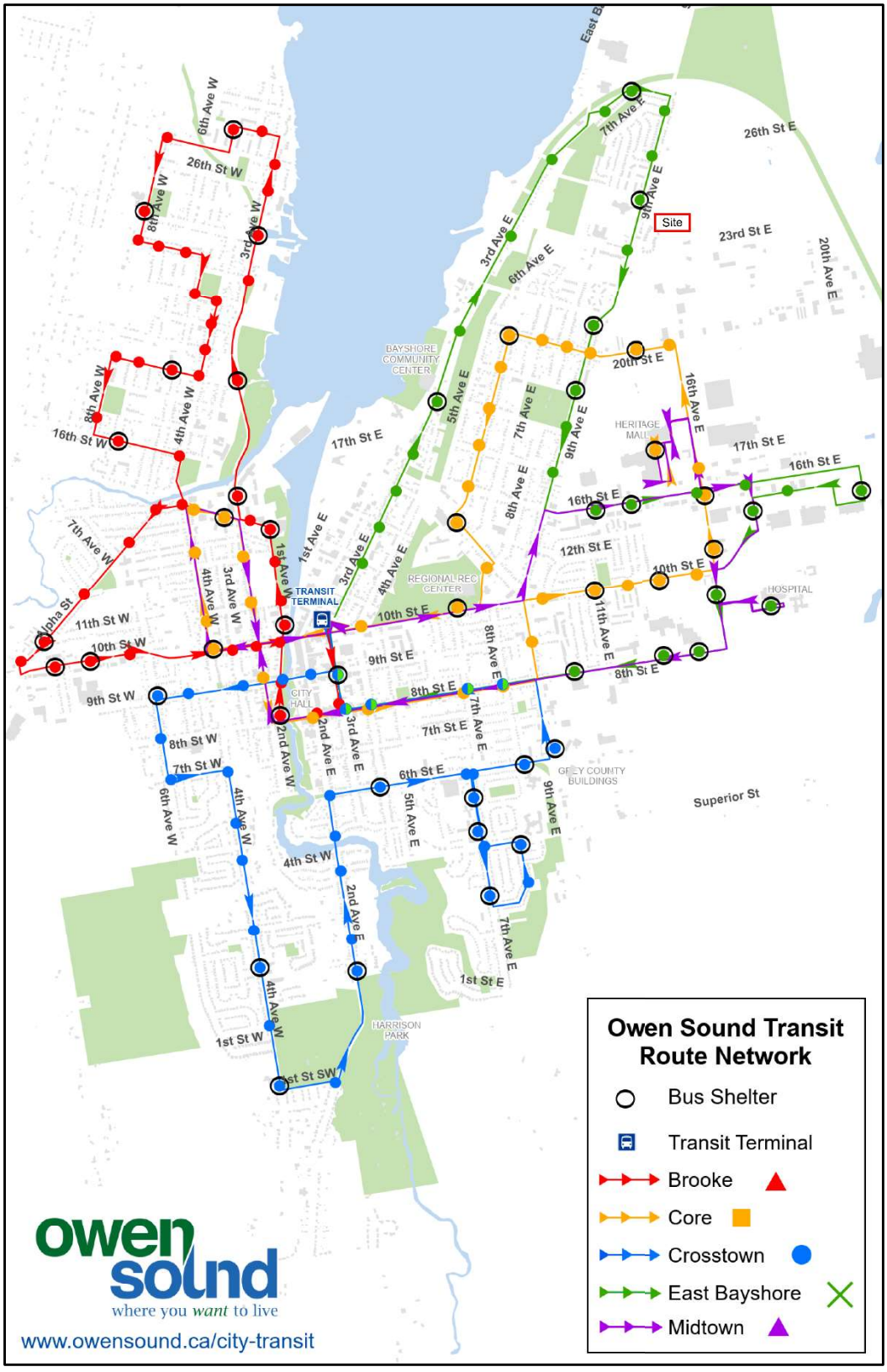
## 2.4 Existing Transit Services

The City of Owen Sound provides both conventional and specialized transit services within the City. The conventional transit service is a four-route system providing half-hour service during the day from Monday through Saturday. Mobility transit provides residents with a specialized door-to-door service which is specifically designed for residents with physical mobility limitations.

In the study area, the City operates the East Bayshore route which runs north-south on 9th Avenue East, with the nearest stop to the subject site located at the corner of 9th Avenue East and 25th Street East. Figure 5 illustrates the existing transit routes in the City.

In addition to local transit routes, Owen Sound serves as the hub for other regional routes including the Guelph Owen Sound Transit Route (GOST) and routes operated by Grey County as the Grey Transit Routes (GTR).

## Figure 5: Existing Transit Route Network

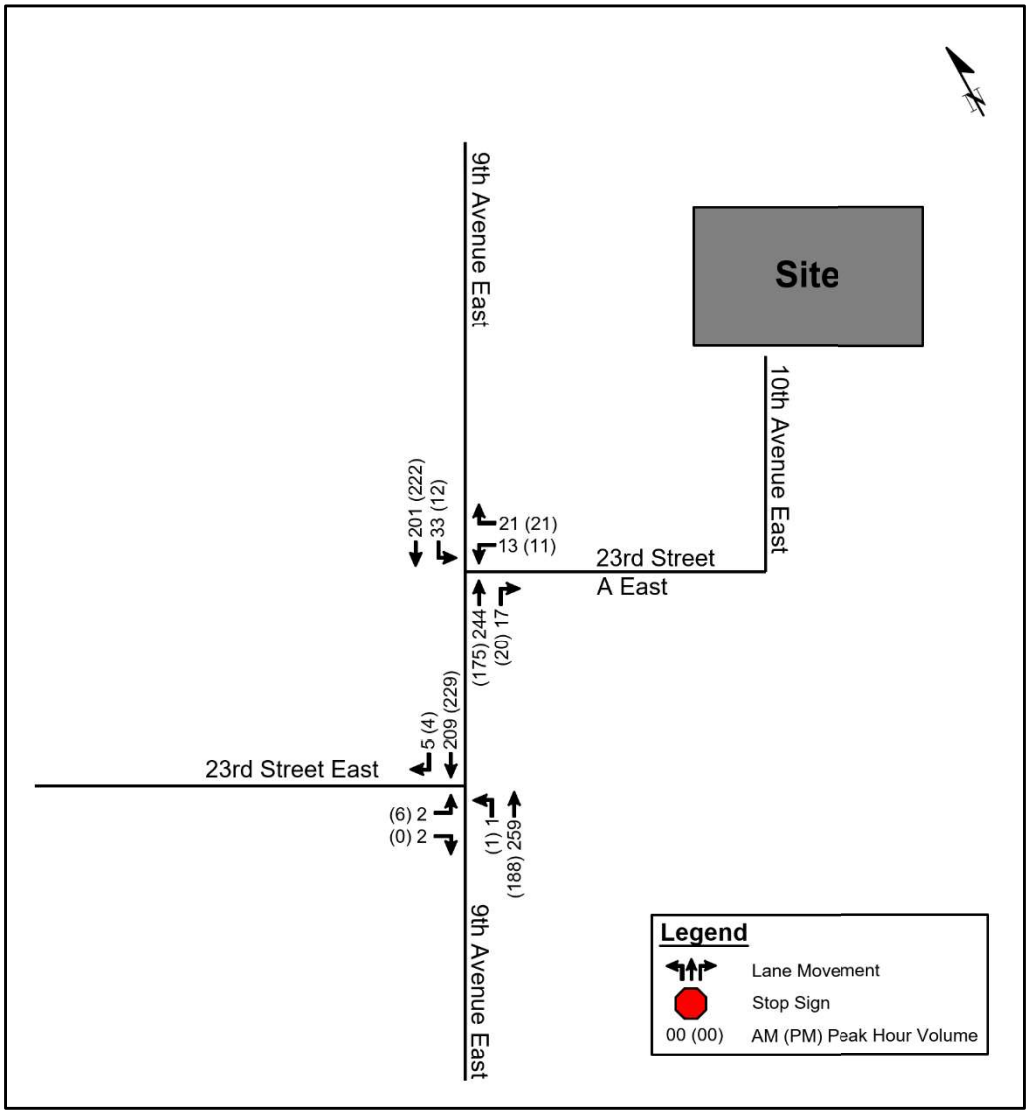


## 2.5 Existing Traffic Volumes

Turning Movement Counts (TMC) were conducted by Ontario Traffic Inc. (OTI) on behalf of Burnside at the intersection of 9th Avenue East and 23rd Street A East as well as 9th Avenue East and 23rd Street East on Thursday, April 16, 2024. The traffic counts were conducted in the morning from 7:00 a.m. to 9:00 a.m. and in the afternoon from 3:00 p.m. to 6:00 p.m.

The existing 2024 traffic volumes are illustrated in Figure 6 and provided in Appendix A.

**Figure 6: Existing Traffic Volumes**



# 3.0 Future Network Considerations

## 3.1 Local Road Connection Opportunities

As per the City's OP, a future north-south collector road is identified to be constructed east of 9th Avenue East as an extension of the current 10th Avenue East. The future local road is intended to provide a connection between 26th Street in the north and 23rd Street in the south. "Option A" considered in this report proposes to provide the 10th Avenue East extension from the existing cul-de-sac to the southwest corner of the Greyfair subdivision development, while "Option B" (selected alternative) proposes to terminate 10th Avenue East at the current cul-de-sac and then loop through the development via a private road.

As per Policy 4.1.3.1 of the OP, all lands are required to be developed in general conformity with the road system illustrated. However, the OP notes that the road system may be considered illustrative only with changes permitted to the location and configuration provided that the planned road network does not adversely impact the development ability of adjoining lands or the general traffic system provided, and that the layout is in accordance with proper design principles.

The planned Greyfair Subdivision (as per "General Plan Phase II", dated August 31, 2006) includes various internal local roads providing access to residential properties with two planned access points to 26th Street East and 9th Avenue East with a possible third access point if the local road connection is implemented. Based on a high-level review of the Greyfair Subdivision, all proposed properties are adequately serviced by the two proposed access points without requiring the 10th Avenue extension to divert/ re-distribute traffic to 9th Avenue. Developing the 10th Avenue extension will lead to additional road users using 10th Avenue, which has been designed as a local road. While providing the 10th Avenue extension would provide an alternative route for the proposed Greyfair Subdivision, it is noted that in addition to the two proposed access points providing a direct route to the collector roads the 10th Avenue Extension would provide a more direct route to the collector road for some Greyfair trips. However, the option of using local residential roads is a negative if a suitable collector road is available. Based on a review of the Greyfair Subdivision design, the road network is designed in a way that all properties are easily accessible without requiring an additional collector road.

As mentioned above, 23rd Street A and 10th Avenue East have been designed as a local road intending to carry low traffic volumes. Implementing the 10th Avenue Extension will result in the road functioning as a collector road with the purpose of getting vehicles from major collectors to their destination. The curve/bend at 23rd Street A and 10th Avenue is not designed to function as a collector road. Therefore, implementing the 10th Avenue Extension could lead to safety risks/concerns at this bend.

Vehicles that are destined for the subject development can adequately access the development via 9th Avenue East, 23rd Street A East and 10th Avenue East without needing an additional route, aside from emergency access. Therefore, by not providing the identified local road connection, the ability for surrounding lands to be developed and/or vehicles to access the proposed developments is not restricted and/or severely impacted. The proposed 10th Avenues Estates development has a 7.5 m wide private road planned for internal site circulation. Therefore, the existing public portion of 10th Avenue East and the existing cul-de-sac maintained by the City are proposed to remain while the internal private road will be the responsibility of the developer to maintain and repair the road. This results in reduced costs for the City for ongoing maintenance and road repairs in the area that would be used as the 10th Avenue Extension.

Other public services such as taxis, garbage collection and delivery vehicles will continue to have adequate access with the network accesses proposed as part of the Greyfair subdivision, without requiring the 10th Avenue Extension. Similar to a resident accessing their property, the impact of having to travel to the 25th Street East, 26th Street East vs 10th Avenue East access is not expected to be significant.

Based on the above-considered items, it is concluded that the proposed road network will meet Policy 4.1.3.1 requirements as it relates to the development ability of adjacent lands. Additionally, traffic flow/access and the impacts on public services and utilities/linear infrastructure will meet Policy 4.1.3.1 requirements (as discussed in a subsequent section of this report). Therefore, the above are not considered to be significant.

## 3.2 Future Active Transportation Connections

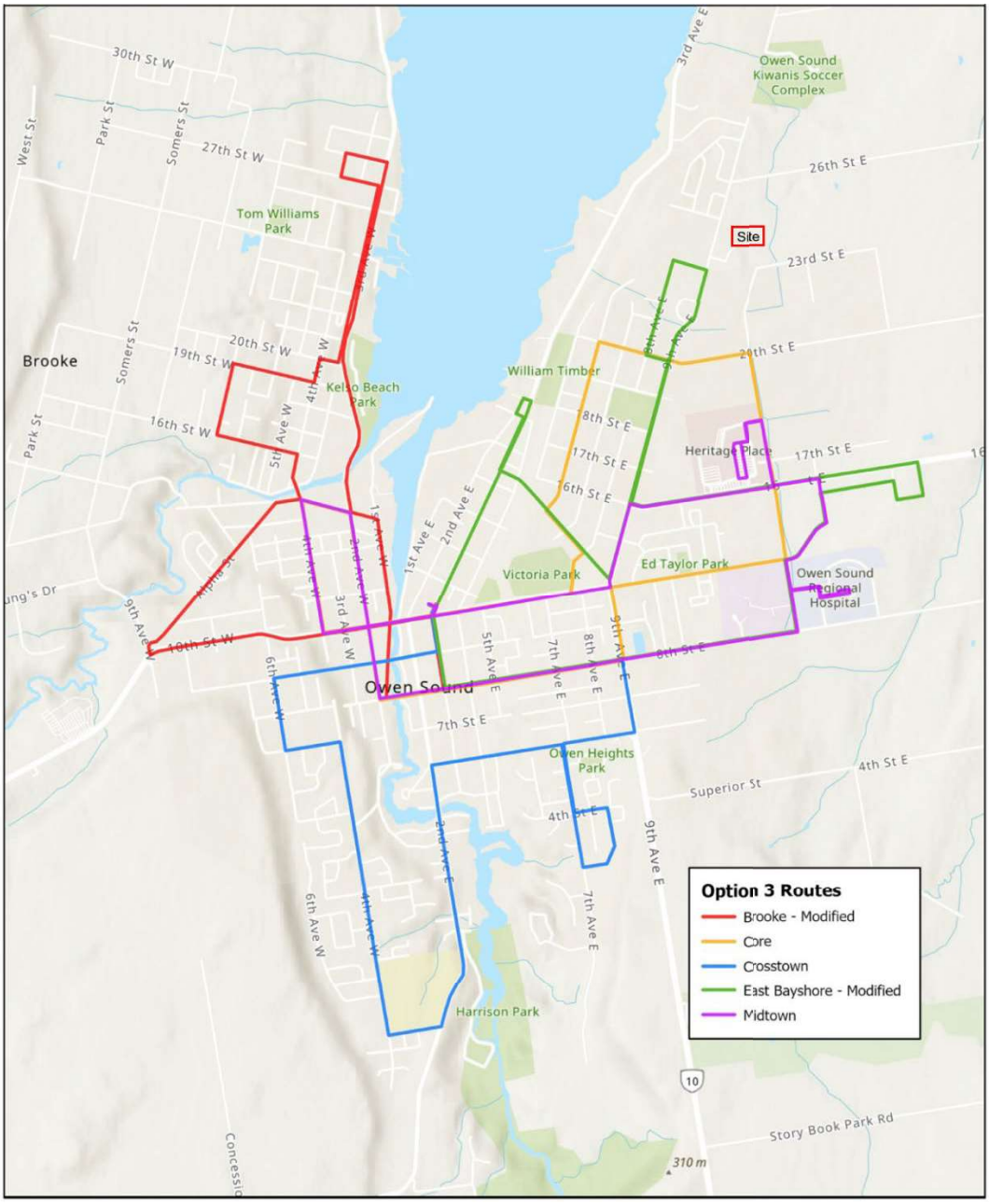
Based on a review of the Official Plan and Transportation Master Plan, there are no future active transportation infrastructure improvements/upgrades proposed in the study area. As mentioned above, existing concrete sidewalks are currently provided on the west side of 10th Avenue. The concept site plan for the proposed development includes continuous sidewalks along one side of the private road, with additional sidewalk connections to the apartment buildings. The sidewalks along the private road continue through the development and connect to a proposed multi-use path in the northeast corner of the site, providing a seamless active transportation connection between 10th Avenue and the Greyfair Subdivision once it has been developed. The concept plan also proposes an active transportation connection via the emergency access route south of the site, connecting to 23rd Street.

As per OP Policy 4.1.3.1, providing the active transportation connection between the proposed development and the Greyfair Subdivision does not adversely impact the development ability of surrounding lands and provides a seamless north-south active transportation connection, therefore not adversely impacting the flow of users on the active transportation network.

## 3.3 Future Transit Connections

In the 2021 Transit Study completed by Dennis Fletcher & Associates, the East Bayshore route has been identified as an above-average performer with available modifications. Option 3 in the transit study, which is the preferred default network includes the East Bayshore route being modified so that it runs as far north as 23rd Street East on 9th Avenue. Based on this, it has been proposed that the East Bayshore route terminate at the southmost intersection of the study area. Figure 7 below illustrates the proposed transit network with the East Bayshore route displayed in green. It should be noted that the trail connection from the subject development to the proposed Greyfair Subdivision will provide a more direct route to 23rd Street which is as far north as the transit route is proposed to run.

**Figure 7: Future Transit Network**




As outlined above and illustrated in Figure 7, the transit network is proposed to terminate at the intersection of 9th Avenue and 23rd Street East and not travel any further north. Therefore, not providing the local road connection between the Adasha and Greyfair Subdivisions will not impact transit, as the City has proposed to run only fixed service transit south of the study area while leaving the areas to the north as on demand transit. However, it should be noted (as mentioned above) that the active transportation connection from the proposed development to the Greyfair Subdivision will allow transit users to take a more direct route to 23rd Street East.

## 3.4 Infrastructure Servicing

A Functional Servicing Report (FSR) completed by Clearwater Shores Civil Engineering, dated June 4, 2024 reviews the availability of existing infrastructure connections and site servicing needs. The FSR indicates that there are existing infrastructure connections available to the proposed development with sufficient capacity available. The findings of the FSR indicate that the proposed development can be constructed to the City of Owen Sound Engineering Standards with no impact to the undeveloped lands to the north (Greyfair Subdivision). Therefore, a road servicing corridor is not required to connect the two developments.

## 3.5 Emergency Access

The existing public road (i.e., 23rd Street A and 10th Avenue) is a total length of 200 m, serving a total of 23 dwelling units. With the proposed development, the total dwelling unit count will increase by 75 units to a total of 98 units. As per the City's Residential Subdivision Policies, a total of 98 dwelling units served by a 200 m roadway exceeds the maximum dwelling units without providing a secondary emergency vehicle access. An emergency vehicle access lane has been proposed to the south of the subject site, connecting to 23rd Street. The proposed emergency access lane is also planned to be used as a sanitary service corridor and an active transportation connection.

The nearest firehall / EMS station to the proposed development which is the closest emergency service is located southwest of the site on Grey Road 15 (3rd Avenue East). If an obstruction were present on 9th Avenue East that would prevent emergency services from using 9th Avenue East as an access route, the alternate route would be to travel north on 3rd Avenue East until it turns into 28th Street East, which then connects to 9th Avenue East, north of the Greyfair Subdivision at the intersection of 9th Avenue East and 26th Street East. This proposed alternate route is approximately 3.5 km in length from the firehall, which equates to a response time of five minutes compared to the two existing routes (via 6th Avenue East, 20th Street East and 9th Avenue East or 6th Avenue East, 16th Street East and 9th Avenue East) which are 3.4 km in length which equates to a five-minute response time.

Under existing conditions, the subdivision located northwest of the Greyfair Subdivision would require the alternate route outlined above to be utilized if 9th Avenue is obstructed north of 20th Street East.

Therefore, not providing the local road connection will not adversely impact the emergency access of surrounding lands when they are developed, as the nearby Greyfair Subdivision has two planned access points that could be used for access purposes in the event of an emergency.

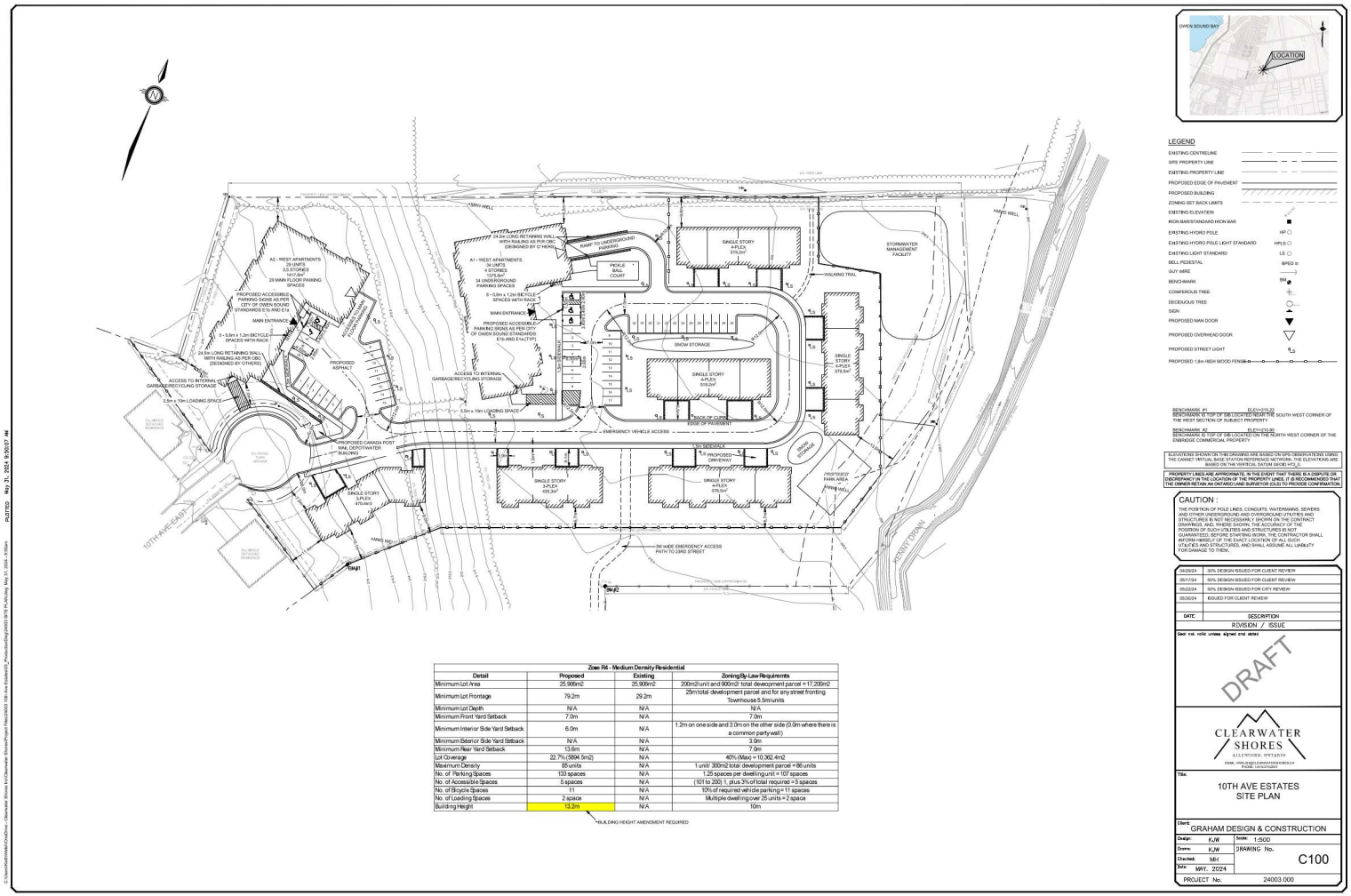
# 4.0 Proposed Development

## 4.1 Site Plan and Driveway Access

The proposed retirement community is located at the east end of 10th Avenue East (2300 block) and within the East Bluffs Planning Area. According to the latest concept plan dated March 13, 2024, the proposed retirement community will include a total of 85 dwelling units (63 apartments and 22 townhouses). Access to the development is proposed via a 7.6 m wide private road extending from the current cul-de-sac.

The concept plan for the proposed retirement community is provided in Figure 8.

**Figure 8: Concept Site Plan**




| Zone R4 - Medium Density Residential | | | |
|---|---|---|---|
| Detail | Proposed | Existing | Zoning By-Law Requirements |
| Minimum Lot Area | 25,969m2 | 25,969m2 | 200m2/unit and 900m2 total development parcel = 17,200m2 |
| Minimum Lot Frontage | 79.2m | 29.2m | 25m total development parcel and for any street fronting Townhouse 5.5m/units |
| Minimum Lot Depth | N/A | N/A | N/A |
| Minimum Front Yard Setback | 7.0m | N/A | 7.0m |
| Minimum Interior Side Yard Setback | 6.0m | N/A | 1.2m on one side and 3.0m on the other side (0.0m where there is a common party wall) |
| Minimum Exterior Side Yard Setback | N/A | N/A | 3.0m |
| Minimum Rear Yard Setback | 13.6m | N/A | 7.0m |
| Lot Coverage | 22.7% (5894.5m2) | N/A | 40% (Max) = 10,362.4m2 |
| Maximum Density | 85 units | N/A | 1 unit/ 300m2 total development parcel =86 units |
| No. of Parking Spaces | 133 spaces | N/A | 1.25 spaces per dwelling unit = 107 spaces |
| No. of Accessible Spaces | 5 spaces | N/A | (101 to 200) 1, plus 3% of total required = 5 spaces |
| No. of Bicycle Spaces | 11 | N/A | 10% of required vehicle parking = 11 spaces |
| No. of Loading Spaces | 2 space | N/A | Multiple dwelling over 25 units = 2 space |
| Building Height | 13.2m | N/A | 10m |

*BUILDING HEIGHT AMENDMENT REQUIRED

## 4.2 Trip Generation

As discussed above, there were two potential options for development of the subject site. To be in accordance with the Terms of Reference proposed by the City's peer review consultant and to provide a comparison between the two options, trip generation was completed for both option A and option B, taking into account the trip generation of the residential component of the Greyfair subdivision. The following scenarios have been used for trip generation.

Greyfair subdivision – consists of 70 single-detached residential lots and commercial/industrial land uses. However, the commercial and industrial uses are planned to be separated from the residential lots and therefore have not been considered in the analysis of this study.

Option A – Includes a total of 54 dwelling units consisting of eight single detached lots, 19 cluster townhouse dwellings and 27 apartment dwellings.

Option B – Includes a total of 85 dwelling units consisting of 63 apartment units (aged 55+) and 22 2-bedroom townhouses (aged 55+).

Both options A and B need to consider the residential trips anticipated along 9$^{th}$ Avenue East as a result of the Greyfair Subdivision, however, option A also needs to consider the expected trips distributed along 10$^{th}$ Avenue East from the Greyfair Subdivision as a result of the 10$^{th}$ Avenue extension.

The proposed Trip Generation was based upon information contained in the publication *Trip Generation Manual, 11$^{th}$ Edition* (Institute of Transportation Engineers). The following land use codes (LUC) were used in the generation of trips, based on a general urban / suburban environment:

- LUC 210 (Single-Family Detached Housing) – Greyfair Subdivision residential component and proposed single lots as part of option A.
- LUC 251 (Senior Adult Housing – Single-Family) – Retirement community 55+ townhouses.
- LUC 252 (Senior Adult Housing – Multifamily) – Retirement community 55+ apartments.

The resulting trip generation is summarized in Table 1.

**Table 1: Site Trip Generation**

| Land Use | A.M. Peak Hour (vph) | | | P.M. Peak Hour (vph) | | |
|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total |
| Greyfair Subdivision | | | | | | |
| Single-Family Detached Housing, LUC 210 – 70 units | 14 | 40 | 54 | 45 | 26 | 71 |
| **Option A** | | | | | | |
| Single-Family Detached Housing, LUC 210 – 8 units | 2 | 5 | 7 | 6 | 3 | 9 |
| Senior Adult Housing – Single Family, LUC 251 – 19 units | 4 | 7 | 11 | 7 | 5 | 12 |
| Senior Adult Housing – Multifamily, LUC 252 – 27 units | 2 | 4 | 6 | 4 | 3 | 7 |
| Option A Total | 8 | 16 | 24 | 17 | 11 | 28 |
| **Option B** | | | | | | |
| Senior Adult Housing – Single Family, LUC 251 – 22 units | 4 | 8 | 12 | 9 | 5 | 14 |
| Senior Adult Housing – Multifamily, LUC 252 – 58 units | 4 | 8 | 12 | 8 | 7 | 15 |
| Option B Total | 8 | 16 | 24 | 17 | 12 | 29 |

In summary it is forecasted that the Greyfair Subdivision will generate 54 vph in the a.m. peak hour and 71 vph in the p.m. peak hour, with the development of Option A generating 24 vph in the a.m. peak hour and 28 vph in the p.m. peak hour, or Option B generating 24 vph in the a.m. peak hour and 29 vph in the p.m. peak hour. These forecasted traffic volumes are all two-way volumes and are considered to have a relatively minor impact on the local road networks.

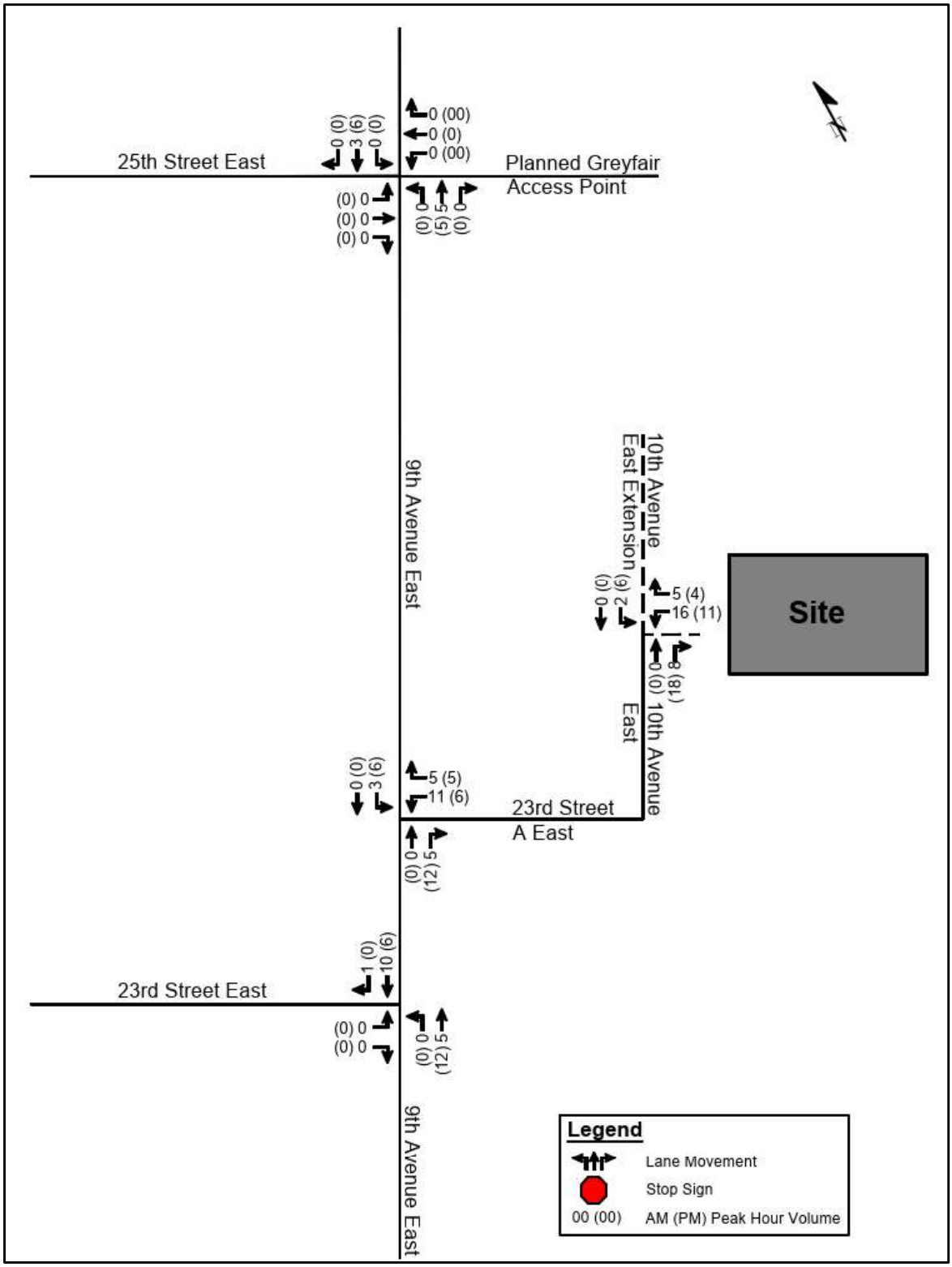
## 4.3 Trip Distribution and Assignment

Trip distribution and assignment for the proposed development were derived from the existing traffic patterns, the available road network, and the expected origin and destination of residents. The estimated distribution of site trips is outlined in Table 2 and illustrated in Figure 9 and Figure 10 for options A and B respectively.

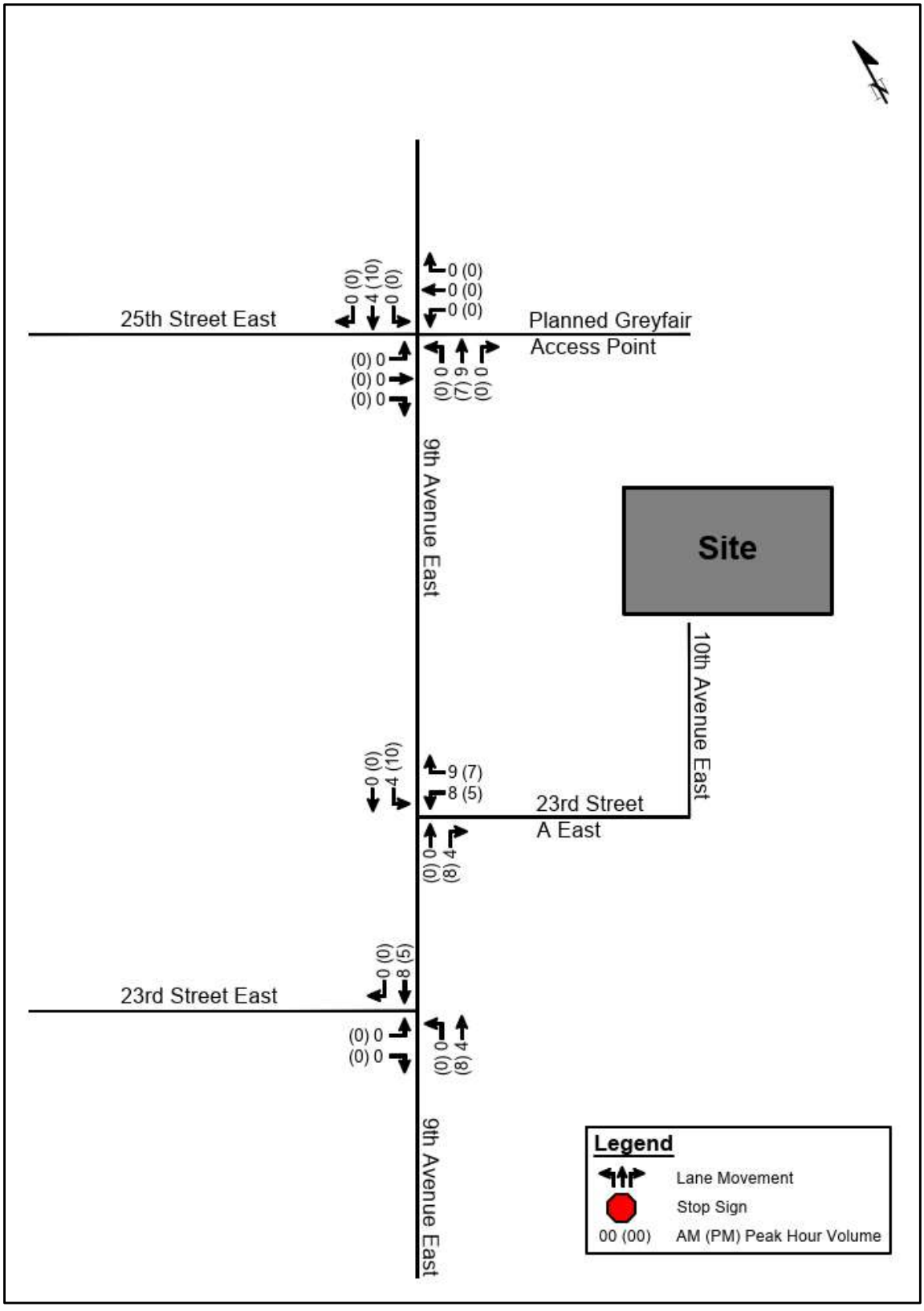
**Table 2: Site Trip Distribution**

| To / From | Via | Distribution |
|---|---|---|
| North | 9th Avenue East | 51% |
| South | 9th Avenue East | 48% |
| West | 23rd Street East | 1% |
| | **Total** | **100%** |

## Figure 9: Trip Assignment – Option A

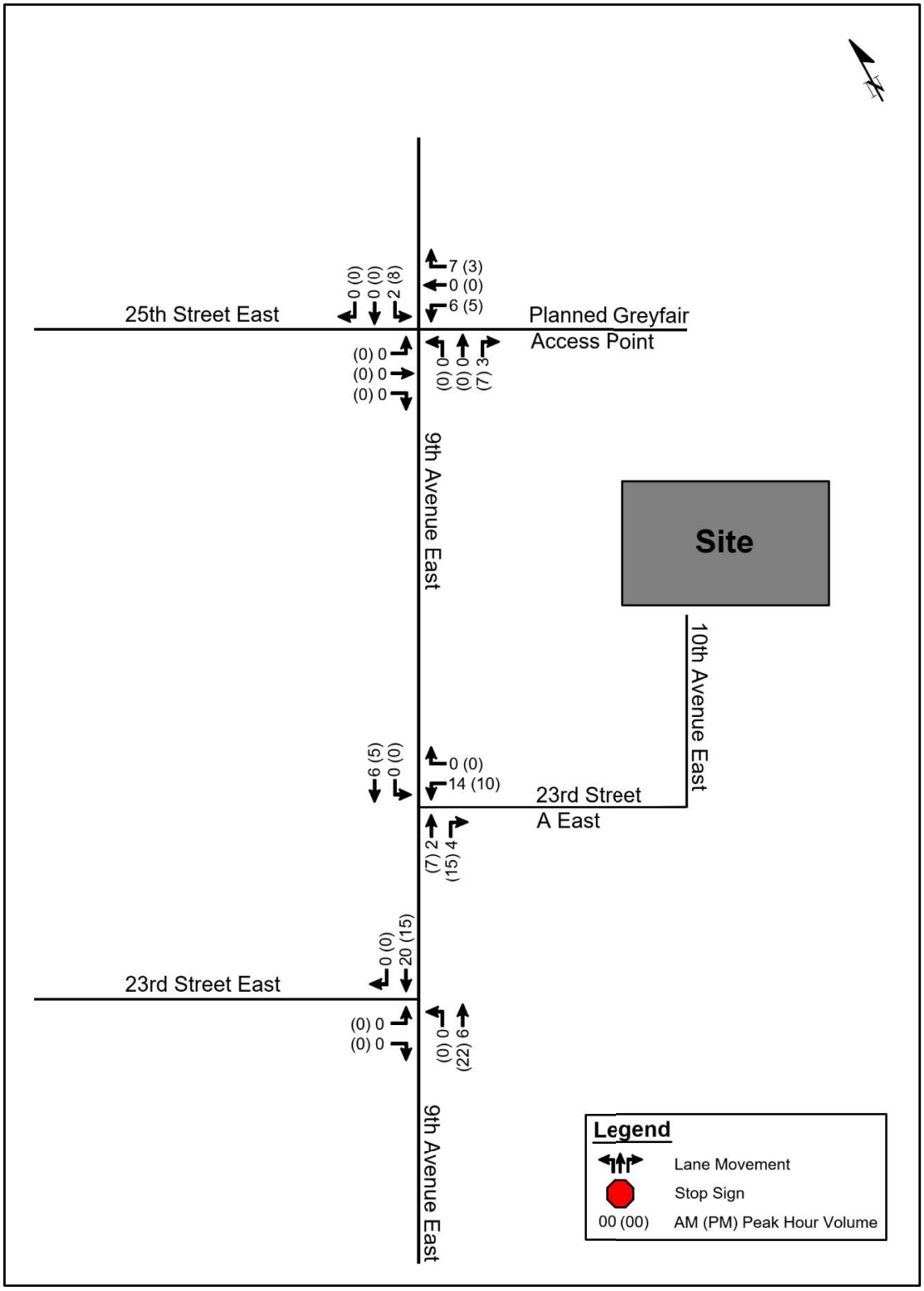


## Figure 10: Trip Assignment – Option B



Based on a network review of the Greyfair Subdivision, it has been assumed that 35% of the trips resulting from the 70 units will utilize the “south” access via the 10th Avenue East extension. The resulting distribution of the Greyfair Subdivision trips is illustrated in Figure 11.

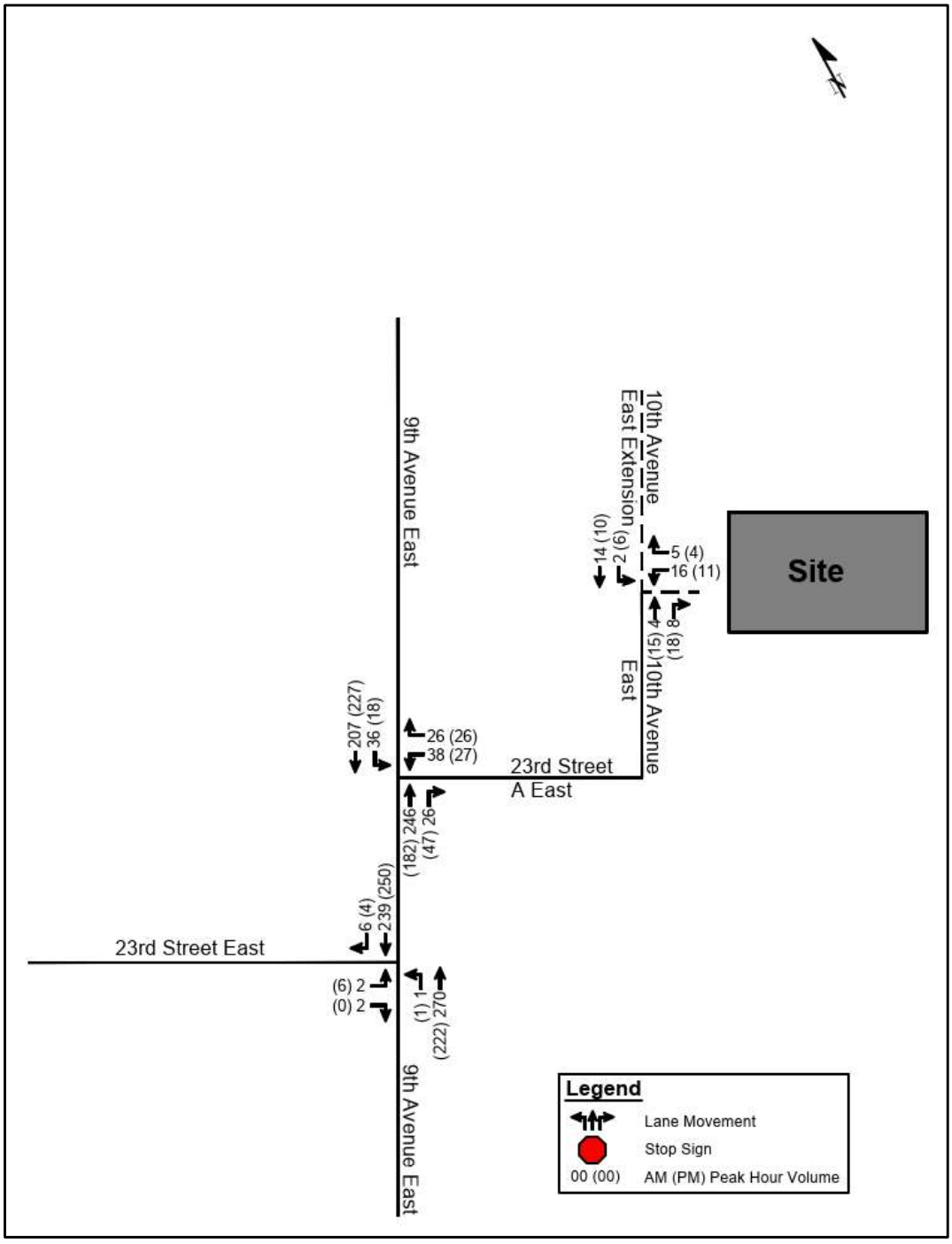
## Figure 11: Trip Assignment – Greyfair Subdivision



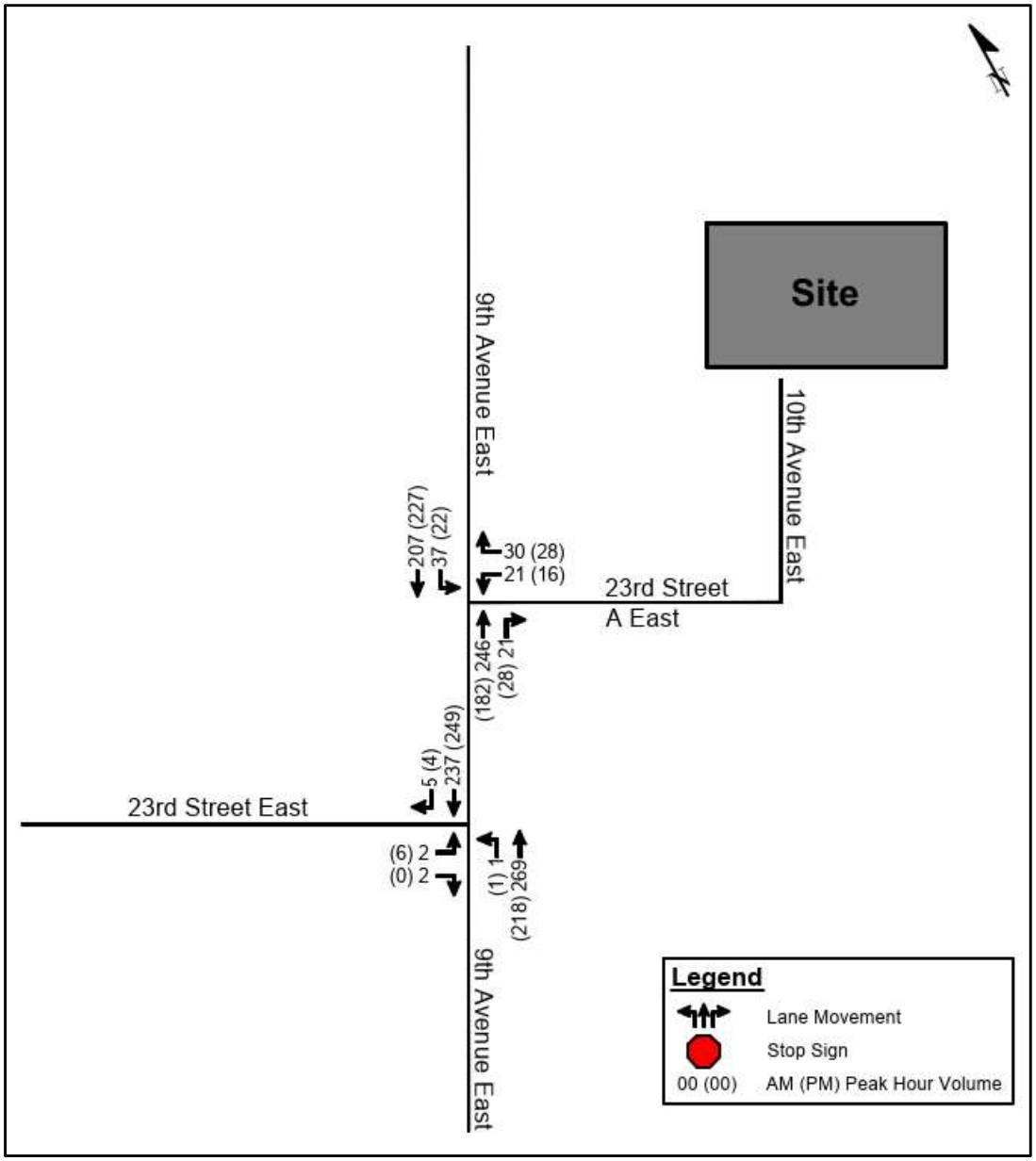
## 5.0 Total Traffic Conditions

Total traffic volumes consist of the existing traffic volumes with the addition of the site trips. The resulting total traffic volumes are shown in Figure 12 and Figure 13 for Options A and B respectively.

**Figure 12: Total Traffic Volumes – Option A**



## Figure 13: Total Traffic Volumes – Option B



# 6.0 Traffic Operations Analysis

Traffic operational analysis was conducted under existing and future traffic conditions for the weekday a.m. and p.m. peak hours at all study intersections. Queueing was reviewed using Synchro's 95th percentile queue. Comparisons of the existing storage and projected queue are also summarized. Detailed Synchro reports are provided in Appendix B through D.

## 6.1 9th Avenue East / 23rd Street A East

Existing and future traffic operations for the intersection of 9th Avenue East and 23rd Street A East are summarized in Table 3.

**Table 3: Operational Analysis for 9th Avenue East / 23rd Street A East**

| Movement | Existing Storage / Link Distance (m) | Weekday A.M. Peak Hour | | | Weekday P.M. Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | v/c | LOS (delay, sec) | 95th Queue (m) | v/c | LOS (delay, sec) | 95th Queue (m) |
| **Existing Conditions** | | | | | | | |
| WBLR | 30.0 | 0.13 | C (17.3) | 3.2 | 0.08 | B (13.2) | 2.0 |
| NBT | 53.0 | 0.12 | A (0.0) | 0.0 | 0.08 | A (0.0) | 0.0 |
| NBTR | 53.0 | 0.07 | A (0.0) | 0.0 | 0.06 | A (0.0) | 0.0 |
| SBLT | 32.0 | 0.10 | A (5.7) | 2.4 | 0.02 | A (1.4) | 0.4 |
| SBT | 32.0 | 0.10 | A (0.0) | 0.0 | 0.10 | A (0.0) | 0.0 |
| **Future Total Conditions – Option A** | | | | | | | |
| WBLR | 30.0 | 0.26 | C (20.6) | 6.9 | 0.15 | C (15.1) | 4.0 |
| NBT | 53.0 | 0.12 | A (0.0) | 0.0 | 0.09 | A (0.0) | 0.0 |
| NBTR | 53.0 | 0.08 | A (0.0) | 0.0 | 0.08 | A (0.0) | 0.0 |
| SBLT | 32.0 | 0.11 | A (6.2) | 2.6 | 0.03 | A (2.0) | 0.6 |
| SBT | 32.0 | 0.10 | A (0.0) | 0.0 | 0.11 | A (0.0) | 0.0 |
| **Future Total Conditions – Option B** | | | | | | | |
| WBLR | 30.0 | 0.20 | C (19.0) | 5.6 | 0.12 | B (14.1) | 3.0 |
| NBT | 53.0 | 0.12 | A (0.0) | 0.0 | 0.09 | A (0.0) | 0.0 |
| NBTR | 53.0 | 0.08 | A (0.0) | 0.0 | 0.06 | A (0.0) | 0.0 |
| SBLT | 32.0 | 0.11 | A (6.2) | 2.8 | 0.03 | A (2.3) | 0.7 |
| SBT | 32.0 | 0.10 | A (0.0) | 0.0 | 0.11 | A (0.0) | 0.0 |

Under existing and future traffic conditions, all movements are forecast to operate with excess capacity with a LOS C or better and delays under 20.6 seconds. Existing queues and projected queues are forecasted to be within the available storage.

## 6.2 9th Avenue East / 23rd Street East

Existing and future traffic operations for the intersection of 9th Avenue East and 23rd Street East are summarized in Table 4.

**Table 4: Operational Analysis for 9th Avenue East / 23rd Street East**

| Movement | Existing Storage / Link Distance (m) | Weekday A.M. Peak Hour | | | Weekday P.M. Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | v/c | LOS (delay, sec) | 95th Queue (m) | v/c | LOS (delay, sec) | 95th Queue (m) |
| **Existing Conditions** | | | | | | | |
| WBLR | 30.0 | 0.01 | B (10.6) | 0.1 | 0.01 | B (11.2) | 0.3 |
| NBT | 53.0 | 0.00 | A (0.1) | 0.0 | 0.00 | A (0.1) | 0.0 |
| NBTR | 53.0 | 0.12 | A (0.0) | 0.0 | 0.09 | A (0.0) | 0.0 |
| SBLT | 32.0 | 0.15 | A (0.0) | 0.0 | 0.16 | A (0.0) | 0.0 |
| SBT | 32.0 | 0.00 | A (0.0) | 0.0 | 0.00 | A (0.0) | 0.0 |
| **Future Total Conditions – Option A** | | | | | | | |
| WBLR | 30.0 | 0.01 | B (10.9) | 0.1 | 0.01 | B (11.7) | 0.3 |
| NBT | 53.0 | 0.00 | A (0.1) | 0.0 | 0.00 | A (0.1) | 0.0 |
| NBTR | 53.0 | 0.13 | A (0.0) | 0.0 | 0.11 | A (0.0) | 0.0 |
| SBLT | 32.0 | 0.17 | A (0.0) | 0.0 | 0.18 | A (0.0) | 0.0 |
| SBT | 32.0 | 0.00 | A (0.0) | 0.0 | 0.00 | A (0.0) | 0.0 |
| **Future Total Conditions – Option B** | | | | | | | |
| WBLR | 30.0 | 0.01 | B (10.9) | 0.1 | 0.01 | B (11.6) | 0.3 |
| NBT | 53.0 | 0.00 | A (0.1) | 0.0 | 0.00 | A (0.1) | 0.0 |
| NBTR | 53.0 | 0.13 | A (0.0) | 0.0 | 0.10 | A (0.0) | 0.0 |
| SBLT | 32.0 | 0.17 | A (0.0) | 0.0 | 0.18 | A (0.0) | 0.0 |
| SBT | 32.0 | 0.00 | A (0.0) | 0.0 | 0.00 | A (0.0) | 0.0 |

Under existing and future traffic conditions, all movements are forecast to operate with excess capacity with a LOS B or better and delays under 11.7 seconds. Existing queues and projected queues are forecasted to be within the available storage.

As shown in the tables above, the peak delay for the intersection of 9th Avenue and 23rd Street A is 17.4 seconds (LOS C) under existing conditions which is forecast to rise to 20.6 seconds (LOS C) under option A, or 19.0 seconds (LOS C) under option B. Similarly, the peak delay for the intersection of 9th Avenue and 23rd Street is 11.2 seconds (LOS B) which is forecast to rise to 11.7 seconds (LOS B) under option A and 11.6 (LOS B) under option B.

Therefore, based on the data presented above, it can be concluded that although option B consists of more housing (i.e., 85 dwelling units vs 54 units), the additional trips do not add significant delays to the existing intersections. Instead, it can be concluded that option B provides more housing with reduced delays on a per vehicle basis when compared to option A which includes the extension of 10$^{th}$ Avenue. Based on the delays experienced, it can be assumed that the trips destined for the Greyfair Subdivision that are anticipated to utilize the 10$^{th}$ Avenue extension would not cause significant delays by having to utilize one of the two proposed access points.

# 7.0 Conclusions and Recommendations

Based on the analysis in this study, the main conclusions and recommendations are as follows:

- The property owner (Tenth Avenue Estates Inc.) is seeking approval to develop a retirement community consisting of a total of 85 dwelling units.
- Existing concrete sidewalks are provided on at least one side of each road external to the site which provides a connection to the sidewalks that have been proposed internal to the site. Sidewalks are provided on the west side of 10th Avenue connecting to the sidewalks on the north side of 23rd Street A East which connect to the sidewalks on 9th Avenue East. Concrete sidewalks are provided on the west side of 9th Avenue with limited sidewalks provided on the east side.
- In the study area, the City operates the East Bayshore transit route which runs north-south on 9th Avenue East, with the nearest stop located at the corner of 9th Avenue East and 25th Street East.
- By not providing the local road connection identified in the Official Plan, the ability for the surrounding lands to be developed, vehicular connection, active transportation connection, servicing connection and emergency access of the proposed developments is not restricted and/or adversely impacted.
- Policy 4.1.3.1 requires that lands be developed in general conformity with the schematic road system in the Official Plan with changes permitted as long as the proposed configuration does not adversely impact the development ability of adjoining lands or the general traffic flow provided. It is concluded that the proposed road network will meet Policy 4.1.3.1 requirements and the impacts to public services and utilities/linear infrastructure are not considered to be significant.
- Option 3 presented in the 2021 transit study is identified as the preferred default network which includes the East Bayshore route being modified so that it runs as far north as 23rd Street East on 9th Avenue. As a result of this route being proposed to terminate at the intersection of 9th Avenue and 23rd Street East and not travel any further north, not providing the local road connection between the existing Adasha Subdivision (i.e., located south of the site) and the proposed Greyfair Subdivision will not impact transit, assuming an active transportation connection is provided through the subject development to access 23rd Street East more directly. Under the future modification, the City has proposed to only run fixed service transit south of the study area while leaving the areas to the north as on-demand transit.
- With the proposed development, the total dwelling unit count along 10th Avenue East will increase by 75 units to a total of 98 units. As per the City's Residential Subdivision Policies, a total of 98 dwelling units served by a 200 m roadway exceeds the maximum number of dwelling units without providing a secondary emergency vehicle access. An emergency vehicle access lane has been proposed from the south of the subject site, connecting to 23rd Street.

- Based on a review of the firehall / emergency service locations with regards to distance and time of response, not providing the local road connection will not adversely impact the emergency access of surrounding lands when they are developed as the nearby Greyfair Subdivision has two planned access points that could be used for access purposes in the event of an emergency.
- Under existing and future total conditions, all movements at the study intersections (9th Avenue East / 23rd Street East and 9th Avenue East / 23rd Street A East) are forecast to operate with excess capacity at a LOS C or better and delays under 20.6 seconds. Existing queues and projected queues are forecasted to be within the available storage.
- The peak delay for the intersection of 9th Avenue and 23rd Street A is 17.4 seconds (LOS C) in the a.m. and 13.2 seconds (LOS B) in the p.m. under existing conditions. The peak delay is forecast to rise to 20.6 seconds (LOS C) in the a.m. and 15.1 seconds (LOS B) in the p.m. under option A, or 19.0 seconds (LOS C) in the a.m. and 14.1 seconds (LOS B) in the p.m. under option B. Similarly, the peak delay for the intersection of 9th Avenue and 23rd Street is 10.6 seconds (LOS B) in the a.m. and 11.2 seconds (LOS B) in the p.m. under existing conditions. The peak delay is forecast to rise to 10.9 seconds (LOS B) in the a.m. and 11.7 seconds (LOS B) in the p.m. under option A and 10.9 seconds (LOS B) in the a.m. and 11.6 seconds (LOS B) in the p.m. under option B. Therefore, it can be concluded that although option B consists of more housing (i.e., 85 dwelling units vs 54 units) the additional trips do not add significant delays to the existing intersections. Instead, it can be concluded that option B, provides more housing with reduced delays on a per vehicle basis when compared to option A which includes the extension of 10th Avenue. Based on the delays experienced, it can be assumed that the trips destined for the Greyfair Subdivision that are anticipated to utilize the 10th Avenue extension would not cause significant delays by having to utilize one of the two proposed access points.

In conclusion, it has been determined that the existing road network can accommodate the proposed development, based on operational parameters (i.e., capacity, delay, queueing, etc.). Additionally, this study has provided the technical justification to support the development of option B which includes not establishing the local road connection as per the City's Official Plan.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

# Appendix A

# Existing Traffic Counts

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# Peak Hour Diagram

| Specified Period | | One Hour Peak | |
|---|---|---|---|
| From: | 07:00:00 | From: | 08:00:00 |
| To: | 09:00:00 | To: | 09:00:00 |

**Intersection:** 9th Ave E & 23rd St A E
**Site Code:** 2416800001
**Count Date:** Apr 16, 2024

**Weather conditions:** Clear

**** Unsignalized Intersection ****

**Major Road:** 9th Ave E runs N/S

## North Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 201 | 233 | 434 |
| Trucks | 33 | 32 | 65 |
| Bicycles | 0 | 0 | 0 |
| | **234** | **265** | **499** |

## 9th Ave E

| | | | |
|---|---|---|---|
| Bicycles | 0 | 0 | 0 |
| Trucks | 25 | 8 | 0 |
| Cars | 176 | 25 | 0 |
| **Totals** | **201** | **33** | **0** |

Peds: 14

Peds: 0


Peds: 0

Peds: 3

| | | | |
|---|---|---|---|
| **Totals** | **244** | **17** | **0** |
| Cars | 218 | 14 | 0 |
| Trucks | 26 | 3 | 0 |
| Bicycles | 0 | 0 | 0 |

## 9th Ave E

## East Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 27 | 39 | 66 |
| Trucks | 7 | 11 | 18 |
| Bicycles | 0 | 0 | 0 |
| | **34** | **50** | **84** |

## 23rd St A E

| | Totals | Cars | Trucks | Bicycles |
|---|---|---|---|---|
| | **0** | 0 | 0 | 0 |
| | **21** | 15 | 6 | 0 |
| | **13** | 12 | 1 | 0 |

## South Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 232 | 188 | 420 |
| Trucks | 29 | 26 | 55 |
| Bicycles | 0 | 0 | 0 |
| | **261** | **214** | **475** |

Cars - Trucks - Bicycles

## Comments

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# Peak Hour Summary

Intersection: 9th Ave E & 23rd St A E
Site Code: 2416800001
Count Date: Apr 16, 2024
Period: 07:00 - 09:00

## Peak Hour Data (08:00 - 09:00)

| Start Time | North Approach 9th Ave E | | | | | | South Approach 9th Ave E | | | | | | East Approach 23rd St A E | | | | | | West Approach | | | | | | Total Vehicles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | |
| 08:00 | 9 | 31 | | 0 | 1 | 40 | | 48 | 2 | 0 | 0 | 50 | 2 | | 3 | 0 | 0 | 5 | | | | | 0 | | 95 |
| 08:15 | 10 | 39 | | 0 | 8 | 49 | | 58 | 5 | 0 | 2 | 63 | 6 | | 2 | 0 | 0 | 8 | | | | | 0 | | 120 |
| 08:30 | 11 | 64 | | 0 | 1 | 75 | | 72 | 5 | 0 | 0 | 77 | 2 | | 11 | 0 | 0 | 13 | | | | | 0 | | 165 |
| 08:45 | 3 | 67 | | 0 | 4 | 70 | | 66 | 5 | 0 | 1 | 71 | 3 | | 5 | 0 | 0 | 8 | | | | | 0 | | 149 |
| **Grand Total** | **33** | **201** | | **0** | **14** | **234** | | **244** | **17** | **0** | **3** | **261** | **13** | | **21** | **0** | **0** | **34** | | | | | **0** | **0** | **529** |
| **Approach %** | 14.1 | 85.9 | | 0 | | - | | 93.5 | 6.5 | 0 | | - | 38.2 | | 61.8 | 0 | | - | | | | | | - | |
| **Totals %** | 6.2 | 38 | | 0 | | 44.2 | | 46.1 | 3.2 | 0 | | 49.3 | 2.5 | | 4 | 0 | | 6.4 | | | | | | 0 | |
| **PHF** | **0.75** | **0.75** | | **0** | | **0.78** | | **0.85** | **0.85** | **0** | | **0.85** | **0.54** | | **0.48** | **0** | | **0.65** | | | | | | **0** | **0.8** |
| **Cars** | 25 | 176 | | 0 | | 201 | | 218 | 14 | 0 | | 232 | 12 | | 15 | 0 | | 27 | | | | | | 0 | 460 |
| **% Cars** | 75.8 | 87.6 | | 0 | | 85.9 | | 89.3 | 82.4 | 0 | | 88.9 | 92.3 | | 71.4 | 0 | | 79.4 | | | | | | 0 | 87 |
| **Trucks** | 8 | 25 | | 0 | | 33 | | 26 | 3 | 0 | | 29 | 1 | | 6 | 0 | | 7 | | | | | | 0 | 69 |
| **% Trucks** | 24.2 | 12.4 | | 0 | | 14.1 | | 10.7 | 17.6 | 0 | | 11.1 | 7.7 | | 28.6 | 0 | | 20.6 | | | | | | 0 | 13 |
| **Bicycles** | 0 | 0 | | 0 | | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | | | | | | 0 | 0 |
| **% Bicycles** | 0 | 0 | | 0 | | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | | | | | | 0 | 0 |
| **Peds** | | | | | 14 | - | | | | | 3 | - | | | | | 0 | - | | | | | 0 | - | 17 |
| **% Peds** | | | | | 82.4 | - | | | | | 17.6 | - | | | | | 0 | - | | | | | 0 | - | |

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# Peak Hour Diagram

| Specified Period | | One Hour Peak | |
|---|---|---|---|
| From: | 15:00:00 | From: | 15:00:00 |
| To: | 18:00:00 | To: | 16:00:00 |

**Intersection:** 9th Ave E & 23rd St A E
**Site Code:** 2416800001
**Count Date:** Apr 16, 2024

**Weather conditions:** Clear

**** Unsignalized Intersection ****

**Major Road:** 9th Ave E runs N/S

## North Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 228 | 182 | 410 |
| Trucks | 6 | 13 | 19 |
| Bicycles | 0 | 1 | 1 |
| | **234** | **196** | **430** |

## 9th Ave E

| | | | |
|---|---|---|---|
| Bicycles | 0 | 0 | 0 |
| Trucks | 5 | 1 | 0 |
| Cars | 217 | 11 | 0 |
| **Totals** | **222** | **12** | **0** |

Peds: 1

Peds: 0

Peds: 0

Peds: 3

| | | | |
|---|---|---|---|
| **Totals** | **175** | **20** | **0** |
| Cars | 165 | 18 | 0 |
| Trucks | 9 | 1 | 0 |
| Bicycles | 1 | 1 | 0 |

## 9th Ave E

## East Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 27 | 29 | 56 |
| Trucks | 5 | 2 | 7 |
| Bicycles | 0 | 1 | 1 |
| | **32** | **32** | **64** |

## 23rd St A E

| | Totals | Cars | Trucks | Bicycles |
|---|---|---|---|---|
| | **0** | 0 | 0 | 0 |
| | **21** | 17 | 4 | 0 |
| | **11** | 10 | 1 | 0 |

## South Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 183 | 227 | 410 |
| Trucks | 10 | 6 | 16 |
| Bicycles | 2 | 0 | 2 |
| | **195** | **233** | **428** |

- Cars  - Trucks  - Bicycles

## Comments

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# Peak Hour Summary

Intersection: 9th Ave E & 23rd St A E
Site Code: 2416800001
Count Date: Apr 16, 2024
Period: 15:00 - 18:00

## Peak Hour Data (15:00 - 16:00)

| Start Time | North Approach 9th Ave E | | | | | | South Approach 9th Ave E | | | | | | East Approach 23rd St A E | | | | | | West Approach | | | | | | Total Vehicles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | |
| **15:00** | 3 | 66 | | 0 | 0 | 69 | | 46 | 10 | 0 | 0 | 56 | 4 | | 8 | 0 | 0 | 12 | | | | | 0 | | 137 |
| **15:15** | 4 | 69 | | 0 | 0 | 73 | | 52 | 5 | 0 | 3 | 57 | 4 | | 5 | 0 | 0 | 9 | | | | | 0 | | 139 |
| **15:30** | 0 | 47 | | 0 | 0 | 47 | | 41 | 2 | 0 | 0 | 43 | 0 | | 3 | 0 | 0 | 3 | | | | | 0 | | 93 |
| **15:45** | 5 | 40 | | 0 | 1 | 45 | | 36 | 3 | 0 | 0 | 39 | 3 | | 5 | 0 | 0 | 8 | | | | | 0 | | 92 |
| **Grand Total** | **12** | **222** | | **0** | **1** | **234** | | **175** | **20** | **0** | **3** | **195** | **11** | | **21** | **0** | **0** | **32** | | | | | **0** | **0** | **461** |
| **Approach %** | 5.1 | 94.9 | | 0 | | - | | 89.7 | 10.3 | 0 | | - | 34.4 | | 65.6 | 0 | | - | | | | | | - | |
| **Totals %** | 2.6 | 48.2 | | 0 | | 50.8 | | 38 | 4.3 | 0 | | 42.3 | 2.4 | | 4.6 | 0 | | 6.9 | | | | | | 0 | |
| **PHF** | **0.6** | **0.8** | | **0** | | **0.8** | | **0.84** | **0.5** | **0** | | **0.86** | **0.69** | | **0.66** | **0** | | **0.67** | | | | | | **0** | **0.83** |
| **Cars** | 11 | 217 | | 0 | | 228 | | 165 | 18 | 0 | | 183 | 10 | | 17 | 0 | | 27 | | | | | | 0 | 438 |
| **% Cars** | 91.7 | 97.7 | | 0 | | 97.4 | | 94.3 | 90 | 0 | | 93.8 | 90.9 | | 81 | 0 | | 84.4 | | | | | | 0 | 95 |
| **Trucks** | 1 | 5 | | 0 | | 6 | | 9 | 1 | 0 | | 10 | 1 | | 4 | 0 | | 5 | | | | | | 0 | 21 |
| **% Trucks** | 8.3 | 2.3 | | 0 | | 2.6 | | 5.1 | 5 | 0 | | 5.1 | 9.1 | | 19 | 0 | | 15.6 | | | | | | 0 | 4.6 |
| **Bicycles** | 0 | 0 | | 0 | | 0 | | 1 | 1 | 0 | | 2 | 0 | | 0 | 0 | | 0 | | | | | | 0 | 2 |
| **% Bicycles** | 0 | 0 | | 0 | | 0 | | 0.6 | 5 | 0 | | 1 | 0 | | 0 | 0 | | 0 | | | | | | 0 | 0.4 |
| **Peds** | | | | | 1 | - | | | | | 3 | - | | | | | 0 | - | | | | | 0 | - | 4 |
| **% Peds** | | | | | 25 | - | | | | | 75 | - | | | | | 0 | - | | | | | 0 | - | |

# Peak Hour Diagram

**Specified Period**
From: 07:00:00
To: 09:00:00

**One Hour Peak**
From: 08:00:00
To: 09:00:00

**Intersection:** 9th Ave E & 23rd St E
**Site Code:** 2416800002
**Count Date:** Apr 16, 2024

**Weather conditions:** Clear

**** Unsignalized Intersection ****

**Major Road:** 9th Ave E runs N/S

## North Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 188 | 232 | 420 |
| Trucks | 26 | 29 | 55 |
| Bicycles | 0 | 0 | 0 |
| | **214** | **261** | **475** |

## 9th Ave E

| | | | |
|---|---|---|---|
| Bicycles | 0 | 0 | 0 |
| Trucks | 0 | 26 | 0 |
| Cars | 5 | 183 | 0 |
| **Totals** | **5** | **209** | **0** |

Peds: 0

## 23rd St E

| | | | Totals |
|---|---|---|---|
| 0 | 0 | 0 | **0** |
| 0 | 0 | 2 | **2** |
| 0 | 0 | 2 | **2** |

Peds: 0


Peds: 0

Peds: 0

## West Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 4 | 6 | 10 |
| Trucks | 0 | 0 | 0 |
| Bicycles | 0 | 0 | 0 |
| | **4** | **6** | **10** |

| | | | |
|---|---|---|---|
| **Totals** | **1** | **259** | **0** |
| Cars | 1 | 230 | 0 |
| Trucks | 0 | 29 | 0 |
| Bicycles | 0 | 0 | 0 |

9th Ave E

## South Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 231 | 185 | 416 |
| Trucks | 29 | 26 | 55 |
| Bicycles | 0 | 0 | 0 |
| | **260** | **211** | **471** |

Cars - Trucks - Bicycles

**Comments**

Ontario Traffic Inc.
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# Peak Hour Summary

Intersection: 9th Ave E & 23rd St E
Site Code: 2416800002
Count Date: Apr 16, 2024
Period: 07:00 - 09:00

## Peak Hour Data (08:00 - 09:00)

| Start Time | North Approach 9th Ave E | | | | | | South Approach 9th Ave E | | | | | | East Approach | | | | | | West Approach 23rd St E | | | | | | Total Vehicles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | |
| 08:00 | | 31 | 2 | 0 | 0 | 33 | 0 | 49 | | 0 | 0 | 49 | | | | | 0 | | 1 | | 0 | 0 | 0 | 1 | 83 |
| 08:15 | | 43 | 2 | 0 | 0 | 45 | 0 | 62 | | 0 | 0 | 62 | | | | | 0 | | 1 | | 0 | 0 | 0 | 1 | 108 |
| 08:30 | | 66 | 0 | 0 | 0 | 66 | 0 | 77 | | 0 | 0 | 77 | | | | | 0 | | 0 | | 1 | 0 | 0 | 1 | 144 |
| 08:45 | | 69 | 1 | 0 | 0 | 70 | 1 | 71 | | 0 | 0 | 72 | | | | | 0 | | 0 | | 1 | 0 | 0 | 1 | 143 |
| **Grand Total** | | **209** | **5** | **0** | **0** | **214** | **1** | **259** | | **0** | **0** | **260** | | | | | **0** | **0** | **2** | | **2** | **0** | **0** | **4** | **478** |
| **Approach %** | | 97.7 | 2.3 | 0 | | - | 0.4 | 99.6 | | 0 | | - | | | | | | - | 50 | | 50 | 0 | | - | |
| **Totals %** | | 43.7 | 1 | 0 | | 44.8 | 0.2 | 54.2 | | 0 | | 54.4 | | | | | | 0 | 0.4 | | 0.4 | 0 | | 0.8 | |
| **PHF** | | **0.76** | **0.63** | **0** | | **0.76** | **0.25** | **0.84** | | **0** | | **0.84** | | | | | | **0** | **0.5** | | **0.5** | **0** | | **1** | **0.83** |
| **Cars** | | 183 | 5 | 0 | | 188 | 1 | 230 | | 0 | | 231 | | | | | | 0 | 2 | | 2 | 0 | | 4 | 423 |
| **% Cars** | | 87.6 | 100 | 0 | | 87.9 | 100 | 88.8 | | 0 | | 88.8 | | | | | | 0 | 100 | | 100 | 0 | | 100 | 88.5 |
| **Trucks** | | 26 | 0 | 0 | | 26 | 0 | 29 | | 0 | | 29 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 55 |
| **% Trucks** | | 12.4 | 0 | 0 | | 12.1 | 0 | 11.2 | | 0 | | 11.2 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 11.5 |
| **Bicycles** | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | 0 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| **% Bicycles** | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | 0 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| **Peds** | | | | | 0 | - | | | | | 0 | - | | | | | 0 | - | | | | | 0 | - | 0 |
| **% Peds** | | | | | 0 | - | | | | | 0 | - | | | | | 0 | - | | | | | 0 | - | |

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# Peak Hour Diagram

| Specified Period | | One Hour Peak | |
|---|---|---|---|
| From: | 15:00:00 | From: | 15:00:00 |
| To: | 18:00:00 | To: | 16:00:00 |

**Intersection:** 9th Ave E & 23rd St E
**Site Code:** 2416800002
**Count Date:** Apr 16, 2024

**Weather conditions:** Clear

**** Unsignalized Intersection ****

**Major Road:** 9th Ave E runs N/S

## North Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 227 | 182 | 409 |
| Trucks | 6 | 10 | 16 |
| Bicycles | 0 | 2 | 2 |
| **Totals** | **233** | **194** | **427** |

## 9th Ave E

| | | | |
|---|---|---|---|
| Bicycles | 0 | 0 | 0 |
| Trucks | 0 | 6 | 0 |
| Cars | 4 | 223 | 0 |
| **Totals** | **4** | **229** | **0** |

Peds: 1

## 23rd St E

| Bicycles | Trucks | Cars | Totals |
|---|---|---|---|
| 0 | 0 | 0 | **0** |
| 0 | 0 | 6 | **6** |
| 0 | 0 | 0 | **0** |

Peds: 0


Peds: 0

Peds: 0

## West Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 6 | 5 | 11 |
| Trucks | 0 | 0 | 0 |
| Bicycles | 0 | 0 | 0 |
| **Totals** | **6** | **5** | **11** |

| | | | |
|---|---|---|---|
| **Totals** | **1** | **188** | **0** |
| Cars | 1 | 176 | 0 |
| Trucks | 0 | 10 | 0 |
| Bicycles | 0 | 2 | 0 |

## 9th Ave E

## South Approach

| | Out | In | Total |
|---|---|---|---|
| Cars | 177 | 223 | 400 |
| Trucks | 10 | 6 | 16 |
| Bicycles | 2 | 0 | 2 |
| **Totals** | **189** | **229** | **418** |

Cars - Trucks - Bicycles

## Comments

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# Peak Hour Summary

| | |
|---|---|
| Intersection: | 9th Ave E & 23rd St E |
| Site Code: | 2416800002 |
| Count Date: | Apr 16, 2024 |
| Period: | 15:00 - 18:00 |

## Peak Hour Data (15:00 - 16:00)

| Start Time | North Approach 9th Ave E | | | | | | South Approach 9th Ave E | | | | | | East Approach | | | | | | West Approach 23rd St E | | | | | | Total Vehicles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | | | | | Peds | Total | |
| **15:00** | | 68 | 2 | 0 | 0 | 70 | 0 | 54 | | 0 | 0 | 54 | | | | | 0 | | 2 | | 0 | 0 | 0 | 2 | 126 |
| **15:15** | | 73 | 0 | 0 | 1 | 73 | 1 | 56 | | 0 | 0 | 57 | | | | | 0 | | 1 | | 0 | 0 | 0 | 1 | 131 |
| **15:30** | | 47 | 0 | 0 | 0 | 47 | 0 | 41 | | 0 | 0 | 41 | | | | | 0 | | 2 | | 0 | 0 | 0 | 2 | 90 |
| **15:45** | | 41 | 2 | 0 | 0 | 43 | 0 | 37 | | 0 | 0 | 37 | | | | | 0 | | 1 | | 0 | 0 | 0 | 1 | 81 |
| **Grand Total** | | **229** | **4** | **0** | **1** | **233** | **1** | **188** | | **0** | **0** | **189** | | | | | **0** | **0** | **6** | | **0** | **0** | **0** | **6** | **428** |
| **Approach %** | | 98.3 | 1.7 | 0 | | - | 0.5 | 99.5 | | 0 | | - | | | | | | - | 100 | | 0 | 0 | | - | |
| **Totals %** | | 53.5 | 0.9 | 0 | | 54.4 | 0.2 | 43.9 | | 0 | | 44.2 | | | | | | 0 | 1.4 | | 0 | 0 | | 1.4 | |
| **PHF** | | **0.78** | **0.5** | **0** | | **0.8** | **0.25** | **0.84** | | **0** | | **0.83** | | | | | | **0** | **0.75** | | **0** | **0** | | **0.75** | **0.82** |
| **Cars** | | 223 | 4 | 0 | | 227 | 1 | 176 | | 0 | | 177 | | | | | | 0 | 6 | | 0 | 0 | | 6 | 410 |
| **% Cars** | | 97.4 | 100 | 0 | | 97.4 | 100 | 93.6 | | 0 | | 93.7 | | | | | | 0 | 100 | | 0 | 0 | | 100 | 95.8 |
| **Trucks** | | 6 | 0 | 0 | | 6 | 0 | 10 | | 0 | | 10 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 16 |
| **% Trucks** | | 2.6 | 0 | 0 | | 2.6 | 0 | 5.3 | | 0 | | 5.3 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 3.7 |
| **Bicycles** | | 0 | 0 | 0 | | 0 | 0 | 2 | | 0 | | 2 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 2 |
| **% Bicycles** | | 0 | 0 | 0 | | 0 | 0 | 1.1 | | 0 | | 1.1 | | | | | | 0 | 0 | | 0 | 0 | | 0 | 0.5 |
| **Peds** | | | | | 1 | - | | | | | 0 | - | | | | | 0 | - | | | | | 0 | - | 1 |
| **% Peds** | | | | | 100 | - | | | | | 0 | - | | | | | 0 | - | | | | | 0 | - | |

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# Appendix B

# Existing Conditions Synchro Reports

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 13 | 21 | 244 | 17 | 33 | 201 |
| Future Volume (Veh/h) | 13 | 21 | 244 | 17 | 33 | 201 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Hourly flow rate (vph) | 16 | 26 | 305 | 21 | 41 | 251 |
| Pedestrians | | | 3 | | | 14 |
| Lane Width (m) | | | 3.7 | | | 3.7 |
| Walking Speed (m/s) | | | 1.1 | | | 1.1 |
| Percent Blockage | | | 0 | | | 1 |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 526 | 177 | | | 326 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 526 | 177 | | | 326 | |
| tC, single (s) | 8.3 | 12.6 | | | 8.9 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.3 | 6.2 | | | 4.6 | |
| p0 queue free % | 95 | 93 | | | 90 | |
| cM capacity (veh/h) | 302 | 359 | | | 424 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 42 | 203 | 123 | 125 | 167 |
| Volume Left | 16 | 0 | 0 | 41 | 0 |
| Volume Right | 26 | 0 | 21 | 0 | 0 |
| cSH | 335 | 1700 | 1700 | 424 | 1700 |
| Volume to Capacity | 0.13 | 0.12 | 0.07 | 0.10 | 0.10 |
| Queue Length 95th (m) | 3.2 | 0.0 | 0.0 | 2.4 | 0.0 |
| Control Delay (s/veh) | 17.3 | 0.0 | 0.0 | 5.7 | 0.0 |
| Lane LOS | C | | | A | |
| Approach Delay (s/veh) | 17.3 | 0.0 | | 2.4 | |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.2 | | |
| Intersection Capacity Utilization | 30.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 2 | 2 | 1 | 259 | 209 | 5 |
| Future Volume (Veh/h) | 2 | 2 | 1 | 259 | 209 | 5 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Hourly flow rate (vph) | 2 | 2 | 1 | 312 | 252 | 6 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 410 | 252 | 258 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 410 | 252 | 258 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 100 | 100 | 100 | | | |
| cM capacity (veh/h) | 574 | 754 | 1318 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 4 | 105 | 208 | 252 | 6 |
| Volume Left | 2 | 1 | 0 | 0 | 0 |
| Volume Right | 2 | 0 | 0 | 0 | 6 |
| cSH | 652 | 1318 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.12 | 0.15 | 0.00 |
| Queue Length 95th (m) | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s/veh) | 10.6 | 0.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | |
| Approach Delay (s/veh) | 10.6 | 0.0 | | 0.0 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 21.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 11 | 21 | 175 | 20 | 12 | 222 |
| Future Volume (Veh/h) | 11 | 21 | 175 | 20 | 12 | 222 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Hourly flow rate (vph) | 13 | 25 | 211 | 24 | 14 | 267 |
| Pedestrians | | | 3 | | | 1 |
| Lane Width (m) | | | 3.7 | | | 3.7 |
| Walking Speed (m/s) | | | 1.1 | | | 1.1 |
| Percent Blockage | | | 0 | | | 0 |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 388 | 119 | | | 235 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 388 | 119 | | | 235 | |
| tC, single (s) | 8.6 | 10.7 | | | 5.8 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 5.2 | | | 3.0 | |
| p0 queue free % | 97 | 95 | | | 98 | |
| cM capacity (veh/h) | 398 | 529 | | | 899 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 38 | 141 | 94 | 103 | 178 |
| Volume Left | 13 | 0 | 0 | 14 | 0 |
| Volume Right | 25 | 0 | 24 | 0 | 0 |
| cSH | 475 | 1700 | 1700 | 899 | 1700 |
| Volume to Capacity | 0.08 | 0.08 | 0.06 | 0.02 | 0.10 |
| Queue Length 95th (m) | 2.0 | 0.0 | 0.0 | 0.4 | 0.0 |
| Control Delay (s/veh) | 13.2 | 0.0 | 0.0 | 1.4 | 0.0 |
| Lane LOS | B | | | A | |
| Approach Delay (s/veh) | 13.2 | 0.0 | | 0.5 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.2 | | |
| Intersection Capacity Utilization | 25.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 6 | 0 | 1 | 188 | 229 | 4 |
| Future Volume (Veh/h) | 6 | 0 | 1 | 188 | 229 | 4 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Hourly flow rate (vph) | 7 | 0 | 1 | 229 | 279 | 5 |
| Pedestrians | | | | | 1 | |
| Lane Width (m) | | | | | 3.7 | |
| Walking Speed (m/s) | | | | | 1.1 | |
| Percent Blockage | | | | | 0 | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 397 | 279 | 284 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 397 | 279 | 284 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 99 | 100 | 100 | | | |
| cM capacity (veh/h) | 585 | 724 | 1290 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 7 | 77 | 153 | 279 | 5 |
| Volume Left | 7 | 1 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 5 |
| cSH | 585 | 1290 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.09 | 0.16 | 0.00 |
| Queue Length 95th (m) | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s/veh) | 11.2 | 0.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | |
| Approach Delay (s/veh) | 11.2 | 0.0 | | 0.0 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 22.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

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# Appendix C

# Option A Synchro Reports

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 38 | 26 | 246 | 26 | 36 | 207 |
| Future Volume (Veh/h) | 38 | 26 | 246 | 26 | 36 | 207 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Hourly flow rate (vph) | 48 | 32 | 308 | 32 | 45 | 259 |
| Pedestrians | | | 3 | | | 14 |
| Lane Width (m) | | | 3.7 | | | 3.7 |
| Walking Speed (m/s) | | | 1.1 | | | 1.1 |
| Percent Blockage | | | 0 | | | 1 |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 547 | 184 | | | 340 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 547 | 184 | | | 340 | |
| tC, single (s) | 8.3 | 12.6 | | | 8.9 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.3 | 6.2 | | | 4.6 | |
| p0 queue free % | 83 | 91 | | | 89 | |
| cM capacity (veh/h) | 287 | 353 | | | 413 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 80 | 205 | 135 | 131 | 173 |
| Volume Left | 48 | 0 | 0 | 45 | 0 |
| Volume Right | 32 | 0 | 32 | 0 | 0 |
| cSH | 310 | 1700 | 1700 | 413 | 1700 |
| Volume to Capacity | 0.26 | 0.12 | 0.08 | 0.11 | 0.10 |
| Queue Length 95th (m) | 7.7 | 0.0 | 0.0 | 2.8 | 0.0 |
| Control Delay (s/veh) | 20.6 | 0.0 | 0.0 | 6.2 | 0.0 |
| Lane LOS | C | | | A | |
| Approach Delay (s/veh) | 20.6 | 0.0 | | 2.7 | |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.4 | | |
| Intersection Capacity Utilization | 32.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 2 | 2 | 1 | 270 | 239 | 6 |
| Future Volume (Veh/h) | 2 | 2 | 1 | 270 | 239 | 6 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Hourly flow rate (vph) | 2 | 2 | 1 | 325 | 288 | 7 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 453 | 288 | 295 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 453 | 288 | 295 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 100 | 100 | 100 | | | |
| cM capacity (veh/h) | 540 | 715 | 1278 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 4 | 109 | 217 | 288 | 7 |
| Volume Left | 2 | 1 | 0 | 0 | 0 |
| Volume Right | 2 | 0 | 0 | 0 | 7 |
| cSH | 615 | 1278 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.13 | 0.17 | 0.00 |
| Queue Length 95th (m) | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s/veh) | 10.9 | 0.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | |
| Approach Delay (s/veh) | 10.9 | 0.0 | | 0.0 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 22.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 16 | 5 | 4 | 8 | 2 | 14 |
| Future Volume (Veh/h) | 16 | 5 | 4 | 8 | 2 | 14 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 5 | 4 | 9 | 2 | 15 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 28 | 9 | | | 13 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 28 | 9 | | | 13 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 98 | 100 | | | 100 | |
| cM capacity (veh/h) | 991 | 1079 | | | 1619 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 22 | 13 | 17 |
| Volume Left | 17 | 0 | 2 |
| Volume Right | 5 | 9 | 0 |
| cSH | 1010 | 1700 | 1619 |
| Volume to Capacity | 0.02 | 0.01 | 0.00 |
| Queue Length 95th (m) | 0.5 | 0.0 | 0.0 |
| Control Delay (s/veh) | 8.6 | 0.0 | 0.9 |
| Lane LOS | A | | A |
| Approach Delay (s/veh) | 8.6 | 0.0 | 0.9 |
| Approach LOS | A | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.9 | | |
| Intersection Capacity Utilization | 13.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 27 | 26 | 182 | 47 | 18 | 227 |
| Future Volume (Veh/h) | 27 | 26 | 182 | 47 | 18 | 227 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Hourly flow rate (vph) | 33 | 31 | 219 | 57 | 22 | 273 |
| Pedestrians | | | 3 | | | 1 |
| Lane Width (m) | | | 3.7 | | | 3.7 |
| Walking Speed (m/s) | | | 1.1 | | | 1.1 |
| Percent Blockage | | | 0 | | | 0 |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 431 | 139 | | | 276 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 431 | 139 | | | 276 | |
| tC, single (s) | 8.6 | 10.7 | | | 5.8 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 5.2 | | | 3.0 | |
| p0 queue free % | 91 | 94 | | | 97 | |
| cM capacity (veh/h) | 364 | 505 | | | 856 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 64 | 146 | 130 | 113 | 182 |
| Volume Left | 33 | 0 | 0 | 22 | 0 |
| Volume Right | 31 | 0 | 57 | 0 | 0 |
| cSH | 421 | 1700 | 1700 | 856 | 1700 |
| Volume to Capacity | 0.15 | 0.09 | 0.08 | 0.03 | 0.11 |
| Queue Length 95th (m) | 4.0 | 0.0 | 0.0 | 0.6 | 0.0 |
| Control Delay (s/veh) | 15.1 | 0.0 | 0.0 | 2.0 | 0.0 |
| Lane LOS | C | | | A | |
| Approach Delay (s/veh) | 15.1 | 0.0 | | 0.8 | |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.9 | | |
| Intersection Capacity Utilization | 27.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 6 | 0 | 1 | 222 | 250 | 4 |
| Future Volume (Veh/h) | 6 | 0 | 1 | 222 | 250 | 4 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Hourly flow rate (vph) | 7 | 0 | 1 | 271 | 305 | 5 |
| Pedestrians | | | | | 1 | |
| Lane Width (m) | | | | | 3.7 | |
| Walking Speed (m/s) | | | | | 1.1 | |
| Percent Blockage | | | | | 0 | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 444 | 305 | 310 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 444 | 305 | 310 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 99 | 100 | 100 | | | |
| cM capacity (veh/h) | 547 | 697 | 1262 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 7 | 91 | 181 | 305 | 5 |
| Volume Left | 7 | 1 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 5 |
| cSH | 547 | 1262 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.11 | 0.18 | 0.00 |
| Queue Length 95th (m) | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s/veh) | 11.7 | 0.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | |
| Approach Delay (s/veh) | 11.7 | 0.0 | | 0.0 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 23.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 11 | 4 | 15 | 18 | 6 | 10 |
| Future Volume (Veh/h) | 11 | 4 | 15 | 18 | 6 | 10 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 12 | 4 | 16 | 20 | 7 | 11 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 51 | 26 | | | 36 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 51 | 26 | | | 36 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 99 | 100 | | | 100 | |
| cM capacity (veh/h) | 959 | 1056 | | | 1588 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 16 | 36 | 18 |
| Volume Left | 12 | 0 | 7 |
| Volume Right | 4 | 20 | 0 |
| cSH | 981 | 1700 | 1588 |
| Volume to Capacity | 0.02 | 0.02 | 0.00 |
| Queue Length 95th (m) | 0.4 | 0.0 | 0.1 |
| Control Delay (s/veh) | 8.7 | 0.0 | 2.8 |
| Lane LOS | A | | A |
| Approach Delay (s/veh) | 8.7 | 0.0 | 2.8 |
| Approach LOS | A | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.7 | | |
| Intersection Capacity Utilization | 15.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

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# Appendix D

# Option B Synchro Reports

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 21 | 30 | 246 | 21 | 37 | 207 |
| Future Volume (Veh/h) | 21 | 30 | 246 | 21 | 37 | 207 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Hourly flow rate (vph) | 26 | 38 | 308 | 26 | 46 | 259 |
| Pedestrians | | | 3 | | | 14 |
| Lane Width (m) | | | 3.7 | | | 3.7 |
| Walking Speed (m/s) | | | 1.1 | | | 1.1 |
| Percent Blockage | | | 0 | | | 1 |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 546 | 181 | | | 334 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 546 | 181 | | | 334 | |
| tC, single (s) | 8.4 | 12.7 | | | 8.9 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.3 | 6.2 | | | 4.6 | |
| p0 queue free % | 91 | 89 | | | 89 | |
| cM capacity (veh/h) | 283 | 352 | | | 421 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 64 | 205 | 129 | 132 | 173 |
| Volume Left | 26 | 0 | 0 | 46 | 0 |
| Volume Right | 38 | 0 | 26 | 0 | 0 |
| cSH | 320 | 1700 | 1700 | 421 | 1700 |
| Volume to Capacity | 0.20 | 0.12 | 0.08 | 0.11 | 0.10 |
| Queue Length 95th (m) | 5.6 | 0.0 | 0.0 | 2.8 | 0.0 |
| Control Delay (s/veh) | 19.0 | 0.0 | 0.0 | 6.2 | 0.0 |
| Lane LOS | C | | | A | |
| Approach Delay (s/veh) | 19.0 | 0.0 | | 2.7 | |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.9 | | |
| Intersection Capacity Utilization | 31.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 2 | 2 | 1 | 269 | 237 | 5 |
| Future Volume (Veh/h) | 2 | 2 | 1 | 269 | 237 | 5 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Hourly flow rate (vph) | 2 | 2 | 1 | 324 | 286 | 6 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 450 | 286 | 292 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 450 | 286 | 292 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 100 | 100 | 100 | | | |
| cM capacity (veh/h) | 542 | 717 | 1281 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 4 | 109 | 216 | 286 | 6 |
| Volume Left | 2 | 1 | 0 | 0 | 0 |
| Volume Right | 2 | 0 | 0 | 0 | 6 |
| cSH | 618 | 1281 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.13 | 0.17 | 0.00 |
| Queue Length 95th (m) | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s/veh) | 10.9 | 0.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | |
| Approach Delay (s/veh) | 10.9 | 0.0 | | 0.0 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 22.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 16 | 28 | 182 | 28 | 22 | 227 |
| Future Volume (Veh/h) | 16 | 28 | 182 | 28 | 22 | 227 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| Hourly flow rate (vph) | 19 | 34 | 219 | 34 | 27 | 273 |
| Pedestrians | | | 3 | | | 1 |
| Lane Width (m) | | | 3.7 | | | 3.7 |
| Walking Speed (m/s) | | | 1.1 | | | 1.1 |
| Percent Blockage | | | 0 | | | 0 |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 430 | 128 | | | 253 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 430 | 128 | | | 253 | |
| tC, single (s) | 8.6 | 10.7 | | | 5.7 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 5.2 | | | 3.0 | |
| p0 queue free % | 95 | 93 | | | 97 | |
| cM capacity (veh/h) | 364 | 518 | | | 892 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 53 | 146 | 107 | 118 | 182 |
| Volume Left | 19 | 0 | 0 | 27 | 0 |
| Volume Right | 34 | 0 | 34 | 0 | 0 |
| cSH | 450 | 1700 | 1700 | 892 | 1700 |
| Volume to Capacity | 0.12 | 0.09 | 0.06 | 0.03 | 0.11 |
| Queue Length 95th (m) | 3.0 | 0.0 | 0.0 | 0.7 | 0.0 |
| Control Delay (s/veh) | 14.1 | 0.0 | 0.0 | 2.3 | 0.0 |
| Lane LOS | B | | | A | |
| Approach Delay (s/veh) | 14.1 | 0.0 | | 0.9 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.7 | | |
| Intersection Capacity Utilization | 26.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 6 | 0 | 1 | 218 | 249 | 4 |
| Future Volume (Veh/h) | 6 | 0 | 1 | 218 | 249 | 4 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| Hourly flow rate (vph) | 7 | 0 | 1 | 266 | 304 | 5 |
| Pedestrians | | | | | 1 | |
| Lane Width (m) | | | | | 3.7 | |
| Walking Speed (m/s) | | | | | 1.1 | |
| Percent Blockage | | | | | 0 | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 440 | 304 | 309 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 440 | 304 | 309 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 99 | 100 | 100 | | | |
| cM capacity (veh/h) | 550 | 698 | 1263 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 7 | 90 | 177 | 304 | 5 |
| Volume Left | 7 | 1 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 5 |
| cSH | 550 | 1263 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.10 | 0.18 | 0.00 |
| Queue Length 95th (m) | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s/veh) | 11.6 | 0.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | | | |
| Approach Delay (s/veh) | 11.6 | 0.0 | | 0.0 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 23.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

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