



BURNSIDE

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

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



BURNSIDE

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

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

**R.J. Burnside & Associates Limited
3 Ronell Crescent
Collingwood ON L9Y 4J6 CANADA**

**August 2024
300057339.0000**

Distribution List

No. of Hard Copies	PDF	Email	Organization Name
0	Yes	Yes	Tenth Avenue Estates Inc.

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 Avenue Estates Inc.
2	August 19, 2024	Revised Submission to Tenth Avenue Estates Inc.

R.J. Burnside & Associates Limited

Report Prepared By:

Ethan McCaw
Ethan McCaw, C.Tech.
Transportation Planner
EM:cvh

Report Reviewed By:



Henry Centen
Senior Engineer – Transportation

Henry Centen

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. The proposed TOR for Option B required the provision of a Traffic Impact Study (TIS) and a Transportation Planning Assessment (TPA), both of which are included in this Transportation Study. For comparative purposes, the Transportation Study for Option B also provides an analysis of Option A, as required by the approved TOR.

Burnside received comments on the initial submission of this Transportation Study from the City’s departments (i.e., Planning, Engineering, Fire Prevention Division), from the City’s Peer Reviewer (Paradigm Transportation Solutions Limited) and from the Public. This revised Transportation Study provides detailed responses to the comments received.

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.

10th Avenue Estates Transportation Study
August 2024

- 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 23rd 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 (i.e., pedestrian, cyclist) connection, servicing connection and emergency access of the proposed developments are only slightly impacted. Any such impacts as a result of the proposed development are proposed to be addressed through mitigation measures that will be included in the Site Plan Approval, including all of those measures that have been identified by the City's review of the submissions to date. The mitigation work proposed in the Site Plan Approvals to address impacts includes the following:
 - Provision of a trail connection in the northeast corner of the proposed development.
 - Provision of a servicing corridor easement along the west side and north side of the proposed development.
 - Provision of a permanent emergency access lane from the proposed development to the south to 23rd Street East., plus a second permanent emergency access to the north.
- 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 and will be addressed by the mitigation measures recommended. Any impacts, as a result of the proposed development, are planned to be addressed through mitigation measures that will be included in the Site Plan Approval.
- 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.

10th Avenue Estates Transportation Study
August 2024

- The existing 10th Avenue East cul-de-sac is approximately 200 metres in length, serving 23 existing dwelling units. The proposed development will result in an additional 85 dwelling units, for a total of 108, served by the 200 m long cul-de-sac, which is not permitted by the City's Residential Subdivision Policies without a secondary emergency vehicle access lane. National Fire Protection Agency (NFPA) Regulation 1140 also requires that a minimum of two emergency access routes be provided where more than 100 units are proposed. Section 8.2 *General Transportation Policies* of the Grey County Official Plan notes that single access to new residential developments will be considered up to 85 units and that new residential developments with 85 to 150 units will need to have at minimum a full access plus a secondary emergency access. An emergency vehicle access lane has been proposed from the south of the subject site, connecting to 23rd Street, which meets the requirements of the City's Residential Policy, the NFPA Regulation 1140 and the Grey County Official Plan policy.
- 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 22.4 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 17.3 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 22.4 seconds (LOS C) in the a.m. and 15.8 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 11.1 seconds (LOS B) in the a.m. and 11.9 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 versus 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.

10th Avenue Estates Transportation Study
August 2024

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 precludes establishing the local road connection as per the City's Official Plan.

Table of Contents

1.0 Response to Comments 1

1.1 City Planning Comments 1

1.2 City Fire Prevention Division 2

1.3 Public Comments..... 2

1.4 Peer Review Comments (Paradigm Transportation Solutions Limited) 3

2.0 Introduction..... 5

2.1 Background 5

2.2 Scope of Work 6

2.3 Intersection Analysis Methodology 7

3.0 Existing Site Conditions 8

3.1 Site Context 8

3.2 Existing Road Network 11

3.3 Existing Active Transportation Infrastructure 12

3.4 Existing Transit Services 13

3.5 Existing Traffic Volumes 15

4.0 Future Network Considerations 16

4.1 Local Road Connection Opportunities 16

4.2 Future Active Transportation Connections 17

4.3 Future Transit Connections 18

4.4 Infrastructure Servicing 20

4.5 Emergency Access 20

4.6 Transportation Planning Considerations 21

5.0 Proposed Development 23

5.1 Site Plan and Driveway Access 23

5.2 Trip Generation 25

5.3 Trip Distribution and Assignment 27

6.0 Total Traffic Conditions 32

7.0 Traffic Operations Analysis 34

7.1 9th Avenue East / 23rd Street A East 34

7.2 9th Avenue East / 23rd Street East 35

8.0 Conclusions and Recommendations 37

Tables

Table 1: Site Trip Generation 26

Table 2: Site Trip Distribution 27

Table 3: Operational Analysis for 9th Avenue East / 23rd Street A East 34

Table 4: Operational Analysis for 9th Avenue East / 23rd Street East 35

Figures

Figure 1: Site Location Figure..... 6
Figure 2: Official Plan Schedule A1 - East Bluffs Planning Area 9
Figure 3: Subdivision Location Figure..... 10
Figure 4: Existing Road Network 12
Figure 5: Existing Transit Route Network..... 14
Figure 6: Existing Traffic Volumes 15
Figure 7: Future Transit Network 19
Figure 8: Concept Site Plan..... 24
Figure 9: Trip Assignment – Option A..... 28
Figure 10: Trip Assignment – Option B 29
Figure 11: Trip Assignment – Greyfair Subdivision 31
Figure 12: Total Traffic Volumes – Option A 32
Figure 13: Total Traffic Volumes – Option B 33

Appendices

- Appendix A Existing Traffic Counts
- Appendix B Existing Conditions Synchro Reports
- Appendix C Option A Synchro Reports
- Appendix D Option B Synchro Reports

Disclaimer

Other than by the addressee, copying or distribution of this document, in whole or in part, is not permitted without the express written consent of R.J. Burnside & Associates Limited.

In the preparation of the various instruments of service contained herein, R.J. Burnside & Associates Limited was required to use and rely upon various sources of information (including but not limited to: reports, data, drawings, observations) produced by parties other than R.J. Burnside & Associates Limited. For its part R.J. Burnside & Associates Limited has proceeded based on the belief that the third party/parties in question produced this documentation using accepted industry standards and best practices and that all information was therefore accurate, correct and free of errors at the time of consultation. As such, the comments, recommendations and materials presented in this instrument of service reflect our best judgment in light of the information available at the time of preparation. R.J. Burnside & Associates Limited, its employees, affiliates and subcontractors accept no liability for inaccuracies or errors in the instruments of service provided to the client, arising from deficiencies in the aforementioned third party materials and documents.

R.J. Burnside & Associates Limited makes no warranties, either express or implied, of merchantability and fitness of the documents and other instruments of service for any purpose other than that specified by the contract.

1.0 Response to Comments

Burnside received comments on the initial submission of this Transportation Study from the City's departments (i.e., Planning, Engineering, Fire Prevention Division), from the City's Peer Reviewer (Paradigm Transportation Solutions Limited) and from the Public. Detailed responses to the comments received are summarized in the following sections, followed by the updated Transportation Study report. Transportation-related comments, as well as select infrastructure-related comments, have been paraphrased and shown in bold for ease of reference.

1.1 City Planning Comments

- **Comment: The Infrastructure Servicing section of the report shall be updated to include an assessment of the property to the north (Greyfair) with respect to servicing (sanitary/water).**
- Response: The Functional Servicing Report, completed by Clearwater Shores, will be updated to include this information. The reader is recommended to refer to that document as it relates to infrastructure servicing.
- **Comment: The assessment shall consider a net residential density of 25 units per hectare on the Greyfair property (i.e., 150 units) rather than the densities proposed in the approved Draft Plan.**
- Response: The assessment in the revised Transportation Study now assumes 150 units on the Greyfair property.
- **Comment: A 3 m to 5.8 m wide easement to the west (rear) of Apartment Building A2 should be provided for the purposes of municipal services, if and when required by the City.**
- Response: Acknowledged. Provisions to be included as part of Site Plan Approval.
- **Comment: A 3.0 m walking trail in the northeast corner of the site is to be maintained as an active transportation connection. The City will require easements across the lands to facilitate public use of the trail.**
- Response: Acknowledged. Provisions to be included as part of Site Plan Approval.

- **Comment: The 6.0 m drive aisle providing access to the underground parking area for apartment building A1 shall be extended northerly, to provide an emergency access to the Greyfair lands. The City will require easements across the lands to facilitate use of a portion of the internal road network for emergency vehicles.**

Response: The provision of two emergency accesses plus the primary access exceeds the requirements of the City and County policies. The City's Fire Prevention Division has confirmed that the provision of the proposed emergency access to the south to 16th Avenue East/23rd Street East meets NFPA requirements and is sufficient. While the provision of the primary access plus two emergency accesses are not strictly required it is understood that this added mitigation will be provided in the Site Plan Approval.

1.2 City Fire Prevention Division

- **Comment: The City's Fire Prevention Division is accepting the proposed emergency vehicle access from the subject property to 16th Avenue East/23rd Street East, across City-owned lands to the south, via an easement. The easement is to be 6.0 m in width, with a 3.7 m hard surfaced lane and have P-gates at both the north and south ends.**

Response: Acknowledged. Provisions to be included as part of Site Plan Approval, including detailed designs and easement agreement. In addition, the second emergency access to the north will be included as part of Site Plan Approval.

1.3 Public Comments

- **Comment: Existing delays at the intersection of 9th Avenue East and 23rd Street 'A' East are greater than 17.4 seconds in the a.m. and 13.2 seconds in the p.m., as identified in the study and will increase significantly with the development. By increasing the residences to 108 and expecting wait times to only change from 17.4 seconds in the AM to 20.6 seconds is unrealistic.**
- Response: The traffic modelling forecasts have been reviewed and the delays at this intersection are confirmed to be representative and acceptable. The increase in wait times is not directly proportional to the increase in the number of units, considering that the delay is the average delay per vehicle spread over the peak hour. The City's Peer Reviewer has acknowledged that the traffic impacts will not be significant.
- **Comment: Concerns over traffic volumes and operations on 9th Avenue East. A 3-way stop should be implemented at the intersection of 23rd Street 'A' East and 9th Avenue East.**
- Response: The traffic modeling forecasts acceptable operations at the intersection of 23rd Street 'A' East and 9th Line. Book 5 of the Ontario Traffic Manual also recommends that all-way stop control only be used under specific traffic conditions

10th Avenue Estates Transportation Study
August 2024

and not as a traffic-calming measure. The comments from the City's peer reviewer indicate that "given the low to moderate existing and future traffic volumes, no significant traffic impacts are associated with either Option A/Option B or the Greyfair subdivision.

- **Comment: The configuration at the 10th Avenue East/23rd Street 'A' East bend may be a concern for additional traffic.**
 - Response: The curve/bend in the road is able to accommodate the forecasted local traffic.
- **Comment: Potential use of the emergency access road for vehicular traffic.**
 - Response: The emergency access road is to have gates at each end to preclude public access. The City's peer review has noted that the resident's petition for a permanent road connection along the proposed emergency corridor is not justifiable based on the existing and future traffic volumes on the area road system.
- **Comment: Why was traffic monitoring only done on one day?**
 - Response: One day monitoring is the industry standard for Traffic Impact Studies and is considered to be representative.
- **Comment: Potential for visibility issues at the intersection of 23rd Street 'A' East and 9th Avenue East due to school bus parking along 9th Avenue.**
 - Response: Any visibility blockage would be of short duration and therefore would not result in any significant delays.

1.4 Peer Review Comments (Paradigm Transportation Solutions Limited)

- **Comment: Given the low to moderate existing and future traffic volumes, no significant traffic impacts are associated with either Option A/Option B or the Greyfair subdivision.**
 - Response: Acknowledged.
- **Comment: The Transportation Study addressed the traffic impact considerations but does not equally address the transportation planning aspects.**
 - Response: Additional transportation planning review is provided in the revised Transportation Study, as outlined in Section 4 of this revised study.
- **Comment: A potential multi-use path is recommended in the northeast corner of the site.**
 - Response: Acknowledged. Provisions to be included as part of Site Plan Approval.

10th Avenue Estates Transportation Study
August 2024

- **Comment: A potential servicing easement is recommended along the west and north side of the site to maintain future servicing flexibility.**
- Response: Acknowledged. Provisions to be included as part of Site Plan Approval.

- **Comment: A potential emergency access to the north is identified, assuming that the proposed emergency access to the south does not remain as a permanent facility.**
- Response: The City's Fire Prevention Division has accepted the south emergency access as a permanent facility and has confirmed that this access meets City and County policies. While the provision of the primary access plus two emergency accesses are not strictly required, it is understood that this added mitigation will be provided in the Site Plan Approval.

- **Comment: The resident's petition for a permanent road connection along the proposed emergency corridor is not justifiable based on the existing and future traffic volumes on the area road system.**
- Response: Acknowledged. The proposed emergency corridor will have P-gates to preclude use as a permanent road connection.

- **Comment: It is appropriate to consider the provision of an infrastructure easement, an emergency access connection and a public multi-use path connecting to lands to the north through the proposed development, to mitigate the impacts of the elimination of the extension of 10th Avenue East as identified in the Official Plan.**
- Response: Acknowledged. These provisions to be included as part of Site Plan Approval.

- **Comment: It would be appropriate to include the existing sidewalk information in the description of each road.**
- Response: Description of existing sidewalk networks has been included with the description of each road.

The updated revised Transportation Study follows, as a complete response to the comments noted above.

2.0 Introduction

2.1 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

2.2 Scope of Work

During pre-consultation with the City, the City retained their peer review consultant (Paradigm Transportation Solutions Limited) 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. The scope set out in this report is based on the completion of the TOR set out by Paradigm for Option B. The proposed TOR for the Option B Transportation Study required the provision of a Traffic Impact Study (TIS) and a Transportation Planning Assessment (TPA), both of which are included in this Transportation Study. For comparative purposes, the Transportation Study for Option B also provides an analysis of Option A, as required by the approved TOR.

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

10th Avenue Estates Transportation Study
August 2024

- | | |
|------------------------|--|
| Analysis Scenarios | <ul style="list-style-type: none"> Existing Traffic Conditions Total Traffic Conditions (including both Option A and Option B and the adjacent Greyfair Subdivision) |
| Analysis Periods | <ul style="list-style-type: none"> Weekday a.m. peak hour (peak hour in 7:00 a.m. to 9:00 a.m. period) Weekday p.m. peak hour (peak hour in 3:00 p.m. to 6:00 p.m. period) |
| Analysis Intersections | <ul style="list-style-type: none"> 9th Avenue East / 23rd Street A East 9th Avenue East / 23rd Street East |

2.3 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

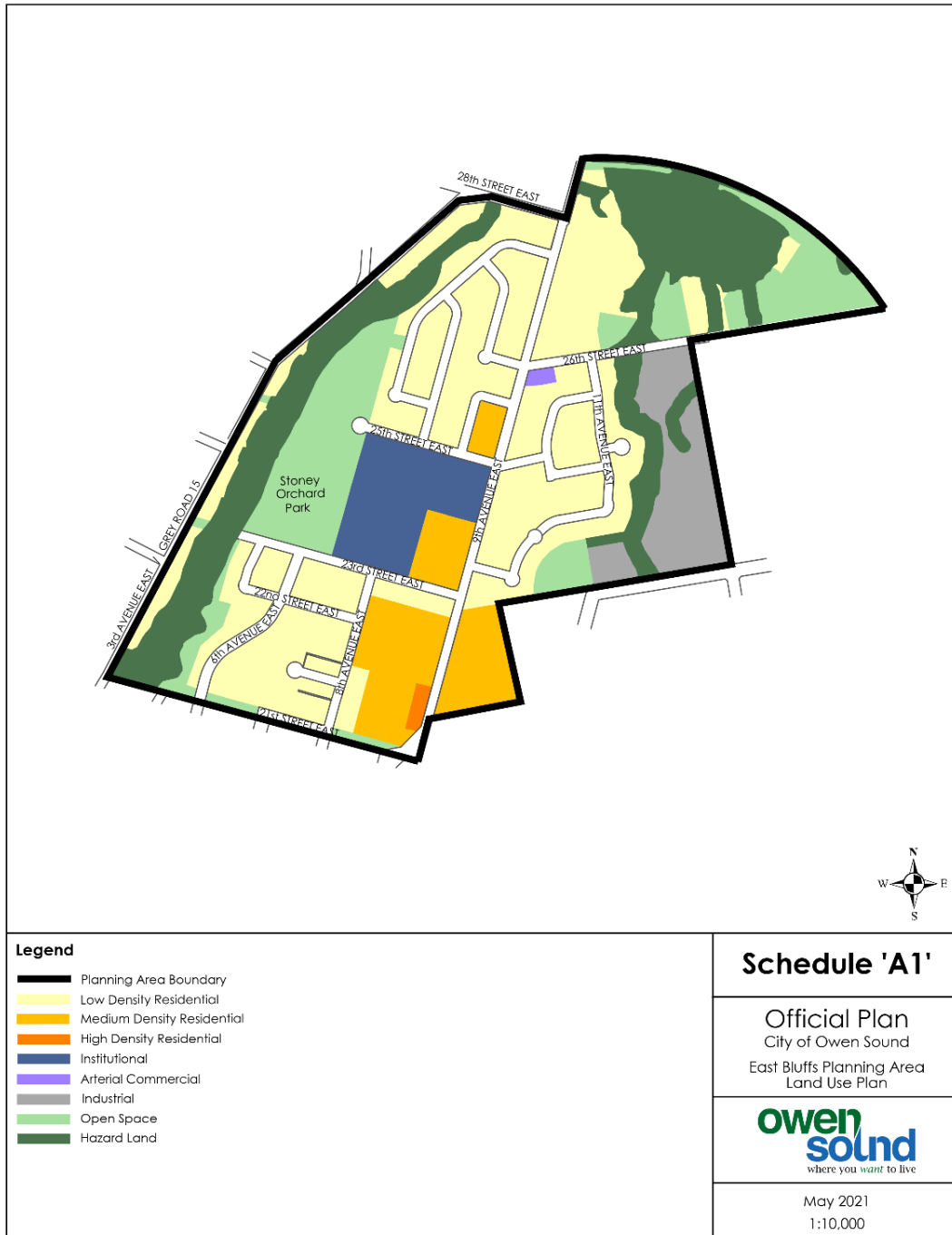
3.0 Existing Site Conditions

3.1 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.

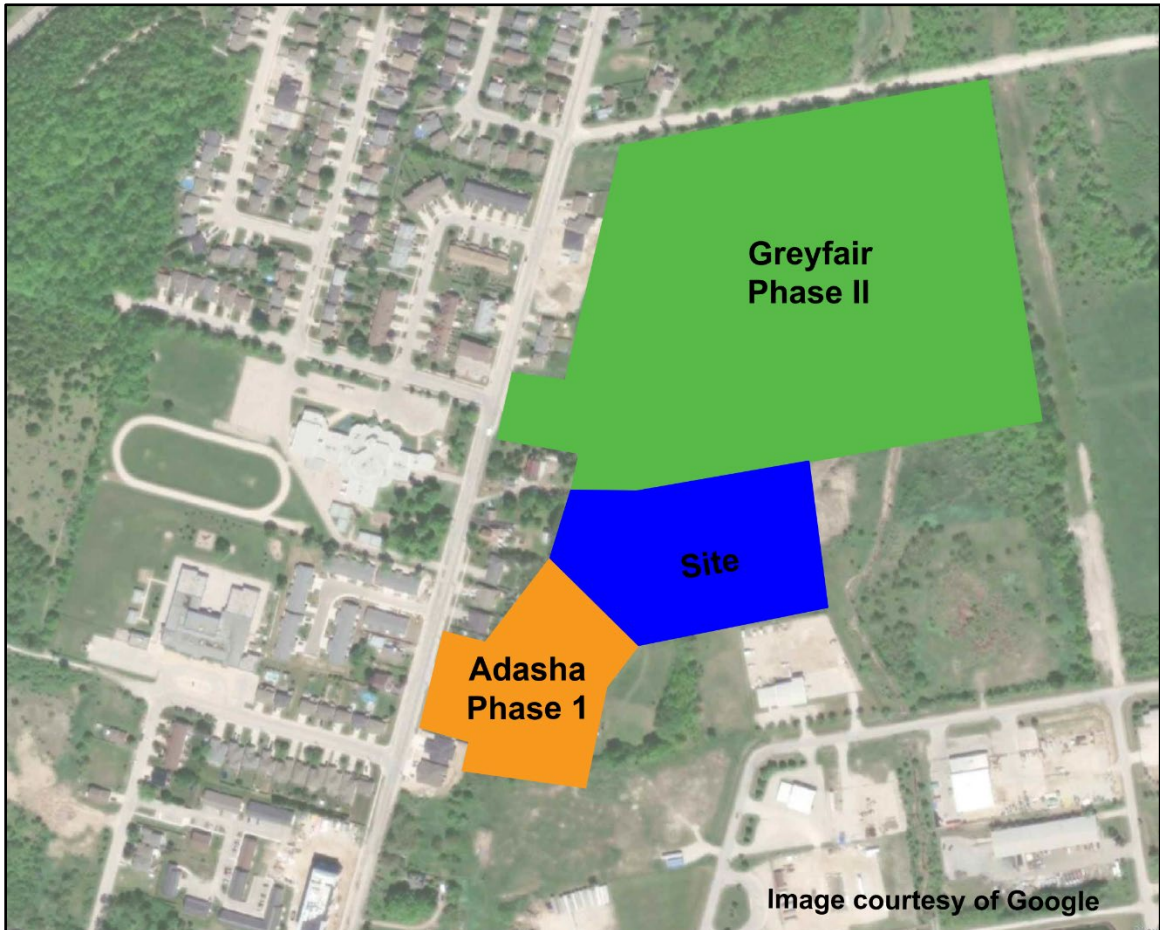
The East Bluffs Planning Area (East Bluffs) covers the northeastern part of the City which includes the lands east and west of 9th Avenue East, to the north of 21st Street and 23rd Street east-west alignments. The lands to the west are mostly developed now and include residential and institutional (school) 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.

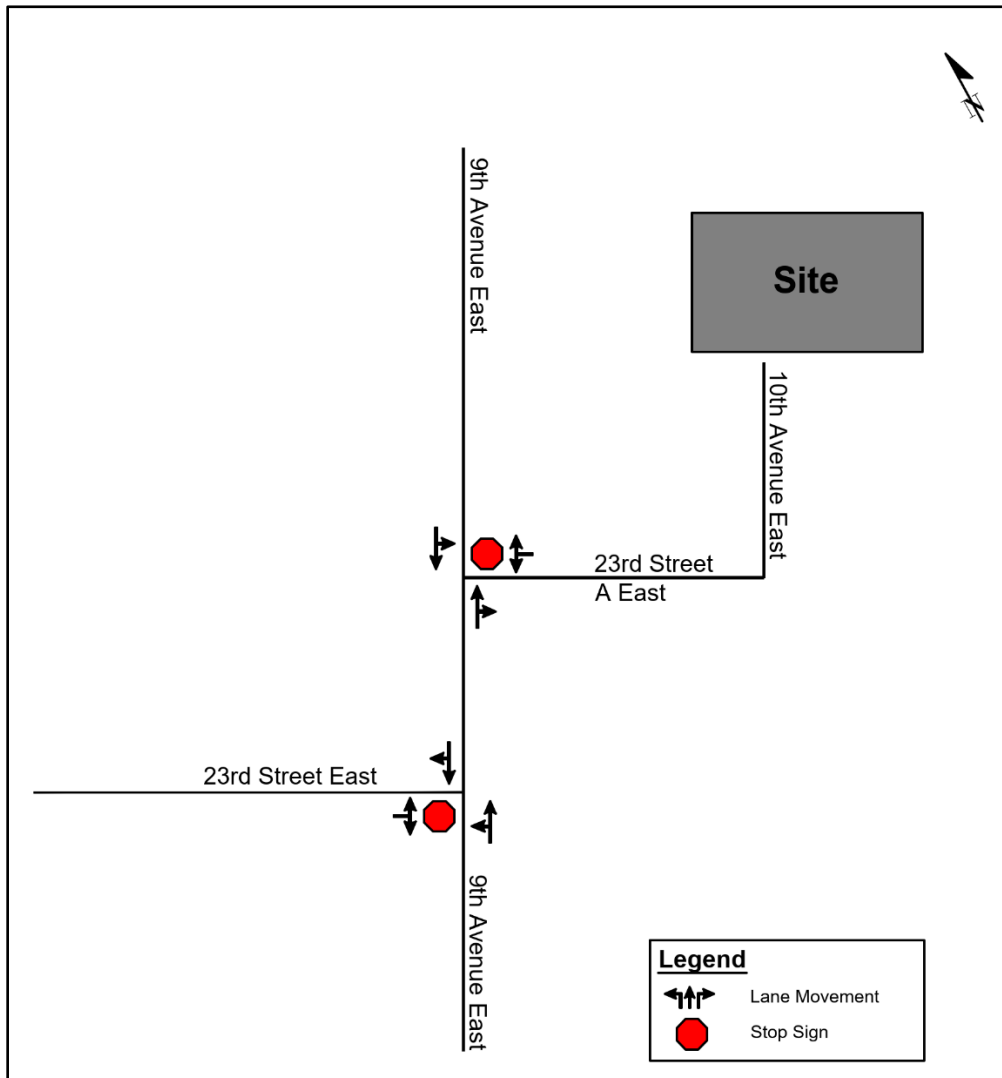
Figure 3: Subdivision Location Figure



3.2 Existing Road Network

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

9 th Avenue East	9 th Avenue is a north-south collector road under the jurisdiction of the City of Owen Sound. 9 th 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. Existing sidewalks are provided on either side of the road through the study area, with the sidewalks on the east side terminating immediately north and south of the study area.
10 th Avenue East	10 th 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. Existing sidewalks are provided on the west side of 10 th Avenue which connect to the sidewalks on 23 rd Street A East.
23 rd Street East	23 rd Street East is an east-west collector road west of 9 th 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. Sidewalks are provided on the north side of 23 rd Street East.
23 rd Street A East	23 rd Street A East is an east-west local road east of 9 th 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. Sidewalks are provided on the north side of 23 rd Street A East which connect to the sidewalks provided on 10 th Avenue East.

Figure 4: Existing Road Network

3.3 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 East 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.

10th Avenue Estates Transportation Study
August 2024

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.

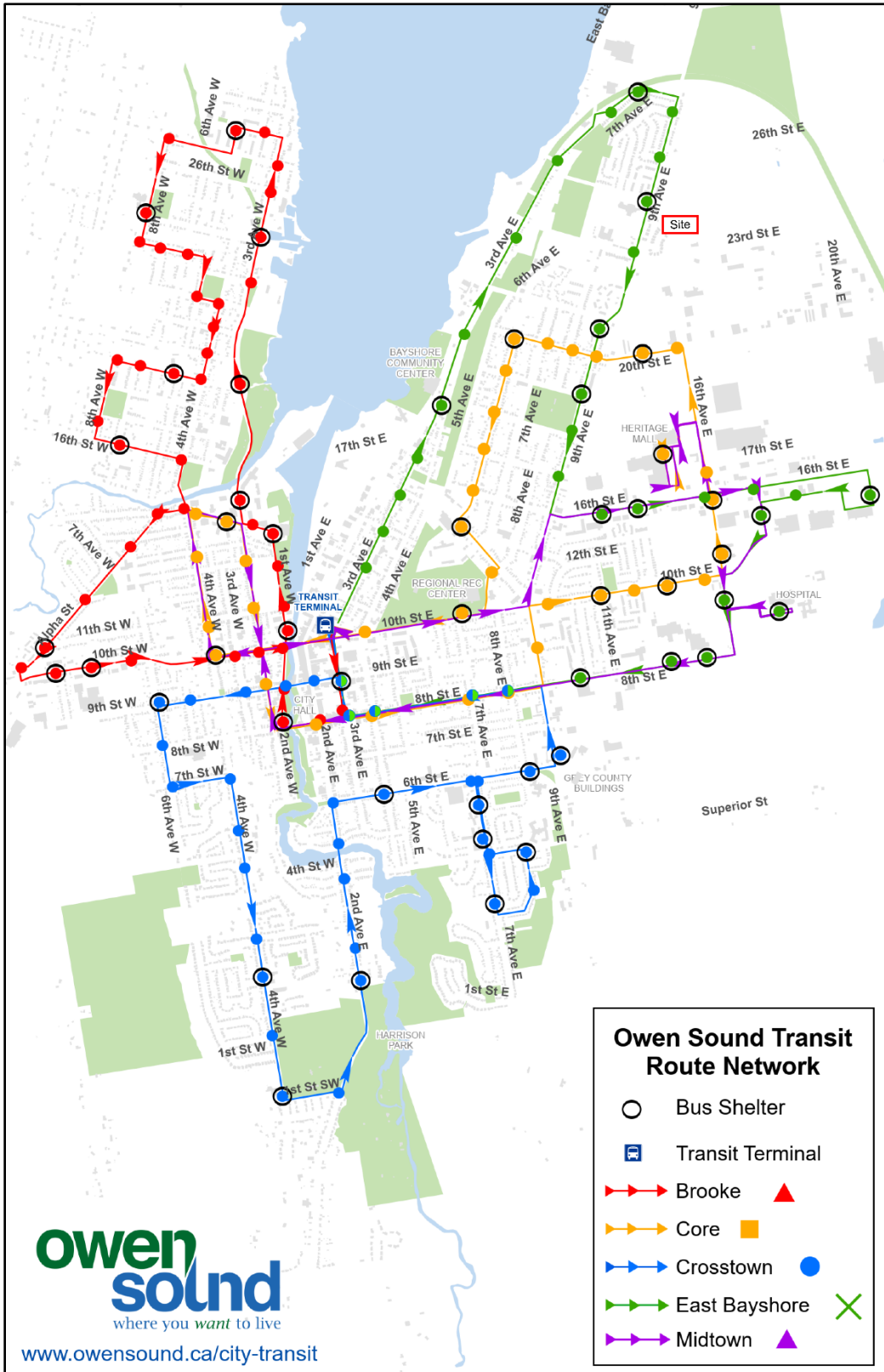
3.4 Existing Transit Services

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 23rd 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

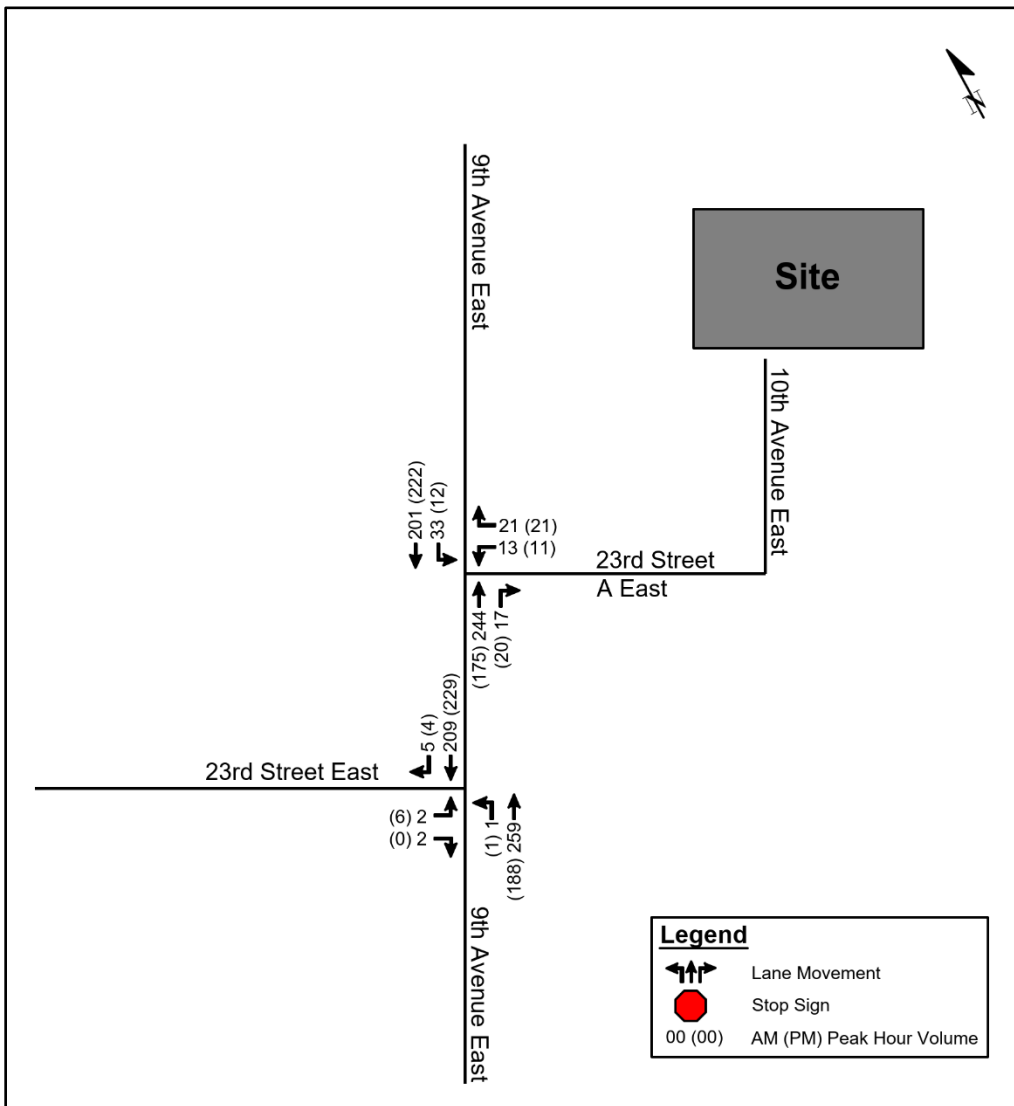


3.5 Existing Traffic Volumes

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



4.0 Future Network Considerations

4.1 Local Road Connection Opportunities

As per the City's Official Plan, a future north-south local 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 East in the north and 23rd Street 'A' East 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 shown on Schedule C of the City's Official Plan, a future collector road is planned to the east of the study area to provide a connection between 26th Street East and 23rd street East, which will provide for the primary road connectivity between these roads in this area, without relying on local road connectivity via an extension of 10th Avenue East through the subject development.

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 to the south 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. Therefore, by not providing the identified local road connection, the ability for surrounding lands to be developed and/or vehicles to access the proposed

10th Avenue Estates Transportation Study
August 2024

developments is only slightly impacted. Any impacts as a result of the proposed development are planned to be addressed through the mitigation measures that will be provided in the Site Plan Approval, as identified by the City and peer review comments.

As mentioned above, 23rd Street A East and 10th Avenue East have been designed as local roads intending to carry low traffic volumes. Implementing the 10th Avenue Extension will result in the road functioning as a collector road connection to the Greyfair Subdivision to the north. The curve/bend at 23rd Street A and 10th Avenue is not designed to function as a collector road. The curve/bend is able to accommodate the local road traffic.

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 a secondary emergency access. 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. This results in reduced costs for the City for ongoing maintenance and road repairs that would otherwise result from the previously proposed 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 or 26th Street East access versus the 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 slight impacts to the road network operations that may result from the development are adequately addressed through the mitigation measures that will be included in the Site Plan Approval, including all of those measures that have been identified by the City's review of the submissions to date.

4.2 Future Active Transportation Connections

Active transportation consists of non-vehicular modes of travel such as walking, jogging/running, cycling, skateboarding, etc.

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

10th Avenue Estates Transportation Study
August 2024

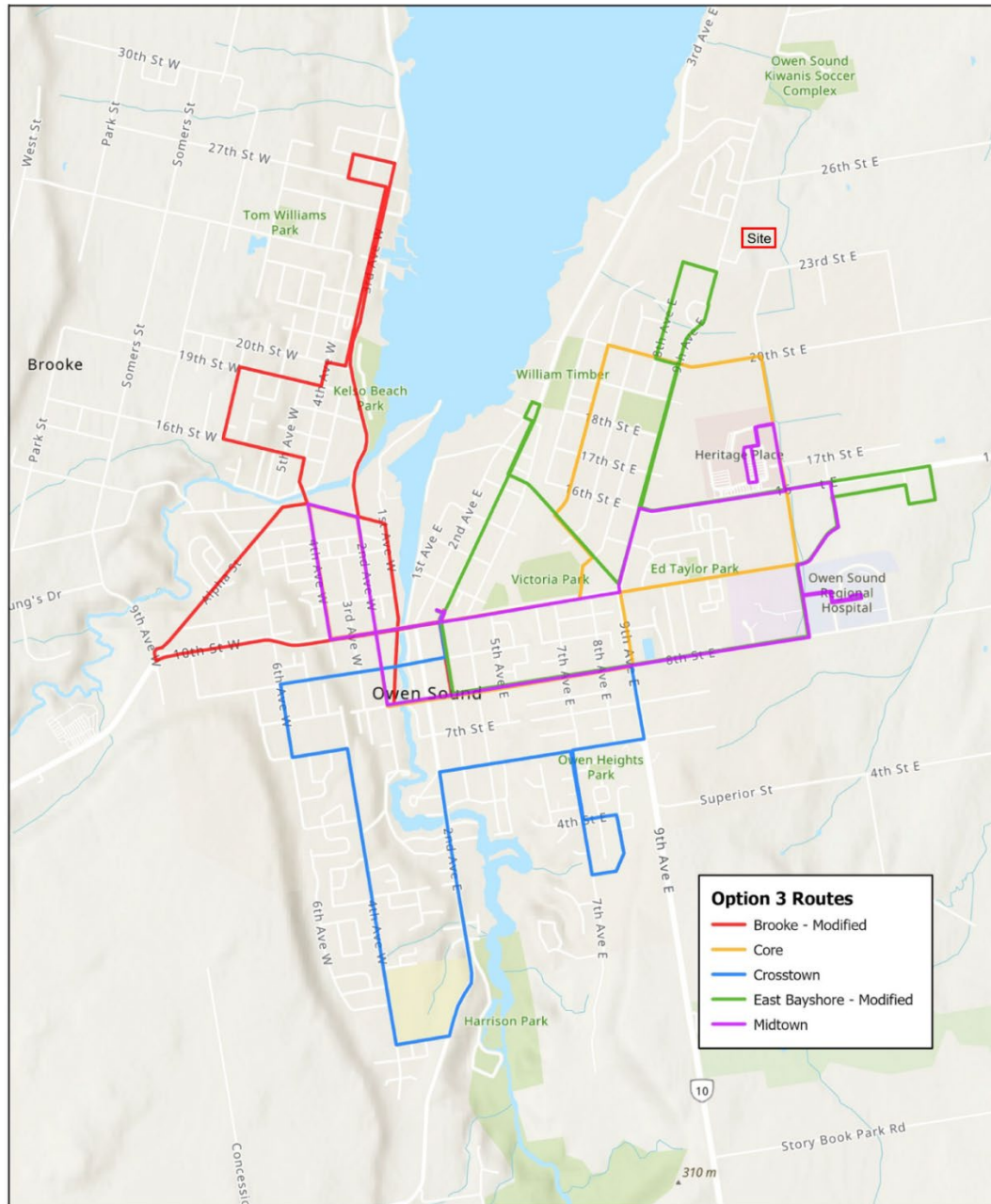
area. As mentioned above, existing concrete sidewalks are currently provided on the west side of 10th Avenue. The concept site plan for the proposed development includes continuous sidewalks along one side of the private road, with additional sidewalk connections to the apartment buildings. The sidewalks 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.

4.3 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 East 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.

4.4 Infrastructure Servicing

A draft Functional Servicing Report (FSR) completed by Clearwater Shores Civil Engineering, dated June 4, 2024 reviewed the availability of existing infrastructure connections and site servicing needs/flow requirements. 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. The City's Peer Reviewer (Paradigm Transportation Solutions Limited) recommended that a service easement/corridor be provided along the west and north sides of the proposed development, to maintain flexibility for the potential connection of municipal services. This proposed corridor will be provided as part of the Site Plan Approval. The FSR has been updated by Clearwater Shores to provide further comparison of the planning impacts of the Option A and Option B alternatives and the reader is encouraged to refer to that document for further discussion on the planning impacts related to servicing.

4.5 Emergency Access

The existing 10th Avenue East cul-de-sac is approximately 200 m in length, serving 23 existing dwelling units. The proposed development will result in an additional 85 dwelling units, for a total of 108, served by the 200 m long cul-de-sac, which is not permitted by the City's Residential Subdivision Policies without a secondary emergency vehicle access lane. National Fire Protection Agency (NFPA) Regulation 1140 also requires that a minimum of two emergency access routes be provided where more than 100 units are proposed. Section 8.2 *General Transportation Policies* of the Grey County Official Plan notes that single access to new residential developments will be considered up to 85 units and that new residential developments with 85 to 150 units will need to have at minimum a full access plus a secondary emergency access. An emergency vehicle access lane has been proposed from the south of the subject site, connecting to 23rd Street East, which meets the requirements of the City's Residential Policy, the NFPA Regulation 1140 and the Grey County Official Plan policy.

A potential emergency access to the north was identified by the City's Peer Reviewer (Paradigm Transportation Solutions Limited), assuming that the proposed emergency access to the south does not remain as a permanent facility. However, the proposed emergency access to the south is proposed to be permanent and has been accepted as sufficient by the City's Fire Prevention Division. While the provision of the primary access plus two emergency accesses are not strictly required it is understood that this added mitigation will be provided in the Site Plan Approval.

The proposed emergency access lane is also planned to be used as a sanitary service corridor and an active transportation connection.

10th Avenue Estates Transportation Study
August 2024

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 only slightly 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. Any impacts caused by the proposed development are planned to be addressed through mitigation measures during the Site Plan Approval process.

4.6 Transportation Planning Considerations

The City's Transportation Planning Reviewer identified the following transportation planning considerations related to the elimination of the extension of the 10th Avenue East local road to the Greyfair subdivision:

- The need to maintain active transportation connectivity.
- The need to maintain future servicing flexibility.
- The need to establish an emergency access to the north if the south emergency access is not a permanent facility.

The mitigation work proposed in the Site Plan Approvals to address these requirements includes the following:

- Provision of a trail connection in the northeast corner of the proposed development.
- Provision of a servicing corridor easement along the west side and north side of the proposed development.
- Provision of a permanent emergency access lane from the proposed development to the south to 23rd Street East., plus a second permanent emergency access to the north.

10th Avenue Estates Transportation Study
August 2024

As noted by the Peer Reviewer, it is appropriate to consider these provisions to mitigate the impacts of the elimination of the extension of 10th Avenue East as identified in the Official Plan.

The Peer Reviewer also noted that given the low to moderate existing and future traffic volumes, no significant traffic impacts are associated with either Option A/Option B or the Greyfair subdivision. In addition, it was noted that the resident's petition for a permanent road connection along the proposed emergency corridor is not justifiable based on the existing and future traffic volumes on the area road system.

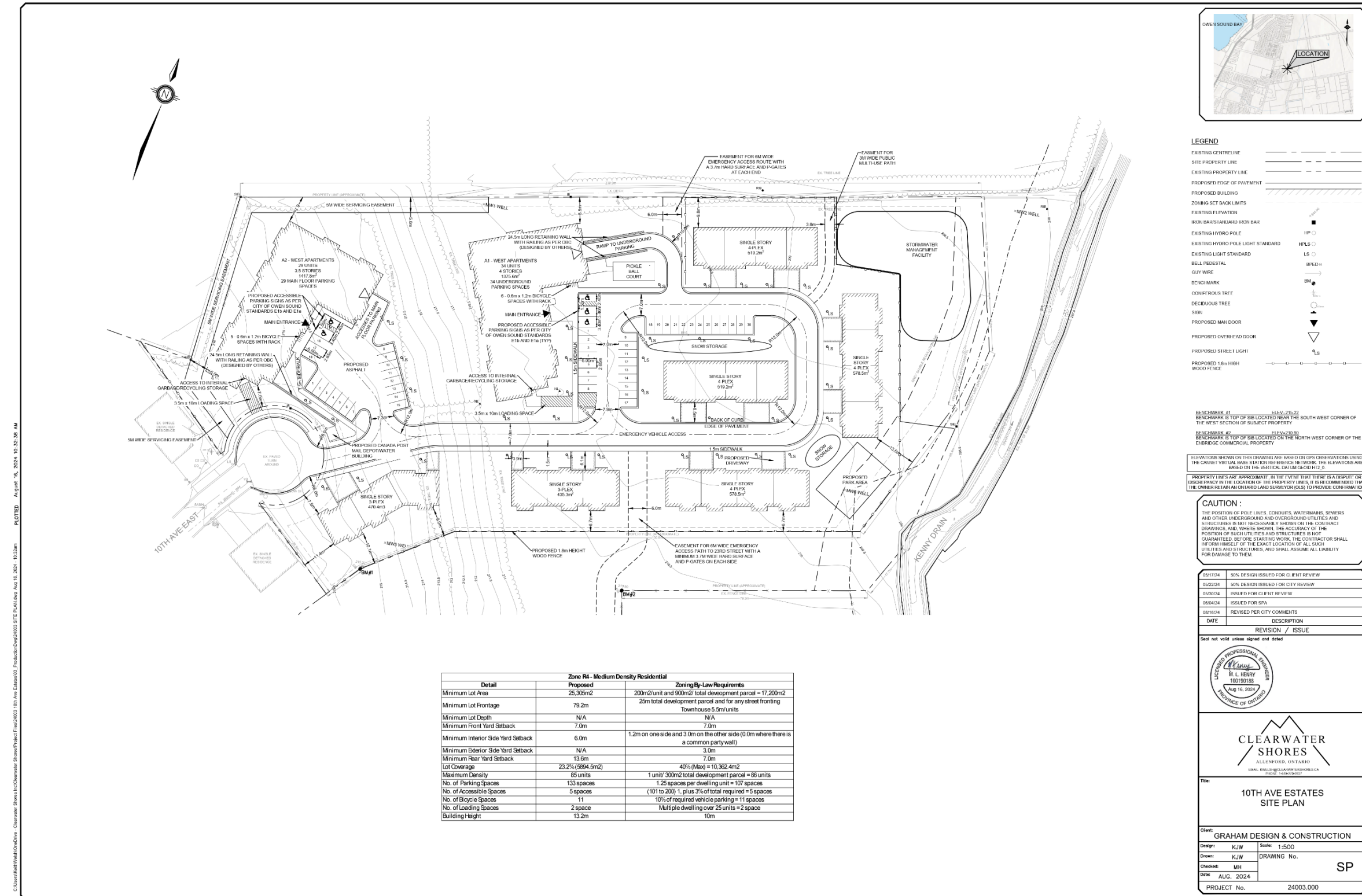
5.0 Proposed Development

5.1 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, revised to May 30, 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



5.2 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 150 single-detached residential lots (i.e., conservatively using the maximum Official Plan density as opposed to the 70 residential lots in the currently approved Draft Plan) 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 9th Avenue East as a result of the Greyfair Subdivision, however, option A also needs to consider the expected trips distributed along 10th Avenue East from the Greyfair Subdivision as a result of the 10th Avenue extension.

The proposed Trip Generation was based upon information contained in the publication *Trip Generation Manual, 11th 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 – 150 units	27	81	108	91	54	145
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 – 63 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 108 vph in the a.m. peak hour and 145 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.

10th Avenue Estates Transportation Study
August 2024

5.3 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	9 th Avenue East	51%
South	9 th Avenue East	48%
West	23 rd Street East	1%
Total		100%

Figure 9: Trip Assignment – Option A

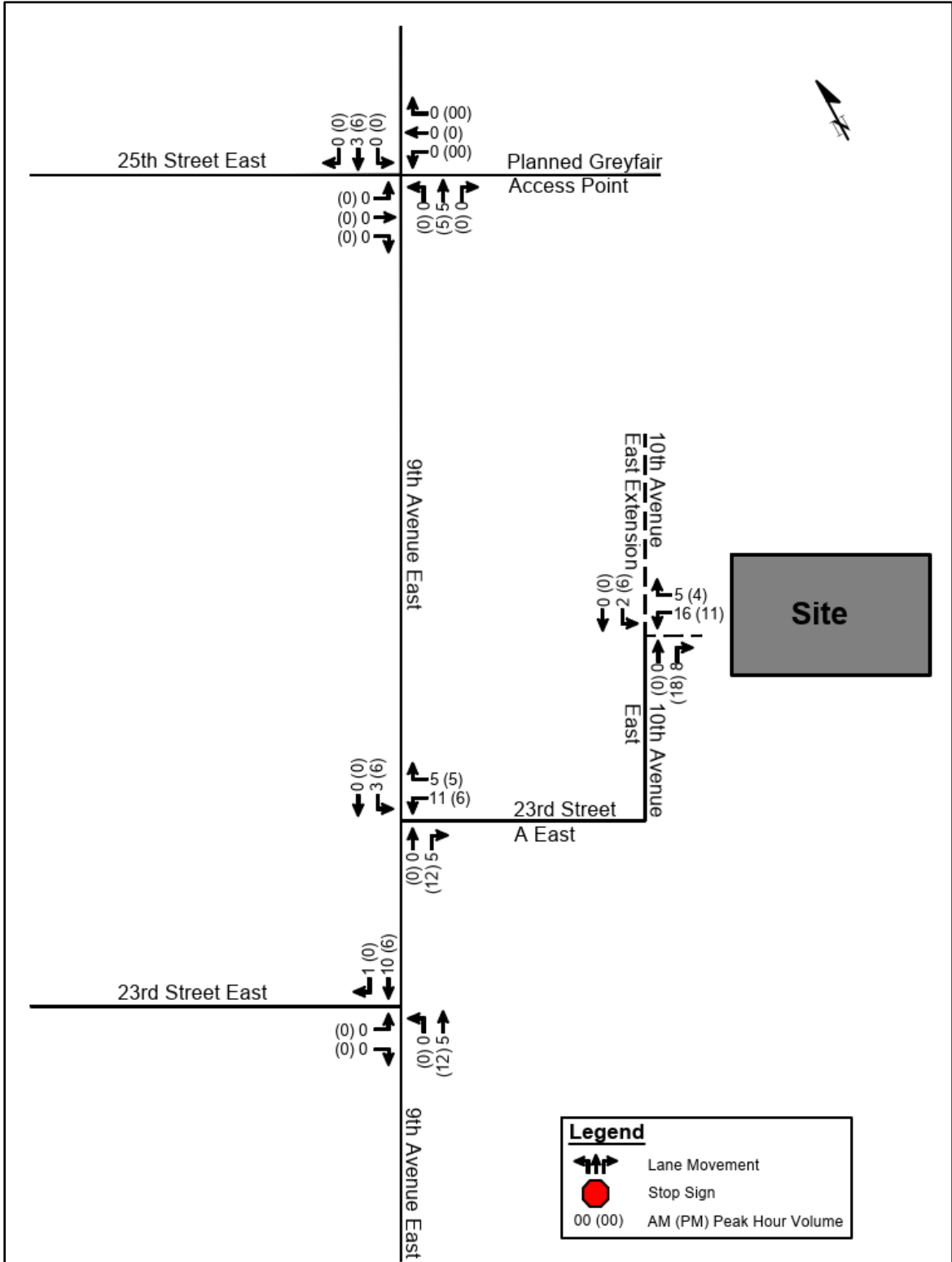
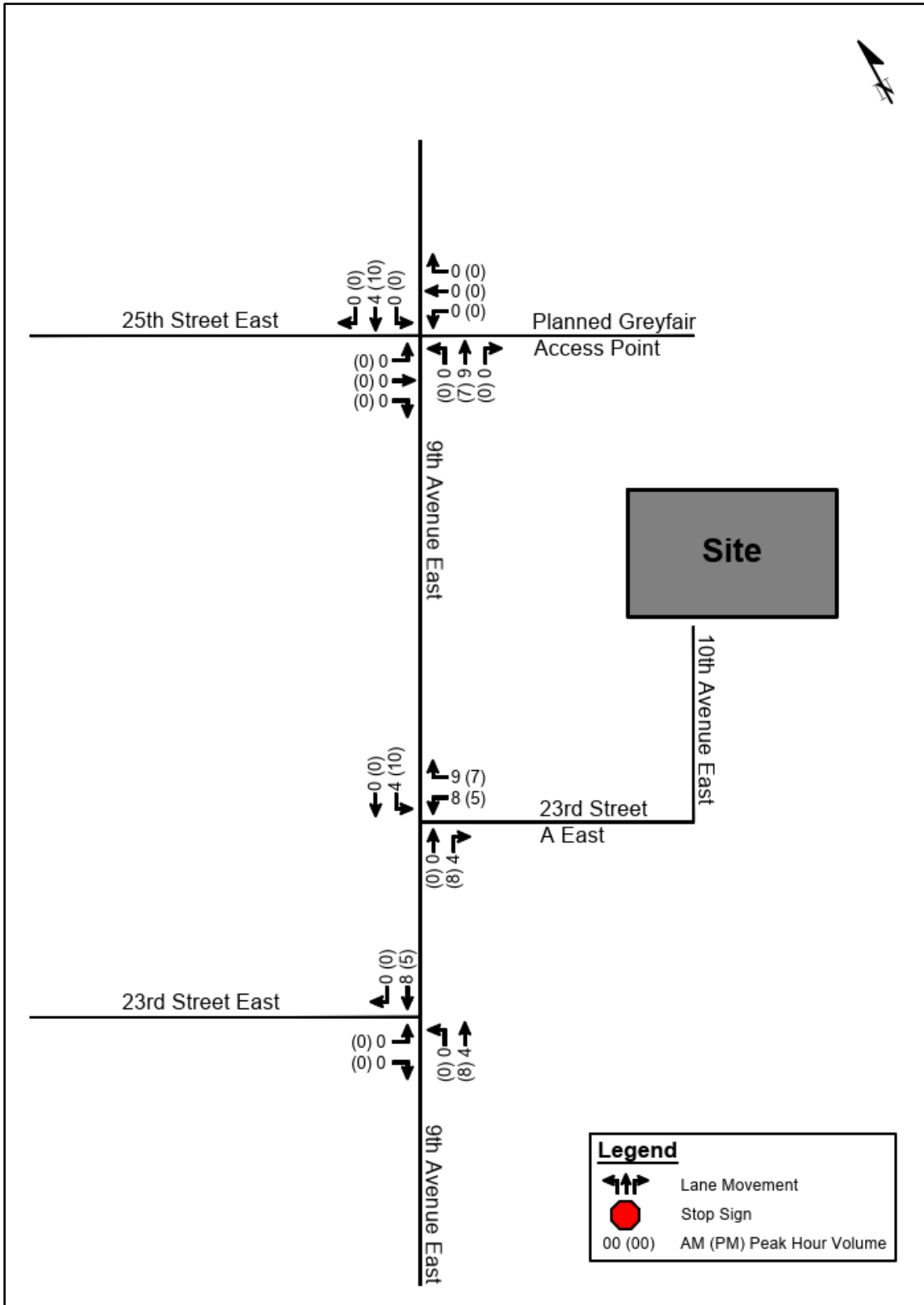


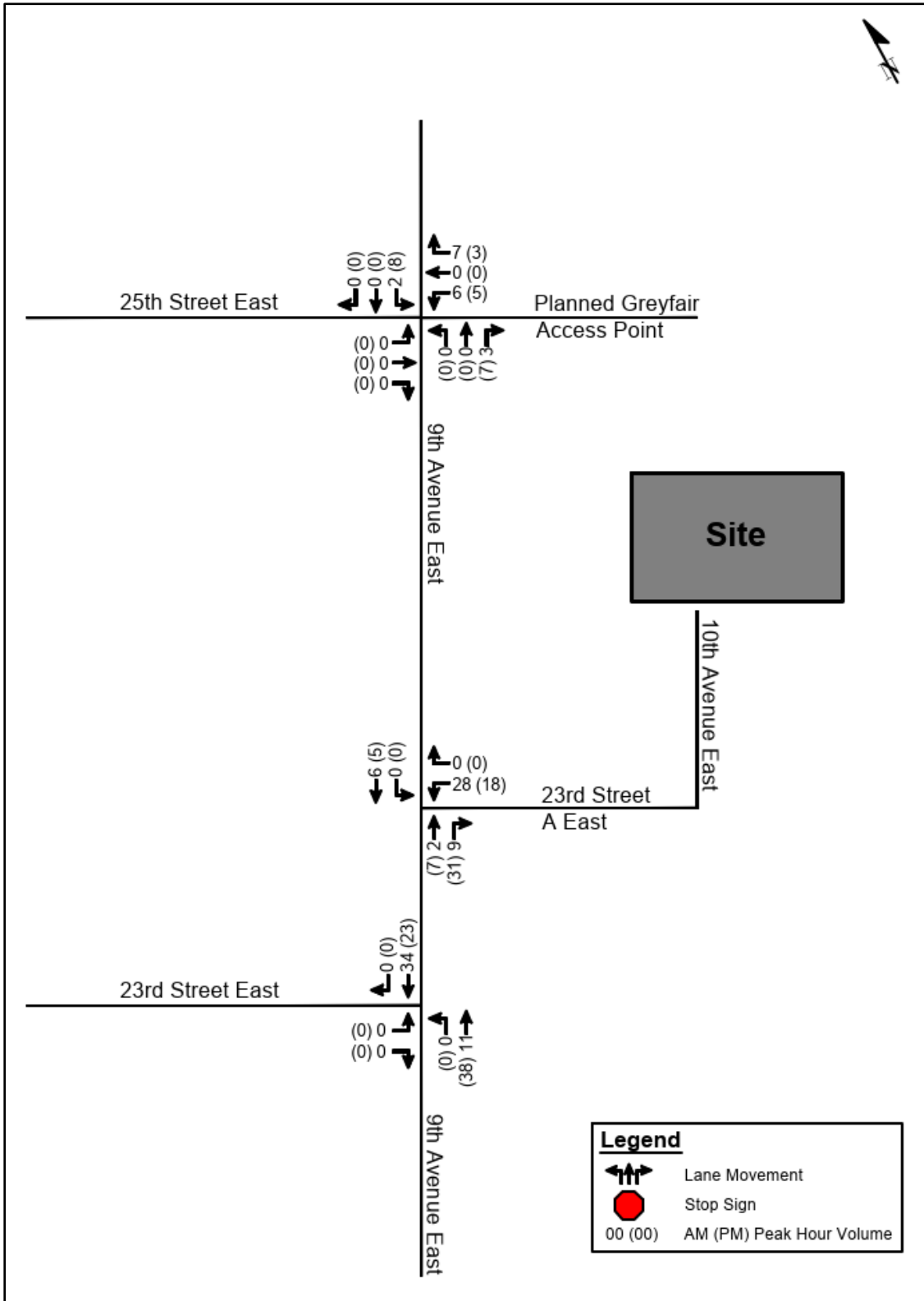
Figure 10: Trip Assignment – Option B



10th Avenue Estates Transportation Study
August 2024

Based on a network review of the Greyfair Subdivision, it has been assumed that 35% of the trips resulting from the 150 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



6.0 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

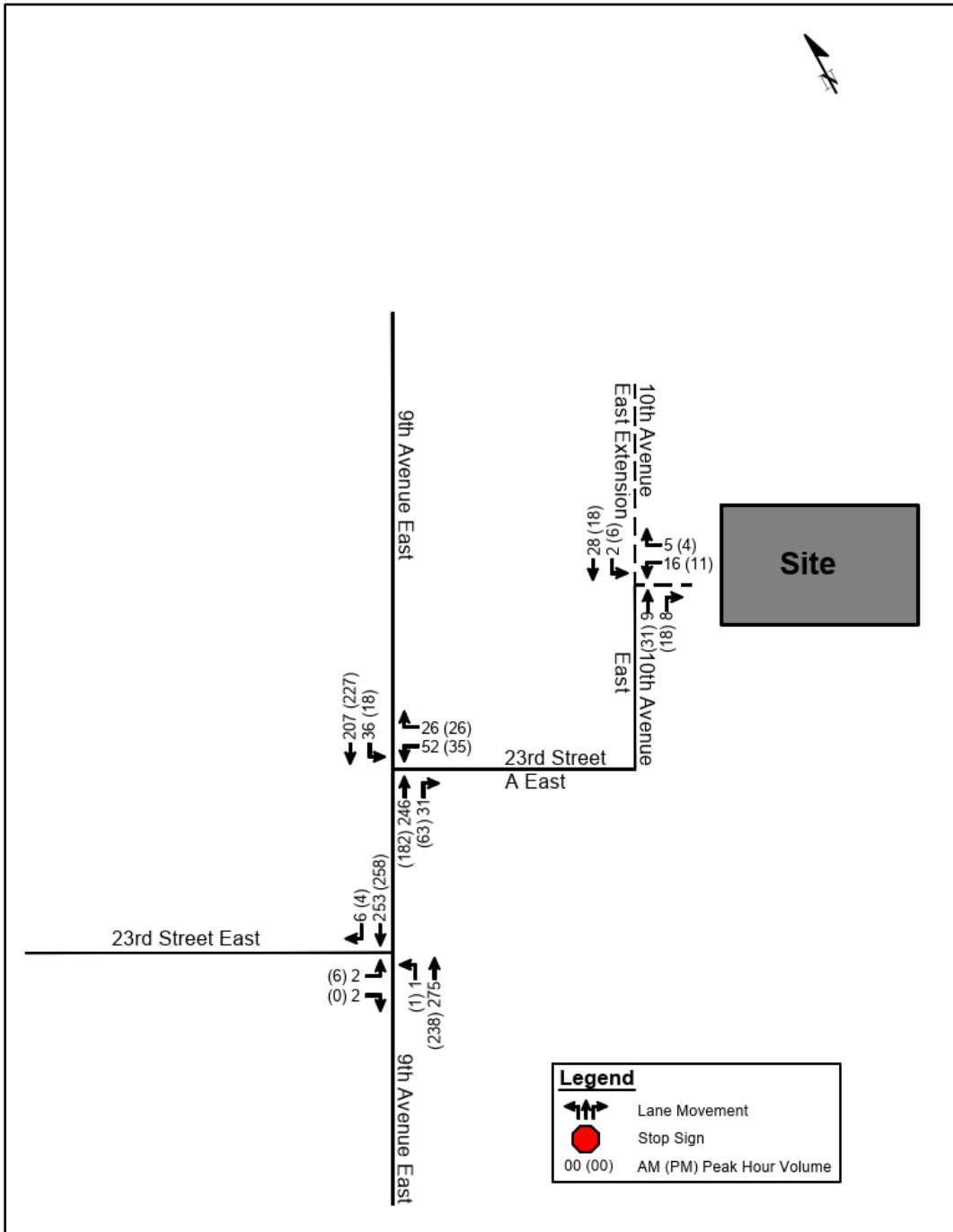
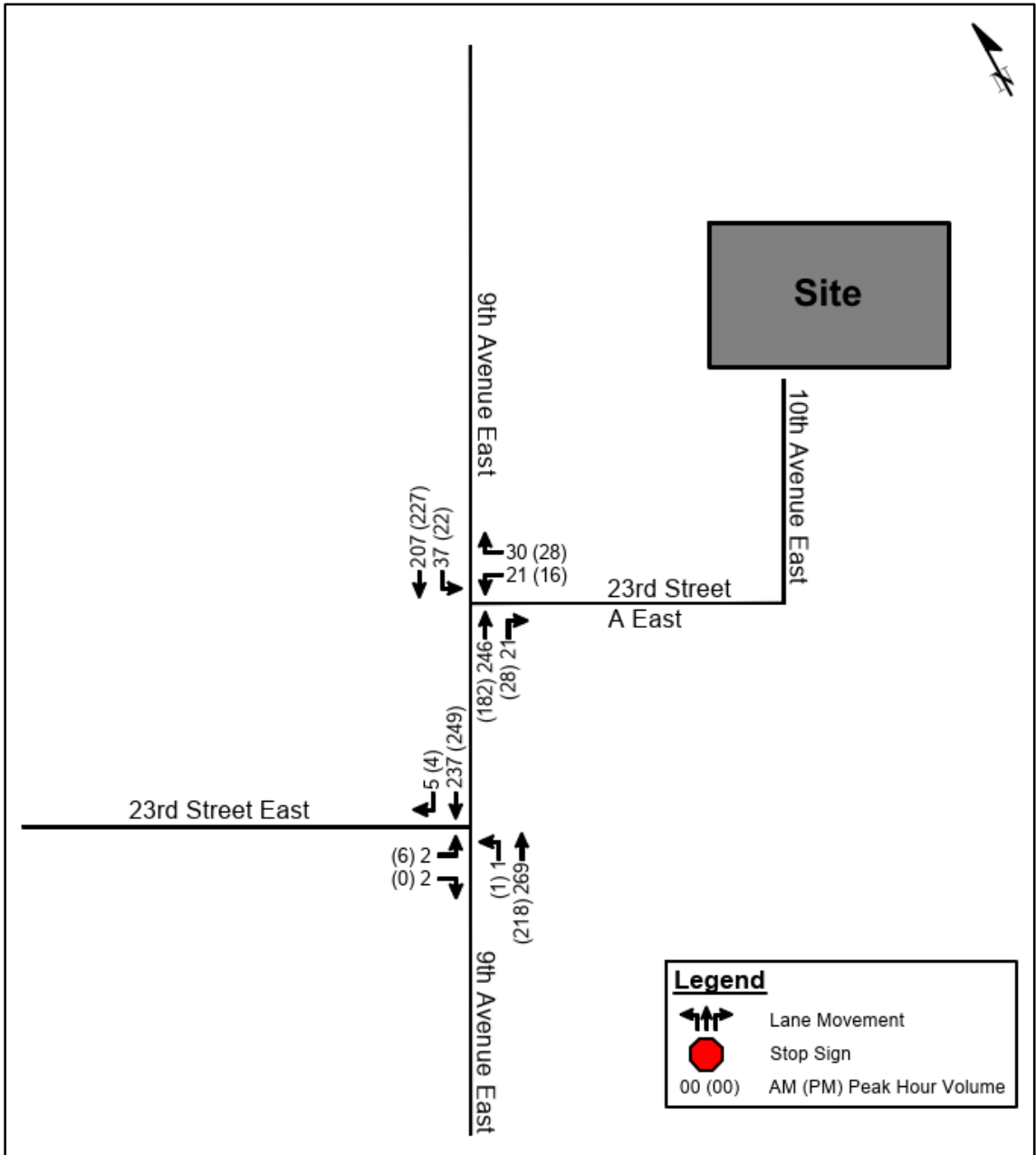


Figure 13: Total Traffic Volumes – Option B



7.0 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.

7.1 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)	95 th Queue (m)	v/c	LOS (delay, sec)	95 th 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	0.32	C (22.4)	10.2	0.18	C (15.8)	4.9
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	0.09	A (0.0)	0.0
SBLT	32.0	0.11	A (6.3)	2.8	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 22.4 seconds. Existing queues and projected queues are forecasted to be within the available storage.

10th Avenue Estates Transportation Study
August 2024

7.2 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)	95 th Queue (m)	v/c	LOS (delay, sec)	95 th 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 (11.1)	0.2	0.01	B (11.9)	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	0.18	A (0.0)	0.0	0.19	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 11.9 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 17.3 seconds (LOS C) under existing conditions which is forecast to rise to 22.4 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 11.9 seconds (LOS B) under option A and 11.6 (LOS B) under option B.

10th Avenue Estates Transportation Study
August 2024

Therefore, based on the data presented above, it can be concluded that although option B consists of more housing (i.e., 85 dwelling units versus 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.

8.0 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 23rd 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 (i.e., pedestrian, cyclist) connection, servicing connection and emergency access of the proposed developments are only slightly impacted. Any such impacts as a result of the proposed development are proposed to be addressed through mitigation measures that will be included in the Site Plan Approval, including all of those measures that have been identified by the City's review of the submissions to date. The mitigation work proposed in the Site Plan Approvals to address impacts includes the following:
 - Provision of a trail connection in the northeast corner of the proposed development.
 - Provision of a servicing corridor easement along the west side and north side of the proposed development.
 - Provision of a permanent emergency access lane from the proposed development to the south to 23rd Street East., plus a second permanent emergency access to the north.
- 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 and will be addressed by the mitigation measures recommended. Any impacts, as a result of the proposed development, are planned to be addressed through mitigation measures that will be included in the Site Plan Approval.
- 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

10th Avenue Estates Transportation Study
August 2024

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.

- The existing 10th Avenue East cul-de-sac is approximately 200 metres in length, serving 23 existing dwelling units. The proposed development will result in an additional 85 dwelling units, for a total of 108, served by the 200 m long cul-de-sac, which is not permitted by the City's Residential Subdivision Policies without a secondary emergency vehicle access lane. National Fire Protection Agency (NFPA) Regulation 1140 also requires that a minimum of two emergency access routes be provided where more than 100 units are proposed. Section 8.2 *General Transportation Policies* of the Grey County Official Plan notes that single access to new residential developments will be considered up to 85 units and that new residential developments with 85 to 150 units will need to have at minimum a full access plus a secondary emergency access. An emergency vehicle access lane has been proposed from the south of the subject site, connecting to 23rd Street, which meets the requirements of the City's Residential Policy, the NFPA Regulation 1140 and the Grey County Official Plan policy.
- 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 22.4 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 17.3 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 22.4 seconds (LOS C) in the a.m. and 15.8 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 11.1 seconds (LOS B) in the a.m. and 11.9 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 versus 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 planning justification to support the development of option B which precludes establishing the local road connection as per the City's Official Plan.



BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]



Appendix A

Existing Traffic Counts

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 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
	201	233	434
	33	32	65
	0	0	0
Totals	234	265	499

9th Ave E

	0	0	0
	25	8	0
	176	25	0
Totals	201	33	0

East Approach

	Out	In	Total
	27	39	66
	7	11	18
	0	0	0
Totals	34	50	84




Peds: 14




Peds: 0



Peds: 0




Peds: 3

	Out	In	Total
	218	14	0
	26	3	0
	0	0	0
Totals	244	17	0








9th Ave E


23rd St A E

Totals			
0	0	0	0
21	15	6	0
13	12	1	0

South Approach

	Out	In	Total
	232	188	420
	29	26	55
	0	0	0
Totals	261	214	475

 - Cars

 - Trucks

 - Bicycles

Comments



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 Vehic es
	←	↑	→	↻	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	-							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	-		

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 15:00:00
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
	228	182	410
	6	13	19
	0	1	1
Totals	234	196	430

9th Ave E

	0	0	0
	5	1	0
	217	11	0
Totals	222	12	0



Peds: 1



Peds: 0

Peds: 0

Peds: 3

	Out	In	Total
	165	18	0
	9	1	0
	1	1	0
Totals	175	20	0

9th Ave E

East Approach

	Out	In	Total
	27	29	56
	5	2	7
	0	1	1
Totals	32	32	64

23rd St A E

Totals			
	0	0	0
	21	17	4
	11	10	1

South Approach

	Out	In	Total
	183	227	410
	10	6	16
	2	0	2
Totals	195	233	428

- Cars

- Trucks

- Bicycles

Comments



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 Vehic es	
	←	↑	→	↻	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									
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
	188	232	420
	26	29	55
	0	0	0
Totals	214	261	475

9th Ave E

	0	0	0
	0	26	0
	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



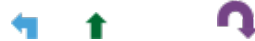
Peds: 0

Peds: 0

West Approach

	Out	In	Total
	4	6	10
	0	0	0
	0	0	0
Totals	4	6	10

Totals	1	259	0
	1	230	0
	0	29	0
	0	0	0



9th Ave E

South Approach

	Out	In	Total
	231	185	416
	29	26	55
	0	0	0
Totals	260	211	471

- Cars

- Trucks

- Bicycles

Comments



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 Vehic es
	←	↑	→	↻	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	0.76	0.25	0.84		0	0	0.84					0	0	0.5		0.5	0	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	-	-		

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 15:00:00
To: 16:00:00




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

Weather conditions: Clear




**** Unsignalized Intersection ****

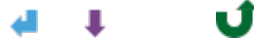
Major Road: 9th Ave E runs N/S

North Approach

	Out	In	Total
	227	182	409
	6	10	16
	0	2	2
	233	194	427







9th Ave E

	0	0	0
	0	6	0
	4	223	0
Totals	4	229	0



Peds: 1

23rd St E

			Totals	
0	0	0	0	
0	0	6	6	
0	0	0	0	




Peds: 0









Peds: 0

Peds: 0




West Approach

	Out	In	Total
	6	5	11
	0	0	0
	0	0	0
	6	5	11


Totals			
	1	188	0
	1	176	0
	0	10	0
	0	2	0

9th Ave E

South Approach

	Out	In	Total
	177	223	400
	10	6	16
	2	0	2
	189	229	418

 - Cars

 - Trucks

 - Bicycles

Comments



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	-		



BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix B

Existing Conditions Synchro Reports

HCM Unsignalized Intersection Capacity Analysis
1: 9th Avenue East & 23rd Street A East

Existing AM
Baseline



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			

HCM Unsignalized Intersection Capacity Analysis
 2: 9th Avenue East & 23rd Street East










Existing AM
 Baseline



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑	↑
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					

HCM Unsignalized Intersection Capacity Analysis
1: 9th Avenue East & 23rd Street A East

Existing PM
Baseline

						
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			

HCM Unsignalized Intersection Capacity Analysis
 2: 9th Avenue East & 23rd Street East

Existing PM
 Baseline



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑	↑
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			



BURNSIDE










[THE DIFFERENCE IS OUR PEOPLE]

Appendix C

Option A Synchro Reports

HCM Unsignalized Intersection Capacity Analysis
 1: 9th Avenue East & 23rd Street A East

Total AM - Option A
 Baseline

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	52	26	246	31	36	207
Future Volume (Veh/h)	52	26	246	31	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)	65	32	308	39	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	550	188			347	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	550	188			347	
tC, single (s)	8.3	12.6			8.9	
tC, 2 stage (s)						
tF (s)	4.3	6.2			4.6	
p0 queue free %	77	91			89	
cM capacity (veh/h)	285	349			408	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	97	205	142	131	173	
Volume Left	65	0	0	45	0	
Volume Right	32	0	39	0	0	
cSH	303	1700	1700	408	1700	
Volume to Capacity	0.32	0.12	0.08	0.11	0.10	
Queue Length 95th (m)	10.2	0.0	0.0	2.8	0.0	
Control Delay (s/veh)	22.4	0.0	0.0	6.3	0.0	
Lane LOS	C			A		
Approach Delay (s/veh)	22.4	0.0			2.7	
Approach LOS	C					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			32.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 2: 9th Avenue East & 23rd Street East

Total AM - Option A
 Baseline



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑	↑
Traffic Volume (veh/h)	2	2	1	275	253	6
Future Volume (Veh/h)	2	2	1	275	253	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	331	305	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	473	305	312			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	473	305	312			
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)	525	697	1260			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	4	111	221	305	7	
Volume Left	2	1	0	0	0	
Volume Right	2	0	0	0	7	
cSH	599	1260	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.13	0.18	0.00	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s/veh)	11.1	0.1	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s/veh)	11.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	23.3%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 4: 10th Avenue East/10th Avenue Extension & Proposed Access










Total AM - Option A
 Baseline



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	5	9	8	2	28
Future Volume (Veh/h)	16	5	9	8	2	28
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	10	9	2	30
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	49	15			19	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	49	15			19	
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)	965	1071			1611	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	22	19	32			
Volume Left	17	0	2			
Volume Right	5	9	0			
cSH	987	1700	1611			
Volume to Capacity	0.02	0.01	0.00			
Queue Length 95th (m)	0.5	0.0	0.0			
Control Delay (s/veh)	8.7	0.0	0.5			
Lane LOS	A		A			
Approach Delay (s/veh)	8.7	0.0	0.5			
Approach LOS	A					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: 9th Avenue East & 23rd Street A East

Total PM - Option A
 Baseline

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	26	182	63	18	227
Future Volume (Veh/h)	35	26	182	63	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)	42	31	219	76	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	441	149			295	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	441	149			295	
tC, single (s)	8.6	10.7			5.8	
tC, 2 stage (s)						
tF (s)	4.4	5.2			3.0	
p0 queue free %	88	94			97	
cM capacity (veh/h)	357	494			837	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	73	146	149	113	182	
Volume Left	42	0	0	22	0	
Volume Right	31	0	76	0	0	
cSH	405	1700	1700	837	1700	
Volume to Capacity	0.18	0.09	0.09	0.03	0.11	
Queue Length 95th (m)	4.9	0.0	0.0	0.6	0.0	
Control Delay (s/veh)	15.8	0.0	0.0	2.0	0.0	
Lane LOS	C			A		
Approach Delay (s/veh)	15.8	0.0			0.8	
Approach LOS	C					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			27.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
2: 9th Avenue East & 23rd Street East

Total PM - Option A
Baseline



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑	↑
Traffic Volume (veh/h)	6	0	1	238	258	4
Future Volume (Veh/h)	6	0	1	238	258	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	290	315	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	463	315	320			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	463	315	320			
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)	532	687	1251			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	7	98	193	315	5	
Volume Left	7	1	0	0	0	
Volume Right	0	0	0	0	5	
cSH	532	1251	1700	1700	1700	
Volume to Capacity	0.01	0.00	0.11	0.19	0.00	
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	
Control Delay (s/veh)	11.9	0.1	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s/veh)	11.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			23.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 4: 10th Avenue East/10th Avenue Extension & Proposed Access

Total PM - Option A
 Baseline



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	4	31	18	6	18
Future Volume (Veh/h)	11	4	31	18	6	18
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	34	20	7	20
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	78	44			54	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	78	44			54	
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)	926	1032			1564	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	54	27			
Volume Left	12	0	7			
Volume Right	4	20	0			
cSH	950	1700	1564			
Volume to Capacity	0.02	0.03	0.00			
Queue Length 95th (m)	0.4	0.0	0.1			
Control Delay (s/veh)	8.9	0.0	1.9			
Lane LOS	A		A			
Approach Delay (s/veh)	8.9	0.0	1.9			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			16.2%	ICU Level of Service		A
Analysis Period (min)			15			



BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix D

Option B Synchro Reports

HCM Unsignalized Intersection Capacity Analysis
 1: 9th Avenue East & 23rd Street A East

Total AM - Option B
 Baseline



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			

HCM Unsignalized Intersection Capacity Analysis
 2: 9th Avenue East & 23rd Street East










Total AM - Option B
 Baseline



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑	↑
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					

HCM Unsignalized Intersection Capacity Analysis
 1: 9th Avenue East & 23rd Street A East

Total PM - Option B
 Baseline

						
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			

HCM Unsignalized Intersection Capacity Analysis
 2: 9th Avenue East & 23rd Street East

Total PM - Option B
 Baseline



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑	↑
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			

