Prepared for:
City of Cornwall

Environmental Study Report

Municipal Class Environmental Assessment
Proposed Widening Improvements on Marleau Avenue
(From Marlborough Street to Glenview Boulevard)

GENIVAR File No. OT-09-114

GENIVAR

September 2011

City of Cornwall

Marleau Avenue Widening Improvements (from Marlborough Street to Glenview Boulevard) Environmental Assessment (EA) Study

Environmental Study Report

September 2011

Prepared by:

GENIVAR

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1.0 PROJECT SUMMARY

1.1 Introduction and Background

Marleau Avenue is a critical east/west link in the City of Cornwall's transportation network. A number of transportation and infrastructure studies have identified the need for capacity and operational improvements to the roadway. The objective of this Municipal Class Environmental Assessment (EA) study is to validate the need for capacity and operational modifications and if required, develop a Recommended Plan which satisfies mobility needs in the study area. The segment of Marleau Avenue under review extends from Marlborough Street to Glenview Boulevard.

The purpose of this study is to define a Recommended Plan for Marleau Avenue that will:

- Address current and projected capacity needs;
- Improve roadway operations and safety by incorporating required improvements such as turning lanes, pedestrian facilities, and transit facilities; and
- Receive environmental clearance for the Recommended Plan.

This examination will consider the mobility needs of all modes of travel including bicycles, pedestrians, trucks and transit.

The purpose of this Schedule "C" EA is to confirm/validate the extent of current and future transportation needs in the Study Area. It follows Phases 1 and 2 (needs and alternative solutions) followed by Phases 3 and 4 (the analysis and evaluation of alternative designs and documentation).

The problem, which was defined with community participation, was to provide an efficient and effective transportation plan to meet forecasted travel demand (movement of people and goods in the 20 year planning horizon). This study has been carried out in consultation with the City of Cornwall, the general public, external agencies, and consultant staff. Members of the public were invited to two (2) Public Open Houses which were held during the course of the study to present issues, alternatives, a Recommended Plan and to obtain public feedback.

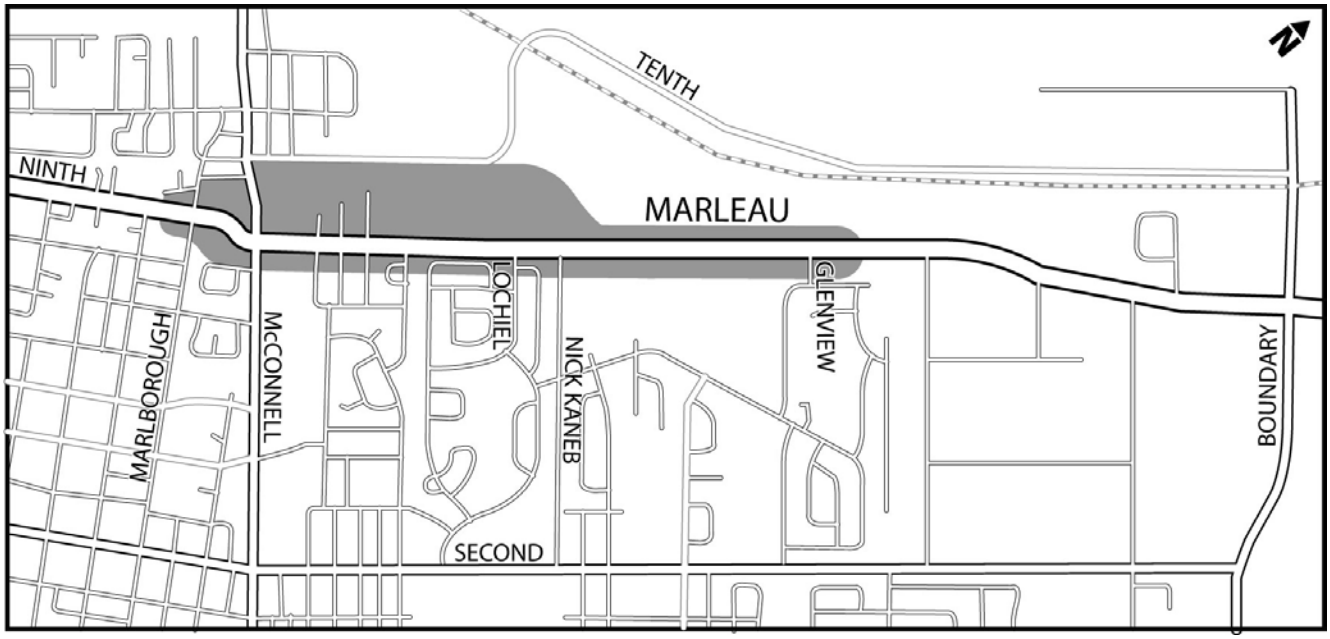
A Technical Advisory Committee was formed to undertake the technical aspects of the study and to communicate local concerns and preferences. The Technical Advisory Committee consisted of City of Cornwall staff and consultant staff from GENIVAR.

This Environmental Study Report (ESR) presents to the public and review agencies a description of the Environmental Assessment (EA) study process that was undertaken and the corresponding Recommended Plan that was developed as a result of the EA process. This EA was carried out in accordance with the *'Municipal Class Environmental Assessment, 2007'* Schedule for a Group "C" project.

1.2 Study Area

The Study Area is the segment of Marleau Avenue which extends from Marlborough Street to Glenview Boulevard. The Study Area is illustrated in **Figure 1-1.**

Figure 1-1
Study Area



1.3 Report Organization

The EA Process was undertaken in a series of phases commencing with identifying the problem and proposed study process and culminating in the filing of this Environmental Study Report (ESR). The EA process included public consultation, an evaluation of all reasonable alternatives, and selection of a Recommended Plan. The effects on the natural, social and cultural environments, as a result of the proposed recommended plan, can be mitigated. See **Chapter 7** for a summary of the effects and mitigation measures proposed.

This ESR has been divided into eight chapters that are as follow:

1. Project Summary
2. Need and Justification
3. Approach and Consultation
4. Existing Conditions
5. Analysis and Evaluation
6. Recommended Plan
7. Areas of Environmental Sensitivities and Mitigation Measures
8. Conclusions

Technical and supporting documentation is appended to this document.

1.4 Need and Justification

Marleau Avenue is a critical east/west link in the City of Cornwall's transportation network. The segment under review, from Marlborough Street to Glenview Boulevard, accommodates in the order of 10,000 to 17,000 vehicles per day (vpd) – traffic levels which typically warrant a 4-lane roadway. Previous planning efforts undertaken by the City have identified the need for expansion, based on capacity and operational issues and the importance of Marleau Avenue from a network perspective. In addition to satisfying east/west travel demands (it is one of a select number of arterials that provide this function), Marleau Avenue also serves as a Highway 401 Emergency Detour Route (EDR). Considering the above, it is essential that appropriate levels of mobility are maintained on this key transportation link.

A number of previous studies have generally identified the need for additional east/west capacity on Marleau Avenue:

- Critical Infrastructure Review (2006);
- Industrial Park Transportation Planning Study (2001); and
- Transportation Operations Study (1996).

The study of this section of Marleau Avenue must recognize the needs of the local residents who live adjacent to this major arterial roadway and the mobility purpose it serves. Marleau Avenue must accommodate high volumes of traffic including heavy truck traffic, as well as provide a safe environment for adjacent residences. In addition, the

roadway must provide safe pedestrian and cycling facilities across the corridor to provide links to residential areas, the hospital, cemeteries and a public school.

The study area includes numerous commercial and residential driveways with direct access to the roadway. These driveways require a safe means of access that reduces conflicts and potential collisions with through traffic. In this regard, the study has included the consideration of several alternative cross sections, l including a range of local property access schemes.

Another key issue was the design and operation of the Marleau Avenue/McConnell Avenue intersection. The east and west legs of this intersection are offset resulting in a skewed alignment. Because of this skew, there is a channelized movement that occurs well north of the formal intersection. Additionally, a lack of capacity was also cited as a concern at this location.

There are a number of network changes and future developments that will also affect Marleau Avenue. The south leg of Nick Kaneb Drive (east of Lochiel) has been completed; a new hospital access to the Cornwall Community Hospital (CCH) has also been recently constructed. It is essential that the configuration of Marleau Avenue be established to allow integration with future roadway links and development accesses.

1.5 Municipal Class EA Process

This project was subject to the planning and design process of the Municipal Class Environmental Assessment (Class EA) for municipal projects (refer to **Section 3.2**). This study was completed as a Schedule "C" project and therefore required the preparation of this Environmental Study Report (ESR).

The Municipal Class EA is a planning and design process developed to ensure that all potential natural, social/cultural, and economic environments as well as property and land use effects are considered when undertaking certain projects. The Municipal Engineers Association of Ontario received approval of the most current Class EA document by the Minister of the Environment in 2007.

The Class EA for municipal road projects provides a methodology for planning projects covered under the EA Act, including obtaining and documenting the necessary public input. It also outlines the methodology for preparing ESRs. The different phases of the process include:

1. Define project need and justification;
2. Identify and evaluate alternative solutions and select the preferred solution;
3. Identify and evaluate alternative design concepts and select the preferred alternative;
4. Document the planning process in the form of an ESR (for Schedule C projects); and
5. Construction and Monitoring.

With the filing of this report, Phases 1 to 4 of the EA process have been completed.

From this process, a Recommended Plan has been determined. This evolving design and final Recommended Plan has been based on meaningful dialogue with all affected stakeholders. The process included two (2) Public Open Houses.

City of Cornwall Council endorsed the technical recommendations for this project on August 8, 2011. The ESR is being filed with the City's Clerk for the 30 day public review period beginning on September 19, 2011.

If public concerns regarding this project cannot be resolved, any person may request a Part II Order. Should the Minister of Environment deem that this is necessary; an Individual Environmental Assessment may be directed. Should no concerns be expressed to the Minister of Environment within thirty (30) days of filing the ESR and notification thereof, the project can proceed in accordance with the recommendations of the ESR.

In summary, the planning and design process undertaken for the Marleau Avenue EA project addresses all the requirements for the Municipal Class EA.

1.6 Analysis and Evaluation of Alternatives

1.6.1 Alternative Planning Solutions - Transportation

The analysis and evaluation of transportation alternatives was undertaken as a two-step process. Initially, alternative transportation planning solutions were assessed as required by the Class EA.

The alternative transportation planning solutions were analyzed to scope the higher level solutions that should be carried forward, then a detailed analysis was provided of various alternative designs.

The following is a list of these transportation solutions:

- Do Nothing;
- Transit;
- TSM/TDM; and
- New and/or Improved Municipal or Provincial Roads, including;
    - 2nd Street Improvements;
    - Montreal Road/Water Street Improvements;
    - Highway 401 Improvements; and
    - Marleau Avenue Improvements.

Based on a qualitative analysis of alternative transportation planning solutions (refer to **Section 5.3**) It was recommended that "Marleau Avenue Improvements" be carried forward as the preferred transportation strategy to meet travel and safety needs. "Transit" and "TSM/TDM" were also carried forward as a component of basket of solutions for the road project. This recommendation was presented at the first Public Open House and supported by the public and Technical Advisory Committee.

1.6.2 Preliminary Design Analysis and Evaluation

The Marleau Avenue corridor was divided into three (3) different sections in order to accommodate the changing site-specific right-of-way constraints throughout the length of the study area. The advantages of dividing the study corridor into separate segments include:

- Allowing the unique transportation and environmental constraints within each section to influence the evaluation; and
- Permits the evaluation to be divided into mutually exclusive areas.

Each section is described as follow:

- **Section 1/ West** - Marlborough Street to Alice Street;
- **Section 2/Central** - Alice Street to Nick Kaneb Drive; and
- **Section 3/East** - Nick Kaneb Drive to Glenview Boulevard.

The different evaluation sections for the coarse screening are illustrated in **Figure 1-2**.

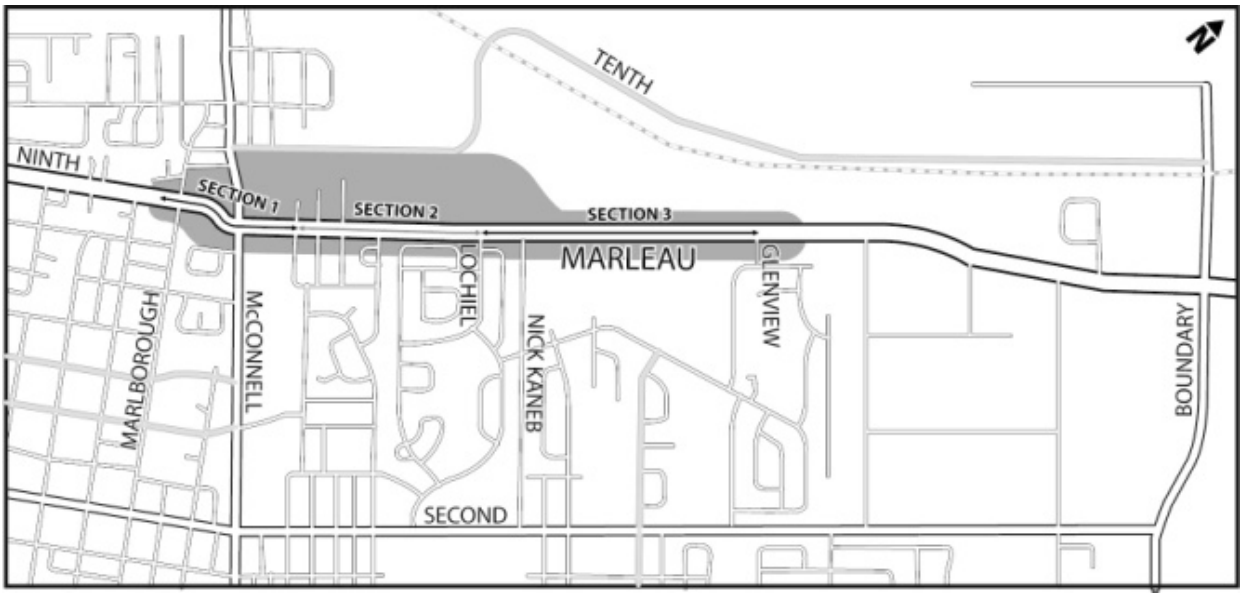


Figure 1-2
Evaluation Sections

The evaluation of preliminary design alternatives included an initial coarse screening of alignments (widening to the north, south or generally centre of the existing right-of-way) and type of cross section (number of lanes, urban design-sidewalks and storm sewers or rural design-no sidewalks, shoulders and ditches).

The preliminary design alternatives were evaluated quantitatively; see **Appendix A**, using the following broad factors:

- Traffic and Transportation;
- Natural Environment;
- Economic Environment;
- Cultural Environment;
- Land Use and Property; and
- Cost.

Under each of these factors, additional sub-factors were selected to describe and measure the impact of the alternatives. Following consultation with the Technical Advisory Committee (TAC), weights were assigned to each of the above criteria.

Preliminary design alternatives for Marleau Avenue were considered, each with varying lanes and other cross section elements. Using the weights determined by the TAC, a Technically Preferred Plan (TPP) was selected. The TPP was presented to the public at the second Open House. The TPP had the following site specific transportation features:

- 4-Lane Urban Divided cross section from Marlborough Street to McConnell Avenue;
- 4-Lane Urban Divided/Undivided cross section from McConnell Avenue to Carleton Street to minimize the right-of-way impacts to the Nativity Cemetery on the northside of Marleau Avenue;
- 5-Lane Urban Undivided (including centre turn lane) cross section from Carleton Street to Nick Kaneb Drive to provide accessibility to commercial properties;
- 4-Lane Urban Divided cross section from Nick Kaneb Drive to Glenview Boulevard. Future access location to adjacent properties will be determined once development occurs; and
- Provision of sidewalks on both sides of the roadway.

It is noted that the Technically Preferred Plan (TPP) requires the following:

- Acquisition of property located in the southwest quadrant of the Ninth Street/Marleau Avenue and McConnell Avenue intersection (Section 1 & 2);
- Acquisition of property from the Cornwall Community Hospital and adjacent Sisters Cemetery (Section 1 & 2);
- Acquisition of 12 residential properties (Section 1 & 2) between Alice Street and Carleton Street (2 of the acquired residential properties are proposed to be reconfigured as part of the plan);

- Acquisition of commercial frontage from the businesses along the north side of Marleau Avenue (Section 1 & 2); and
- Acquisition of property at the Marlborough Street intersection (northwest and southwest quadrants), between Guy Street and Carleton Street (south side), along the north side of Marleau Avenue (Section 3) and southeast and southwest quadrants of the Marleau/Glenview intersection (Section 3).

The Technically Preferred Plan is shown in **Figure 1-4**. **Appendix A** contains the Analysis and Evaluation Report.

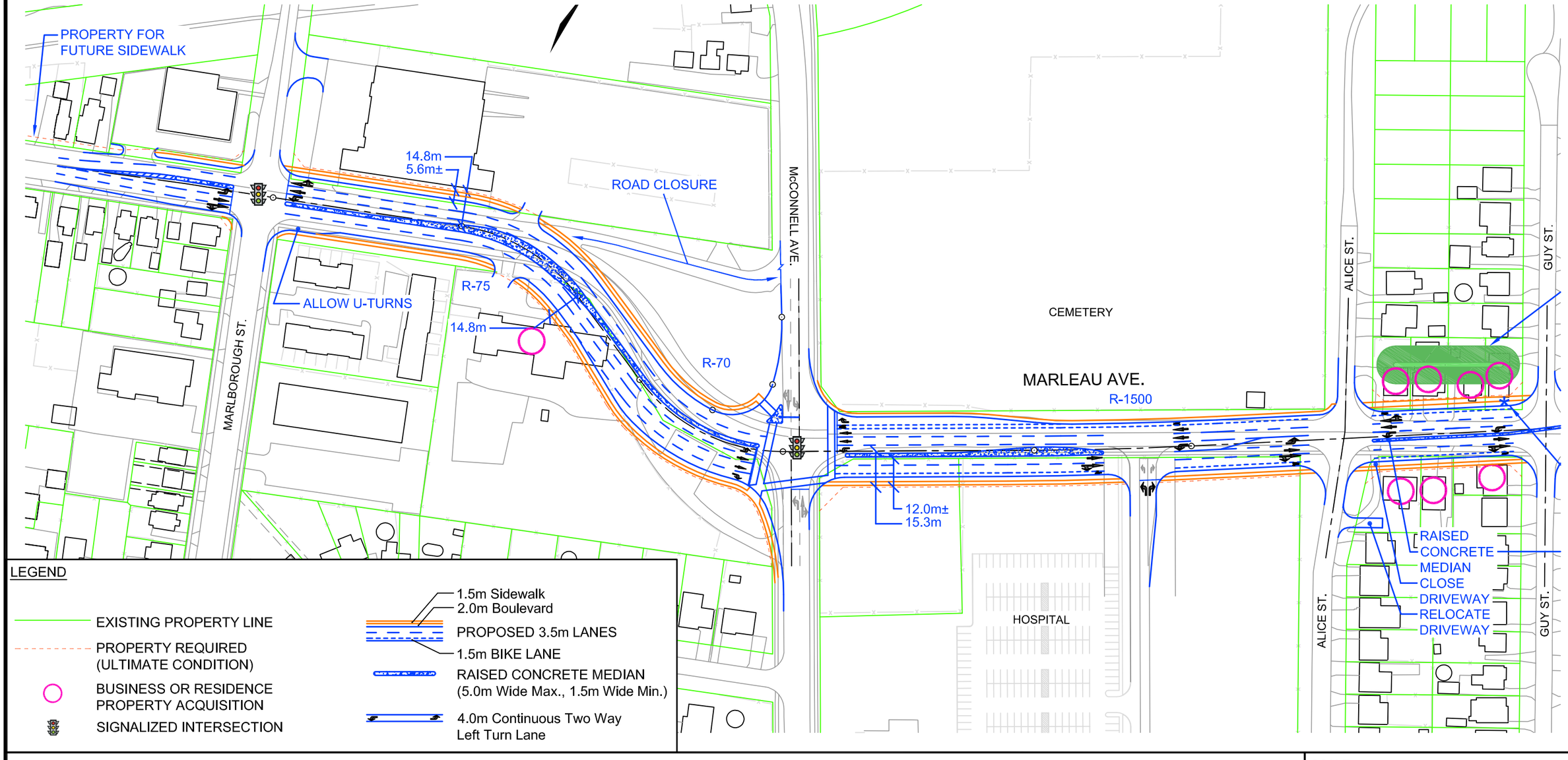


FIGURE 1 - 3A

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

Cornwall
ONTARIO CANADA

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

GENIVAR

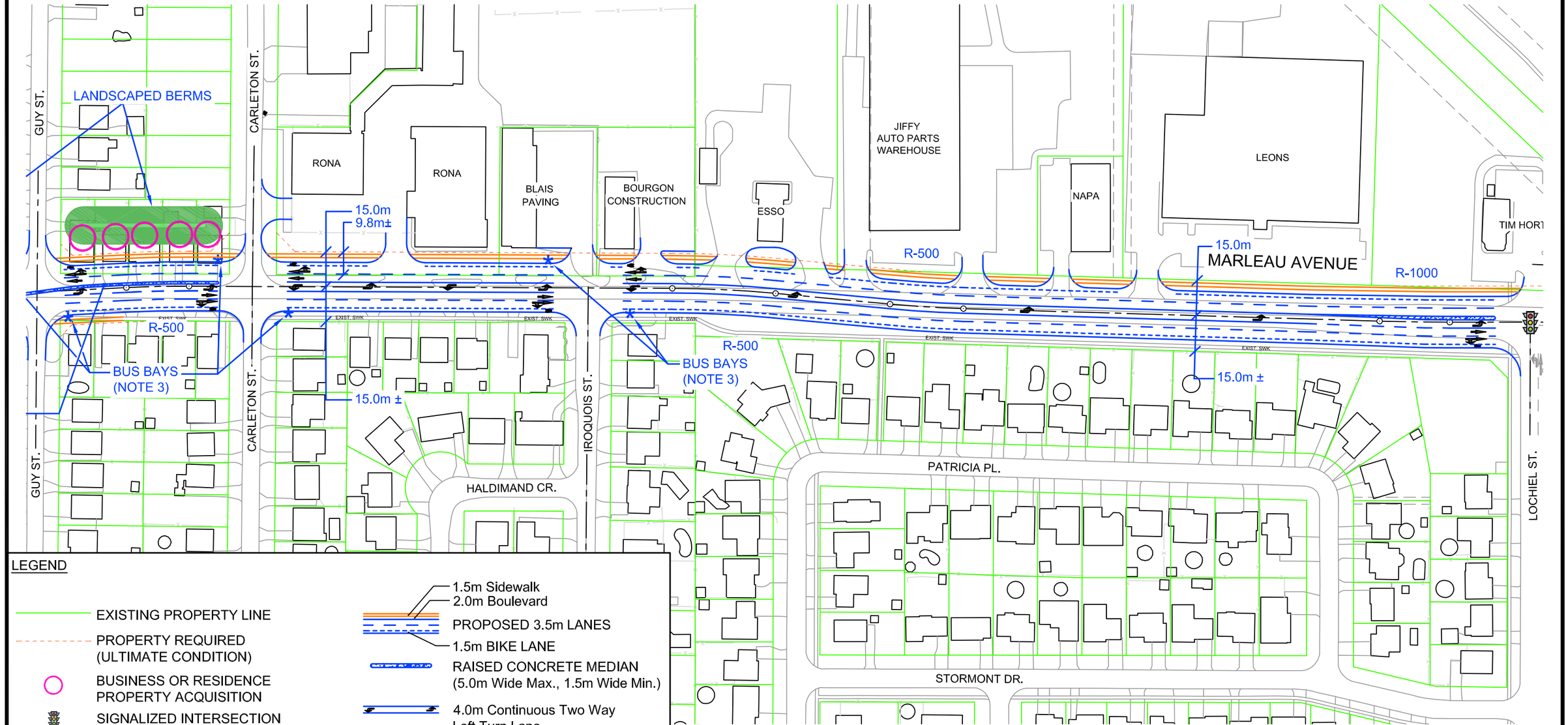


FIGURE 1 - 3B

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

GENIVAR

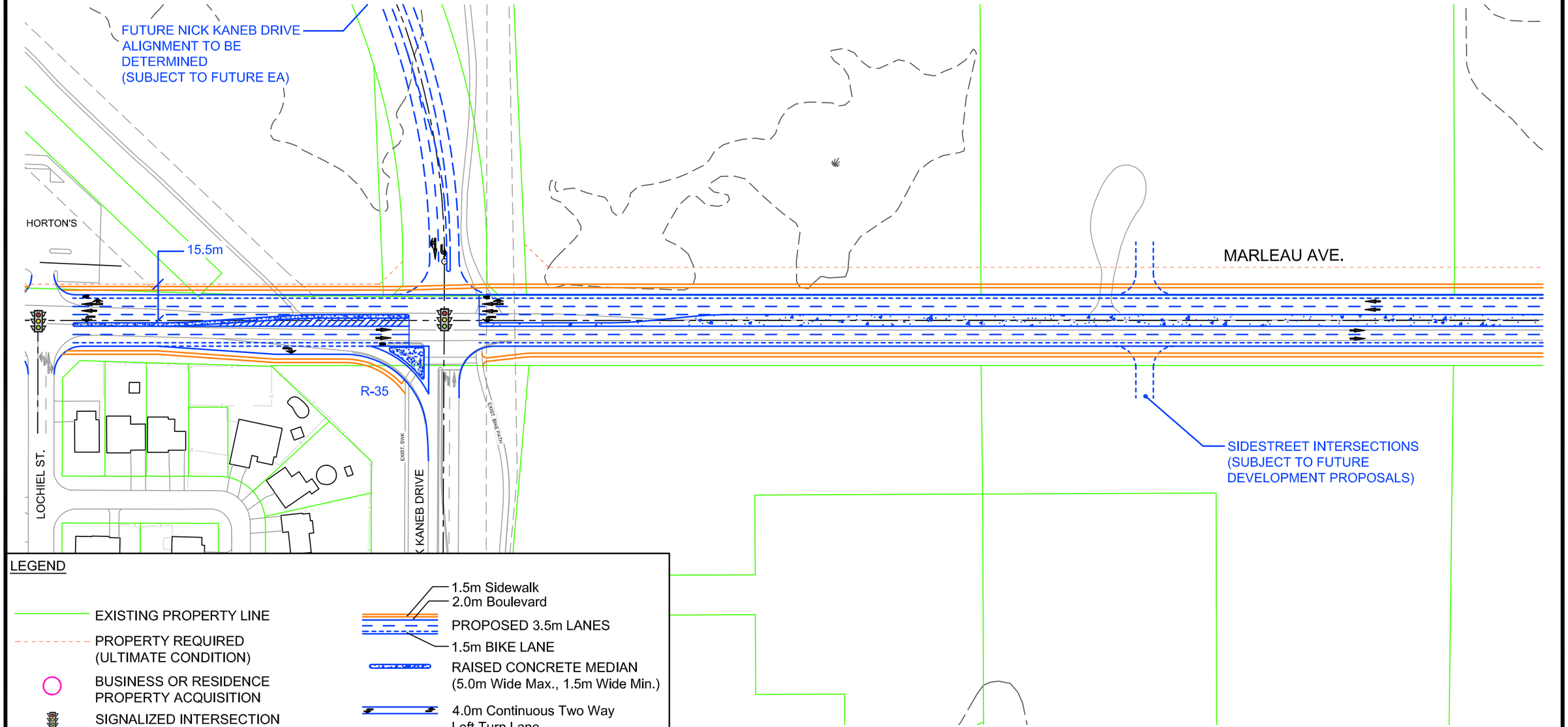


FIGURE 1 - 3C

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

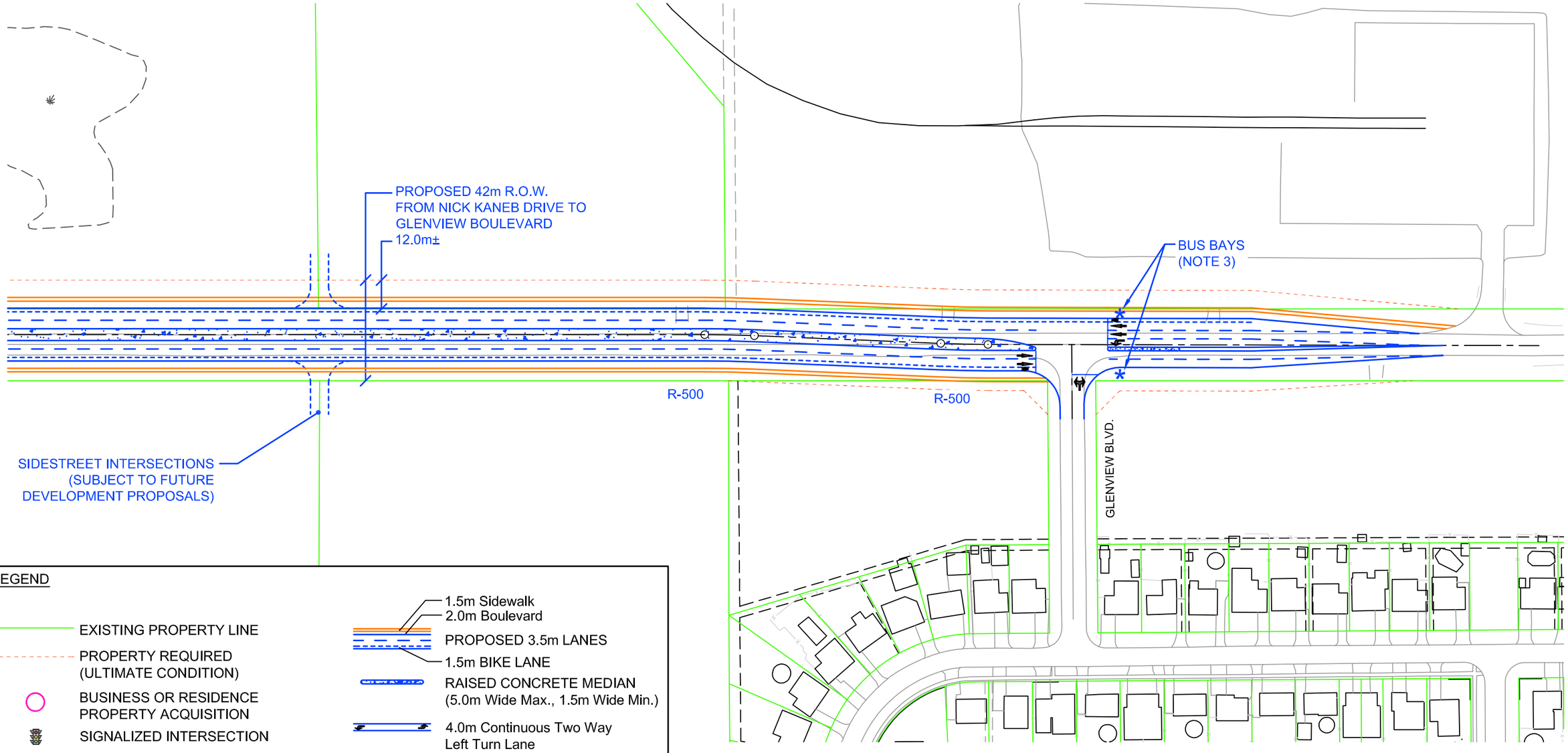


FIGURE 1 - 3D

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

1.6.2.1.1 Project Staging

The Technical Advisory Committee endorsed carrying forward a staging plan for the project based on availability of property and funding, if necessary.

The project stages and expected timing will include:

Stage 1

- Roadwork from Marlborough Street to Alice Street (0-5 years)
- Nick Kaneb Drive Extension EA (0-3 years)

Stage 2

- Roadwork from Alice Street to Iroquois Street (10 year planning horizon (subject to property acquisition))

Stage 3

- Roadwork from Iroquois Street to Glenview Boulevard (10 years)

1.7 Recommended Plan

Following the second Open House, the Technically Preferred Plan, having received input and comments from the public, agencies and Study Team, was carried forward as the Recommended Plan to be implemented following environmental approval. Through this review process, several refinements were made to the TPP and a Recommended Plan was developed. Refinements included:

- 2.5 m auxilliary lane along eastbound lanes from Guy Street to Iroquois Street;
- Acquisition of two (2) residential properties at the west limits and along the north side of the project to accommodate sidewalk widening; and
- Visual screening fence along backyards of homes on Patricia Place and Kenyon Drive adjacent to Marleau Avenue.

The Recommended Plan as endorsed by the TAC, public and City Council is shown in **Figure 1-4.**

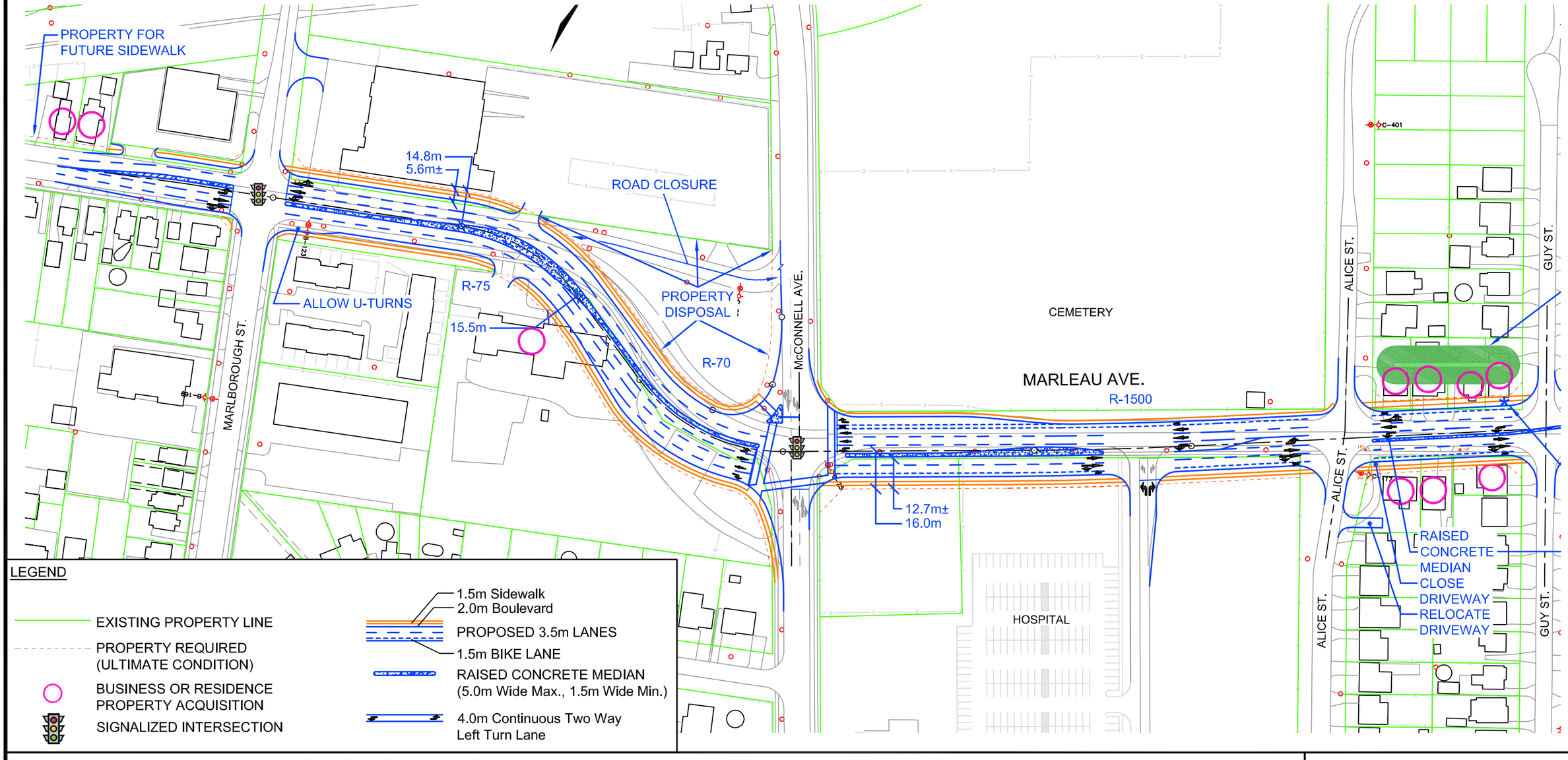


FIGURE 1 - 4A

SCALE: N.T.S.

RECOMMENDED PLAN

Cornwall
ONTARIO CANADA

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

GENIVAR

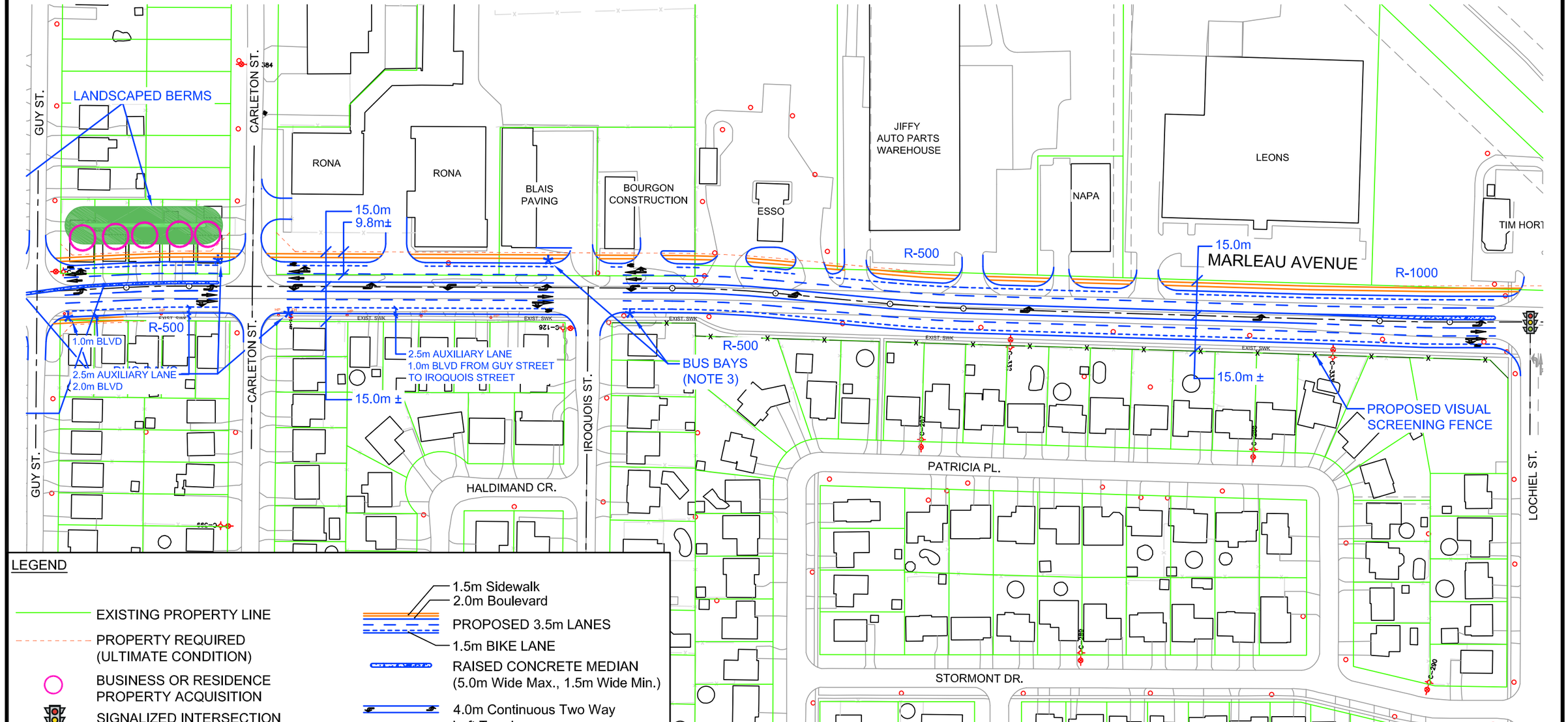


FIGURE 1 - 4B

SCALE: N.T.S.

RECOMMENDED PLAN

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

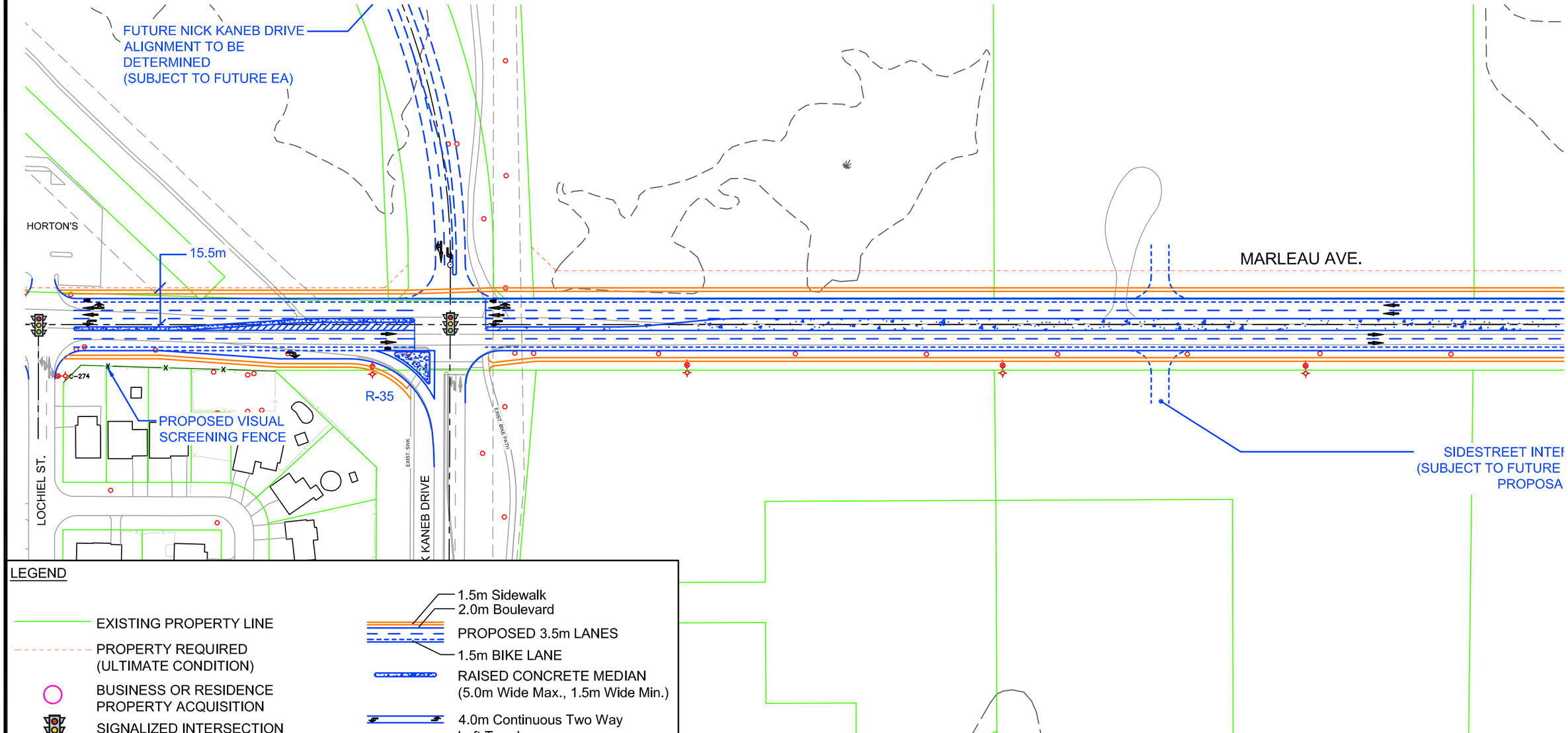


FIGURE 1 - 4C

SCALE: N.T.S.

RECOMMENDED PLAN

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

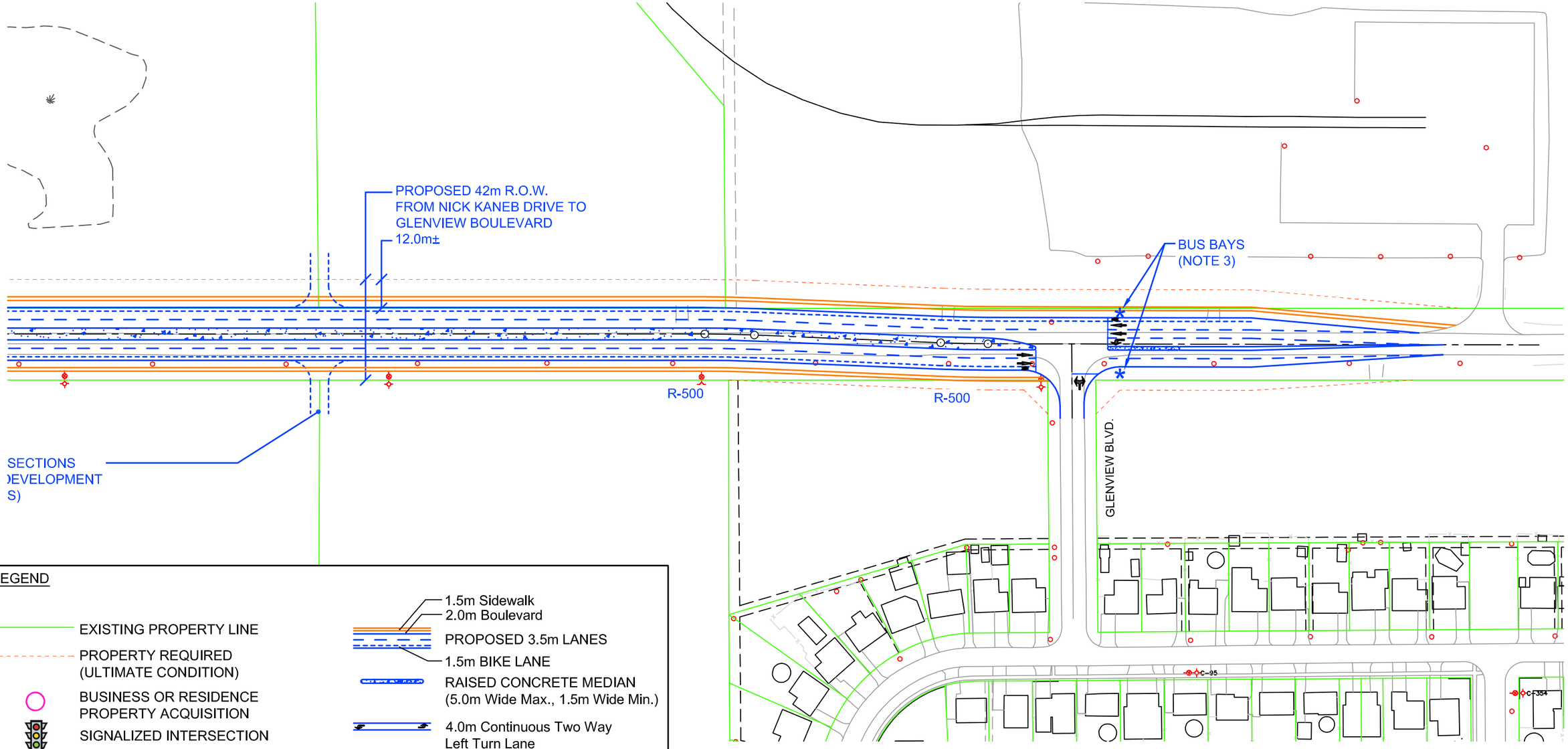


FIGURE 1 - 4D

SCALE: N.T.S.

INTERIM AND ULTIMATE RECOMMENDATION

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

1.8 Consultation

1.8.1 Public Consultation

The Marleau Avenue Widening Improvements (Marlborough Street to Glenview Boulevard) EA Study was carried out in accordance with the *Municipal Engineer's Association Class EA Process for Municipal Road Projects (2007)* as a Schedule "C" project. Throughout the duration of the study, regular progress meetings were held with the Technical Advisory Committee to seek input, direction and concurrence on the study findings and recommendations.

The following is a list of consultation activities for this study:

- Notification of Study Commencement to public, agencies and stakeholders – September, 2009;
- Notification of Public Open House No. 1 to public, agencies and stakeholders – October 8, 2009;
- Public Open House No. 1 – October 15, 2009;
- Public Advisory Group Meeting – January 21, 2010
- Notification of Public Open House No. 2 to public, agencies and stakeholders – January 19, 2011;
- Public Open House No. 2 – January 26, 2011;
- City Council Presentation – June 27, 2011; and
- Notification of Study Completion to public, agencies and stakeholders – September 19, 2011.

The public consultation efforts for this study were successful. At the conclusion of the study, the majority of comments received from members of the public were positive, in support of the recommendations to improve Marleau Avenue within the Study Area.

1.8.2 Technical Advisory Committee (TAC)

The Technical Advisory Committee (TAC) included City of Cornwall (proponent) staff and consultant staff (GENIVAR). The TAC was organized to complete the technical aspects of the study and to communicate local concerns and preferences.

1.8.3 Public Advisory Group (PAG)

The Public Advisory Group (PAG) included City of Cornwall (proponent) staff, residents, business owners, property owners and consultant staff (GENIVAR). The PAG provided stakeholders within the study area an opportunity to offer their study area issues/concerns during a round table discussion during the study.

1.9 Construction Costs

The preliminary cost estimate to complete the construction of the Recommended Plan is approximately $11.5 million (See **Section 7.8**).

1.10 Conclusions

Based on the findings of this study, the recommended plan for the Marleau Avenue Widening Improvements (Marlborough Street to Glenview Boulevard) EA Study includes the construction of the following:

- 4-Lane Urban Divided cross section from Marlborough Street to McConnell Avenue;
- 4-Lane Urban Divided/Undivided cross section from McConnell Avenue to Carleton Street to minimize the right-of-way impacts to the Nativity Cemetery on the north side of Marleau Avenue;
- 5-Lane Urban Undivided (including centre turn lane) cross section from Carleton Street to Nick Kaneb Drive to provide accessibility to commercial properties;
- 4-Lane Urban Divided cross section from Nick Kaneb Drive to Glenview Boulevard. Future access location to adjacent properties will be determined once development occurs;
- Provision of sidewalks on both sides of the roadway;
- 2.5 m auxiliary lane along eastbound lanes from Guy Street to Iroquois Street;
- Acquisition of two (2) residential properties at the west limits and along the north side of the project to accommodate sidewalk widening; and
- Visual screening fence along backyards of homes on Patricia Place and Kenyon Drive adjacent to Marleau Avenue.

These conclusions were achieved through the application of the Class Environmental Assessment (EA) for Municipal Projects. The public and government agencies have contributed to the findings of the report through their active participation throughout the course of the study.

1.11 Statement of Flexibility

The City of Cornwall maintains the flexibility to stage each phase of the project if and when traffic volumes warrant improved safety, funding becomes available and properties along the corridor are acquired.

2.0 NEED AND JUSTIFICATION

2.1 Study Purpose

Marleau Avenue is a critical east/west link in the City of Cornwall's transportation network. The segment under review, from Marlborough Street to Glenview Boulevard, accommodates in the order of 10,000 to 17,000 vehicles per day (vpd) – traffic levels which typically warrant a 4-lane roadway. Previous planning efforts undertaken by the City have identified the need for expansion, based on capacity and operational issues and the importance of Marleau Avenue from a network perspective. In addition to satisfying east/west travel demands (it is one of a select number of arterials that provide this function), Marleau Avenue also serves as a Highway 401 Emergency Detour Route (EDR).

A number of previous studies have generally identified the need for additional east/west capacity on Marleau Avenue:

- Critical Infrastructure Review (2006);
- Industrial Park Transportation Planning Study (2001); and
- Transportation Operations Study (1996).

Marleau Avenue must accommodate high volumes of traffic including heavy truck traffic, as well as provide a safe environment for adjacent residences. In addition, the roadway must provide safe pedestrian and cycling facilities across the corridor to provide links to residential areas, the hospital, cemeteries and a public school.

The study area includes numerous commercial and residential driveways with direct access to the roadway. These driveways require a safe means of access that reduces conflicts and potential collisions with through traffic. In this regard, the study has included the consideration of several alternative cross sections, including a range of local property access schemes.

Another key issue in the study involves the design and operation of the Marleau Avenue/McConnell Avenue intersection. The east and west legs of this intersection are offset resulting in a skewed alignment. Because of this skew, there is a channelized movement that occurs well north of the formal intersection. Additionally, a lack of capacity is also cited as a concern at this location.

There are a number of network changes and future developments that will also affect Marleau Avenue. The south leg of Nick Kaneb Drive (east of Lochiel) has been completed; a new hospital access to the Cornwall Community Hospital (CCH) has also been recently constructed. It is essential that the configuration of Marleau Avenue be established to allow integration with future roadway links and development accesses.

2.2 Traffic

The traffic analysis indicated the following key issues along Marleau Avenue:

- Marleau Avenue accommodates in the order of 10,000 to 17,000 vpd – traffic

levels which typically warrant a 4-lane roadway

- Capacity concerns currently exist at the Marleau/McConnell intersection
- Capacity concerns will exist at the Marleau/Marlborough intersection in the planning horizon
- Movements from all side roads and commercial driveways onto Marleau Avenue will experience increasingly lengthy delays (in particular the left turn movements)
- A number of intersections do not provide turn lanes on Marleau Avenue (e.g. Marlborough, unsignalized intersections, etc.)
- The Marleau/McConnell intersection is located on a skew which creates operational issues (e.g. truck turning concerns)
- To facilitate future development in this corridor (e.g. Cornwall Community Hospital site), the future design of the roadway must be established
- There are no cycling facilities in the study area; sidewalks are generally limited to one side of the roadway
- Marleau Avenue serves as a Highway 401 Emergency Detour Route and it is essential that appropriate levels of mobility are maintained on this key transportation link

3.0 STUDY APPROACH AND CONSULTATION

3.1 Background

This section of the Environmental Study Report presents a discussion of the following:

- Environmental Assessment requirements;
- Study process and tasks involved in the completion of the project; and
- The study organization, including:
  - Technical Advisory Committee membership;
  - Involvement of external agencies and interest groups; and
  - Public participation program.

3.2 Environmental Assessment Requirements

This project has been undertaken as a Schedule "C" Class EA as outlined in the *"Municipal Class Environmental Assessment, 2007"*. This document specifies the procedures required for road planning and servicing projects. The study process is illustrated in **Figure 3-1, Municipal Class EA Planning and Design Process**.

The study followed the Ministry Of Environment's (MOE's) five guiding principles for EA studies, namely:

- Consider all reasonable alternatives;
- Provide a comprehensive assessment of the environment;
- Utilize a systematic and traceable evaluation of net effects;
- Undertake a comprehensive public consultation program; and
- Provide clear and concise documentation of the decision-making process and public consultation program.

These principles are described in the following sections.

3.3 Study Process

The study process for the Marleau Avenue Widening Improvements EA project was carried out in a series of steps commencing with study need and culminating in the filing of this ESR. The steps in the study process are as follow:

Phase 1: Identification of the problem and opportunity

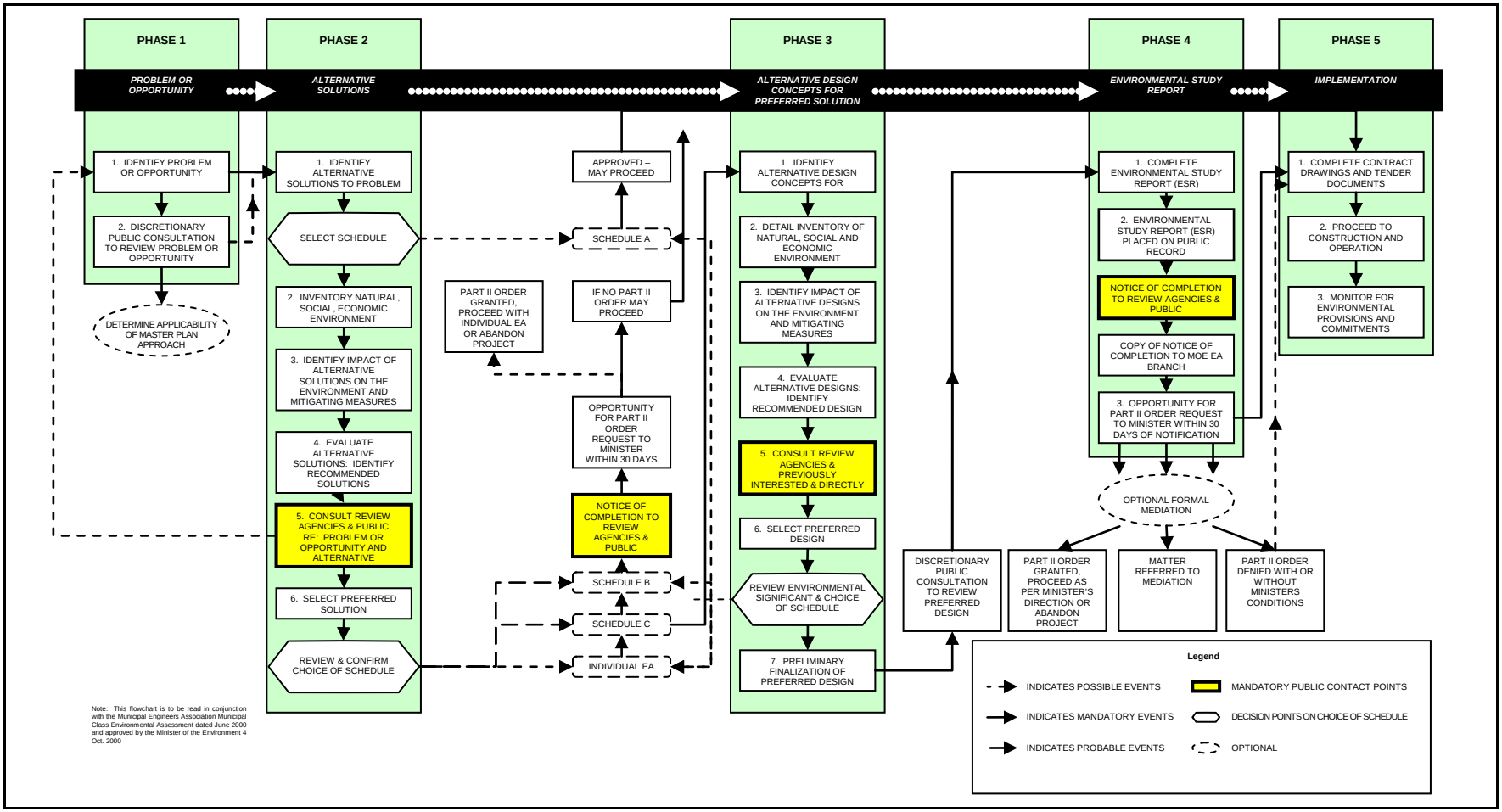
Phase 2: Environmental Inventories and Review and Confirmation of the Alternative Planning Solutions considered

Phase 3: Generation and Assessment of Design Alternatives

Phase 4: Documentation/ Environmental Study Report (ESR)

The project included effective and meaningful public consultation in each phase of the process.

Figure 3-1
Municipal Class EA Planning and Design Process



A description of the individual stages and the various activities is provided in subsequent sections of this report. **Figure 3-2, Generalized Planning Process** provides a pictorial representation of the various technical and public consultation tasks and their inter-relationships.

3.4 Study Organization

The City of Cornwall provided overall direction for the study, including technical advice and assistance relating to transportation needs, roadway element design, property, and other infrastructure elements. In addition, the City provided coordination and liaison with municipal representatives, external agencies, elected representatives, interest groups, property owners, and the public.

The specific activities for each element of the study are described in the following sections.

Figure 3-3 summarizes the study organization including the external agencies, study partners, project team, and Technical Advisory Committee.

3.4.1 Technical Advisory Committee (TAC)

Direction and consultation for the study was provided by a Technical Advisory Committee (TAC). The role of the TAC was to complete the technical aspects of the study and to communicate local concerns and preferences. Membership on the TAC was from the following organizations:

- City of Cornwall staff; and
- Consultant Staff (GENIVAR).

Figure 3-2
Generalized Planning Process

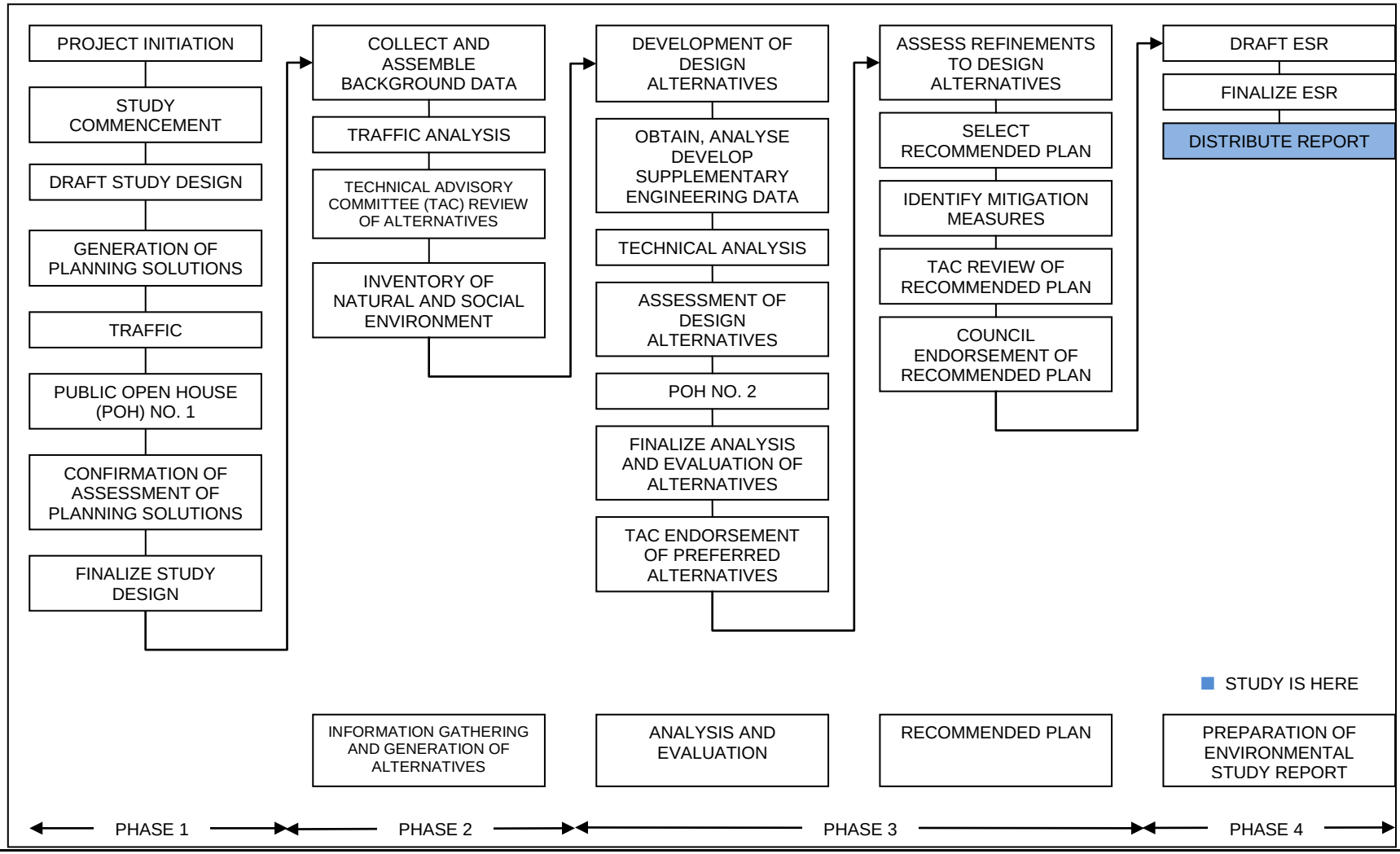
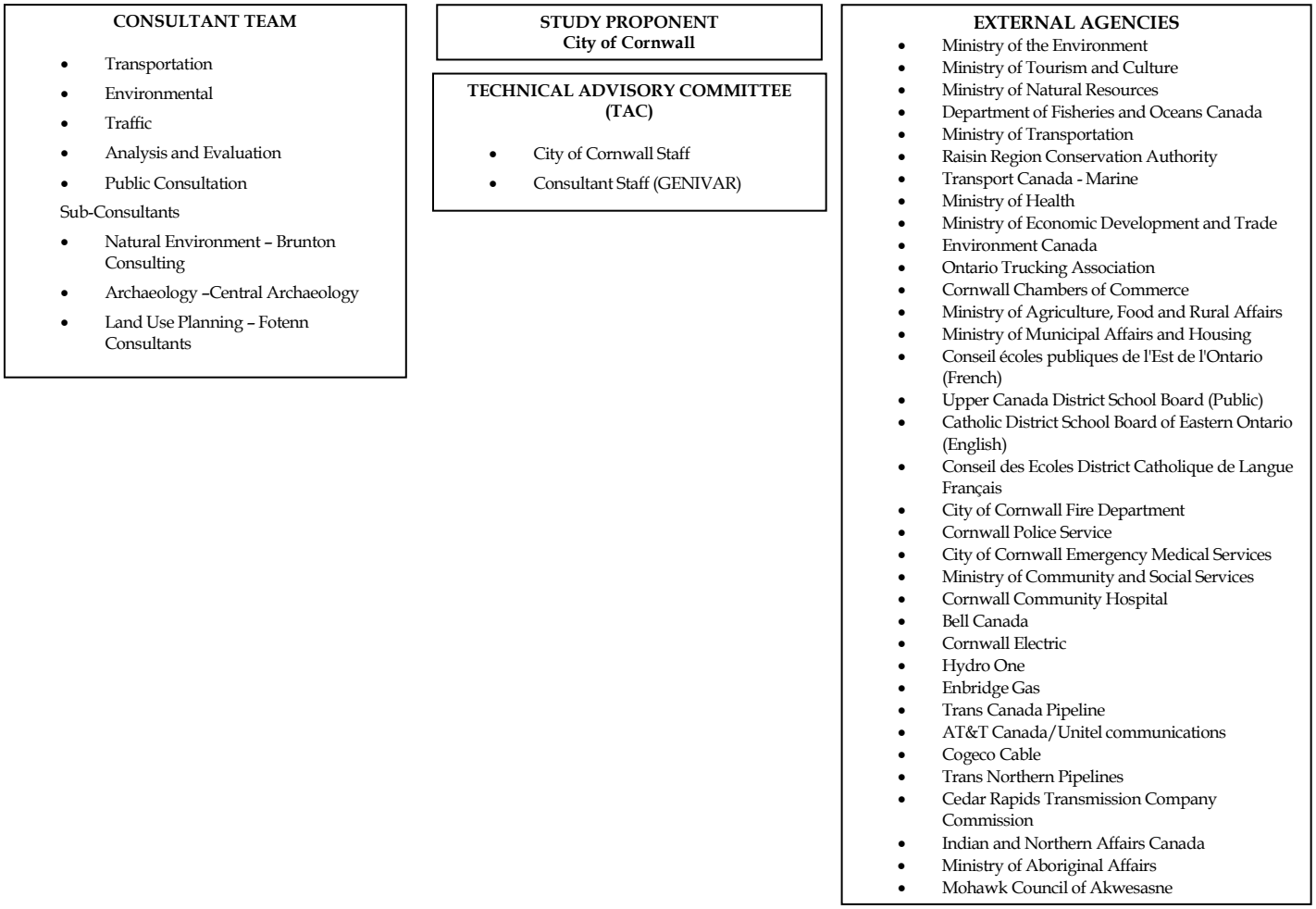


Figure 3-3
Study Organization



3.4.2 Consultant Team

GENIVAR was retained to provide transportation and project management expertise and conduct specialty services related to:

- Traffic and Transportation;
- Environmental;
- Analysis and Evaluation; and
- Public Consultation.

The services of several sub-consultants were also retained to provide expert advice in required areas, as follow:

- **Brunton Consulting Services** - Wildlife/Botany
- **Central Archaeology -** Archaeological Resources
- **Fotenn Consultants –** Land Use Planning

3.4.3 City Council

City councillors were kept informed of the study through City staff and through attendance at the Public Open Houses. City Council endorsed the Recommended Plan on August 8, 2011. Refer to **Appendix B, Council Resolution**.

3.4.4 Special Interest Groups and Other Agencies

Throughout the project, a consultative approach was used with external agencies and interest groups. All agencies/groups that either may have had information to contribute to the study, or could be affected by study proposals, were contacted.

Organizations were consulted during numerous stages of the study including data collection, development of alternatives, preparation and screening of evaluation criteria, review of the assessment of alternatives and the development of appropriate mitigation plans.

3.5 Public Open Houses

Public Open Houses were held at key milestones during the course of the study. Both Public Open Houses were held at the Cornwall Civic Complex:

- Public Open House No. 1 – October 15, 2009; and
- Public Open House No. 2 – January 26, 2011.

Announcements were placed in local newspapers prior to the Open Houses. All adjacent landowners and residents within the Study Area were invited to the Open Houses through individual notices. The following sections outline the results of the two (2) Public Open Houses.

3.5.1 Public Open House No. 1

The first Public Open House was held October 15th, 2009 at the Cornwall Civic Complex. City of Cornwall and consultant representatives were available to respond to any inquiries. Announcements were placed in local newspapers prior to the Open House. All property owners and businesses

within the Study Area were invited to the Open House through individual notices.

The purpose of the first Public Open House was to introduce the study, present the draft Study Design, review the need and justification of the project, review study process and schedule, review existing conditions, review preliminary improvement alternatives and obtain public comments.

In total, twenty-eight (28) persons registered at Public Open House No. 1. Nineteen (19) comment sheets, letters and e-mails were returned during the Open House and the subsequent 2-week response period. A summary of the first Public Open House is found in **Appendix C, Public Open House Summary Reports**.

3.5.2 Public Open House No. 2

The second Public Open House was held January 26th, 2011 at the Cornwall Civic Complex. City of Cornwall and consultant representatives were available to respond to any inquiries. Announcements were placed in local newspapers prior to the Open House. All property owners and businesses within the Study Area were invited to the Open House through individual notices.

The purpose of the second Public Open House was to review the study background, review the evaluation of alternatives, present the Technically Preferred Plan (TPP), review project staging, review the study schedule and obtain public comments.

In total, eighty-one (81) persons registered at Public Open House No. 2. Twenty-six (26) comment sheets, letters and e-mails were returned during the Open House and the subsequent 2-week response period. A summary of the second Public Open House is found in **Appendix C, Public Open House Summary Reports**.

3.6 Summary of Public Consultation

One of the key objectives of any Environmental Assessment is to provide the public, interested parties and affected agencies with the opportunity for meaningful input. In order to ensure that this objective was met, a public and agency notification program was undertaken for the Marleau Avenue Widening Improvements EA. The program included several communication mechanisms as described in succeeding sections.

3.6.1 Individual Property Owner Contacts

All property owners within the Study Area were included on a study mailing list, as provided by the City, and mailed individual notices inviting them to attend the Public Open Houses that were held during the course of the project. In addition, all members of the public who participated in the study and/or were included on the mailing list, received notification of the 30-day public review period of this document.

3.6.2 Newspaper Notices

Notices of the Study Commencement and Public Open Houses (POHs) were placed in the Cornwall Standard-Freeholder and the Journal de Cornwall. This project's second Open House was held in conjunction with another City of Cornwall project, the Industrial Park Drive Extension to Tenth Street EA. The newspaper notices can be found in **Appendix C, Public Open House Summary Reports**. Advertisements were placed in the aforementioned newspapers on the following dates:

- September 22, 2009 – Study Commencement Notice (Cornwall Standard-Freeholder);
- October 1, 2009 - Study Commencement Notice (Journal de Cornwall);
- October 8, 2009 – Public Open House No. 1 Notice (Cornwall Standard-Freeholder and Journal de Cornwall);
- January 19, 2011 - Public Open House No. 2 Notice (Cornwall Standard-Freeholder and Journal de Cornwall); and
- September 19, 2011 – Study Completion Notice (Cornwall Standard-Freeholder and Journal de Cornwall).

3.6.3 Agency Contacts

In addition, letters were sent to the following agencies and interest groups to solicit their input in the study:

Public

- Area residents/business owners/property owners

Agencies

- Ministry of the Environment
- Ministry of Tourism and Culture
- Ministry of Natural Resources
- Department of Fisheries and Oceans Canada
- Ministry of Transportation
- Raisin Region Conservation Authority
- Transport Canada - Marine
- Ministry of Health
- Ministry of Economic Development and Trade
- Environment Canada
- Ontario Trucking Association
- Cornwall Chambers of Commerce
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Municipal Affairs and Housing
- Conseil écoles publiques de l'Est de l'Ontario (French)
- Upper Canada District School Board (Public)
- Catholic District School Board of Eastern Ontario (English)
- Conseil des Ecoles District Catholique de Langue Français
- City of Cornwall Fire Department

- Cornwall Police Service
- City of Cornwall Emergency Medical Services
- Ministry of Community and Social Services
- Cornwall Community Hospital
- Utilities
    - Bell Canada
    - Cornwall Electric
    - Hydro One
    - Enbridge Gas
    - Trans Canada Pipeline
    - AT&T Canada/Unitel communications
    - Cogeco Cable
    - Trans Northern Pipelines
    - Cedar Rapids Transmission Company Commission

3.6.4 First Nations Contacts

A notification program was undertaken to contact First Nations Groups and organizations for this study. Letters were sent to the following First Nations groups and organizations at the study commencement, public open houses and study completion to solicit their interest or non-interest in the study:

- Indian and Northern Affairs Canada
- Ministry of Aboriginal Affairs
- Mohawk Council of Akwesasne

4.0 EXISTING CONDITIONS

Environmental inventories and site assessments were undertaken to review the past, present, and future conditions of the Study Area. The inventory and site assessment provides the background information required for the evaluation of alternatives and the determination of impacts by the proposed modifications. The level of detail accounted for in each assessment reflects the complexity of the site features.

The following sections provide an overview of the information collected throughout the Study Area. The information is divided into the following sections:

- **Section 4.1** Natural Environment Features;
- **Section 4.2** Social and Cultural Environment Features; and
- **Section 4.3** Land Use and Property.

4.1 Natural Environment Features

The following sub-sections summarize the findings of technical assessments/studies related to natural environmental features, and identify the significant features to be taken into consideration during the assessment of alternatives, and requirements for mitigation.

4.1.1 Surface Water and Drainage

The existing westerly portion (from Marlborough to Iroquois) of Marleau Avenue has an urban cross section and surface water is drained via sewer. The easterly portion (from Iroquois to Glenview) of Marleau Avenue has a rural cross section and surface water is drained via ditching on both sides of the road.

4.1.2 Terrestrial Environment

The clay-based landscape in the Marleau Avenue study area is relatively level, with a broad, low, predominately forested area across the eastern half of the corridor. Silty sand and peaty sand thinly covers some areas within the wooded portion of the area. The higher, drier western half of the corridor has been completely transformed from a natural condition into residential and commercial development. The shale and limestone bedrock underlying the study area is deeply buried; no outcropping is evident in or near the corridor.

Natural environment values in the study area are restricted to the predominantly forested eastern half of the roadway corridor. This natural/near-natural area is bordered on the west by a cleared north-south trending hydro line corridor and on the east by residential development along Hamilton Crescent and clearing for commercial development to the north of there.

The diversity of natural habitat (in only the eastern half of the Marleau Avenue study

area corridor) is limited as a result of a relatively homogeneous landscape and a long history of disturbance. The natural habitat is composed entirely of low upland deciduous forest, deciduous swamp forest and cultural meadow and scrub. A description of each habitat is below:

Low Deciduous Forest

Young deciduous forest dominated by Trembling Aspen, Red Maple and Green Ash, with scattered White Elm, White Cedar, Eastern Hemlock is the dominant woodland type south of the roadway between the power line and Hamilton Crescent and over the northern half of the forested area north of roadway. Evidence of former selective logging activity is common throughout. The substrate consists of silty sand over clay with little or no peat accumulation and it supports dense ground level vegetation composed of a mixture of true upland species and others tolerant of occasion flooding. These include Lady Fern (Athyrium filix-femina), Jack-in-the-Pulpit (Arisaema triphyllum), Alternate-leaved Dogwood (Cornus alternifolia), White Trillium (Trillium grandiflorum), Christmas Fern (Polystichum acrosticoides), Wild Sarsaparilla (Aralia nudicaulis), Blue Cohosh (Caulophyllum giganteum), Gooseberry (Ribes cynosbati) and Red Baneberry (Actaea rubra).

One small area at the western edge of the forested edge (adjacent the northern side of the roadway immediately east of the Tim Horton's store) represents a fragment of drier upland deciduous forest, with Trembling Aspen, White Ash and Bitternut Hickory dominating. Occasional White Elm, Butternut and Basswood occur within this narrow fringe over upland herbaceous species such as Zig-zag Goldenrod (Solidago flexicaulis), Bottlebrush Grass (Elymus hystrix), Blue-stem Goldenrod (Solidago caesia), Blue Cohosh (Caulophyllum giganteum) and a greater diversity of graminoids than is evident in lower upland forest to the east.

Deciduous Swamp Forest

This wetland habitat is the less common of the two woodland habitats here, occupying the area within 125-150 m of either side of the roadway in the central and eastern portion of the woodland. As noted above, this grades gradually into low Upland Deciduous Forest on all sides where woodland cover persists. Semi-permanent pools are common throughout although no standing water was evident by late summer. Red Maple, United Maple (Acer x freemanii) and Green Ash dominate. The substrate includes thin patches of peaty sand over clay, indicating prolonged submergence (at least in the past). This area too has been impacted by long-term drainage efforts, as indicated by the presence of old, channelized (dry in late summer) drains.

Ground vegetation is dominated by wetland and flood-tolerant herbaceous species including Sensitive Fern (Onoclea sensibilis), Ostrich Fern (Matteuccia struthiopteris), Bladder Sedge (Carex intumescens), Whorled Aster (Oclemena

acuminata) and Drooping Woodgrass (Cinna latifolia).

Cultural Meadow and Scrub

A wide variety of common native and non-native shrubs and herbaceous species are present in the regenerating field, hedge rows and roadsides that dominate most of the non-forested uplands of the study area. Dense growths of non-native Reed-grass (Phragmites australis) choke seasonally flooded roadside ditches as well. This severely disturbed area has been all but entirely transformed from a natural condition and support few if any natural environment values.

The vegetation represented in the three habitat types described above compares closely to vegetation types found commonly in southeastern Ontario. These and variations of them are also commonly described in the Southern Ontario Vegetation Classification system.

No provincially rare taxa or Regionally Significant taxa (rare in SDG County or southeastern Ontario) were noted in or reported from the study area. Two Butternuts, a designated Species At Risk (SAR) tree were noted here, however. At least one of the two trees is diseased. The two young Butternut trees are located immediately east of the Tim Horton's store opposite Lochiel Street.

Meadow Horsetail (Equisetum pratense) was found to be abundant in the Deciduous Swamp forest habitat south of Marleau Avenue and likely constitutes a locally (Cornwall area) rare species of pteridophyte. Similarly, Swamp Gooseberry (Ribes triste) also found in the Deciduous Swamp forest habitat south of Marleau Avenue likely constitutes a locally rare shrub species.

No significant fauna are reported or evident within the study area.

The study area does not appear to support more than locally significant ecological functions (neighbourhood level biodiversity representation and wildlife corridors).

No significant natural areas are reported or evident within or adjacent to the study area.

Overall, the negative natural environment implications of potential roadway upgrading along the Marleau Avenue study area appear to be minor.

No other designated or significant features are evident or appear to have particular potential to be present along the Marleau Avenue study area corridor. Similarly, no significant opportunities for the enhancement of natural environment features and functions are evident within the study area.

The Natural Environment Assessment is found in **Appendix D, Natural Environment Assessment**.

4.1.3 Fisheries

One culvert (CSP) crossing was observed within the study area, approximately 400 m west of Glenview Boulevard. This CSP was

found to be dry and lacked any characteristics that would favour and support fish habitat. No other water crossings were observed within the study area.

The works involved with the Marleau Avenue EA study will not directly impact any fish habitat within the study area. It should be noted that the ground and storm water drainage flow appears to be from an easterly to a westerly direction and terminates at Fly Creek, approximately 200 m beyond Glenview Boulevard outside the study area. This location was not observed to have any aquatic species present at the time of the fisheries reconnaissance. Since this location, outside the study area, could be potential aquatic habitat, it is recommended that works within the Study Area will include a risk management plan that will reduce the potential negative effects of the works to this unknown water course.

No fish species at risk (SAR) were identified at the time as per a review of Environment Canada's Canadian Wildlife Services reports.

Please refer to **Appendix E, Fisheries Reconnaissance Assessment Memorandum.**

4.2 Social and Cultural Environments

The following sub-sections summarize the findings of technical assessments/studies related to social and cultural environments and identify the significant features to be taken into consideration during the assessment of alternatives and to identify the requirements for mitigation.

4.2.1 Stage 1 Archaeological Assessment

A Stage 1 Archaeological Resource Assessment was undertaken in August 2009 and included background research and a fieldwork survey to determine any archaeological site potential in the Study Area. The Stage 1 background study was undertaken in order to delineate the cultural land use, archaeological history, and the present conditions of the property. This information was used to prepare the First Nations pre-contact and historic archaeological sequence and the Euro-Canadian historic settlement record of the project area, which in turn helps to establish the potential for the discovery of extant archaeological materials.

Based on the results of this Stage 1 archaeological background study, the following recommendations are provided for consideration:

There remains a moderate to high potential for the discovery of extant pre-contact and/or historic First Nations as well as Euro-Canadian cultural materials within the project area. This potential was determined by:

1. The presence of a historic cemetery located on the southeast corner of the

McConnell Avenue/ Marleau Avenue intersection;

2. The presence of a cemetery located on the northeast corner of the McConnell Avenue/ Marleau Avenue intersection; and
3. The location of Fly Creek Drain, which can potentially be associated with food resource extraction.

Therefore, a Stage 2 archaeological property survey was recommended for the entire project area.

4.2.2 Stage 2 Archaeological Assessment

A Stage 2 archaeological investigation was undertaken from November 20, 2009 to August 24, 2010. The Stage 2 archaeological property survey entailed a systematic shovel testing excavation strategy which occurred within areas deemed to retain moderate to high archaeological potential (based on the Stage 1 Archaeological Assessment). Test pit excavations were conducted during cool and sunny weather and under suitable dry soil conditions. All soil was processed, without hinderance, through 6.0 mm mesh hand screens.

Based on the results of the Stage 2 archaeological assessment, the following recommendations are provided:

1. The Stage 2 archaeological assessment did not recover any material culture during excavation activities. Consequently, significant pre-contact and historic First Nations or historic Euro-Canadian archaeological sites are unlikely to be found in any undisturbed grounds within the project area. Therefore, there are no significant archaeological concerns associated with the remainder of this project and it is recommended that the property be cleared of archaeological concerns.
2. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Sec. 48 (1) of the Ontario Heritage Act.
3. The Cemeteries Act requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries, Ministry of Small Business and Consumer Services.

Please refer to **Appendix F, Stage 1 and Stage 2 Archaeological Assessment Report.**

4.2.3 Noise

Future sound levels within the Study Area will be a function of the traffic generated by increased development. As such, the need for noise mitigation for all new development will be the responsibility of the developers of each of these sites. No noise sensitive residential receiver sites were present in the study area.

4.3 Land Use and Property

A summary of the existing conditions within the Study Area from a land use planning perspective was undertaken. This section highlights existing land uses, proposed developments within the Study Area, and the planning policy framework as outlined in key municipal documents.

Please refer to **Appendix G, Land Use Planning Existing Conditions Report**.

4.3.1 Existing Land Use Conditions

The Study Area is characterized by a variety of land uses including commercial, industrial, institutional, residential and open space uses. Existing uses along the south side of Marleau Avenue consist of the Sisters Cemetery, the Cornwall Community Hospital (McConnell Avenue Site), residential uses (Holy Cross Boulevard Subdivision, Lynwood Forest and Orsi Subdivision) and greenspace. Existing uses along the north side of Marleau Avenue consist of the Nativity Cemetery, limited retail, industrial and residential uses and lands identified for redevelopment. Marleau Avenue crosses a Hydro corridor, east of Kenyon Crescent.

4.3.1.1 Retail

Retail development is located predominantly on the north side of Marleau Avenue, east of the Carleton Street/ Marleau Avenue intersection. Retail uses consist of RONA, Perkins Home Centres, other retail buildings with associated surface parking located between the right-of-way and buildings, an Esso gas station and a recently constructed Tim Horton's at the corner of Lochiel Street/Marleau Avenue.

4.3.1.2 Industrial

Limited industrial uses are located along the north side of Marleau Avenue, alongside existing retail/commercial uses within the built up area. A small portion of land owned by CN located to the north of Marleau Avenue falls within the eastern limit of the Study Area. An existing Industrial Park is located east of the corridor, beyond the Study Area.

4.3.1.3 Residential

The primary residential area within the Study Area is located on the south side of Marleau Avenue, starting at Alice Street and extending east towards the existing Hydro corridor. Limited residential uses are located on the north side of Marleau Avenue, adjacent to the Nativity Cemetery. The housing along Marleau Avenue varies with the western portion closer to McConnell Street consisting largely of one storey single detached homes, most with direct frontage and vehicular access onto Marleau Avenue. Residential development towards Lochiel Street appears to be newer and is set back further from the street, separated from Marleau Avenue by vegetation and sound attenuation fencing. The residential development along this latter stretch does not have direct vehicular access onto Marleau Avenue.

4.3.1.4 Institutional

A number of institutional uses are located within the Study Area including a daycare, two cemeteries and a hospital.

Two cemeteries straddle Marleau Avenue, to the northeast and southeast of the Marleau/McConnell intersection. The Nativity Cemetery is located close to Marleau Avenue, spanning the north side of Marleau Avenue and extending towards Alice Street. The Sisters Cemetery on the south side of Marleau is located at the corner of Marleau and McConnell intersection.

The Cornwall Community Hospital (McConnell Avenue Site) land is located on the south side of Marleau Avenue and abuts the Sisters Cemetery to the west. The hospital has undertaken the construction of expanding the hospital and a driveway to access Marleau Avenue.

4.3.1.5 Hydro Corridor

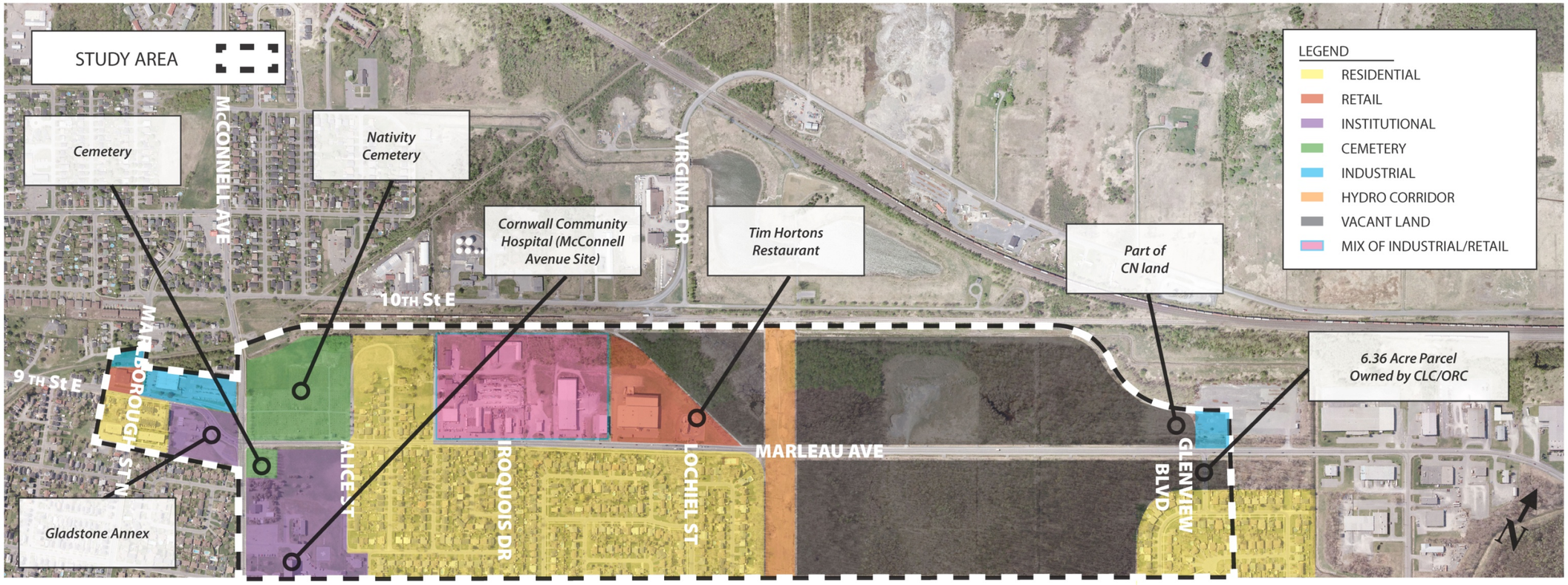
An existing north-south Hydro corridor traverses the Study Area at Nick Kaneb Drive.

4.3.1.6 Vacant Land

The land to the east of the existing Hydro corridor extends towards Glenview Boulevard and is largely vacant with the exception of the CN works yard. The CN land is located within the northeastern most limit of the Study Area and is screened from view by vegetation. This portion of the Study Area coincides with Marleau Avenue where it becomes a two lane rural cross section with a speed limit of 80 km/h, beginning at the Lochiel and Marleau intersection travelling east and continuing past the eastern limit of the Study Area.

The existing land use conditions are illustrated on **Figure 4-1, Existing Land Use Conditions.**

Figure 4-1
Existing Land Use Conditions



4.4 Land Use Designation

As the Study Area spans 2.3 km of Marleau Avenue, land use designations illustrated in **Figure 4-2**, **Official Plan - Land Use Designations**, for properties abutting Marleau Avenue vary and represent a broad spectrum of land uses.

Starting west at Malborough and Ninth Street, the lands are designated ***Urban Residential***. The area to the northwest of the Marlborough and Ninth Street intersection is designated ***Future Study Area (Potential Future Land Use)*** and ***Urban Residential***. Lands designated ***Urban Residential*** area are intended to accommodate a range of residential uses and associated complementary uses. A goal for urban residential areas is to promote land use compatibility in the planning of all residential areas and minimize the effects of transportation facilities, utilities and non-residential uses on residential areas. Lands designated Future Study Area do not show specific land use patterns and will require further planning studies to determine the appropriate use.

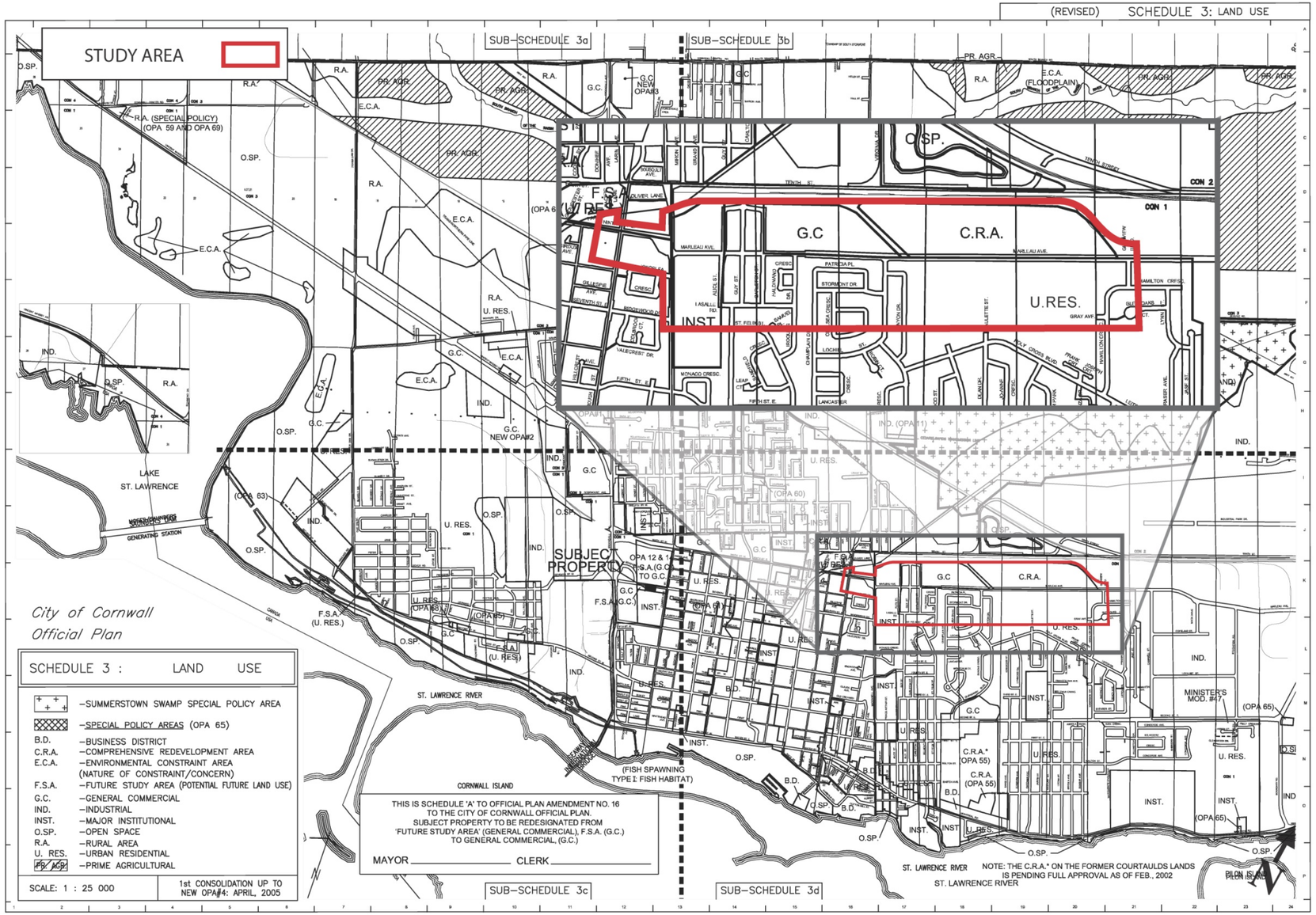
Both sides of Marleau to the east of Marleau/McConnell Avenue intersection are designated ***Major Institutional***. Lands designated ***Major Institutional*** serve major public and quasi-public uses which are not always appropriate for residential neighbourhoods such as offices, schools, and health care facilities.

Further east, a small parcel of land on the north side of Marleau and a large area of land south of Marleau are designated ***Urban Residential***.

A portion of land along the north side of Marleau is designated ***General Commercial***, while lands further east, but still on the north side of Marleau, are designated ***Comprehensive Redevelopment Area***. The purpose of the commercial land use designations is to establish a commercial hierarchy to be applied across the City. Land uses permitted in the ***General Commercial*** designation include retail stores, offices, planned commercial centres, etc. A number of policies related to ***General Commercial*** designation have been established in the Official Plan. Lands designated ***Comprehensive Redevelopment Area*** are large sites with redevelopment potential and the ability to accommodate high intensity uses.

Further east, a small parcel of land on the north side of Marleau and a large area of land south of Marleau are designated **Urban Residential**.

Figure 4-2
Official Plan - Land Use Designations



5.0 ANALYSIS AND EVALUATION

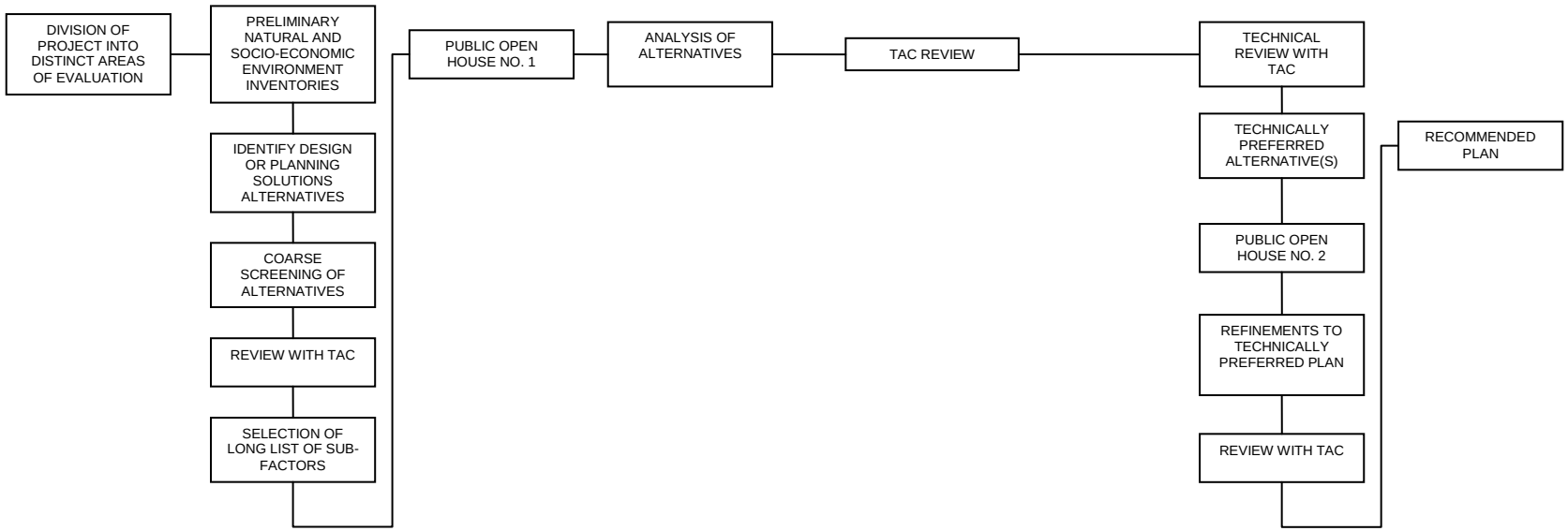
This Chapter describes the approach used to develop, analyze and evaluate roadway alternatives for the Marleau Avenue EA Study. The information collected and documented is applied not only to the planning and design, but also to the mitigation of impacts associated with construction, operation, and maintenance.

The assessment and evaluation of alternatives must be traceable, defendable and documented.

5.1 Evaluation Process

This study's evaluation process is illustrated in **Figure 5-1, Evaluation Flowchart**. The following sections describe the methodology, analysis and evaluation, and the resulting Technically Preferred Plan (TPP) and Recommended Plan.

Figure 5-1
Evaluation Flowchart



5.2 Evaluation Methodology

This section documents in detail the formal evaluation approaches used in this study as the primary tool for selecting the Technically Preferred Plan (TPP) for the project.

5.2.1 Qualitative Assessment

There are numerous methods available for the assessment and evaluation of alternatives, each with a variety of advantages and disadvantages. In situations where there are a limited number of alternatives to be compared or few measurable differences between the alternatives, the qualitative method is an acceptable evaluation approach. The use of simple qualitative and narrative assessments is an accepted methodology for the evaluation of alternatives where there are few alternatives and there is substantial agreement for the study recommendations. In this study, the Technical Advisory Committee (TAC) reviewed the alternatives being evaluated and endorsed when the qualitative approach would be followed.

For the alternatives being compared, a long-list of assessment factors and sub-factors is considered for each set of alternatives. Those factors and sub-factors, which have meaningful differences among the alternatives, are then carried forward for use in the evaluation.

For the qualitative approach, the long list of criteria (including factors and sub-factors) allow for the identification of all benefits and impacts. The alternatives are evaluated by relative comparison to each other, using the rating scale and symbols as illustrated on **Table 5.1.** There is no absolute measure of effect but rather the effects are categorized into one of three levels.

The selection of a preferred alternative is based on a subjective comparison of the alternatives and ranking of options which generally have good performance for most sub-factors where there are differences among alternatives. This also includes a qualitative assessment of any sub-factors which are considered the most important in the decision-making process.

Table 5.1
Qualitative Evaluation Rating Symbols

Relative Rating	Symbol
Good in comparison	✓
Neutral in comparison	–
Poor in comparison	✖

For this study the qualitative evaluation approach was used for the evaluation of alternative planning solutions and the coarse screening of alignment alternatives.

5.3 Alternative Planning Solutions

The assessment of Planning Solutions is found below. The results of the assessment recommended carrying forward a 'Basket' of Transportation Planning Solutions (or Alternatives to the Project). These recommendations were endorsed by the

public at the first Public Open House. Planning Solutions included:

- Do Nothing – Not carried forward as it does not address identified capacity and operational deficiencies along Marleau Avenue;
- Transit - ***Carried forward to complement the preferred solution;***
- Transportation System Management (TSM)/Transportation Demand Management (TDM) – ***Carried forward to complement the preferred solution;***
- 2nd Street Improvements - Not carried forward as it does not address identified capacity and operational deficiencies along Marleau Avenue;
- Montreal Road/Water Street Improvements - Not carried forward as it does not address identified capacity and operational deficiencies along Marleau Avenue;
- Highway 401 Improvements - Not carried forward as it does not address identified capacity and operational deficiencies along Marleau Avenue; and
- Marleau Avenue Improvements – ***Carried forward as the preferred planning solution***

Table 5.2 presents the results of the evaluation of planning solutions.

It is recommended that "Marleau Avenue Improvements" be carried forward as the preferred transportation strategy to meet travel and safety needs. The preferred Planning Solution (or "Alternative to" the undertaking) will be described as the "Undertaking".

Table 5.2
Evaluation of Planning Solutions

Do Nothing	Transit	TSM/TDM	New and/or Improved Municipal or Provincial Roads			
			2nd Street Improvements	**Montreal Road/Water Street Improvements**	**Highway 401 Improvements**	**Marleau Avenue Improvements**
SUMMARY/RECOMMENDATION						
• Least property impact and capital cost. • Does not however, address operational, safety, mobility, planning and capacity deficiencies.	• Does not address operational, safety, mobility, planning and capacity deficiencies in east-west travel demand as a stand-alone solution. However, transit improvements, where possible, should be considered by project.	• The TSM/TDM improvements are not sufficient to address the identified current and future traffic demands • TSM/TDM should be considered part of an overall transportation strategy for the City	• This transportation corridor currently serves east-west travel demands and traverses the centre of Cornwall. • Much of this corridor is mature and fully developed • Opportunities for additional roadway capacity are limited in much of this corridor. • Based on these considerations the 2nd Street corridor is not recommended.	• This transportation corridor currently serves east-west travel demands and traverses the centre of Cornwall. • Much of this corridor is mature and fully developed • Opportunities for additional roadway capacity are limited in much of this corridor. • Based on these considerations the Montreal Road/Water Street corridor is not recommended as the preferred solution	• This 4-lane corridor currently serves east-west provincial travel demands. • Highway 401 does not serve local mobility needs • Based on these considerations the Highway 401 corridor is not recommended as the preferred solution	• This solution addresses specific operational and capacity deficiencies and planning objectives • This solution is consistent with the City's long range planning objectives for the need for expansion, based on capacity and operational issues • This solution also addressed the need for Marleau Avenue to serve as a Highway 401 Emergency Detour Route
✗ **DO NOT CARRY FORWARD**	✓ **CARRIED FORWARD (as a component of basket solutions for the road project**	✓ **CARRIED FORWARD (as a component of basket solutions for the road project**	✗ **DO NOT CARRY FORWARD**	✗ **DO NOT CARRY FORWARD**	✗ **DO NOT CARRY FORWARD**	✓ **CARRIED FORWARD**

5.4 COARSE SCREENING OF PRELIMINARY DESIGN ALTERNATIVES

A review and assessment of the long list of Preliminary Design Alternatives was undertaken to determine which would be carried forward for detailed analysis and evaluation. After considering the public commentary from the first Open House and the TAC's recommendations, the long list of preliminary design alternatives for Marleau Avenue alternatives were coarse screened.

The coarse screening evaluation consisted of the following broad criteria:

- **TRANSPORTATION**: How well does the alternative fulfill existing and future transportation and safety needs?
- **ENVIRONMENTAL**: How does the solution affect the natural and social environments?
- **LAND USE & PROPERTY**: How does the alternative affect adjacent land uses and property?
- **ECONOMIC**: What are the construction cost implications of the alternative?

The complete coarse screening exercise is found in **Appendix H**.

5.4.1 Evaluation Sections

The corridor was divided into three (3) different sections in order to accommodate the changing site-specific right-of-way constraints throughout the length of the study area. The advantages of dividing the study corridor into separate segments include:

- Allowing the unique transportation and environmental constraints within each section to influence the evaluation; and
- Permits the evaluation to be divided into mutually exclusive areas.

Each section is described as follows:

- **Section 1/ West** - Marlborough Street to Alice Street
- **Section 2/Central** - Alice Street to Nick Kaneb Drive
- **Section 3/East** - Nick Kaneb Drive to Glenview Boulevard

The different evaluation sections for the coarse screening are illustrated in **Figure 5-2**.

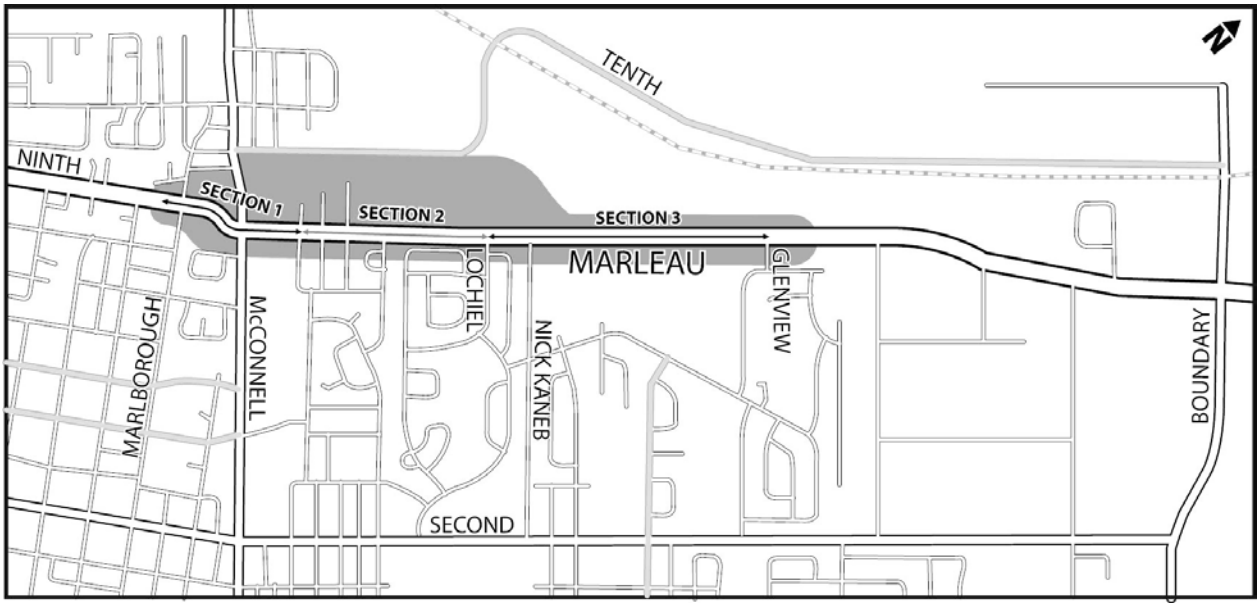


Figure 5-2
Evaluation Sections

5.4.2 Section 1/ West - Marlborough Street to Alice Street

5.4.2.1 Preliminary Design Alternatives - Section 1

The following seven (7) alternatives were considered for **Section 1**:

- **Alternative 1 –** Widening to the South;
- **Alternative 2 –** Curvilinear 1 Widening;
- **Alternative 3 –** Curvilinear 2 Widening;
- **Alternative 4 –** Widening to the North (Urban Undivided);
- **Alternative 5 –** Widening to the North (Urban Divided);
- **Alternative 6 –** Widening about Centreline (Urban Divided; and
- **Alternative 7** – Widening about Centreline (Urban Divided).

Following the coarse screening, **Alternative 2 – Curvilinear 1 Widening (4-Lane Urban Undivided Cross Section)**; was selected as the Technically Preferred Alternative for Section 1, as shown in **Table 5.3**. All other alternatives were coarse screened due to their significant impact to adjacent properties and/or to the Nativity Cemetery on the north side of Marleau Avenue.

Table 5.3
Coarse Screening
Section 1/West - Marlborough Street to Alice Street

Alternatives	Coarse Screening	Carried Forward as Technically Preferred Alternative
• **Alternative 1** Widening to the South	× Alternative 1 was not carried forward for further evaluation based on significant impact to adjacent properties and/or to the Nativity Cemetery on the north side of Marleau Avenue.	
• **Alternative 2** Curvilinear 1 Widening		✓
• **Alternative 3** Curvilinear 2 Widening	× Alternative 3 was not carried forward for further evaluation based on significant impact to adjacent properties and/or to the Nativity Cemetery on the north side of Marleau Avenue.	
• **Alternative 4** Widening to the North (Urban Undivided)	× Alternative 4 was not carried forward for further evaluation based on significant impact to adjacent properties and/or to the Nativity Cemetery on the north side of Marleau Avenue.	
• **Alternative 5** Widening to the North (Urban Divided)	× Alternative 5 was not carried forward for further evaluation based on significant impact to adjacent properties and/or to the Nativity Cemetery on the north side of Marleau Avenue.	
• **Alternative 6** Widening about Centreline (Urban Divided	× Alternative 6 was not carried forward for further evaluation based on significant impact to adjacent properties and/or to the Nativity Cemetery on the north side of Marleau Avenue.	
• **Alternative 7** Widening about Centreline (Urban Divided)	× Alternative 7 was not carried forward for further evaluation based on significant impact to adjacent properties and/or to the Nativity Cemetery on the north side of Marleau Avenue.	

5.4.3 Section 2/Central - Alice Street to Nick Kaneb Drive

5.4.3.1 Preliminary Design Alternatives - Section 2

The following four (4) alternatives were considered for Section 2:

- **Alternative 1 –** Widening to the North;
- **Alternative 2 –** Widening to the South;
- **Alternative 3 –** Widening about Centreline; and
- **Alternative 4 –** One Way Pairs (Separation of Westbound Traffic North of Existing Marleau Avenue and Eastbound Traffic on Existing Marleau Avenue).

The following alternatives for Section 2 were carried forward following the coarse screening. See **Table 5.4** for further detailed evaluation:

- **Alternative 1 -** Widening to the North**;** and
- **Alternative 4 -** One Way Pairs (Separation of Westbound Traffic North of Existing Marleau Avenue and Eastbound Traffic on Existing Marleau Avenue)

Alternatives 2 and 3 were not carried forward due to their significant impact to the residential homes on the south side of Marleau Avenue.

Table 5.4
Coarse Screening
Section 2/Central - Alice Street to Nick Kaneb Drive

Alternatives	Coarse Screening	Carried Forward for Further Evaluation
• **Alternative 1 –** Widening to the North;		✓
• **Alternative 2 –** Widening to the South;	× Alternative 2 was not carried forward for further evaluation based on significant impacts to the residential homes on the south side of Marleau Avenue	
• **Alternative 3 –** Widening about Centreline; and	× Alternative 3 was not carried forward for further evaluation based on significant impacts to the residential homes on the south side of Marleau Avenue.	
• **Alternative 4 –** One Way Pairs (Separation of Westbound Traffic North of Existing Marleau Avenue and Eastbound Traffic on Existing Marleau Avenue).		✓

Two (2) alternative cross sections were also carried forward for Section 2 as well for further detailed evaluation:

- 4-Lane Urban Divided (with shared bike/travel lane); and
- 5-Lane Urban including Continuous Left Turn Lane (with shared bike/travel lanes).

Since the One Way Pairs alternative impacted both Sections 1 and 2, it was determined by the TAC to combine the Technically Preferred Alternative for Section 1 with the Widening to the North alignment alternative for Section 2 (in combination with the 2 cross section alternatives) to span the two evaluation sections. Therefore, 3 alternatives were carried forward for further detailed evaluation for Section 1 & 2:

- **Alternative 1 –** 4-Lane Urban Divided;
- **Alternative 2 –** 5-Lane Urban Undivided (including CTWLTL); and
- **Alternative 3** - One Way Pairs

The three (3) alternatives for Section 1 & 2 are shown in **Figures 5-3 to 5-5.**

NOTE

* Existing Right-of-Way Width:
  20m - West of Marlborough St.
  26m - Marlborough St. to McConnell Ave
  20m - McConnell Ave to Alice St.
  20m - Alice Street to Iroquois Street
  30m - Iroquois Street to Lochiel St.

NOTE

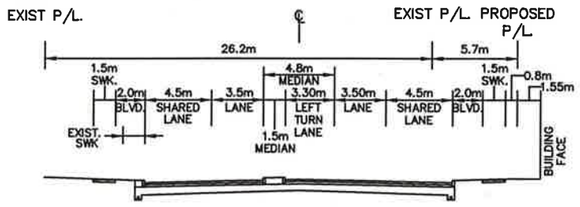
* Existing Right-of-Way Width:
  20m - Alice Street to Iroquois Street
  30m - Iroquois Street to Lochiel St.

LEGEND

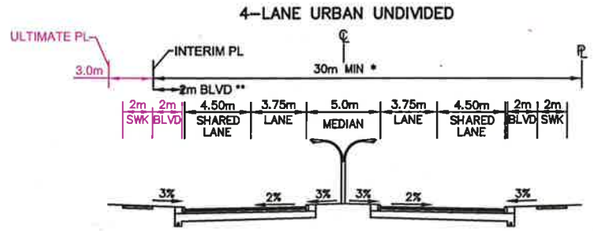
EXISTING PROPERTY LINE

PROPERTY AQUISITION

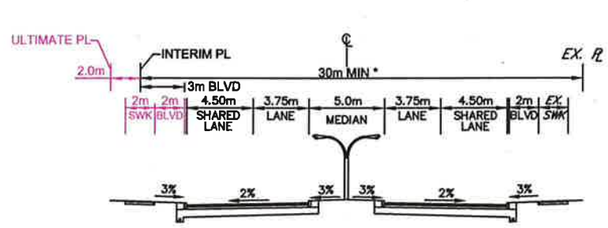
IMPACTED PROPERTY



TYPICAL SECTION
MARLBOROUGH STREET TO 100m± EASTERLY



** NARROW BVLD AT CEMETERY PITCH POINT



4-LANE URBAN DIVIDED

FIGURE 5 - 3

SCALE: N.T.S.

SECTION 1 & 2 - MARLBOROUGH STREET TO NICK KANEB DRIVE
ALTERNATIVE 1 - 4 LANE URBAN DIVIDED

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

GENIVAR

NOTE

* Existing Right-of-Way Width:
  20m - West of Marlborough St.
  26m - Marlborough St. to McConnell Ave
  20m - McConnell Ave to Alice St.
  20m - Alice Street to Iroquois Street
  30m - Iroquois Street to Lochiel St.

NOTE

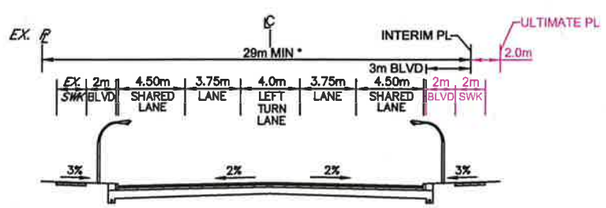
* Existing Right-of-Way Width:
  20m - Alice Street to Iroquois Street
  30m - Iroquois Street to Lochiel St.

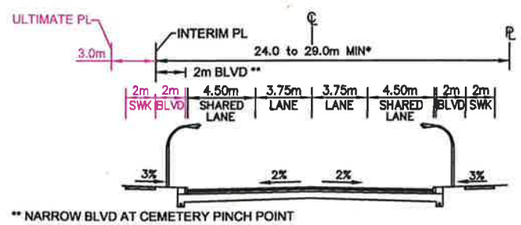
LEGEND

EXISTING PROPERTY LINE

PROPERTY AQUISITION

IMPACTED PROPERTY





** NARROW BLVD AT CEMETERY PINCH POINT

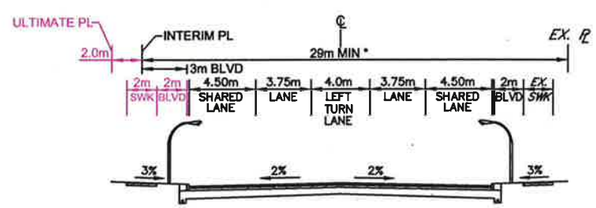


FIGURE 5 - 4

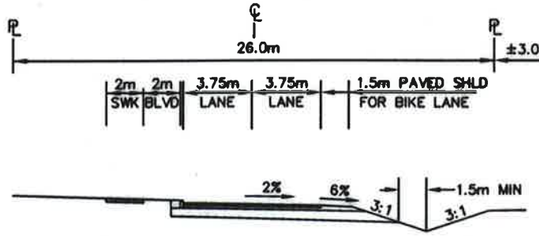
SCALE: N.T.S.

SECTION 1& 2 - MARLBOROUGH STREET TO NICK KANEB DRIVE
ALTERNATIVE 2 - 5 LANE URBAN UNDIVIDED AND
5 LANE URBAN INCLUDING CONTINUOUS LEFT TURN LANE

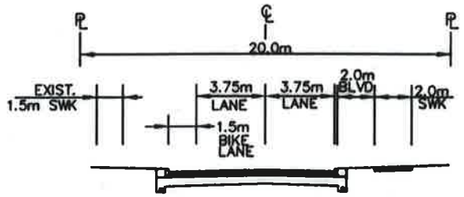
MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

GENIVAR



WESTBOUND LANES



EASTBOUND LANES

LEGEND

- EXISTING PROPERTY LINE
- POTENTIAL PROPERTY REQUIRED (26m Right-Of-Way)
- POTENTIAL INTERSECTION LOCATIONS
- POTENTIAL ENTRANCE LOCATIONS

* WESTBOUND TRAFFIC ON NEW ROAD NORTH OF EXISTING MARLEAU AND EASTBOUND TRAFFIC ON EXISTING MARLEAU AVENUE

FIGURE 5 - 5

SCALE: N.T.S.

SECTION 1& 2 - MARLBOROUGH STREET TO NICK KANEB DRIVE
ALTERNATIVE 3 - ONE WAY PAIRS

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

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5.4.4 Section 3/East - Nick Kaneb Drive to Glenview Boulevard

5.4.4.1 Preliminary Design Alternatives - Section 3

The following three (3) alternatives were considered for Section 3. :

- **Alternative 1 –** Widening to the South
- **Alternative 2 –** Widening to the North;; and
- **Alternative 3 –** Widening about Centreline

Each alternative was combined with the following cross section alternatives:

- 4-Lane Urban Divided (with shared bike/travel lane); and
- 4-Lane Urban/Rural Divided.

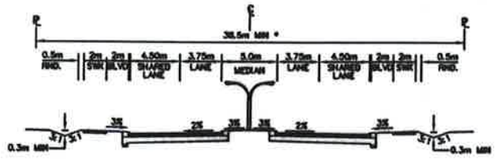
All three (3) alternatives combined with the two (2) cross sections were carried forward for further detailed evaluation. Therefore, six (6) alternatives were carried forward, they include:

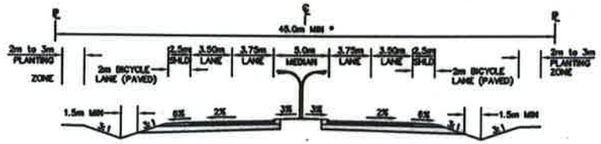
- **Alternative 1 –** Widening to the South (4-Lane Urban Divided);
- **Alternative 2 –** Widening to the South (4-Lane Urban/Rural Divided);
- **Alternative 3 –** Widening to the North (4-Lane Urban Divided);
- **Alternative 4 –** Widening to the North (4-Lane Urban/Rural Divided);
- **Alternative 5 –** Widening about Centreline (4-Lane Urban Divided); and
- **Alternative 6 –** Widening about Centreline (4-Lane Urban/Rural Divided).

These alternatives are illustrated in **Figures 5-6 to 5-8**.

NOTE

* Existing Right-of-Way Width:
  30 m - Iroquois Street to East Study Limits





LEGEND

EXISTING PROPERTY LINE

PROPERTY AQUISITION

IMPACTED PROPERTY

ALTERNATIVE 1 - WIDENING TO THE SOUTH - 4 LANE URBAN DIVIDED

ALTERNATIVE 2 - WIDENING TO THE SOUTH - 4 LANE URBAN / RURAL DIVIDED

FIGURE 5 - 6

SCALE: N.T.S.

SECTION 3 - NICK KANEB DRIVE TO GLENVIEW BOULEVARD
ALTERNATIVE 1 - WIDENING TO THE SOUTH - 4 LANE URBAN DIVIDED
ALTERNATIVE 2 - WIDENING TO THE SOUTH - 4 LANE URBAN / RURAL DIVIDED

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

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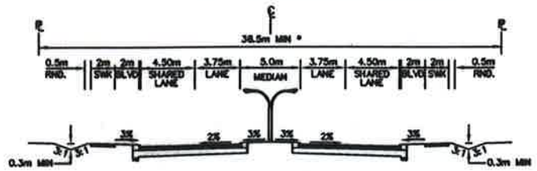
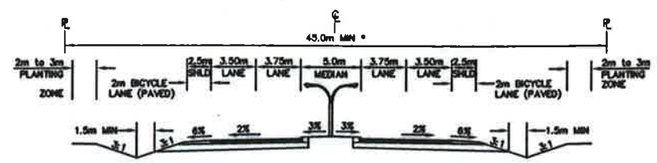
NOTE

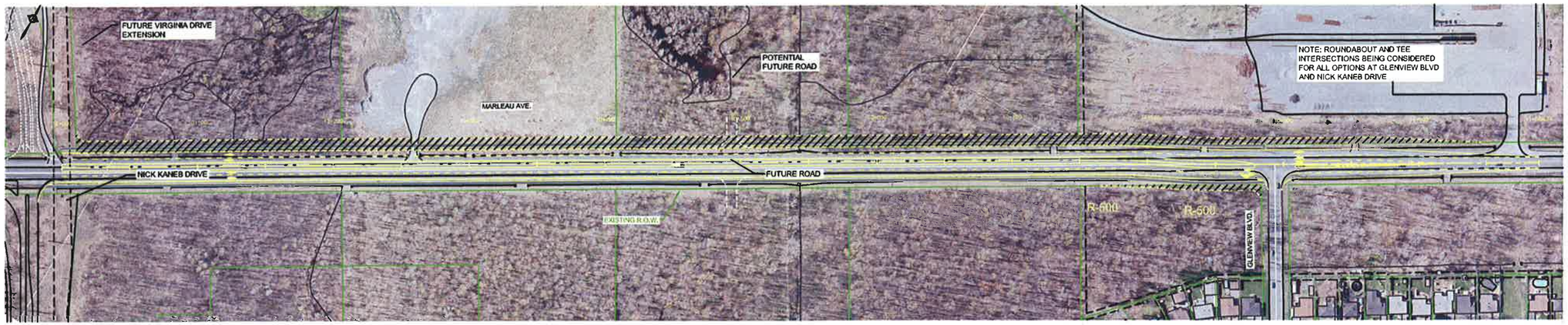
* Existing Right-of-Way Width:
  30 m - Iroquois Street to East Study Limits



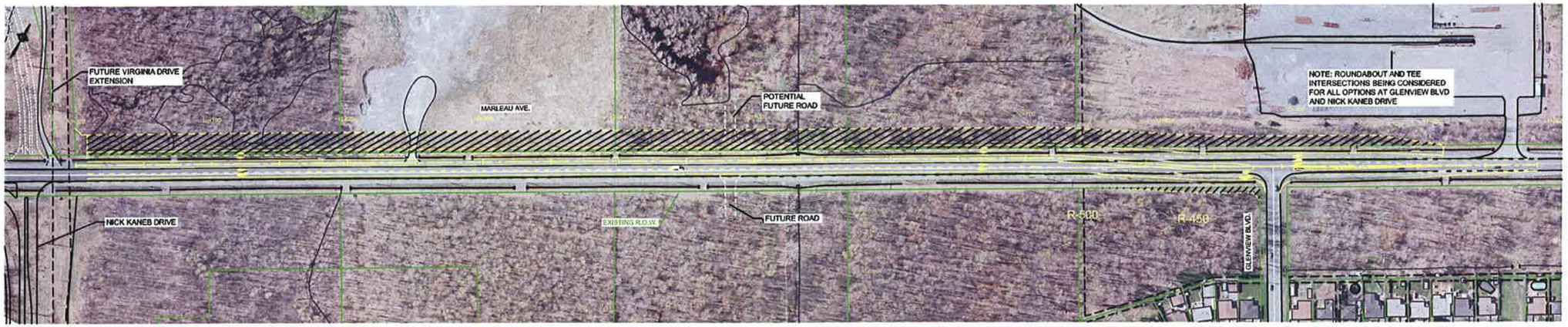


LEGEND

- EXISTING PROPERTY LINE
- PROPERTY AQUISITION
- IMPACTED PROPERTY



ALTERNATIVE 3 - WIDENING TO THE NORTH - 4 LANE URBAN DIVIDED



ALTERNATIVE 4 - WIDENING TO THE NORTH - 4 LANE URBAN / RURAL DIVIDED

FIGURE 5 - 7

SCALE: N.T.S.

SECTION 3 - NICK KANEB DRIVE TO GLENVIEW BOULEVARD

ALTERNATIVE 3 - WIDENING TO THE NORTH - 4 LANE URBAN DIVIDED
ALTERNATIVE 4 - WIDENING TO THE NORTH - 4 LANE URBAN / RURAL DIVIDED

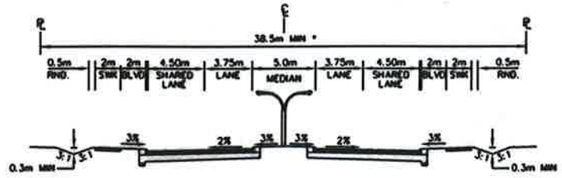
MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

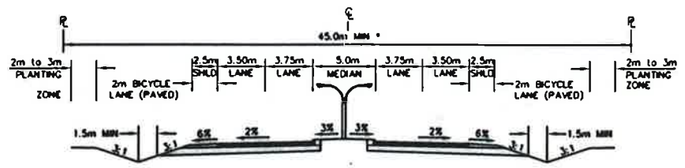
Cornwall ONTARIO CANADA

GENIVAR

NOTE

* Existing Right-of-Way Width:
30 m - Iroquois Street to
East Study Limits





LEGEND

- EXISTING PROPERTY LINE
- PROPERTY AQUISITION
- IMPACTED PROPERTY

ALTERNATIVE 5 - WIDENING ABOUT CENTRELINE - 4 LANE URBAN DIVIDED

ALTERNATIVE 6 - WIDENING ABOUT CENTRELINE - 4 LANE URBAN / RURAL DIVIDED

FIGURE 5 - 8

SCALE: N.T.S.

SECTION 3 - NICK KANEB DRIVE TO GLENVIEW BOULEVARD

ALTERNATIVE 5 - WIDENING ABOUT CENTRELINE - 4 LANE URBAN DIVIDED
ALTERNATIVE 6 - WIDENING ABOUT CENTRELINE - 4 LANE URBAN / RURAL DIVIDED

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

GENIVAR

5.5 PRELIMINARY DESIGN ALTERNATIVES ANALYSIS AND EVALUATION

Following the coarse screening, short listed alternatives for Section 1 & 2 and Section 3 were carried forward for additional analysis. Each alternative carried forward was assessed in terms of its impact to the study area based on quantifiable measures.

5.5.1 Evaluation Criteria – Section 1 & 2

A long list of evaluation criteria was established from a review of the preliminary design alternatives for Section 1 & 2. A screening exercise was undertaken to determine those sub-factors used in the detailed evaluation of alternatives (See **Table 5.5, Short List of Sub-factor Criteria for Section 1 & 2**). The definitions and measurements for the short-listed sub-factors are described in **Appendix A.**

A sub-factor was carried forward to the "Short-List" of criteria if it was found to:

- be a measure of a meaningful difference among alternatives;
- capture a measurable difference among alternatives;
- not "double count" the effect that was measured under another sub-factor; and/or
- describe a difference in the natural or social environment that the TAC considered necessary to be included in the decision-making process.

Table 5.5
Short List of Sub-factor Criteria for Section 1 & 2

FACTORS AND SUBFACTORS	UNIT
Traffic and Transportation	
Level of Service (Average Travel Time) on Marleau Avenue	sec
Collision Potential	high/med/low
Spacing of Intersections on McConnell Avenue	yes/no
Spacing of Intersections on Marleau Avenue	yes/no
Driveway Safety	high/low
Design Consistency	yes/no
Accommodates Transit Service	yes/no
Residential Out-of-Way Travel (m)	m
Ability to Accommodate Dedicated Bicycle Lane	yes/no
Bicycle Out-of-Way Travel	m
Cornwall Community Hospital Public/Delivery Access Impacted	yes/no
Emergency Response Impacted	high/med/low
School Bus Operational Delays to Travelling Public	yes/no
Length of Driveway Storage	m
Natural Environment	
No. of Specimen Trees Impacted	no.
Air Quality Impacted	yes/no
Economic Environment	
Business Access – Tim Horton's Site	high/low
Business Access – Leon's Site	high/med/low
Business Access – NAPA Site	high/med/low
Business Access – Jiffy Site	high/med/low
Business Access – Esso	high/med/low
Business Access – Bourgon Construction	high/med/low
Business Access – Blais Paving	high/low
Business Access – RONA Site	high/low
Impact to Frontage of RONA Site	yes/no
Impact to Frontage of Blais Paving Site	yes/no
Impact to Frontage of Bourgon Construction Site	yes/no
Impact to Jennum Development Site	high/low
Cultural Environment	
Home with Sound Level Decreases	no.
Residents with Increased Visual Intrusion	no.
Flexibility for On-Street Parking	yes/no
Land Use and Property	
Residential Property Required	ha
Number of Residential Buyouts	no.
Commercial Property Required	ha
Institutional Property Required	ha
Manufacturing Property Required	ha

FACTORS AND SUBFACTORS	UNIT
Cost	
Life Cycle Cost	$
Construction Staging Opportunities	yes/no
Ability to Phase Project – Funding Availability	yes/no

5.5.1.1 Section 1 & 2 Evaluation Results

The results of the evaluation of Section 1 & 2 are summarized in **Figure 5-9** and **Figure 5-10** and the corresponding sensitivity tests are shown in **Table 5.6**.

Alternative 2 ranked the highest and therefore was selected as the Technically Preferred Alternative for Section 1 & 2. The TAC weighted Transportation to be the most important criteria for selecting the preferred alignment alternative with approximately 46%, followed by economic environment at 21%. Alternative 2 had good performance for transportation and minimized property and economic impacts.

The sensitivity analysis validated the results for the average TAC weights by demonstrating that Alternative 2 consistently rated highest under all of the weighting scenarios. The results are detailed in full in **Appendix A, Analysis and Evaluation Report**.

Figure 5-9
Ranking of Alternatives
Section 1 & 2

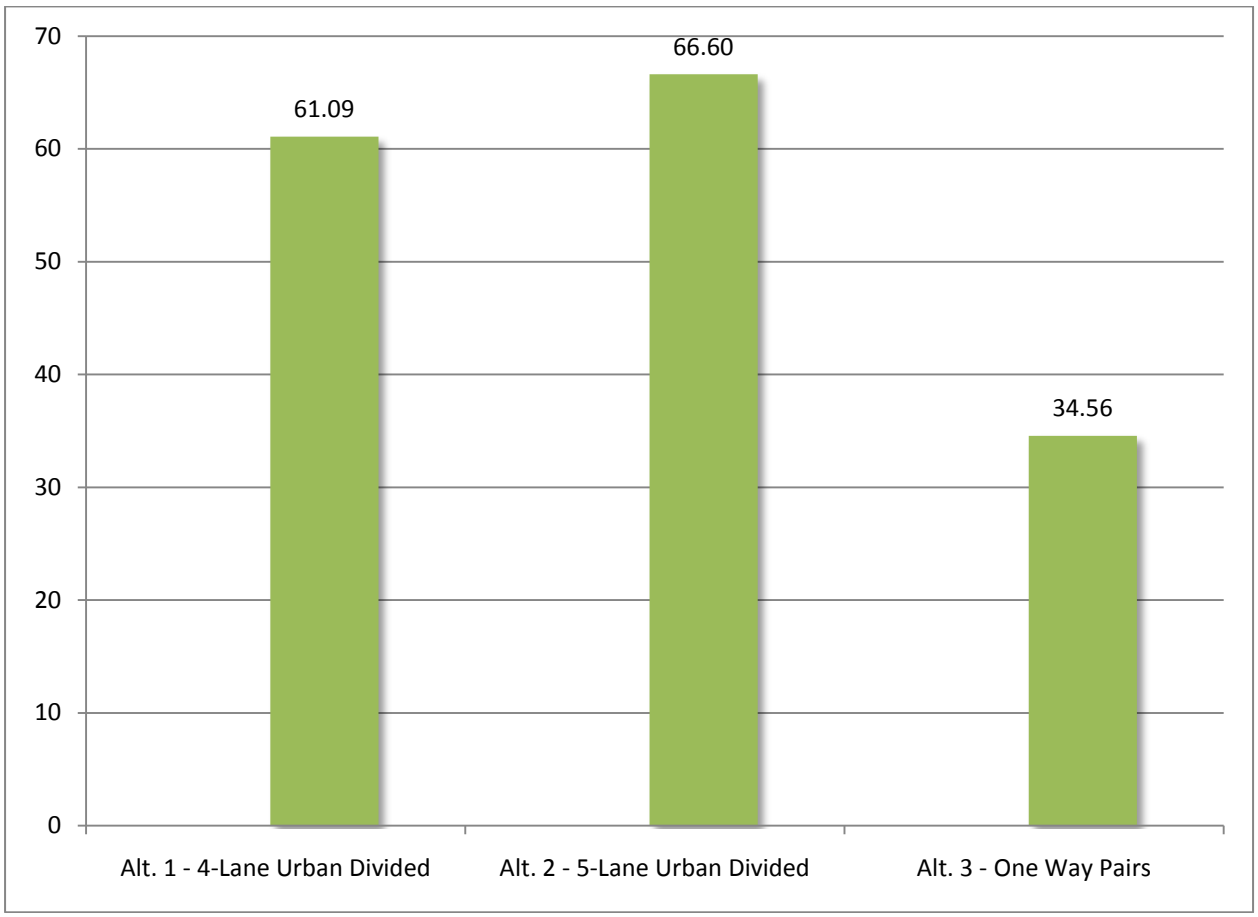


Figure 5-10
Weights
Section 1 & 2

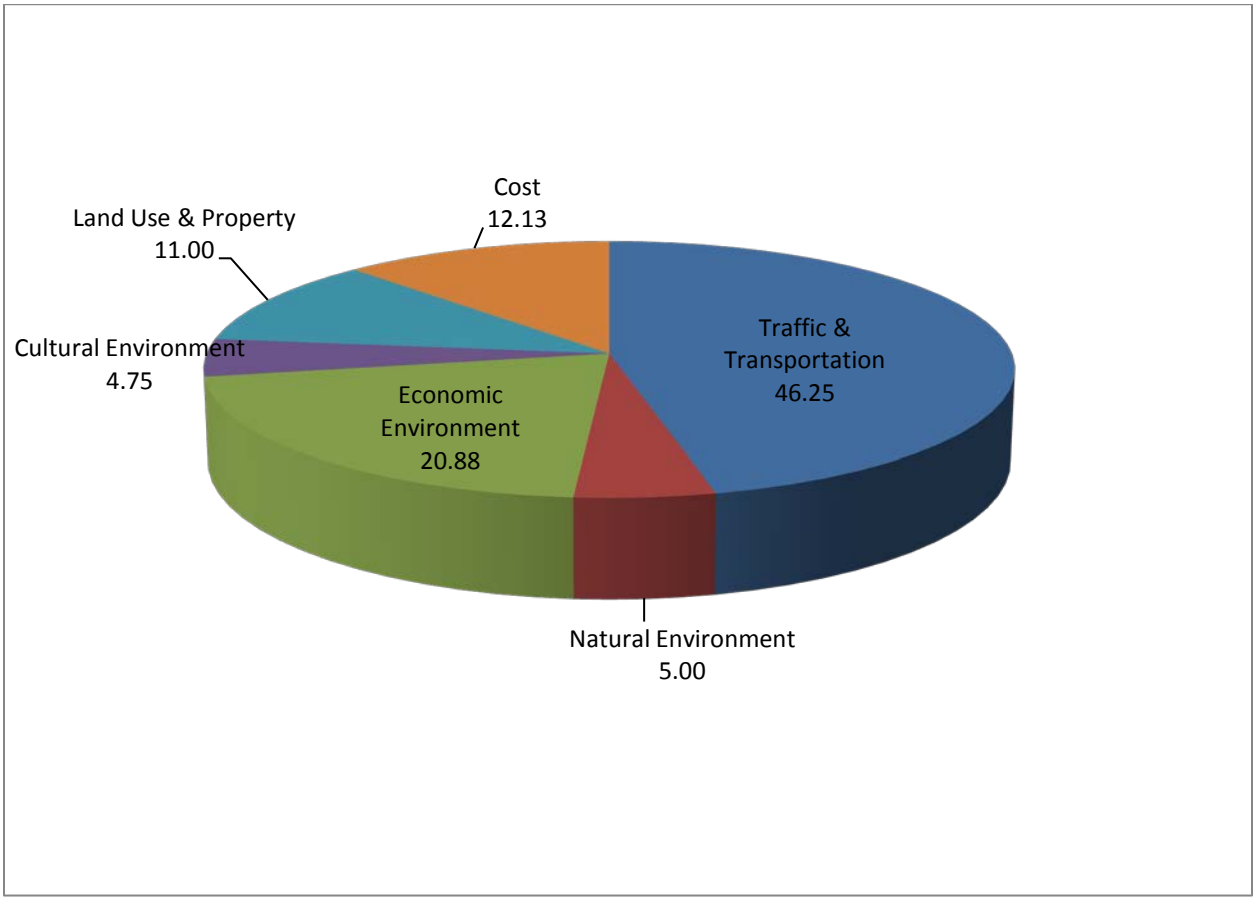


Table 5.6
Sensitivity Tests
Section 1 & 2

		Rankings		
Testing	**Weight**	**Alt. 1 4-Lane Urban Divided**	**Alt. 2 5-Lane Undivided**	**Alt. 3 One Way Pairs**
Technical Advisory Committee	N/A	61.09	66.60	34.56
High Traffic & Transportation	60	66.29	69.93	30.93
Low Traffic & Transportation	35	56.83	63.87	37.53
High Natural Environment	10	60.47	65.69	35.41
Low Natural Environment	0	61.70	67.51	33.72
High Economic Environment	40	59.77	69.20	31.68
Low Economic Environment	15	61.49	65.80	35.45
High Cultural Environment	10	57.72	63.42	38.17
Low Cultural Environment	0	64.13	69.48	31.30
High Land Use & Property	18	60.47	66.22	35.06
Low Land Use & Property	4	61.70	66.98	34.07
High Cost	20	58.19	63.54	37.85
Low Cost	5	63.71	69.37	31.59

5.5.2 Evaluation Criteria – Section 3

A long list of evaluation criteria was established from a review of the preliminary design alternatives for Section 3. A screening exercise was undertaken to determine those sub-factors used in the detailed evaluation of alternatives (See **Table 5.7, Short List of Sub-factor Criteria for Section 3**. The definitions and measurements for the short-listed sub-factors are described in **Appendix A.**

Table 5.7
Short List of Sub-factor Criteria for Section 3

FACTORS AND SUBFACTORS	UNIT
Transportation	
Provision for Sidewalks	yes/no
Natural Environment	
Vegetation Removed	ha
Stormwater Quality	yes/no
Cultural Environment	
Home with Sound Level Increases	yes/no
Land Use and Property	
Number of Properties Impacted	no.
Residential Property Required	ha
Cost	
Life Cycle Cost	$
Construction Staging	yes/no

5.5.2.1 Section 3 Evaluation Results

The results of the evaluation of Section 3 are summarized in **Figure 5-11** and **Figure 5-12** and the corresponding sensitivity tests are shown in **Figure 5-13**.

Alternative 3 ranked the highest and was therefore was selected as the Technically Preferred Alternative for Section 3. The TAC weighted Cost to be the most important criteria for selecting the preferred alignment alternative with approximately 46%, followed by Transportation at 21%. Alternative 3 had good performance for transportation and minimized property and impacts.

The sensitivity analysis validated the results for the average TAC weights by demonstrating that Alternative 3 consistently rated highest or second highest under all of the weighting scenarios. The results are detailed in full in **Appendix A**.

Figure 5-11
Ranking of Alternatives
Section 3

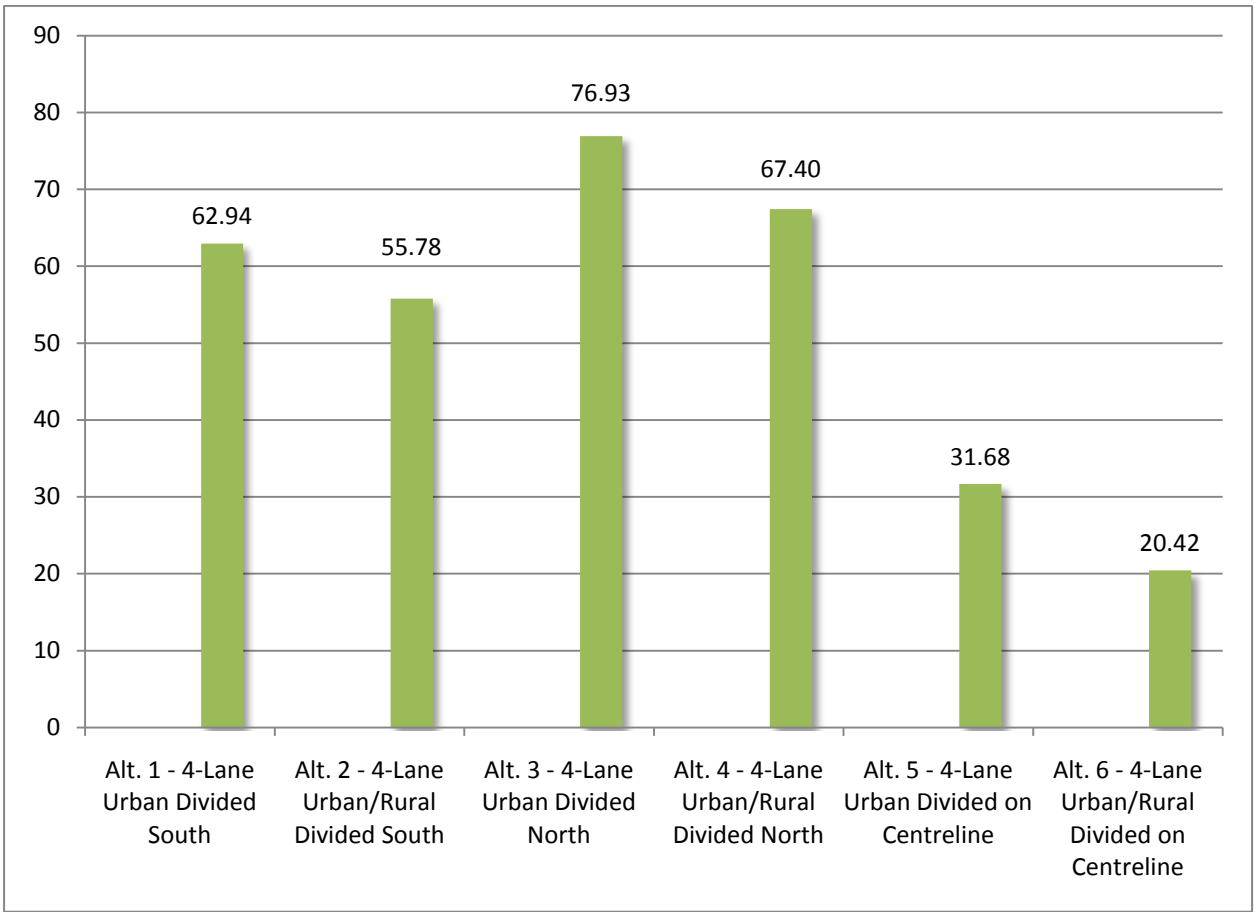


Figure 5-12
Weights
Section 3

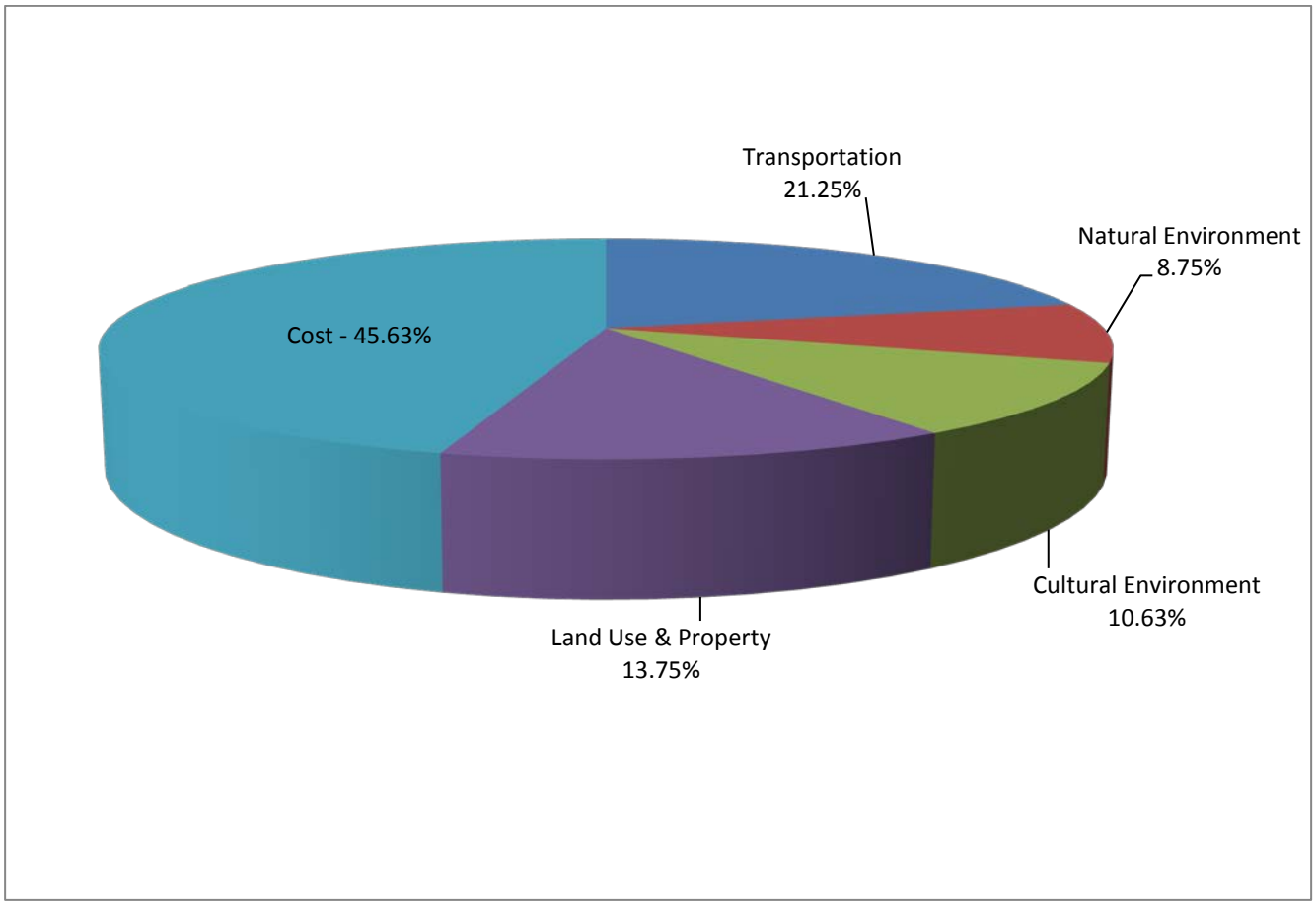


Figure 5-13
Section 3 Sensitivity Tests

		Rankings					
Testing	Weight	Alt. 1 4-lane Urban Divided South	Alt. 2 4-laneUrban/ Rural Divided South	Alt. 3 4-lane Urban Divided North	Alt. 4 4-laneUrban/ Rural Divided North	Alt. 5 4-lane Urban Divided on Centreline	Alt. 6 4-laneUrban/ Rural Divided on Centreline
Technical Advisory Committee	N/A	62.94	55.78	76.93	67.40	31.68	20.42
High Transportation	30	67.06	49.58	79.49	59.92	39.27	18.15
Low Transportation	10	57.64	63.75	73.63	77.03	21.92	23.34
High Natural Environment	10	62.73	55.90	76.45	67.24	31.90	20.86
Low Natural Environment	5	63.57	55.43	78.35	67.91	31.03	19.10
High Cultural Environment	20	56.34	49.93	79.35	70.82	28.36	18.28
Low Cultural Environment	5	66.90	59.29	75.47	65.35	33.67	21.71
High Land Use & Property	25	66.35	57.09	77.86	64.62	33.50	17.76
Low Land Use & Property	5	60.28	54.77	76.20	69.57	30.26	22.49
High Cost	70	59.56	71.16	71.72	82.02	17.48	26.82
Low Cost	35	64.41	49.08	79.20	61.04	37.87	17.63

5.6 Technically Preferred Plan

The Technically Preferred Plan (TPP) for the Study Area includes the combination of the following Marleau Avenue preliminary design alternatives;

- **Section 1 & 2 -** Alternative 2 – 5-Lane Urban Undivided (including CTWLTL); and
- **Section 3 -** Alternative 3 **–** Widening to the North (4-Lane Urban Divided)

The TPP is shown in **Figure 5-14**.

The TPP incorporates the following site specific features:

- 4-Lane Urban Divided cross section from Marlborough Street to McConnell Avenue;
- 4-Lane Urban Divided/Undivided cross section from McConnell Avenue to Carleton Street to minimize the Right-of-Way impacts to the Nativity Cemetery on the north-side of Marleau Avenue;
- 5-Lane Urban Undivided (including centre turn lane) cross section from Carleton Street to Nick Kaneb Drive to provide accessibility to commercial properties; and
- 4-Lane Urban Divided cross section from Nick Kaneb Drive to Glenview Boulevard. Future access location to adjacent properties will be determined once development occurs.

The TPP was shown at Public Open House No. 2 for public review and comment.

It is noted that the (TPP) requires the following:

- Acquisition of property located in the southwest quadrant of the Ninth Street/Marleau Avenue and McConnell Avenue intersection (Section 1 & 2);
- Acquisition of property from the Cornwall Community Hospital and adjacent Sisters Cemetery (Section 1 & 2);
- Acquisition of 12 residential properties (Section 1 and 2) between Alice Street and Carleton Street (2 of the acquired residential properties are proposed to be reconfigured as part of the plan);
- Acquisition of commercial frontage from the businesses along the north side of Marleau Avenue (Section 1 & 2); and
- Acquisition of property at the Marlborough Street intersection (northwest and southwest quadrants), between Guy Street and Carleton Street (south side), along the north side of Marleau Avenue (Section 3) and southeast and southwest quadrants of the Marleau/Glenview intersection (Section 3).

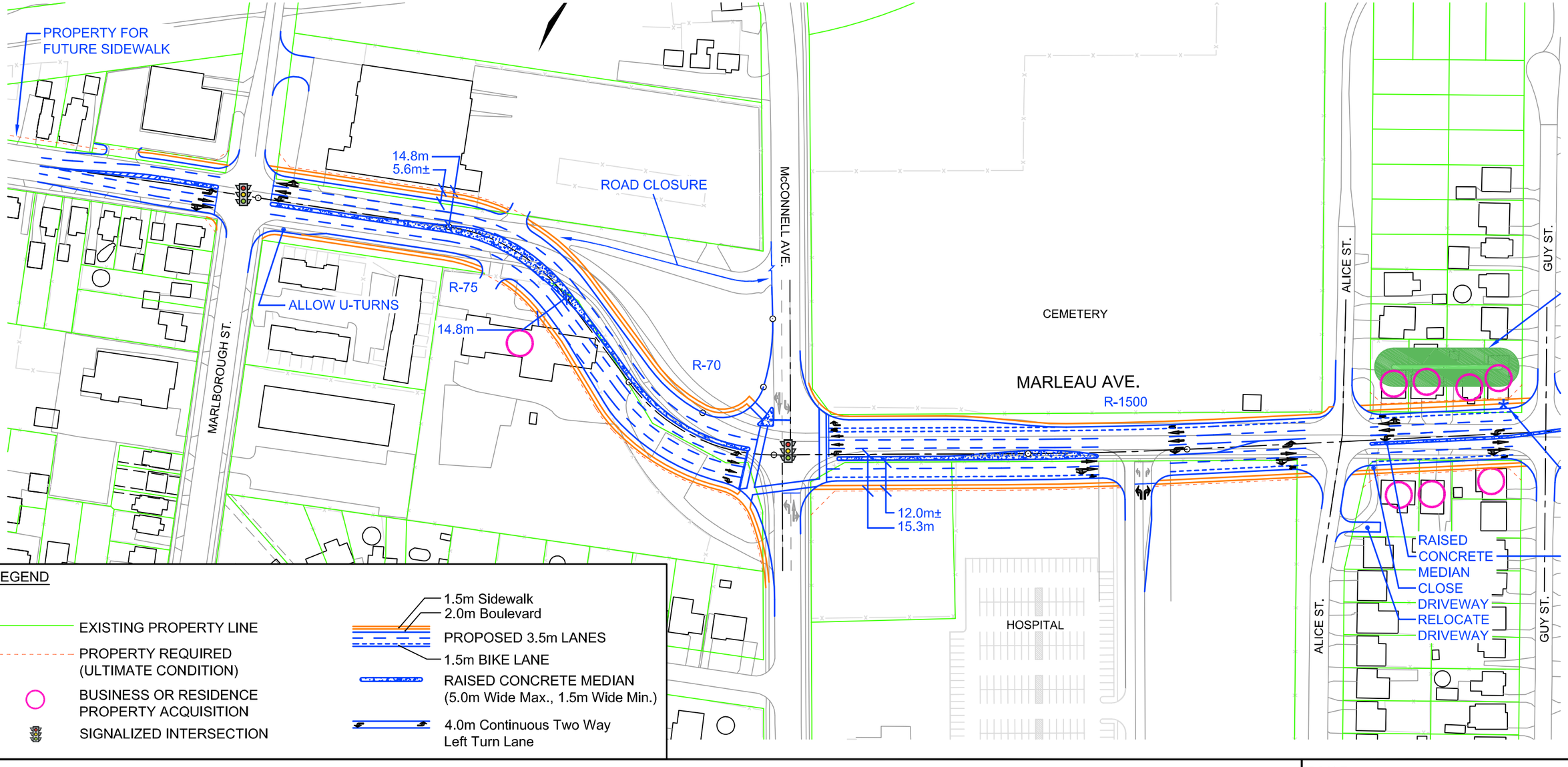


FIGURE 5 - 14A

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

Cornwall
ONTARIO CANADA

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

GENIVAR

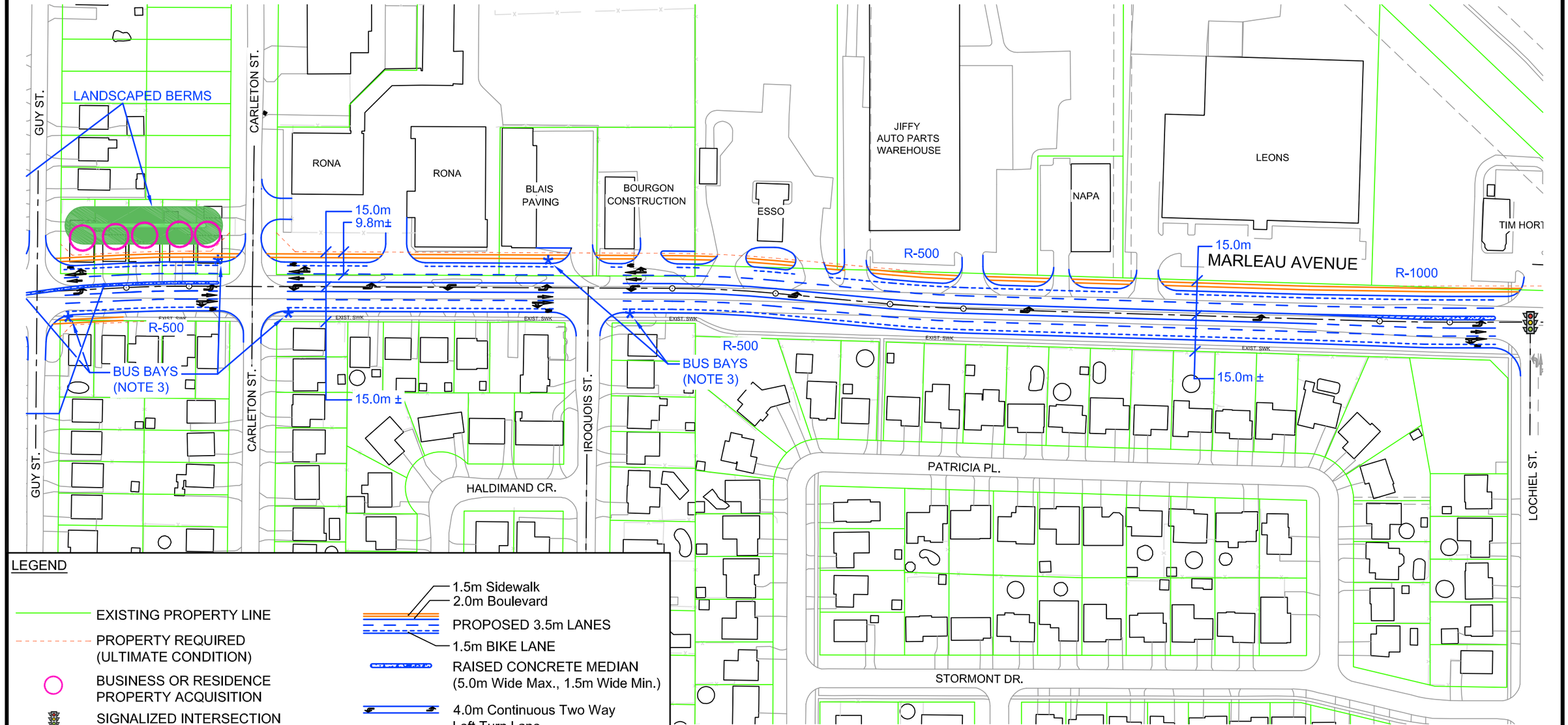


FIGURE 5 - 14B

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

GENIVAR

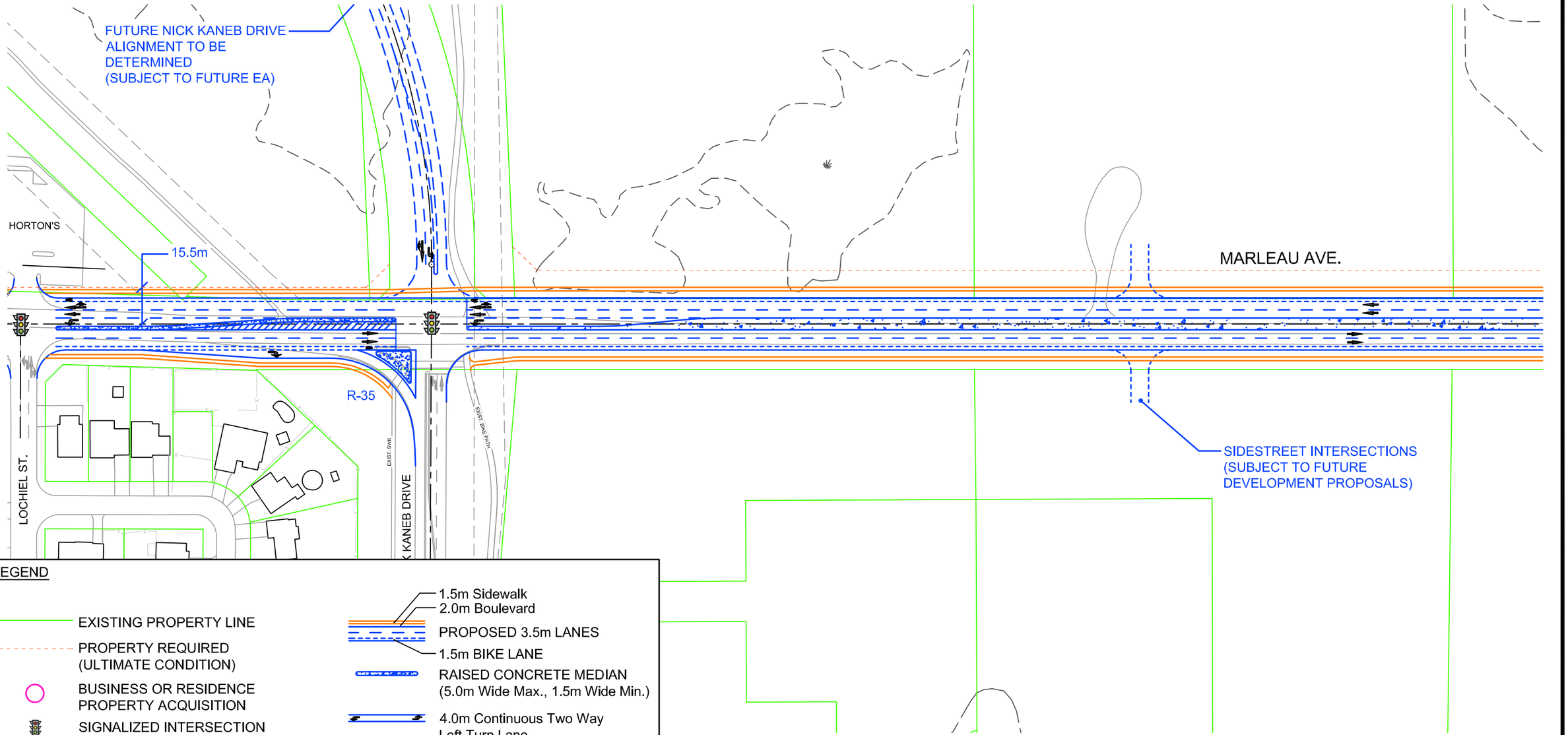


FIGURE 5 - 14C

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

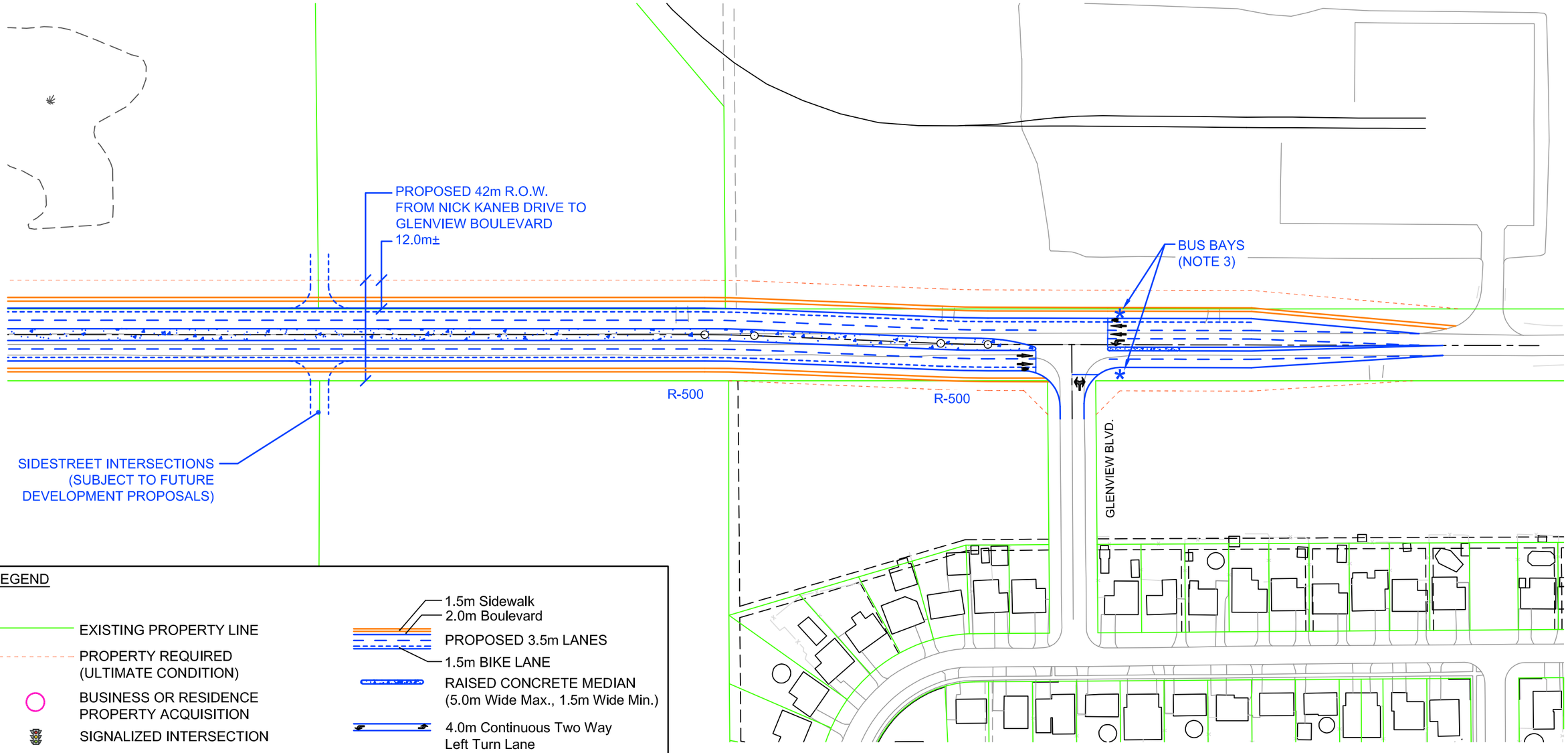


FIGURE 5 - 14D

SCALE: N.T.S.

TECHNICALLY PREFERRED PLAN (TPP)

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

6.0 RECOMMENDED PLAN

The Recommended Plan for the Marleau Avenue EA Study was finalized following comments received from Public Open House No. 2. The Recommended Plan for the roadway improvements is therefore based on both the Technical Advisory Committee's evaluation and public and stakeholder comments.

6.1 Summary of Recommended Transportation Plan

The Recommended Plan was selected and endorsed by the Technical Advisory Committee as the long term solution for Marleau Avenue. The Recommended Plan includes the combination of the following Marleau Avenue preliminary design alternatives;

- **Section 1 & 2 -** Alternative 2 – 5-Lane Urban Undivided (including CTWLTL); and
- **Section 3 -** Alternative 3 **–** Widening to the North (4-Lane Urban Divided)

Based on comments received at the second Public Open House, several technical refinements were carried forward by the TAC. They include:

1. Residential property acquisitions will be shown at the west limits of the project for 2 properties in the northwest quadrant of the Ninth/Marlborough intersection to accommodate sidewalks
2. An auxiliary lane will be implemented on the south side of Marleau Avenue, between Guy Street and Iroquois Street to accommodate access/egress to residential properties
3. Include a visual screening fence along the south side of Marleau Avenue, from Iroquois Drive to Nick Kaneb Drive

The Recommended Plan provides the following site specific transportations features:

- 4-Lane Urban Divided cross section from Marlborough Street to McConnell Avenue;
- 4-Lane Urban Divided/Undivided cross section from McConnell Avenue to Carleton Street to minimize the right-of-way impacts to the Nativity Cemetery on the north-side of Marleau Avenue;
- 5-Lane Urban Undivided (including centre turn lane) cross section from Carleton Street to Nick Kaneb Drive to provide accessibility to commercial properties;
- 4-Lane Urban Divided cross section from Nick Kaneb Drive to Glenview Boulevard. Future access location to adjacent properties will be determined once development occurs;
- Varying right-of-way width to accommodate site specific constraints;
- 3.5 m vehicles lanes; and
- 1.5 m bicycle lanes.

6.2 Recommended Staging Plan

The project will be implemented in a series of stages as funding becomes available and to allow for property acquisition. The project stages and expected timing will include:

Stage 1

- Roadwork from Marlborough Street to Alice Street (0-5 years)
- 2 residential homes required
- * Nick Kaneb Drive Extension EA (0-3 years)

Stage 2

- Roadwork from Alice Street to Iroquois Street (10 year planning horizon (subject to property acquisition))
- 12 residential homes required

Stage 3

- Roadwork from Iroquois Street to Glenview Boulevard (10 years)
- No residential homes required

The City of Cornwall maintains the flexibility to stage each phase of the project if and when traffic volumes warrant improved safety, funding becomes available and properties along the corridor are acquired.

The Recommended Plan is shown in **Figure 6-1**.

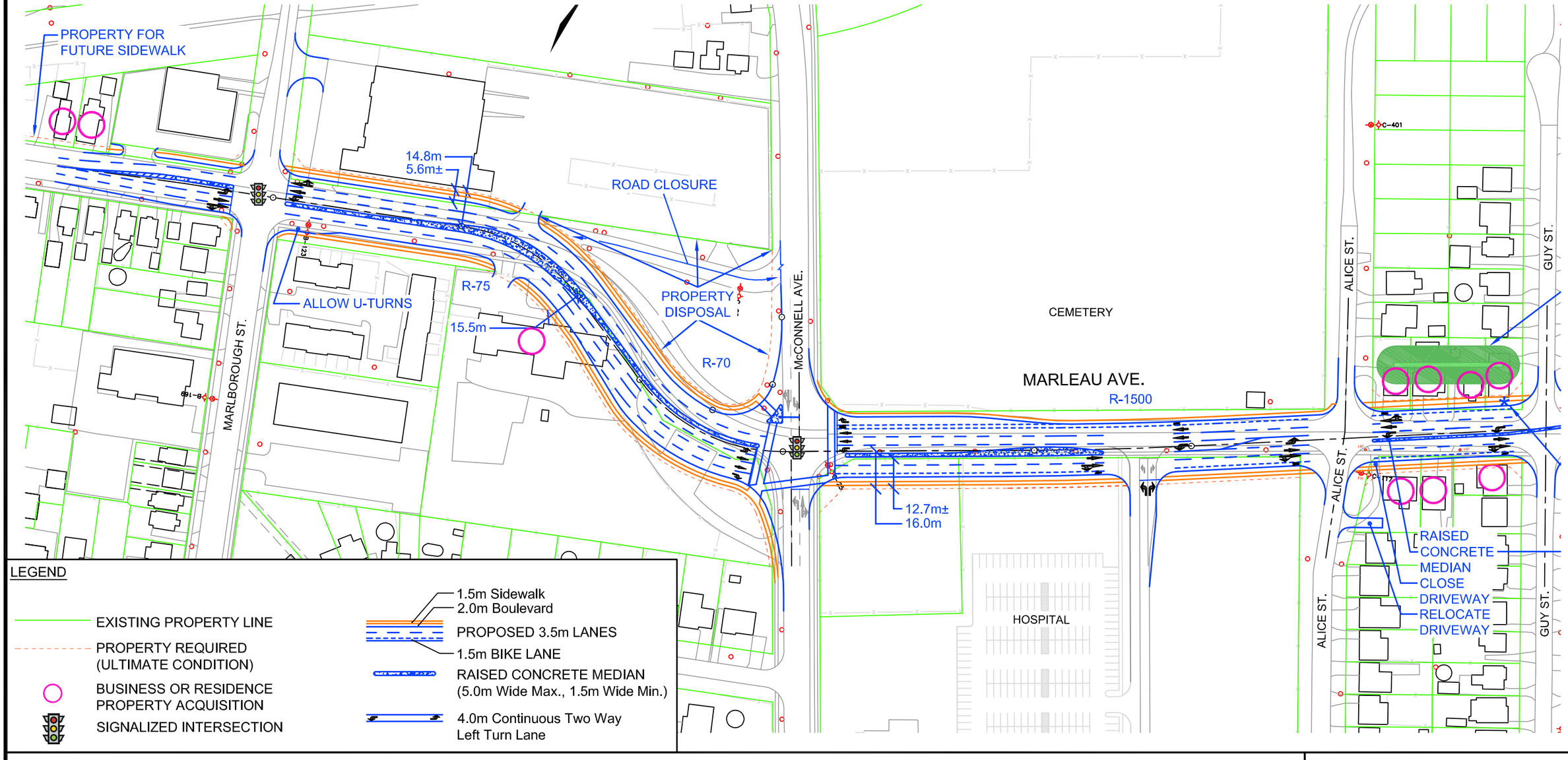


FIGURE 6 - 1A

SCALE: N.T.S.

RECOMMENDED PLAN

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

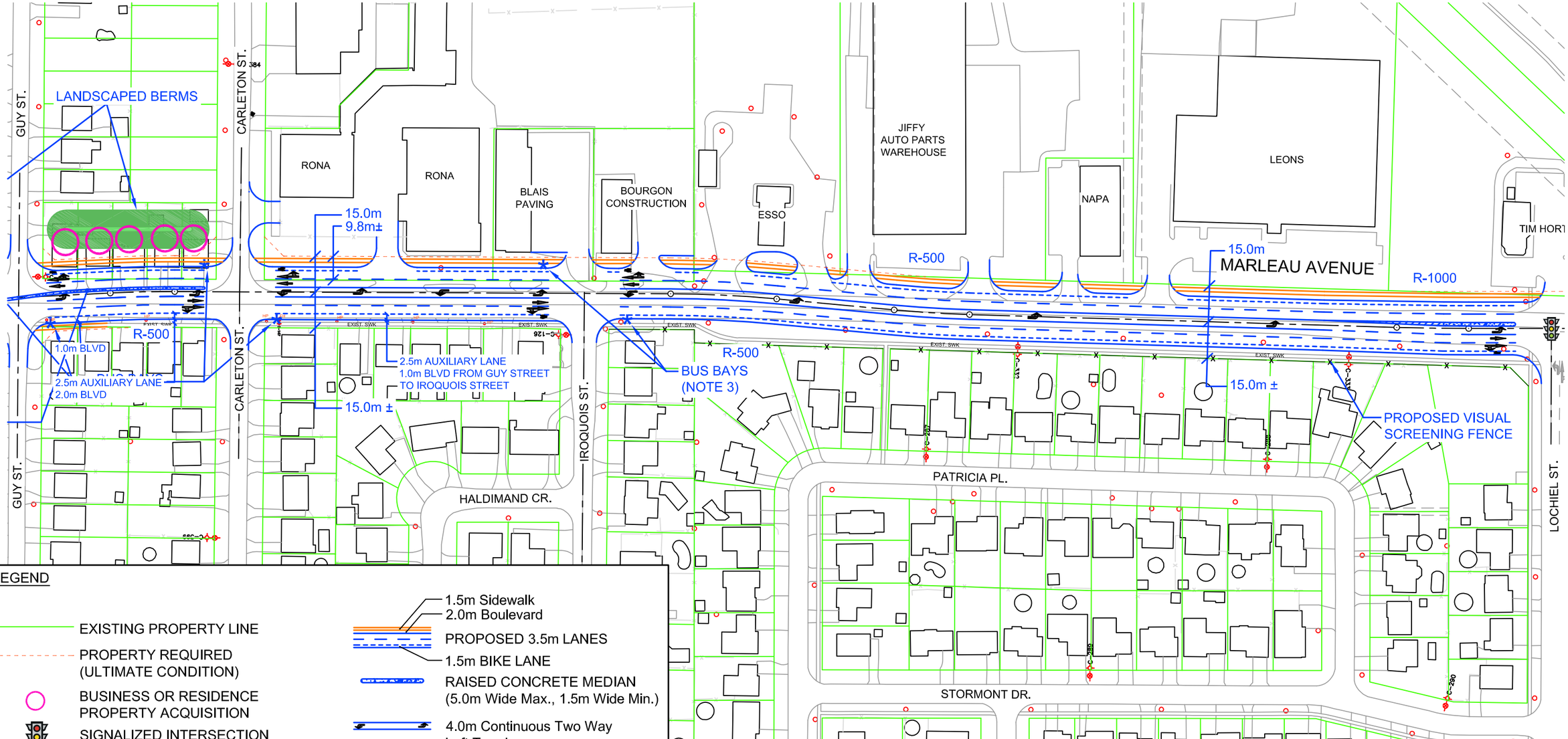


FIGURE 6 - 1B

SCALE: N.T.S.

RECOMMENDED PLAN

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall ONTARIO CANADA

GENIVAR

OT-09-114-RECOMMENDED PLAN JAN 2011.dwg - Tue, 25 Jan 2011

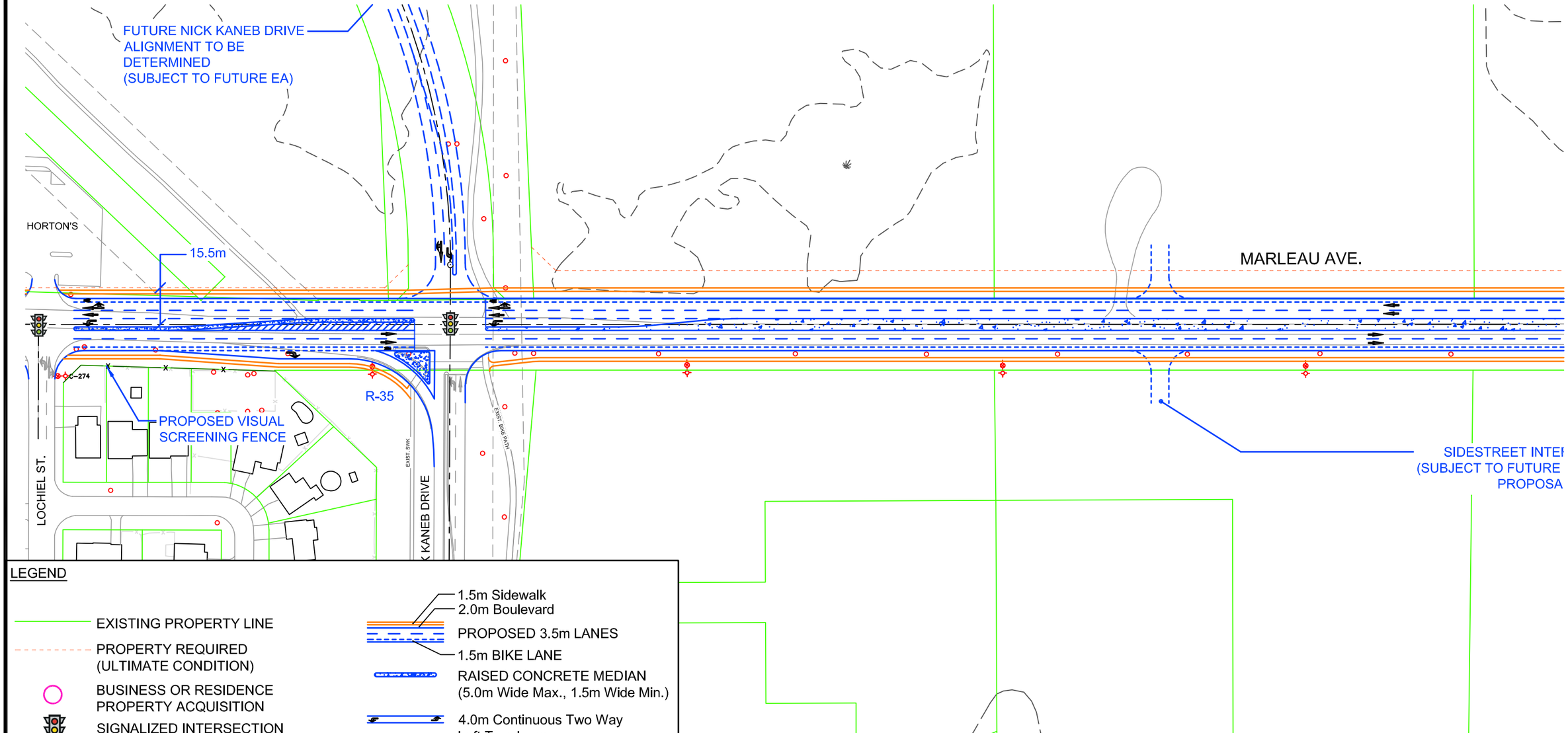


FIGURE 6 - 1C

SCALE: N.T.S.

RECOMMENDED PLAN

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

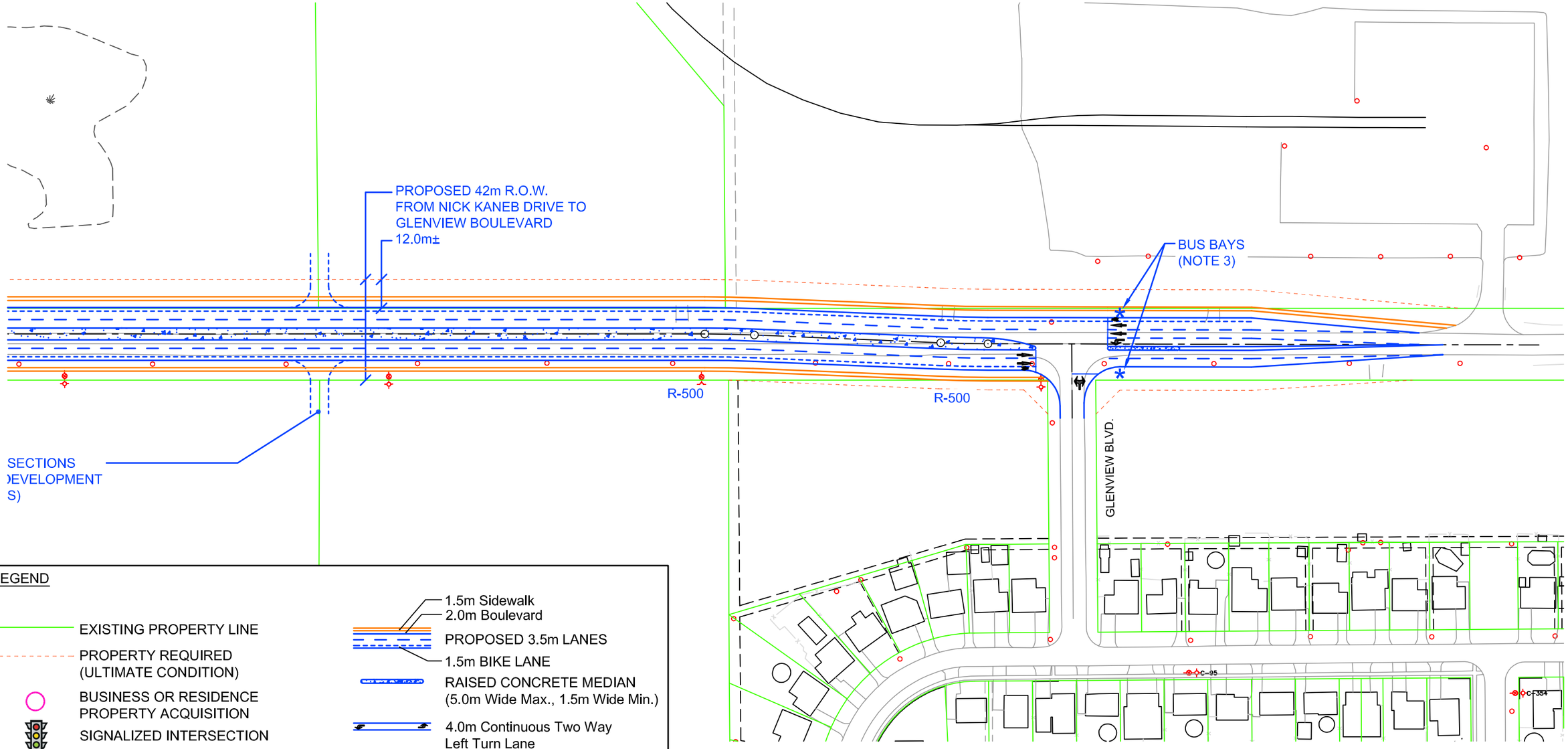


FIGURE 6 - 1D

SCALE: N.T.S.

RECOMMENDED PLAN

MARLEAU AVENUE WIDENING IMPROVEMENTS
(FROM MARLBOROUGH STREET TO GLENVIEW BOULEVARD)
ENVIRONMENTAL ASSESSMENT STUDY

Cornwall
ONTARIO CANADA

GENIVAR

7.0 AREAS OF ENVIRONMENTAL SENSITIVITIES AND MITIGATION MEASURES

The remaining areas of concern, related to the Recommended Plan, will be mitigated to minimize or remove any detrimental effects. The following subsections provide a description of areas of mitigation that will be considered during the implementation phase of the project. This includes:

- the natural, social, and cultural environments;
- land use, and property;
- construction material management;
- implementation requirements; and
- municipal services.

In addition, this section will discuss the following:

- estimated construction costs;
- downstream/cumulative impacts;
- summary of remaining areas of concern;
- 30-Day public review; and
- modification process.

7.1 Natural Environment Concerns

Natural environment concerns include surface water, fisheries/aquatic habitat, erosion and sediment control, groundwater, and vegetation.

Surface Water

As part of the implementation of the Recommended Plan, existing/improved stormwater sewer system will be utilized throughout the length of the improved roadway to accommodate storm water run-off.

The effective implementation of erosion and sediment control measures, spill contingencies and the implementation of best management practices during construction will be required.

Erosion and Sediment Control Plan

During the construction phase of the project, interim solutions will be required to deal with surface water run-off and corresponding offshoot effects such as erosion and sedimentation. Solutions could involve a combination of measures including:

- Providing ditching where possible until run-off can be redirected to the permanent stormwater sewer system;
- Implementing erosion and sediment control measures (i.e. hay bales placed in strategic locations); and
- Pumping excess water run-off from the construction site and/or local detour routes as required and discharging into nearby ditching.

A Plan will be prepared to manage the flow of sediment into storm sewers and surface

water. This plan will be based on best control management practices including the *Guideline on Erosion and Sediment Control at Urban Construction Sites*. The design elements associated with the plan will be identified in the detail design process and construction specifications. To mitigate any unforeseen areas predisposed to erosion or sedimentation, the contractor will be required to prepare an erosion and sedimentation control plan prior to commencing work on the site. The plan will be prepared to the satisfaction of the City.

Fisheries and Aquatic Habitat

No impacts to fisheries and aquatic habitat are anticipated with the improvements to Marleau Avenue.

Groundwater

The study area is serviced by the municipal water supply. Where required, construction activities will incorporate measures to mitigate impacts to groundwater.

Natural Environment

No significant natural environment concerns are known or suspected in the study area. Eleven (11) trees on the Sister's Cemetery property (Southeast quadrant of the Marleau/McConnell intersection) will need to be removed to accommodate the roadway widening. New trees will be planted on the property adjacent to the new roadway during construction.

A preliminary Environmental Protection Plan has been developed in order to identify measures to mitigate the impacts of the roadway improvements. These measures are recommended for implementation to address the anticipated components of related construction activities, which have the potential to negatively affect aquatic and terrestrial environment and will require management. The following major components of a future environmental protection plan are presented:

- The establishment of erosion/sediment controls will be necessary at construction sites to enclose utility excavations and exposed ground for roadway construction to prevent migration of sediments towards any ditching/watercourses. Erosion control fencing should be placed around all ongoing construction activity areas as well as at adjacent locations where supplies or excavated materials and imported fills may be temporarily stored. Fencing is to be checked routinely for effectiveness and regularly cleared of silt accumulation to ensure the integrity of erosion prevention/sediment containment measures. Areas of exposed soil, especially newly graded areas that cannot be immediately stabilized with the final surface treatments are to be treated with straw mulch, erosion blanket, sod, or hydroseed, depending on the specific circumstances.

- The possibility of dewatering for utilities placement has the potential to introduce sediments to local ditching/watercourses. Methods must be identified for isolating construction activities from aquatic habitats and suitable methods must be developed for reintroduction of dewatering effluent to the watercourse without impact. Where it becomes necessary to dewater excavation areas, effluent should be directed over grassed areas. Filter bags may necessarily be attached to pump outlets, which must be located no closer than 30 m from any water body. Settling ponds, swales and check dams and/or any other measures must be incorporated as necessary to prevent sedimentation of the adjacent watercourses. A Permit to Take Water (PTTW) may be required from the Ministry of the Environment.

- Any removal of trees and shrubs must be minimized given the limited vegetation cover. Approved vegetation clearing should only be undertaken before the onset of the avian breeding season, as per the federal *Migratory Birds Act*. Tree cutting should only be permitted after August 1 and before May 1 to prevent destruction of migratory bird nests. Upon the completion of construction, disturbed areas should be replanted with site-appropriate indigenous trees and shrubs. Snow fencing must be utilized to protect any existing vegetation and to delineate areas not to be disturbed by construction activities.

- Operating, refuelling and maintenance of construction equipment and the handling and storage of toxic materials (e.g. fuel, lubricants, form oils, paints, wood preservatives, and other chemicals) must be carried out in such a way as to avoid contamination of soils, groundwater and surface waters. Temporary materials and equipment storage locations must be approved. Measures must be in place to reduce the risk of spills and to minimize impacts of accidental spills during construction, including a contingency plan ready for immediate implementation that includes immediate reporting of incidents to MOE's Spills Action Centre. In addition, there must be adequate measures to prevent or capture and contain any debris and spills resulting from construction activities. All such measures and procedures will conform to pertinent provincial requirements.

- The implementation of stormwater quality best management practices is recommended to accommodate new pavement surface areas. As well, opportunities to retrofit existing roadway surfaces and direct runoff to new stormwater quality treatment facilities should be pursued to aid in the surface water quality improvement effort.

7.2 Social and Cultural Environment Concerns

Archaeology

Stage 1 and Stage 2 Archaeological Assessments were undertaken and no archaeological resources were found within the Study Area. If during construction, deeply buried/undetected archaeological remains are uncovered, the constructor or agents should immediately notify the Archaeology Section of the Ministry of Tourism and Culture (MTC) (416) 314-7146. In the event that human remains are encountered during construction, the proponent should immediately contact the Police, MTC and the Cemeteries Registry of the Ministry of Consumer and Business Services (416) 326-8393.

Noise

No noise impacts requiring mitigation were identified for the Study Area. The future sound levels for the Recommended Plan are consistent with the future sound levels without the introduction of road improvements. Increased noise levels will be experienced during construction. To mitigate construction noise, construction noise constraints will be incorporated into the contract documents, including requirements to comply with local municipal by-laws, to minimize the idling of construction equipment and to maintain construction equipment in good working order.

Community

The Recommended Plan identifies the need to provide sidewalks on both sides of Marleau Avenue and a closed storm sewer system throughout the study corridor.

Visual intrusion is a concern where the future 4-lane roadway is located adjacent to backyards of existing residences between Iroquois Street and Nick Kaneb Drive. Where possible, it is recommended that a visual screening fence be installed as per the Recommended Plan and form part of the detail design.

Traffic

Residents and business owners will be notified regarding the timing of construction and possible traffic delays. Emergency service providers and school boards will also be notified of the construction schedule.

An auxiliary lane has been implemented on the south side of the Recommended Plan between Guy Street and Iroquois Street to accommodate improved access/egress and safety to residential properties along Marleau Avenue.

Utilities

Utilities were contacted to establish all existing plants within the study area. Relocations have been identified where conflicts exist with the proposed improvements. The major utility relocation requirement will be the relocation of Cornwall Electric hydro poles. Utility locations will be confirmed at the detail design phase.

7.3 Land Use and Property

Prior to construction, property owners along Marleau Avenue will be contacted, informing them of the upcoming construction activities. In cases where frontage is required, the contractor will reconfirm with the homeowner the access configuration (i.e. right-in-right-out accesses will be provided as per the Recommended Plan). In addition, the City of Cornwall will erect signs indicating when construction is likely to begin.

The Recommended Plan requires the acquisition of fourteen (14) residential dwelling units and frontage from various residential, commercial and institutional properties. Financial compensation will be provided for the purchase of residential dwelling units and lands required. Permission to access adjacent properties will be acquired by the contractor prior to construction.

7.4 Preliminary Mitigation Summary

Table 7.1 summarizes the potential environmental impacts and proposed mitigation for the project.

Table 7.1
Preliminary Mitigation Summary

Potential Environmental Impact	Concerned Agency/ Stakeholder	Mitigation
Surface Water, Groundwater and Erosion and Siltation Impacts during Construction	Ministry of the Environment (MOE)	• Standard temporary erosion and sedimentation control measures will been incorporated in the contract package in accordance with OPSS 577 (Construction Specification for Temporary Erosion and Sedimentation Control Measures) and NSSP (Environmental Constraint – Erosion and Sedimentation Control – General) to specify generic erosion and sedimentation protection measures for ditching and watercourses. • Stormwater will be directed to storm sewer and stormwater management facilities.
Removal of Trees	Sister's Cemetery	• New trees will be planted on the cemetery's property adjacent to the new roadway during construction to replace the removal of the eleven trees.
Archaeological Resources	Ministry of Tourism and Culture (MTC)	• Although no archaeological resources were found within the Study Area, should deeply buried/undetected archaeological remains be uncovered during construction, the constructor or agents should immediately notify the Archaeology Section of the Ministry of Tourism and Culture (MTC) (416) 314-7146. In the event that human remains are encountered during construction, the proponent should immediately contact the Police, MTC and the Cemeteries Registry of the Ministry of Consumer

Table 7.1
Preliminary Mitigation Summary

Potential Environmental Impact	Concerned Agency/ Stakeholder	Mitigation
		and Business Services (416) 326-8393.
Noise Impacts	Public	• Noise restrictions during construction.
Visual Intrusion	Property Owners	• Installation of a visual screening fence along south side of Marleau Avenue for properties between Iroquois Street and Nick Kaneb Drive.
Traffic Disruption	City of Cornwall	• Residents and business owners will be notified regarding the timing of construction and possible traffic delays. Emergency service providers and school boards will also be notified of the construction schedule.
Safety of Access/Egress to Residential Properties along Marleau Avenue	Public	• An auxiliary lane has been implemented on the south side of the Recommended Plan between Guy Street and Iroquois Street to accommodate improved safety for access/egress to residential properties along Marleau Avenue.
Utility Impacts	Cornwall Electric	• Liaise with Cornwall Electric during detail design stage to develop a pole location plan.
Property Acquisitions (Fourteen (14) residential dwelling units and frontage from various residential, commercial and institutional properties) required	Property Owners	• Financial Compensation.

7.5 Construction and Material Management Plans

Several construction management plans will also be developed to account for temporary impacts to adjacent residents due to construction activities. This includes noise, dust and vehicular delay impacts.

Shoring Plan

The contractor will be responsible for selecting and designing the excavation and support methods required throughout the contract. The procedures shall be submitted to the City to ensure safe installation of services.

Dewatering Plan

The contractor will be responsible for submitting to the City its method(s) on how to handle groundwater during service installations to ensure safe installation of services. Should dewatering involve storage or diversion of water in excess of 50,000 litres per day, a Permit to Take Water will be required.

Pre-Construction Inspection

The contractor will be responsible for completing a pre-construction inspection of buildings, and structures within and around the vicinity of the work area for both the interior and exterior conditions. This inspection will ensure that the state of a building and/or structure is satisfactorily documented prior to construction to resolve possible claims by residents or building owners during and after construction.

Vibration Monitoring Plan

The contractor will be responsible for completing an initial vibration analysis based on existing conditions. During the course of construction, the contractor shall complete vibration monitoring in order to control the amount and effects of vibration from construction operations.

Construction Waste Management Plan

General management and disposal of construction waste and debris by the contractor will be similar to the guidelines and practices of the Ontario Provincial Standard Specifications (OPSS) 180 and shall conform to *Ontario's Environmental Protection Act* and associated regulations (notably Regulation 347) and if applicable, to the *Ontario Dangerous Goods Transportation Act* and the *Canadian Transportation of Dangerous Goods Act*.

Environmental Protection Plan

It will be the responsibility of the contractor to ensure that no contamination, waste or other substances, which may be detrimental to the environment, will enter the environment as either a direct or indirect result of construction. In this regard, any floating debris resulting from construction which accumulates in drainage ditches and/or creeks is to be immediately cleaned up and disposed of. Any spills or contamination, waste or other substances which may be detrimental to aquatic life or water quality will also be immediately cleaned up.

Watercourse / Fisheries Protection Plan

The contractor will be responsible for implementing measures during construction that prevent any sediments/ petroleum products from entering the watercourse (i.e. using silt fencing, check dams and debris capture devices). Adjacent to all watercourses, storage of materials and refuelling of equipment will be prohibited.

Emergency Response Plan

The preparation of an Emergency Response Plan by the contractor shall allow for full emergency services access during the construction period, such that access is maintained to all residential properties and other land uses in the event of an emergency. Additionally, the emergency response plan should include provisions for providing temporary services to end users in the event of a construction-related service outage or other service disruption. A Spills Response and Reporting Plan will be prepared and adhered to by the contractor.

Management of Contaminated Materials

The MOE and Construction Manager should be notified immediately upon discovery of any contaminated material encountered within the construction area. If contaminated materials or contaminated groundwater are encountered within the construction limits, these are to be removed and disposed of in accordance with all applicable Acts and Regulations. Recommendations regarding material, handling, storage and remediation/disposal will be incorporated and monitored during construction.

Traffic Control Plan

The contractor will be responsible for developing a plan which outlines procedures for controlling vehicular and pedestrian traffic movements. The plan may include items such as staging sequences, work, public, and emergency vehicle access and egress, public access and separation from hazardous areas, temporary barriers, removal of old pavement marking, and traffic control layouts and devices. This plan shall be submitted to the City for approval.

7.6 Implementation

The project will be implemented in a series of stages as funding becomes available and to allow for property acquisition. The project stages and expected timing will include:

Stage 1

- Roadwork from Marlborough Street to Alice Street (0-5 years)
- 2 residential homes required
- * Nick Kaneb Drive Extension EA (0-3 years)

Stage 2

- Roadwork from Alice Street to Iroquois Street (10 year planning horizon (subject to property acquisition))

- 12 residential homes required

Stage 3

- Roadwork from Iroquois Street to Glenview Boulevard (10 years)
- No residential homes required

The City of Cornwall maintains the flexibility to stage each phase of the project if and when traffic volumes warrant improved safety, funding becomes available and properties along the corridor are acquired.

7.7 Municipal Services

Municipal services, including future watermains, storm sewers, and sanitary sewers, will be constructed within the roadway right-of-way as part of the construction of the roadway.

7.8 Estimated Construction Costs

The preliminary cost estimate to complete the construction of the Recommended Plan is approximately $11.5 million. The estimated costs do not include traffic signals or municipal services such as watermains and sanitary sewers.

7.9 Council Approval

The City of Cornwall Council endorsed the Recommended Plan on August 8, 2011. Refer to **Appendix B.**

7.10 30-Day Public Review

A 30-day public review of this ESR began on September 19, 2011 following Council approval. During this period, there will be an opportunity for an individual to request a *Part II Order* which is a request for the project to be "bumped-up" to an Individual Environmental Assessment.

7.11 Modification Process

Should there be a need in the future to make a change to the Recommended Plan once the EA process has been completed and prior to construction, it will be necessary to determine whether a minor or major change is required. A major change would require an amendment to this EA (as prescribed in the Municipal Class EA, June 2000), while a minor change would not.

A major change would be defined as a proposed shift of roadway alignment (i.e. horizontal or vertical profile) for the Recommended Plan that would generate impacts not accounted for in the original EA. An addendum to this EA would need to be completed to document the change and allow for public and agency review of the proposed change.

A minor change may be defined as a design change in landscaping, lighting treatment, median widths, vehicle lane widths, intersection improvements and/or underground infrastructure. Minor changes would be dealt with during the detail design phase and would not require public consultation.

8.0 CONCLUSIONS

The findings of this report were based on the application of the Environmental Assessment (EA) process, as outlined in the Class Environmental Assessment (EA) for Municipal Roads. The principles and methodology of the EA process assisted the Technical Advisory Committee in the analysis and evaluation of alternatives and the selection of the Recommended Plan. The participating public and government agencies have directly and indirectly endorsed these findings through their active participation throughout the course of the study.

This Environmental Study Report (ESR) will be filed with the City Clerk and be available for review at the City's engineering department, local library and City Hall. If public concerns regarding this project cannot be resolved, any person may request that the Minister of Environment requires the proponent to comply with Part II of the EA Act (which addresses individual EA's). If no concerns are expressed within 30 days of filing this document and notification thereof, the project can proceed in accordance with the recommendations of the ESR.

Specifically, the approval of the ESR will enable the City of Cornwall to carry out detail design followed by construction.

9.0 GLOSSARY OF TERMS

- **AADT** — Annual Average Daily Traffic – the average 24-hour, two-way traffic for the period from January 1st to December 31st.
- **Alignment** — The vertical and horizontal position of a road.
- **Alternative** — Well-defined and distinct course of action that fulfills a given set of requirements. The EA Act distinguishes between alternatives to the undertaking and alternative methods of carrying out the undertaking.
- **Alternative Methods** — Alternative ways of carrying out the selected alternative which may include preliminary design, detail design, construction or maintenance alternatives.
- **Alternatives To** — Alternative ways of solving a documented transportation deficiency or taking advantage of an opportunity.
- **ANSI** — Area of Natural or Scientific Interest
- **Berm** — Earth landform used to screen areas.
- **BMP** — Best management practice.
- **Bump-Up** — The act of requesting that an environmental assessment initiated as a class EA be required to follow the individual EA process. The change is a result of a decision by the proponent or by the Minister of Environment to require that an individual environmental assessment be conducted.
- **Bypass** — A form of realignment in which the route is intended to go around a particular feature or collection of features.

• **CEAA**	Canadian Environmental Assessment Act
• **Class Environmental Assessment Document**	An individual environmental report documenting a planning process which is formally submitted under the EA Act. Once the Class EA document is approved, projects covered by the class can be implemented without having to seek further approvals under the EA Act provided the Class EA process is followed.
• **Class Environmental Assessment Process**	A planning process established for a group of projects in order to ensure compliance with the Environmental Assessment (EA) Act. The EA Act, in Section 13 makes provision for the establishment of Class Environmental Assessments.
• **Compensation**	The replacement of natural habitat lost through implementation of a project, where implementation techniques and other measures could not alleviate the effects.
• **Corridor**	A band of variable width between two locations. In transportation studies a corridor is defined area where a new or improved transportation facility might be located.
• **Criterion(a)**	Explicit feature or consideration used for comparison of alternatives.
• **Decibel (dB)**	A logarithmic unit of measure used for expressing level of sound.
• **dBA**	'A' weighted sound level; the human ear cannot hear the very high and the very low sound frequencies as well as the mid-frequencies of sound, and hence the predicted sound levels, measured in dBA, are a reasonable accurate approximation of sound levels heard by the human ear.

- **Detail Design** — The final stage in the design process in which the engineering and environmental components of preliminary design are refined and details concerning, for example, property, drainage, utility relocations and quantity estimate requirements are prepared, and contract documents and drawings are produced.
- **DFO** — Department of Fisheries and Oceans.
- **Dichotomous Utility Function** — A utility function that represents a desirable or undesirable response from a criterion (yes/no, present/absent, true/false)
- **Dimensionless Number** — A number that does not have a measurement unit, such as length, associated with it. Examples include utility score and overall score.
- **Double Counting** — Unintentional accounting for a particular factor more than once through the evaluation method.
- **EA** — Environmental Assessment
- **EA Act** — Environmental Assessment Act (as amended by S.O. 1996 C.27), RSO 1980.
- **Effective Lane Width** — The lane width as perceived by the driver. The implementation of this policy will be to implement all freeway effective lane widths to match the actual lane width i.e. the painted lane width will match the design lane width.
- **Emergency Work** — Construction or repair of transportation infrastructure which has been damaged as a result of an accident, natural catastrophe, or sudden facility failure, etc. that is urgently required to restore safety and use of the facility.
- **Environment**
  - Air, land or water,
  - Plant and animal life, including man,

- The social, economic and cultural conditions that influence the life of man or a community,
- Any building structure, machine or other device or thing made by man,
- Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities or man, or
- Any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

- **Environmental Effect** — A change in the existing conditions of the environment which may have either beneficial (positive) or detrimental (negative) effects.

- **Environmentally Sensitive Areas (ESA's)** — Those areas identified by any agency or level of government which contain natural features, ecological functions or cultural, historical or visual amenities which are susceptible to disturbance from human activities and which warrant protection.

- **Equivalent Sound Level (Leq)** — The level of a continuous sound having the same energy as a fluctuating sound in a given time period. In this report Leq refers to 24-hour averages.

- **ESR** — Environmental Study Report.

- **Evaluation** — The outcome of a process that appraises the advantages and disadvantages of alternatives.

- **Evaluation Process** — The process involving the identification of criteria, rating of predicted impacts, assignment of weights to criteria, and aggregation of weights, rates and criteria to produce an ordering of alternatives.

- **Excess Materials** — Materials which are surplus to the requirements of a highway construction or maintenance operation. These materials can be managed through re-use,

disposal as fill, open-burning or disposal as waste.

- **External Agencies** — Include Federal departments and agencies, Provincial ministries and agencies, conservation authorities, municipalities, Crown corporations or other agencies other than MTO.
- **Factor** — A category of sub-factors.
- **Function Form** — See Utility Function
- **HADD** — Harmful Alternation, Disturbance or Destruction of fish habitat.
- **Individual Environmental Assessment** — An environmental Assessment for an undertaking to which Assessment the EA Act applies and which requires formal review and approval under the Act.
- **Lane Width** — Defined as the travelled way to accommodate a single line of vehicles. It is measured from the centre of the roadway (or adjacent lane) to the inside edge of the shoulder including the pavement markings for the edge striping. The later space of a lane accommodates the vehicle (2.6 m maximum) wheel tracking and provides a lateral offset to hazards (curbs and/or opposing vehicles).
- **Linear Utility Function** — A function that can be defined using a linear equation of the form $y = a + bx$, where y is the dependent variable (raw score) x is the independent variable (measurement) b is the slope of the function, and a is the y intercept, normalized in this study to be equal to one or zero
- **Matrix** — A rectangular array of criteria and values.
- **Median** — The portion of a roadway separating oncoming traffic (space, barrier or combination).

- **Mitigating Measure** — A measure that is incorporated into a project to reduce, eliminate or ameliorate detrimental environmental effects.
- **Mitigation** — Taking actions that either remove or alleviate to some degree the negative impacts associated with the implementation of alternatives.
- **MNR** — Ministry of Natural Resources.
- **MOE** — Ministry of the Environment
- **MTO** — Ministry of Transportation
- **Noise Attenuation** — A mitigation measure used to lessen the intensity of the noise level (dBA) where the noise level is increased in a noise sensitive area greater than 5 dBA 10 years after completion.
- **NSA** — Noise Sensitive Area is a noise sensitive land use, which has an outdoor living area associated with the residential unit.
- **NSSP** — Non-standard special provision. Environmental NSSP's have wording for project-specific environmental protection requirements in construction and maintenance contracts.
- **OLA** — Outdoor Living Area is the part of an outdoor amenity area provided for the quiet enjoyment of the outdoor environment.
- **Overall Score** — The final value of an alternative's score derived at by summing all of the weighted scores.
- **PCG** — Public Consultation Group
- **Performance Factor** — See Utility Function
- **Planning** — That part of the planning and design process where alternatives to the undertaking and alternative

routes are identified and assessed.

- **POH** — Public Open House
- **Preliminary Design** — That part of the planning and design process, during which various alternative solutions are examined and evaluated including consideration of environmental effects and mitigation; the recommended design solution is then developed in sufficient detail to ensure that the horizontal and vertical controls are physically compatible with the proposed site, that the requirements of lands and rights-of-way are satisfactorily identified, and that the basic design criteria or features to be contained in the design, have been fully recognized and documented in sufficient graphic detail to ensure their feasibility.
- **Prime Agricultural Areas** — Prime agricultural areas as defined in municipal official plans and other government policy sources.
- **Project** — A specific undertaking planned and implemented in accordance with this Class EA including all those activities necessary to solve a specific transportation problem.
- **Proponent** — A person or agency who carries or proposes to carry out an undertaking, or is the owner or person having change, management, or control of an undertaking.
- **Public** — Includes the general public, interest groups, associates, community groups, and individuals, including property owners.
- **Ranking** — The ordering of alternatives from first to last for comparison purposes.
- **Raw data** — The measurement of the impact, or measured data, under each criterion.

- **Realignment** — Replacement or upgrading of an existing highway on a new or revised alignment.
- **Risk** — Probability that a given outcome will or will not materialize. Distinct from uncertainty in that the alternative outcomes are known or defined and that the probability of each is measurable.
- **Rounding** — Shoulder rounding is a transition between the shoulder cross fall and the granular side slope. It provides additional material beyond the shoulder for lateral support of the shoulder and provides a smooth transition for control of an errant vehicle leaving the roadway. On the higher speed facilities, this transition is extended over a greater distance.
- **Route Alternatives** — Location alternatives within a corridor.
- **SADT** — Summer Average Daily Traffic – the average 24-hour, two-way traffic for the period from July 1st to August 31st including weekends.
- **Screening** — Process of eliminating alternatives from further consideration, which do not meet minimum conditions or categorical requirements.
- **Shoulder Width** — Defined as the portion of the roadway immediately adjacent to the travelled lane (outside the painted edge striping where edge-striping is utilized). Its function includes storage or disabled vehicles, snow storage and a recovery area.
- **SP** — Standard special provision. Environmental SP's have a standard working for routine environmental protection requirements in construction and maintenance contracts.
- **Step Function** — A function can be defined by several linear functions within separate ranges that have a slope

equal to zero. For this study, two linear functions are used
y = 1, for x = desirable
y = 0, for x = undesirable

- **Sub-factor** — A single criterion used for the evaluation. Each sub-factor is grouped under one of the factors.
- **TAC** — Technical Advisory Committee
- **Traceability** — Characteristics of an evaluation process which enables its development and implementation to be followed with ease.
- **Undertaking** — In keeping with the definition of the Environmental Assessment Act, a project or activity subject to this Class Environmental Assessment.
- **Utility Function** — A function (linear, step) that represents the utility score versus the criterion measurement or desirableness.
- **Utility Score** — The "y" value derived from the utility function of the measurement of the impact induced by a particular alternative's criterion. A measurement of the usefulness of an alternative's criterion (a number between 0 and 1).
- **Waste** — Excess materials which are disposed of at a site certified under Part V of the Environmental Protection Act.
- **Weight** — The importance attributed to criterion relative to other criterion. The value of the weight is expressed in a percentage and the sum of all criterion weights is equal to 100%.
- **Weighted Additive Method** — The method used in the evaluation of alternatives, which reduces the project's numerous criteria into a dimensionless number for each alternative suitable

for comparison.

- **Weighted Score**

A raw score that has been multiplied by the criterion weights. The weighted scores reflect the social value or importance of the specific group providing weights.

Appendix A

Analysis and Evaluation Report

Appendix B

City of Cornwall Council Resolution

Appendix C

Public Open House Summary Reports

Appendix D

Natural Environment Assessment

Appendix E

Fisheries Reconnaissance Assessment Memorandum

Appendix F

Stage 1 and Stage 2 Archaeological Assessment Report

Appendix G

Land Use Planning Existing Conditions Report

Appendix H

Coarse Screening Report