

City of Barrie Bell Farm Road Improvements Study Design

DRAFT



November 9, 2016

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1.0 Study Introduction

1.1 Preface

The City of Barrie has initiated this Municipal Class Environmental Assessment (EA) to review Phases 1 and 2 and then to undertake the completion of Phases 3 and 4 of the Municipal Class EA Process for the widening of Bell Farm Road, with provisions for pedestrians and cyclists, from St. Vincent Street to a 4-lane cross section east of Alliance Boulevard, and maintaining the 4-lane cross section with improvements for pedestrians and cyclists from east of Alliance Boulevard to Duckworth Street.

The project will obtain environmental clearance and seek stakeholder consensus for the roadway improvements that will include definition of the municipal servicing to properties, roadway entrance locations, property requirements, stormwater management and potential sidewalk and bike lanes/paved shoulders or a multi-use pathway to support multiple modes of travel (pedestrian, bicycling, vehicular traffic and truck traffic).

The roadway plan will establish the servicing for the land use plan to accommodate the residential, industrial and commercial uses for the next 30- 50 years. It will need to have flexibility to accommodate future modifications to the lot fabric and land uses.

This report is the initial public document for the Bell Farm Road EA Study. It presents a blueprint of the Work Plan and Study Process for the planning and

design of this future transportation project.

1.2 Study Area

The project location is within the City of Barrie. The Study will define the entire right-of-way protection plan to accommodate:

- Proposed horizontal alignment;
- Vertical alignment;
- Widening required for stormwater management facilities (which may be shared facilities with adjacent developments should consultation determine an interest from land owners);
- Intersection treatments;
- Cross section elements (sidewalks, multi-use path, boulevards, bicycle lanes or shared lanes);
- Utilities and municipal services;
- Lighting;
- Driveway entrance locations; and
- Any required widening to accommodate grading.

The Study Area, illustrated in **Figure 1**, consists of Bell Farm Road from St. Vincent Street to Duckworth Street, including both intersections.

1.3 Need and Justification

The Multi-Modal Active Transportation Master Plan (MMATMP) addressed Phases 1 and 2 of the five-phase Municipal Class EA Process for City-wide transportation improvements.

Bell Farm Road is an existing 2-lane major collector with a rural cross section servicing commercial/industrial

properties (Section A). The east end of Bell Farm Road includes a 280 m section that is primarily urbanized with 4 lanes (Section B) and serves a mix of commercial and multi-unit residential properties. The road structure will require renewal activities in the near future. The MMATMP recommends that Section A be widened to 3 lanes with bicycle lanes and sidewalks on both sides. Section B is to maintain 4 lanes, but include buffered bicycle lanes and sidewalks on both sides of the road.

Intersection improvements shall be determined for each intersection within the study area as per the traffic operations assessment. In addition, all proposed improvements will be

developed in consideration of lane widenings identified for 2031 and 2051 where applicable.

As part of the transportation improvements, municipal infrastructure renewal is required. The existing 200 mm DI watermain is recommended to be replaced. The 250 mm AC sanitary sewer will be assessed for capacity. A stormwater management system is required for this roadway including a minor piped system that can convey the 5 year critical storm event and a major system that will convey the regulatory storm overland within the right-of-way. Stormwater quantity control (via oversized sewers) and quality control via low impact development is required.

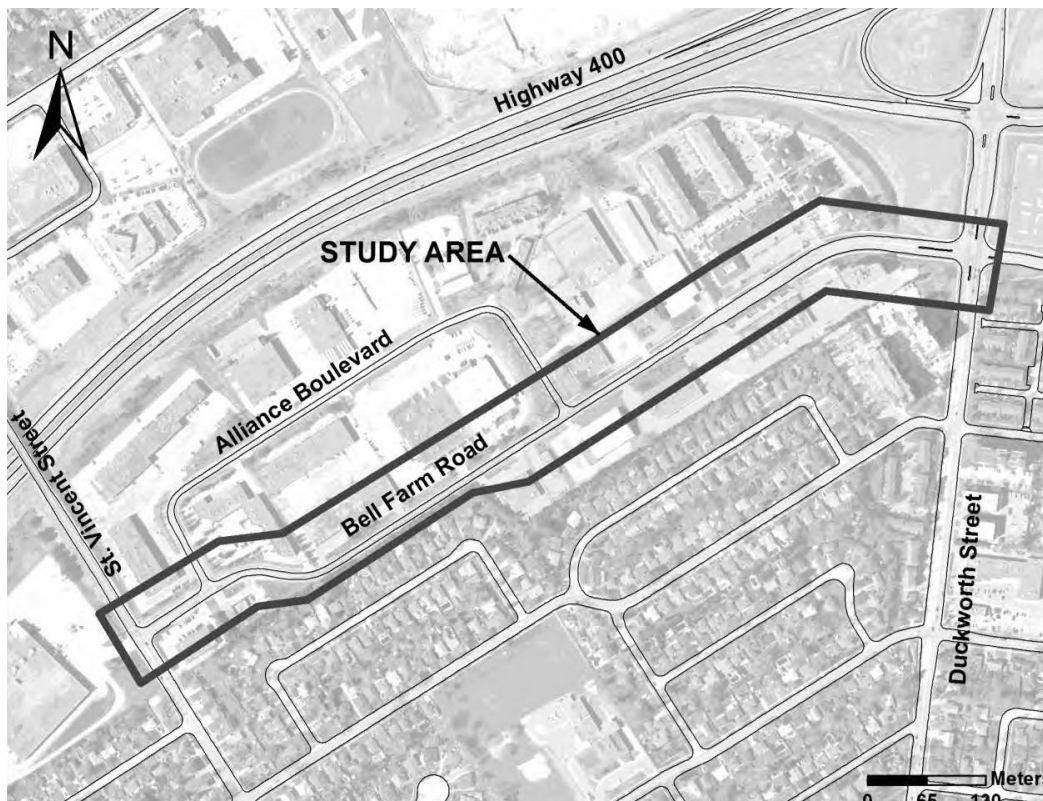


Figure 1: Study Area Study Approach

2.0 Municipal Class Environmental Assessment

This Study will be completed as a standalone EA study meeting the requirements of the Municipal Class EA. The final document will be an Environmental Study Report (ESR).

This project will complete all requirements of a Schedule C project under the Municipal Class EA by establishing the need and justification for the project, considering all reasonable alternatives with acceptable effects on the natural, social and cultural environments, and proactively involving the public in defining a recommended plan for improvements. Should the project trigger federal approvals, the documentation will present recommended mitigation measures to satisfy federal requirements in principle.

2.1 Guiding Principles

The study approach includes the following Ministry of the Environment and Climate Change's (MOECC) 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.

2.2 Environmental Assessment Act Requirements

The Environmental Assessment will follow a Class EA process meeting the requirements of the Municipal Class EA (amended 2011 and 2015).

Based on the range of anticipated effects and capital cost of the project, the study is being initiated as a Municipal Schedule C project.

This Schedule C project will include two Public Information Centres (PICs) and will conclude with the preparation of an ESR. Following this approach the public will be provided a 30-day review period at the Study conclusion. As the initial step in the Class EA process, this Study Design Report is being made available to the public as the discretionary Step 1.2 in the Municipal Class EA process illustrated in **Figure 2**. The public and agencies will have this initial opportunity to comment on the proposed approach.

2.3 EA Phases

The Municipal Class EA Process is illustrated in **Figure 2**.

The following is the specific breakdown of tasks by phase for a Municipal Schedule C project:

Phase 1: Identify the Problem (completed by the MMATMP)

Step 1: Identification and description of the problem or opportunity.

Step 2: Discretionary public consultation (Draft Study

- Design available on the City's website).
- Phase 2: Alternative Solutions (completed by the MMATMP)**
- Step 1: Identification of alternative solutions to the problem.
 - Step 2: Identify the study area and a general inventory of the natural, social and cultural environments.
 - Step 3: Identification of the net positive and negative effects of each alternative solution.
 - Step 4: Review and validation of Alternative Solutions considered by TMP and preliminary recommendation of a preferred solution.
 - Step 5: Identification of reasonable design alternatives for the preferred solution.
 - Step 6: Public consultation at PIC No.1.
 - Step 7: Confirmation; finalization of Study Design for work program; and refinements and/or addition of design alternatives to be carried forward for Phase 3.
 - Step 8: Selection of the preferred solution, following public and agency review.
- Phase 3: Alternative Design Concepts for the Preferred Solution**
- Step 1: Identification of alternative designs.
 - Step 2: Preparation of a detailed inventory of the social and economic environments.

- Step 3: Identification of the potential impacts of the alternative designs.
 - Step 4: Evaluation of the alternative designs.
 - Step 5: Public consultation at PIC No. 2.
- Phase 4: Environmental Study Report (ESR)**
- Step 1: Completion of the ESR.
 - Step 2: File the ESR and Notice of Completion.
 - Step 3: 30-day public review period
- Phase 5: Implementation**
- Future phase after this Study.
- The simplified generalized EA process is illustrated in **Figure 3**.

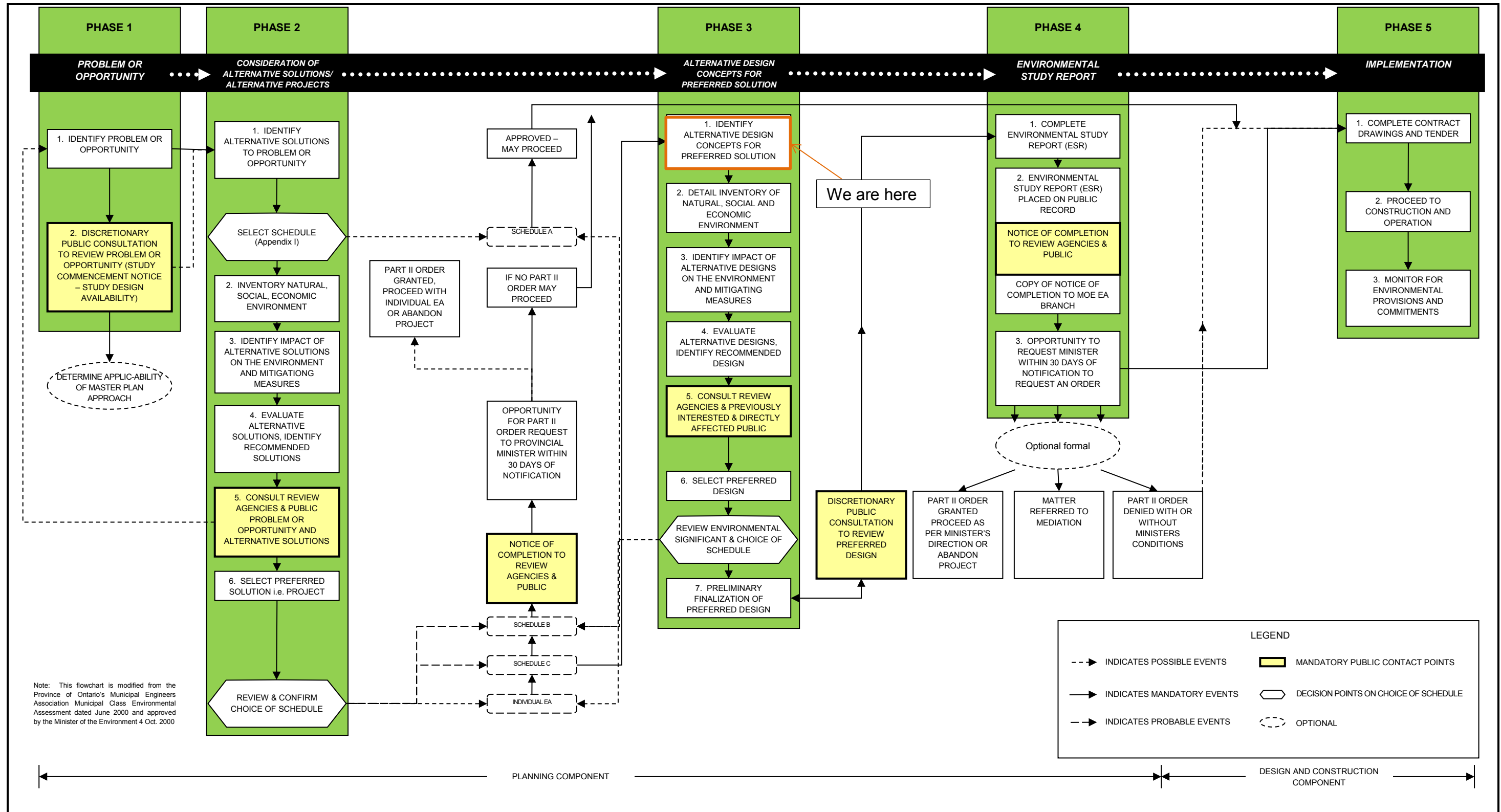
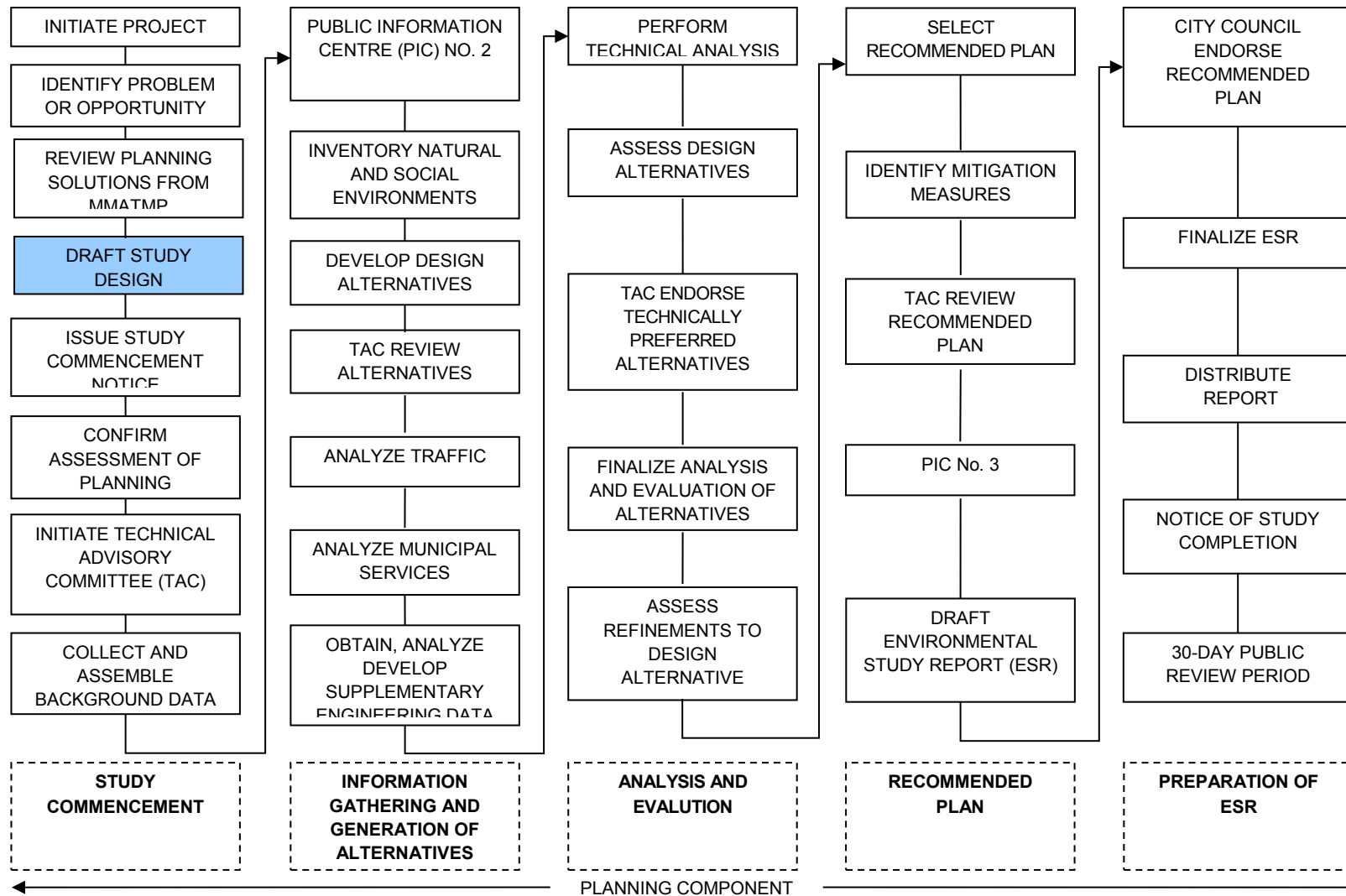


Figure 2: Municipal Class EA Process



STUDY PROCESS IS HERE

Figure 3: Generalized Study Process

3.0 Study Process

3.1 Public Consultation Process

The consultation process will use several techniques to proactively involve the public including Public Information Centres (PIC's), and meetings with external agencies. Meetings will be organized with a Technical Advisory Committee (TAC), and will include as a minimum, Lake Simcoe Region Conservation Authority (LSRCA), and Emergency Services. These meetings will be in addition to the progress meetings with the Project Team.

The use of separate meetings with project team and interest groups will ensure a high level of communication with the community on issues and alternatives.

Two rounds of Public Information Centre meetings will be held to present the project, the assessment of opportunities, the preliminary transportation improvement alternatives and the prioritization of improvements. The PIC's will be an integral component of the studies - seeking input and comments from the local road users/ stakeholders.

With respect to public involvement, the work program proposes the following key elements:

- Study commencement notice and PIC notices in local papers.
- Maintaining and updating study mailing lists.
- Facilitating a Value Planning workshop with agency, City and

stakeholders early in the Study to solicit opinions and receiving early input to prepare the draft Study Design.

- Submission and review of a Draft and Final Study Design Report (Scoping Document) that will be available on the City's web site for public review.
- PIC No. 2 (1st PIC for this project stage) will present the project goals, problem and opportunity statement, Draft Study Design (Work Plan), environmental inventories, traffic analysis, assessment of Planning Solutions and seek public/agency input. A session will be scheduled to present information to agencies and elected officials in advance of the public.
- PIC No. 3 (2nd PIC for this project stage) will present the assessment of design alternatives and the Technically Preferred Alternative (TPA) for the Study Area. Council members will be invited to an advance session of the PIC and the consultant will be available to present to Council in advance of the public meeting.
- Public presentation to Council to seek endorsement of the study recommendations (these endorsements will be included as an Appendix in a final ESR).

PIC No. 1 occurred as part of the MMATMP. This project will have two PICs, PIC No. 2 and PIC No. 3.

It is essential that there be contact and interaction with the following major agencies and groups including: First Nations, Public, DFO (Federal Fisheries Act), LSCRA, Ministry of Natural Resources and Forestry (MNR), Ministry of the Environment and Climate Change (MOECC), Ministry of Tourism, Culture and Sport (MTCS), and Utility Companies.

3.2 Work Program

The major elements of the technical work program to be completed include the following:

Task 1: Project Start-Up

Upon initiation of the projects, a meeting will be held to: review study scope, budget and schedule; establish membership, meeting dates and role of the Project Team, Staff Technical Committee, and Stakeholder's Group; review the Notice of Study Commencement; and prepare all required agreements. The Project Team and Staff Technical Committee will provide guidance into the technical elements of the study including the study issues, data collection, and weighting of factors and the evaluation of alternatives.

Task 2: Information Gathering

The collection and organization of the data necessary for the analysis, evaluation and design activities will include:

- Assembly and review of study materials;

- Field reviews and the collection of photographs to maintain a visual record of existing conditions;
- Collect reports and modelling data/output from the City's MMATMP;
- Review the Official Plan, relevant Official Plan Amendments and Secondary Plans;
- Gather existing natural/social environmental inventories and stormwater reports; and
- Review of existing and projected traffic volumes as identified in any area traffic studies and the Multi-Modal Active Transportation Master Plan.

Task 3: Study Design and Value Planning Workshop

This Study Design document will help establish the foundation for all of the remaining environmental planning and public consultation processes. The Study Design allows the early identification of the major issues and concerns, and in addition, recognizes areas of consensus or agreement and defines the Problem Statement. The preliminary identification and assessment of Planning Solutions/Alternatives to the Undertaking in the Study Area will be presented in this report for public/agency review and comment.

An early Value Planning workshop will be organized for the TAC to attend. This early workshop will allow open

discussion with stakeholders as an event before the study presents any conclusions.

Task 4: Transportation Analysis

The transportation analysis will build upon the previous work that has been completed. The operational implications of existing and projected traffic demands and the improvement alternatives will be examined. In this regard, the transportation analysis will involve the following key tasks:

- An initial review of the previous traffic modelling activities;
- Documentation of existing profile of road users including all modes of travel (vehicular, bicycles, pedestrians and emergency services);
- Analysis of forecast traffic demands and future projections, and identification of level of service for roadway links and intersections (building and documenting on previous forecasts) for land use development;
- Examination of area collision histories to identify areas of concern and possible improvement opportunities;
- identification of existing /future operational problems and timelines for need for additional capacity of the transportation network;

- Providing input into the performance of each alternative (traffic operation and safety); and
- Confirmation of the need and justification for roadway improvements and timing.

The Traffic Analysis will provide documentation of the Synchro modelling within the study area and measure the operational performance of intersections and roadway links. The traffic report will also provide recommendations on the timing of the improvements. This analysis will be used to identify the preliminary design level of geometric needs of the various alternatives (i.e. storage lengths, auxiliary lanes, signal/traffic controls, etc.) and in addition, will be used to evaluate the impacts/benefits of the various competing alternatives.

Active Transportation: The roadway design should reflect physical geometric design elements that match the community design objectives. Safety of bicycle lanes, buffered bicycle lane, raised cycle tracks or multi-use pathways and pedestrian crossings will be key elements. The key task will be the development and approval of design criteria.

Task 5: Inventory of Natural, Social and Cultural Environment

Social Environment:

Areas of investigation include existing and proposed land uses, land use

policies and regulations, aesthetics, recreation facilities, and links with pedestrian and cycling facilities. This will document the community plan of the existing and future land uses and form the baseline from which alternatives will be measured.

Noise Analysis

The acoustical assessment for this project will determine existing daytime sound level contours and future sound levels associated with the improvements for areas with existing residential (noise sensitive) land uses. STAMSON noise software will be used for the noise assessment. Noise mitigation will be assessed in accordance with applicable standards and bylaws and the MTO Environmental Reference Manual. Any proposed noise mitigation will be consistent with the existing land uses and will define the future sound levels that might need to be mitigated by land developers for future residential and noise sensitive land uses in the study area. The need for mitigation will be based on the preliminary forecasted sound change created by the proposed improvements

Natural Habitat Assessment

This non-fisheries natural environment assessment will investigate and categorize the natural and near-natural habitats of the study area, identify native biodiversity and identify their supporting ecological functions. These investigations, aided through advance

consultation with the Conservation Authority and/ or Ontario Ministry of Natural Resources and Forestry, will particularly address the potential for agency-designated significant features and functions as well as any provincially or regionally rare or ecologically significant features to be present. Particular attention will be paid to the potential occurrence of designated Species at Risk (SAR).

Cultural Heritage

A desktop assessment of available historical sources, mapping and City of Barrie information to identify potential for significant cultural heritage resources within or adjacent to the study area will be completed. The local heritage staff will be contacted to determine if any listed or designated properties are located within or adjacent to the study area. A technical memorandum outlining the preliminary screening will be completed, recommending whether additional study may be necessary to confirm the presence of cultural heritage resources; assess the potential impact of any of the selected alternatives; and identify mitigation measures that may be required to reduce adverse impacts to any identified cultural heritage resources.

Archaeology

The Stage 1 archaeological assessment to be undertaken for this project will be conducted in accordance with the Ministry of Tourism, Culture and Sport

(MTCS) Standards and Guidelines for Consultant Archaeologists (2010).

The objectives of a Stage 1 archaeological background study are: to develop an inventory of archaeological resources in the proposed area; to determine the presence of any archaeological sites in the area; and, to recommend appropriate strategies for future planning consideration. This will be accomplished by conducting detailed documentary research of the land use, archaeological history, and present condition of the property. This information will be gathered by reviewing the National Archaeological Site Registration Database. The data gathered will advise of the location, type, and significance of registered archaeological sites for a typical radius of one kilometre around the subject property. Reviewing the registered archaeological site database will identify significant heritage resources on or adjacent to the study area, and will summarize the form and extent of previous cultural heritage investigations undertaken within the general project vicinity.

Landscape Architecture

The aesthetics of the corridor will be evaluated and recommendations for complementing/ enhancing the aesthetics of the roadway will be incorporated into the preliminary streetscape design. Urban/rural corridor 'greening' techniques will be

recommended in appropriate areas in consideration of City standards. These techniques could include plantings for canopy cover, buffer plantings, riparian zone restoration and general aesthetic upgrades to the roadway. The use of salt tolerant, drought tolerant and native species wherever appropriate will be recommended.

Tree Inventory Plan and Arborist Report

The inventory component of this project is anticipated to take approximately one day to complete, with the delivery of a preservation plan and an arborist report. The report component of the program will identify trees that pose a specific risk, as well as any trees that may require removal or specific preservation criteria dependent upon the type and limits of construction, construction staging areas, and access points to successfully complete the work.

Task 6: Technical Investigations

Illumination

The existing roadway illumination will be reviewed. Available documentation will be studied and the design criteria for the roadway classification will be established. Based on these site investigation findings and the proposed roadway design, the requirements for illumination will be determined and identified. Lighting calculations with photometric printouts for various alternatives will be carried out.

Topographic & Legal Survey

A detailed topographic & legal survey will be completed within the project limits and extended as necessary where topography might deal with grading/elevation differences. The survey will establish the location of property lines in the project limits.

Drainage and Hydrology

The drainage and storm water management design criteria will be confirmed with the City. Hydrologic calculations will be performed to determine the flows for the 2 to 100 year return period rainfall events, including the regulatory event, and to establish the capacities of the existing and required system. As the various alternatives are developed, the corresponding drainage and storm water design will be developed and detailed in a storm water management plan, sufficient to permit identification of constraints and prepare preliminary cost estimates. The following is a breakdown of the drainage and hydrology work plan:

1. Background information review, field investigations, and documentation of existing conditions;
2. Determining the design criteria for drainage and stormwater management (SWM), and conceptual storm water management; and

3. Completion of hydrology studies, review SWM and low impact development alternatives, preliminary design, and final design.

Watermain and Sanitary Sewer

Watermain improvements and upgrades in the study area will also be identified. Capacity analysis of the existing sanitary sewer will be performed. This will include location and analysis of existing infrastructure, and detailed design of the recommended improvements, new alignments, services, tie-ins etc., as required.

Task 7: Development, Analysis and Evaluation of Alternatives

As previously noted, the consideration of all reasonable alternatives is a guiding principle for EA studies. The context sensitive design roadway alignment, cross section, intersection alternatives will be generated through discussions with the City, Project Team, Stakeholders Group, agencies and the general public. The list of design alternatives will be confirmed with the public, as required as part of the EA process, including the “Do Nothing” option. These alternatives will consider the community and planning visions of the study area.

This study will include a systematic, traceable analysis and evaluation of the needs in the study area, the process used to identify alternatives and the

methodology used to analyze and evaluate alternative planning solutions. Additionally, this assignment will include a comprehensive public consultation programme which will assist in the development of a recommended plan.

The identification of evaluation criteria will include potential factors such as roadway level of service, traffic safety, property impacts, noise, natural environment and cost. The evaluation process Multi Attribute Trade-off System (MATS) will assign a “weight” to each criteria and an iterative process will be used for the evaluation of individual competing alternatives. The iterative process will involve one, or possible two levels of evaluation and sensitivity testing.

The evaluation process is transparent and can be readily defended where significant trade-offs are involved. The Project Team and Staff Technical Committee will participate in weighting exercises to provide direct input into the decision-making process.

The evaluation and analysis of design alternatives will identify all improvement options and associated cost estimates including lifecycle costs, development charges, alternative construction/material options, proposed timeline and innovative solutions.

Based on the results of the MATS evaluation results, a technically preferred alternative (TPA) will be identified. A technical memorandum

outlining the results of the MATS process/Analysis and Evaluation will be completed and will include: the assessment of alternatives to the undertaking; generation and assessment of preliminary design alternatives; evaluation criteria (i.e. environmental inventories and technical investigations); selection of the technically preferred alternative; and alternative refinements to the technically preferred alternative (if applicable).

Task 8: PIC No. 2* (1st project PIC)

Public Information Centre (PIC) No. 2 will present the Problem Statement, Draft Study Design, and the preliminary analysis of Planning Alternatives. It will present preliminary recommendations for a basket of solutions.

PIC No. 2 will summarize the traffic and needs analysis, the environmental inventories, an initial list of preliminary design alternatives and potential coarse screening of those planning alternatives. The public will be given the opportunity to provide input on the priorities of evaluation criteria “Factor Groups”.

Task 9: PIC No. 3* (2nd project PIC)

PIC No. 3 will present the detailed MATS evaluation of alternatives and recommendations for a Preferred Plan. This will quantify measurable differences between the options (performance and environmental effects). This evaluation will present a sensitivity analysis of the distribution of weights by evaluators for

the evaluation criteria, which will demonstrate the trade-offs involved in the Study.

Each PIC will include coloured graphics and text boards to describe the process and opportunities for the public to provide comment.

** PIC No. 1 occurred as part of the MMATMP. This project will have two PICs, PIC No. 2 and PIC No. 3.*

Task 10: Preparation of Environmental Study Report

The preparation of the draft and final report will follow the format and content for an ESR accepted by MOECC. The ESR will document the study methodology, findings, public involvement and recommendations. A draft version will be submitted to the City and external review agencies and made available for PIC No. 2. After PIC No. 2, the document will be updated and finalized. A presentation will be made to City Council.

The project schedule includes a provisional presentation of the ESR at the General Information Committee meeting.

Task 11: Public Notification of the PIC/ESR

Individual letters (or emails) will be sent to persons/ organizations on the contact lists maintained throughout the course of the study advising of the PIC dates and

availability of the ESR. The ESR is anticipated to be available for PIC No. 3.

The ESR will be made available for review on the project website, City Hall (Clerks Office and 6th Floor Engineering), the Downtown and Painswick Libraries.

4.0 Study Schedule

A draft schedule for this Study is shown in **Table 1: Draft Study Schedule**.

Table 1: Draft Study Schedule

TASKS	DATES
Project Start-up Meeting	August 2016
Study Design	September 2016
Alternative Design Solutions	September 2016
Assessment of Planning Alternatives	September 2016
Value Planning Workshop	September 7, 2016
PIC No. 2	Fall 2016
Transportation Analysis	Fall 2016
Municipal Infrastructure Memorandum	Fall 2016
Archaeological Assessment	Fall 2016
Built Heritage and Cultural Heritage Assessment	Fall 2016
Natural Heritage Impact Assessment	Fall 2016
Arborist Report/Tree Survey	Fall 2016
Topographic Survey	Fall 2016
Legal Survey	Fall 2016
Traffic Operations Report	Fall 2016
Noise Study	Fall 2016
Draft ESR	November 2016
Development of Preliminary Design Alternatives	Winter 2017
Assessment of Preliminary Design Alternatives	Winter 2017
PIC No. 3	Winter 2017
Complete Draft Final ESR / Initiate 30% Detailed Design	Winter 2017
Final ESR/Notice of Completion	Spring 2017

5.0 Assessment of Planning Solutions

This section is a summary of the recommendations from the MMATMP. For a full assessment, please refer to the original report.

Alternative Planning Solutions represent alternative ways or methods of addressing the problem to be solved by the project. These reflect different strategies and include the “Do Nothing” approach (maintaining the status quo). Following the assessment of Alternative Planning Solutions, those alternatives judged to address the problem statement will be carried forward and will form the Recommended Planning Solution. The recommended planning solution will address the problem statement required to plan for the safety of the travelling public, while providing the best overall balance between transportation engineering objectives, life cycle costs, and other environmental, cultural, socio-economic, and land use planning objectives.

The City’s MMATMP has previously identified the need for the roadway improvements.

5.1 Alternative Planning Solutions for Bell Farm Road

In determining the preferred planning alternative for the City, Alternative Planning Solutions were analyzed in the MMATMP. These included:

- 1) Do Nothing;

- 2) Transportation Demand Management;
- 3) Limited Land Use planning; and,
- 4) Provide Transportation / Municipal Infrastructure.

The “Do Nothing” Alternative – as mandated by the Class EA, must be considered. It represents a baseline from which other approaches can be compared.

Transportation Demand Management (TDM) – This strategy would reduce vehicular demand and would encourage more active modes of transportation (cycling and walking).

Limited Land Use Planning – this strategy would be an approach that would limit any new residential development and therefore eliminate the need for roadway improvements.

Provide Transportation / Municipal Infrastructure – This strategy would be to provide roadway and intersection improvements to accommodate future demand and vehicular turning movements.

Coarse Screening of Planning Solutions

Based on traffic demands, the “Do Nothing” alternative and Limited Land Use Planning are not recommended to be carried forward.

TDM is not carried forward as standalone solution, but rather will be incorporated with the Provide

Transportation/Municipal Infrastructure alternative as a Recommended Solution. This recommendation is consistent with the findings of the MMATMP and will be presented to the public at PIC No. 2. Should no objection to this recommendation be received by the public at PIC No. 2, then it will be accepted and the study will continue forward to assess preliminary design alternatives.

6.0 Preferred Design Criteria

The design criteria for Bell Farm Road are illustrated in **Table 2**.

Table 2: Design Criteria	
Road Class	Major Collector
Posted Speed	50 km/h
Design Speed	70 km/h
Minimum Horizontal Curve Radius	200 m
Maximum Superelevation	4 %
Minimum Vertical Crest Curve:	
Crest:	K=24
Sag (headlight control):	K=20
Stopping Sight Distance	100 m
Lane Width	3.5 m
Bike Lane	1.5-2.0 m
Shared Bicycle Lane	4.5 m
Sidewalks	1.5 m to 2.0 m
Right-of-way	26m (3 lanes) to 29m (4 lanes) - midblock
Side Street Day-Lighting Distance	5 m (local to major collector)
Triangles:	10m (major collector to arterial)
Watermain Cover to Obvert	1.7 m
Storm Cover to Obvert	1.5 m
Sanitary Cover to Obvert	2.5 m or 2 % from basement elevation
Truck Route	Yes
Boulevard	Varies by cross-section
Continuous Two Way Left Turn Lane	4.0 m

7.0 Potential Preliminary Design Alternatives

Preliminary design alternatives are site specific design solutions to implement the recommended planning solution. The following sections describe the consideration of roadway and intersection improvements. The assessment of roadway improvements will be presented at PIC No. 3.

7.1.1 Coarse Screening of Preliminary Design Alternatives

Cross Section Alternatives:

The long list of cross section preliminary design alternatives for the roadway includes the following:

- 2-lane rural (Do Nothing);
- 3-lane continuous centre turn lane urban; and,
- 4-lane urban.

Based on the analysis and the recommendation from the MMATMP, it is recommended to carry forward: 3-lane urban cross section with improvements for active transportation; and maintain the existing 4-lane. This recommendation confirms the number of general purpose lanes on the street.

See the section succeeding for a discussion of active transportation (sidewalks and cycling facilities) improvements. See **Figure 4** for the cross section alternatives.

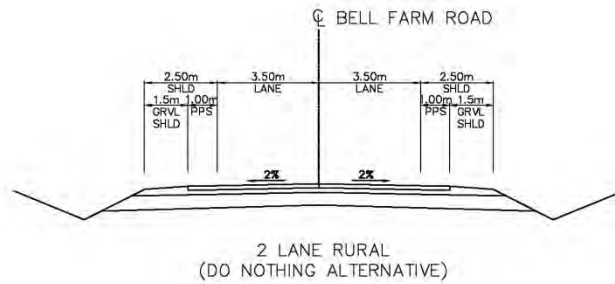
Road Improvements for Active Transportation

Road improvement alternatives for active transportation will include but not be limited to the following:

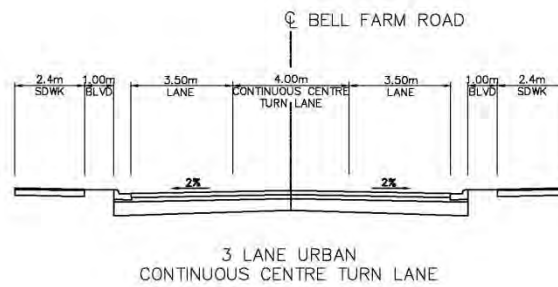
- Raised cycle tracks and sidewalks on both sides of Bell Farm Road;
- Shared 4.5 m bike/vehicular lane;
- Dedication bike lanes (1.5-2.0 m) and sidewalks on both sides of Bell Farm Road;
- Sidewalk on north side of Bell Farm Road and Multi-use Path (MUP) on south side of Bell Farm Road; and,
- Sidewalk on south side of Bell Farm Road and Multi-use Path (MUP) on north side of Bell Farm Road.

All alternatives will be carried forward for evaluation, see **Figure 5** and **Figure 6** for the 3-lane and 4-lane cross sections respectively.

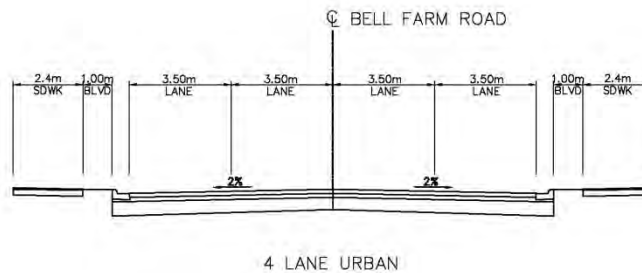
ALTERNATIVE 1 — ✘



ALTERNATIVE 2 — ✔



ALTERNATIVE 3 — ✔



Legend

- ✘ –Preliminary Recommendation Not to Carry Forward
- ✔ –Preliminary Recommendation to Carry Forward

Figure 4: Road Cross Section Alternatives Defining Number of General Purpose Lanes (Consistent with Recommendations from MMATMP)

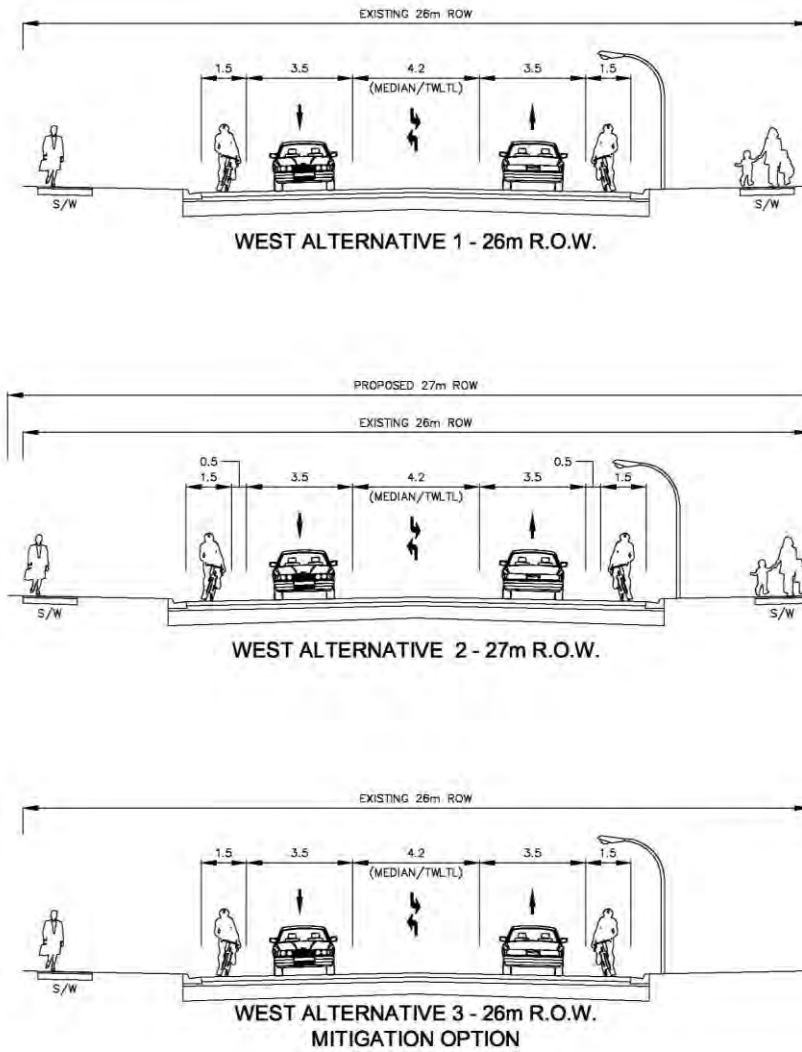


Figure 5: Bell Farm Road West Section Cross Section Alternatives

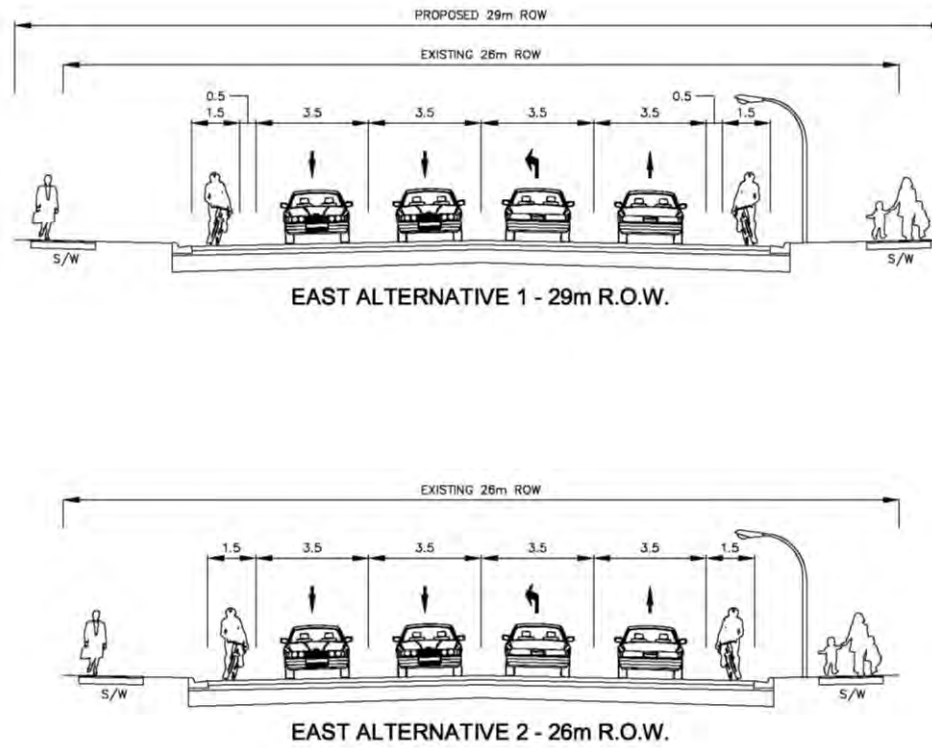


Figure 6: Bell Farm Road East Section Alternatives

Road Alignment Alternatives

Road alignment alternatives include the following:

- Widen to the north;
- Widen on the centre; and,
- Widen to the south.

Based on the level of adjacent development, a preliminary recommendation is to carry forward equal widening on each side (widen on the centre). This preliminary recommendation will be presented at PIC No. 2 (first PIC for this project) for public comment.

Stormwater Management Best Management Practices

- Major / Minor System Design
- Oversized Pipes
- On-Site and Off-site Control Devices and Facilities
- Mechanical Treatment Devices

Low Impact Development Practices

- Soakaways, Infiltration Trenches and Chambers
- Bioretention
- Vegetated Filter Strips
- Permeable Pavement

- Enhanced Grass Swales
- Perforated Pipe Systems

Mitigation of Visual Intrusion Alternatives

The mitigation of visual intrusion alternatives will include but are not limited to the following:

- Protect existing coniferous trees (adjacent to residential land uses);
- New noise barrier/visual screen;
- Planting of new trees on private property for visual screening; and,
- Planting of new trees in ROW for visual screening.

Sidewalk Alternatives

The sidewalk alternatives will include but are not limited to the following:

- Existing (<1.2 m);
- 1.5 m sidewalk;
- 1.8 m sidewalk; and,
- 2.0 m sidewalk.

The existing sidewalk width is not recommended to be carried forward as it is below current sidewalk accessibility standards, see **Figure 7**.

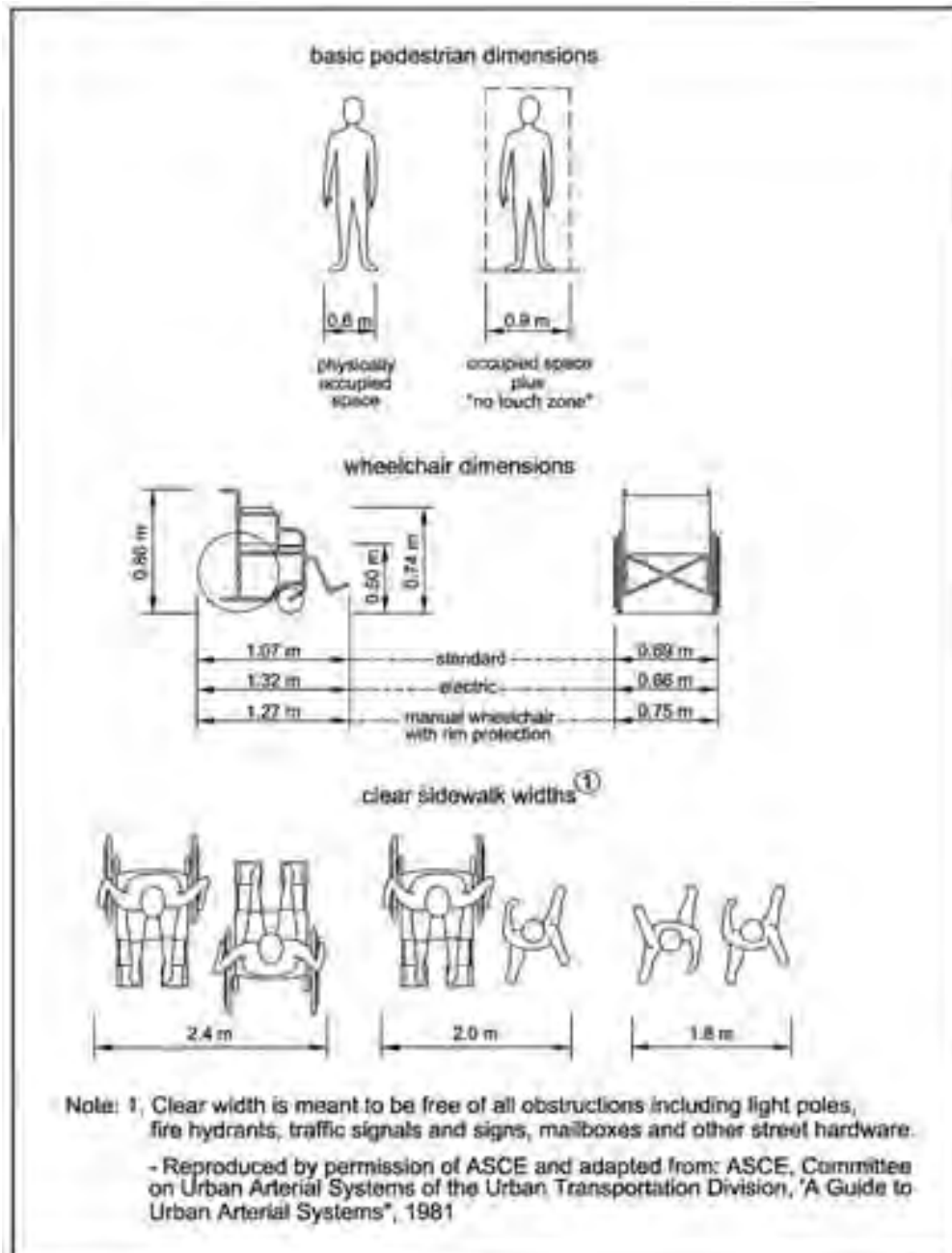


Figure 7: TAC Sidewalk Requirements

8.0 Preliminary Design

Considerations

The existing conditions in the study area present a variety of issues and constraints for the improvements to Bell Farm Road. Issues in the study area include:

Transportation and Structures:

- The alternatives must accommodate requirements for access to emergency services and existing commercial/ industrial businesses during and post construction.
- Traffic capacity (accommodating turning movements).



Photo 1: Barrie Fire Station 2

- Pavement condition of Bell Farm Road.



Photo 2: Existing Condition of Bell Farm Road

- Accommodating safe active modes of transportation will be a

focus (pedestrian friendly streetscapes and connectivity for cyclists are recognized as key components)

- Traffic impacts of design alternatives
- The investigation and evaluation of minor and major gateways in the project area and the feasibility.



Photo 3: Concerns for Pedestrian Safety

Utilities and Municipal Services:

- Condition and capacity of the existing sanitary sewers in the study area



Photo 4: Ditches along Bell Farm Road

- Evaluation of future capacity requirements for water, storm and sanitary sewers

- Location of existing utility conflicts within the study area.



Photo 5: Existing Utilities on Bell Farm Road

aesthetics and historical significance.



Photo 6: Bicycle Storage at the Georgian College Residences on Bell Farm Road

- Need for relocation or design revision of existing aerial power lines.

Social Environment:

- Disturbances to residents and businesses during construction including noise, air quality, safety and traffic control.
- Protection and mitigation of negative effects on existing commercial buildings during construction.
- Considerations for vulnerable road users (pedestrians, cyclists etc.).
- Potential property impacts to residential and commercial properties and potential encroachment on privately owned land.
- Potential for archeological and heritage sites.
- Landscaping/Streetscaping which will include an assessment of existing features and planning of new landscaping and potential street furniture to increase

Natural Environment:

- Investigation and protection of surrounding plant and wildlife in project area.
- Stormwater best management practices for widened roadways in consultation with the City.
- Investigation of existing commercial properties and the impact and control of any hazardous or deleterious materials used in their operations (including the effect of new construction).

Engineering:

- Future right-of-way protection to accommodate utilities and services, stormwater management, sidewalks, curbs and cycling facilities.
- Geometric Design Standards and potential horizontal and vertical alignment adjustments.
- Evaluation and alternatives of using innovative design throughout the project area, including but not limited to LID

techniques and innovative materials.

Economics:

- Capital costs including property acquisition.
- Life cycle costs including operations and maintenance costs.

9.0 List of References

Reference 1: Multi-Modal Active
Transportation Master Plan (City of
Barrie), 2013

Appendix A: Glossary of Terms

• AADT	Annual Average Daily Traffic – the average 24-hour, two-way traffic per day 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 fulfils a given set of requirements. The EA Act distinguishes between alternatives to the undertaking and alternative methods of carrying out the undertaking.
• Alternative Planning Solutions	Alternative ways of solving problems or meeting demand (Alternatives to the Undertaking).
• Alternative Design Concepts	Alternative ways of solving a documented transportation deficiency or taking advantage of an opportunity. (Alternative methods of carrying out the undertaking).
• Alternative Project	Alternative Planning Solution, see above.
• 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.
• Canadian Environmental Assessment Act (CEAA)	The CEAA applies to projects for which the federal government holds decision-making authority. It is legislation that identifies the responsibilities and procedures for the environmental assessment.
• 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.

<ul style="list-style-type: none"> • Class Environmental Assessment Process 	<p>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.</p>
<ul style="list-style-type: none"> • Compensation 	<p>The replacement of natural habitat lost through implementation of a project, where implementation techniques and other measures could not alleviate the effects.</p>
<ul style="list-style-type: none"> • Consortium 	<p>A group of businesses or organizations allied to take on a project.</p>
<ul style="list-style-type: none"> • Corridor 	<p>A band of variable width between two locations. In transportation studies a corridor is a defined area where a new or improved transportation facility might be located.</p>
<ul style="list-style-type: none"> • Criterion 	<p>Explicit feature or consideration used for comparison of alternatives.</p>
<ul style="list-style-type: none"> • Cumulative Effects Assessment 	<p>Cumulative Effects Assessment assesses the interaction and combination of the residual environmental effects of the project during its construction and operational phases on measures to prevent or lessen the predicted impacts with the same environmental effects from other past, present, and reasonably foreseeable future projects and activities.</p>
<ul style="list-style-type: none"> • Decibel (dB) 	<p>A logarithmic unit of measure used for expressing level of sound.</p>
<ul style="list-style-type: none"> • dBA 	<p>'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.</p>
<ul style="list-style-type: none"> • Detail Design 	<p>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.</p>
<ul style="list-style-type: none"> • DFO 	<p>Department of Fisheries and Oceans.</p>
<ul style="list-style-type: none"> • EA 	<p>Environmental Assessment</p>
<ul style="list-style-type: none"> • EA Act 	<p>Ontario Environmental Assessment Act (as amended by S.O. 1996 C.27), RSO 1980.</p>

<ul style="list-style-type: none"> • Environment 	<ul style="list-style-type: none"> • Air, land or water, • Plant and animal life, including human life, • The social, economic and cultural conditions that influence the life of humans or a community, • Any building structure, machine or other device or thing made by humans, • Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or • Any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.
<ul style="list-style-type: none"> • Environmental Effect 	<p>A change in the existing conditions of the environment which may have either beneficial (positive) or detrimental (negative) effects.</p>
<ul style="list-style-type: none"> • Environmentally Sensitive Areas (ESA's) 	<p>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.</p>
<ul style="list-style-type: none"> • Equivalent Sound Level (Leq) 	<p>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, 16 or 18-hour averages.</p>
<ul style="list-style-type: none"> • ESR 	<p>Environmental Study Report. The final documentation for Schedule C project, defining the project, consultation process, preferred solution and mitigation measures.</p>
<ul style="list-style-type: none"> • Evaluation 	<p>The outcome of a process that appraises the advantages and disadvantages of alternatives.</p>
<ul style="list-style-type: none"> • Evaluation Process 	<p>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.</p>
<ul style="list-style-type: none"> • External Agencies 	<p>Include Federal departments and agencies, Provincial ministries and agencies, conservation authorities, municipalities, Crown corporations or other agencies other than MTO.</p>
<ul style="list-style-type: none"> • General Arrangement 	<p>Structural plan of the bridge and proposed works including elevations and cross-sectional views of the bridge.</p>
<ul style="list-style-type: none"> • Factor 	<p>A category of sub-factors.</p>
<ul style="list-style-type: none"> • HADD 	<p>Harmful Alternation, Disturbance or Destruction of fish habitat.</p>

• Individual Environmental Assessment	An environmental Assessment requiring the submission of a document for approval by the Minister, pursuant to the EA Act and which is neither exempt from the EA Act nor covered by a Class EA approval.
• LSRCA	Lake Simcoe Region Conservation Authority
• 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.
• MMATMP	Multi-Modal Active Transportation Master Plan
• MNRF	Ministry of Natural Resources and Forestry.
• MOECC	Ministry of the Environment and Climate Change.
• MTCS	Ministry of Culture, Tourism and Sport.
• MTO	Ministry of Transportation Ontario.
• 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.
• NVCA	Nottawasaga Valley Conservation Authority
• OLA	Outdoor Living Area is the part of an outdoor amenity area provided for the quiet enjoyment of the outdoor environment.
• PIC	Public Information Centre (see POH).
• Planning Alternatives	Planning alternatives are “alternative methods” under the EA Act. Identification of significant transportation engineering opportunities while protecting significant environmental features as much as possible.
• Planning Solutions	That part of the planning and design process where alternatives to the undertaking and alternative routes are identified and assessed. Also described as “Alternative Project” under the federal EA Act.
• POH	Public Open House (see PIC).
• 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 the Class EA including all those activities necessary to solve a specific problem.
• Project File	The final product of a Schedule B project. This is a completion of all data/reports produced for the project.
• Proponent	A person or agency that carries or proposes to carry out an undertaking, or is the owner or person having charge, management, or control of an undertaking.
• Public	Includes the general public, interest groups, associates, community groups, and individuals, including property owners.
• Realignment	Replacement or upgrading of an existing roadway on a new or revised alignment.
• Recommended Plan	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.
• Route Alternatives	Location alternatives within a corridor.
• SADT	Summer Average Daily Traffic – the average 24-hour, two-way traffic for the period from July 1 st to August 31 st including weekends.
• Screening	Process of eliminating alternatives from further consideration, which do not meet minimum conditions or categorical requirements.
• Sub-factor	A single criterion used for the evaluation. Each sub-factor is grouped under one of the factors.
• Technical Advisory Committee	The Technical Advisory Committee will include the City and Consultant. It will act as the decision-making body for the study recommendations.
• TESR	Transportation Environmental Study Report
• TMP	Transportation Master Plan
• Traceability	Characteristics of an evaluation process which enables its development and implementation to be followed with ease.

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- **Undertaking** In keeping with the definition of the Environmental Assessment Act, a project or activity subject to an Environmental Assessment.