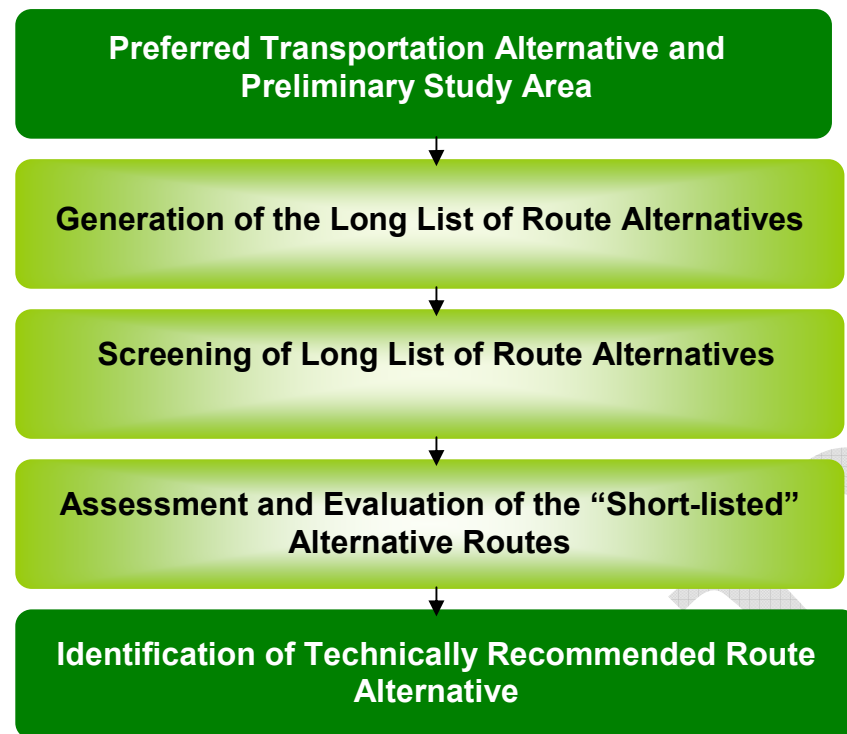


2. Generation, Assessment and Evaluation Methodology for Alternative Routes

The methodology proposed in the approved 407 East EA Terms of Reference (ToR) was followed for generating, screening, assessing, and evaluating route alternatives. **Figure 2.1** provides a schematic overview of this methodology. Each of the steps illustrated in **Figure 2.1** are further explained in following sections.

Figure 2.1: Alternative Methods (Route Alternatives) Process



3. Generation of the Alternative Routes

In the late 1980's and early 1990's, the Ministry of Transportation (MTO) undertook several studies to identify a technically recommended route for the proposed east-west transportation corridor and two north-south links. Accordingly, the generation of route alternatives took into consideration the work undertaken in the previous studies as well as information obtained through the current EA process and the requirements set out in the approved 407 East EA ToR.

The approved 407 East EA ToR outlined five guiding principles and 22 objectives for use in generating alternative routes. Since a number of the principles were similar in nature and intent, they were combined together and refined into the following 3 guiding principles to reflect the current EA process, with the 22 objectives grouped under their corresponding guiding principle (see **Table 3.1**):

- Minimize impacts to significant natural features, functions, systems and communities
- Minimize impacts to existing and planned (approved under the Planning Act) population and employment areas
- Maximize transportation service

Table 3.1: Guiding Principles and Objectives for Use in Generating Alternative Routes

Guiding Principle	Objective
Minimize impacts to significant natural features, functions, systems and communities	1. Avoid where possible, or minimize encroachment on or loss of water bodies and associated riparian zones
	2. Avoid where possible, or minimize encroachment on or loss of critical fish habitat features
	3. Avoid where possible, or minimize encroachment on or loss of species of conservation concern (vegetation, fish and wildlife)
	4. Avoid where possible, or minimize encroachment on or loss of critical habitat of Species at Risk
	5. Avoid where possible, or minimize encroachment on or loss of encroachment into ecologically functional areas
	6. Avoid where possible, or minimize encroachment on or loss of important wildlife areas and travel corridors. Other areas to be considered are any identified wildlife management, rehabilitation and research program sites
	7. Avoid where possible, or minimize encroachment on or loss of Provincially Significant Wetlands (PSWs) and avoid impairment to wetland functions, including ecological function
	8. Avoid where possible, or minimize encroachment on or loss of all other evaluated and unevaluated wetlands
	9. Avoid where possible, or minimize encroachment on or loss of designated significant woodlands
	10. Avoid where possible, or minimize encroachment on or loss of other important woodlands
	11. Avoid where possible, or minimize encroachment on known groundwater recharge and discharge areas; as well as identified

Table 3.1: Guiding Principles and Objectives for Use in Generating Alternative Routes

Guiding Principle	Objective
	<p>wellhead and source protection areas and areas susceptible to groundwater contamination</p> <p>12. Avoid where possible or minimize encroachment on, loss of, or impairment of ecological function to environmentally significant features, and where appropriate associated functions, including Significant Valleylands, ESAs, ANSIs, or other areas of provincial, regional or local significance</p> <p>13. Avoid where possible, or minimize encroachment on loss of, or impairment of ecological function to special spaces (including recreational activity zones)</p>
Minimize impacts to existing and planned (approved under the Planning Act) population and employment areas	<p>14. Maximize separation distance from sensitive receptor locations</p> <p>15. Avoid where possible or minimize encroachment on, or loss of developed properties</p> <p>16. Minimize access impacts</p> <p>17. Maximize the access provided to major generators of economic activity</p> <p>18. Avoid where possible, or minimize encroachment on, or loss of prime agricultural areas and agricultural infrastructure</p> <p>19. Avoid where possible, or minimize encroachment on, or loss of mineral, petroleum and mineral aggregate resources</p> <p>20. Avoid operating and "non-operating" waste disposal sites</p> <p>21. Avoid where possible, or minimize encroachment on, or loss of known archaeological sites/built heritage features/cultural heritage landscape areas of extreme significance</p>
Maximize transportation service	<p>22. Generate alternatives that are efficient and direct, while meeting standards for design</p>

Appendix A illustrates the long list of alternative routes generated for the east-west mainline and the links using the preceding methodology. The alternative routes generated through previous studies are shown in blue while those generated as part of the current study are shown in red.

Each alternative route is identified by a unique set of node numbers that designate common points of intersection. Node numbers from M1 through to M43 are associated with the mainline alternative routes. Node numbers from W1 through to W26 are associated with the West Durham Link alternative routes and node numbers E1 through to E26 are associated with the East Durham Link alternative routes in Clarington.

Recognizing the guiding principles and corresponding objectives, the focus of the generation phase was protecting the natural, social, and cultural environments through avoiding, where possible, or minimizing encroachment on, or loss of significant areas and features.

These objectives were applied to identify alternatives that were no longer feasible or were significantly less desirable than other available alternatives. It is recognized that some objectives were more restrictive than others in constraining alternative routes.

Data necessary to support the generation of alternative routes was based primarily on secondary sources such as aerial photography and large-scale constraint mapping (i.e., GIS data), which was compiled from previous MTO studies in Durham Region, external agencies, and Municipal Official Plans. This data was supplemented by information provided through discussions with municipalities, interested groups, and members of the public.