

Executive Summary



407 TRANSITWAY - KENNEDY ROAD TO BROCK ROAD

MINISTRY OF TRANSPORTATION - CENTRAL REGION

E. EXECUTIVE SUMMARY

E.1. Background

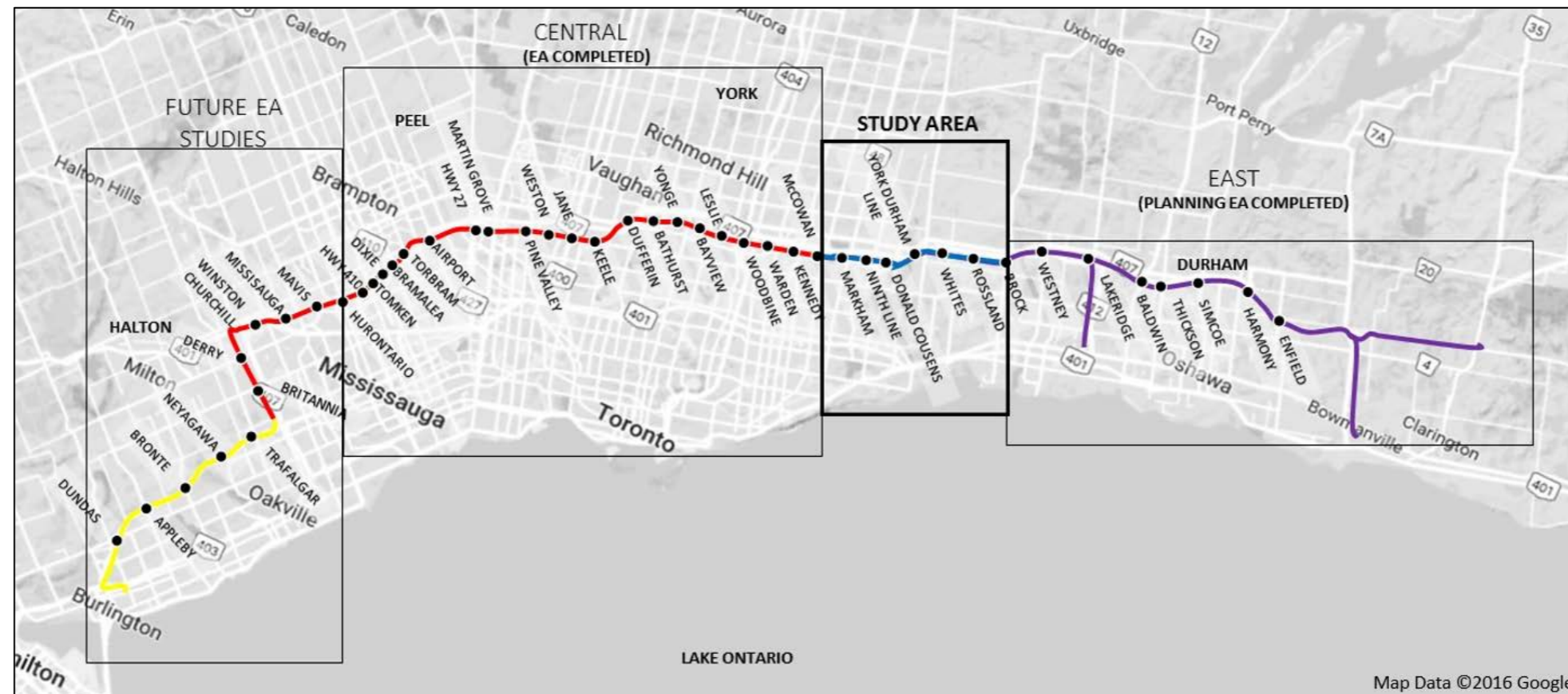
E.1.1. 407 Transitway Background and Status

The planned 407 Transitway is a 150 km high-speed public transit facility on a separate right-of-way. It will parallel Hwy 407 ETR from the Burlington GO station (Halton) to the Hwy 35/115 interchange (Durham). The 407 Transitway is being designed as a Bus Rapid Transitway (BRT) facility with protection for possible conversion to Light-Rail-Transit (LRT). To meet rapidly growing transportation demands across the Greater Toronto Area (GTA) east-west, a transit facility has been identified as a key element of the future. The Transitway is intended to form a northern spine parallel to the Lakeshore GO corridor that will connect the municipalities in this corridor. The Transitway will also integrate with north-south transit services by providing stations for quick and convenient transfers. The Transitway is a component of the official plans of the stakeholder municipalities and is part of the Province’s Move Ontario 2020 Project and the Metrolinx Rapid Transit Plan.

The Ministry of Transportation (MTO) has been actively planning and protecting the required land for the Transitway for the past 30 years. For the section between the Burlington GO station and Markham Road, the Ministry has completed property protection studies, has received Planning/Preliminary Design Environmental Assessment (EA) approval from Hwy 400 to Kennedy Road (Markham) and is currently undertaking an EA from Hurontario Street to Hwy 400. For the section between Markham Rd. and the Hwy 35/115 interchange, the Ministry has received Planning EA approval (for the corridor) between Markham Road and Brock Rd. and Planning EA approval (for the corridor, stations and associated facilities) between Brock Road and the Hwy 35/115 interchange.

This current study is seeking Planning and Preliminary Design EA approval for the Transitway, stations and associated facilities between Kennedy Rd. (Markham) and Brock Rd (Pickering). The study objectives are explained below.

FIGURE E.1: FULL 407 TRANSITWAY STUDY LIMITS



E.1.2. Study Objectives

The 407 Transitway study from Kennedy Road to Brock Road encompasses the planning, environmental assessment and preliminary design of a dedicated 19.3 kilometre facility including an exclusive runningway and stations along the Highway 407 Corridor. The 407 Transitway will be implemented initially as a busway with the opportunity to convert to LRT in the future.

The primary purpose and objectives of the undertaking include the following:

- Enhance east-west cross-regional mobility and increase transit capacity to meet forecast travel demand;
- Offer a viable, cost-effective alternative method of moving people in the Highway 407 Corridor;
- Improve accessibility to existing/planned major urban centres/nodes, post-secondary educational institutions, and other nodes of high demand, such as: Vaughan City Centre, Richmond Hill Centre and Markham Centre, future Seaton Development, York University, Humber College, University of Ontario Institute of Technology, Durham College, Pearson International Airport, and potential future Pickering Airport;
- Improve integration with the regional transportation network – connection to Spadina Subway, future Yonge Subway, GO Milton, Barrie, Richmond Hill, Stouffville rail lines and future commuter service on Havelock rail line; and, Peel, York and Durham Transit systems;
- Reduce automobile dependence and greenhouse gas emissions; and,
- Identify land protection requirements to accommodate the Transitway infrastructure.

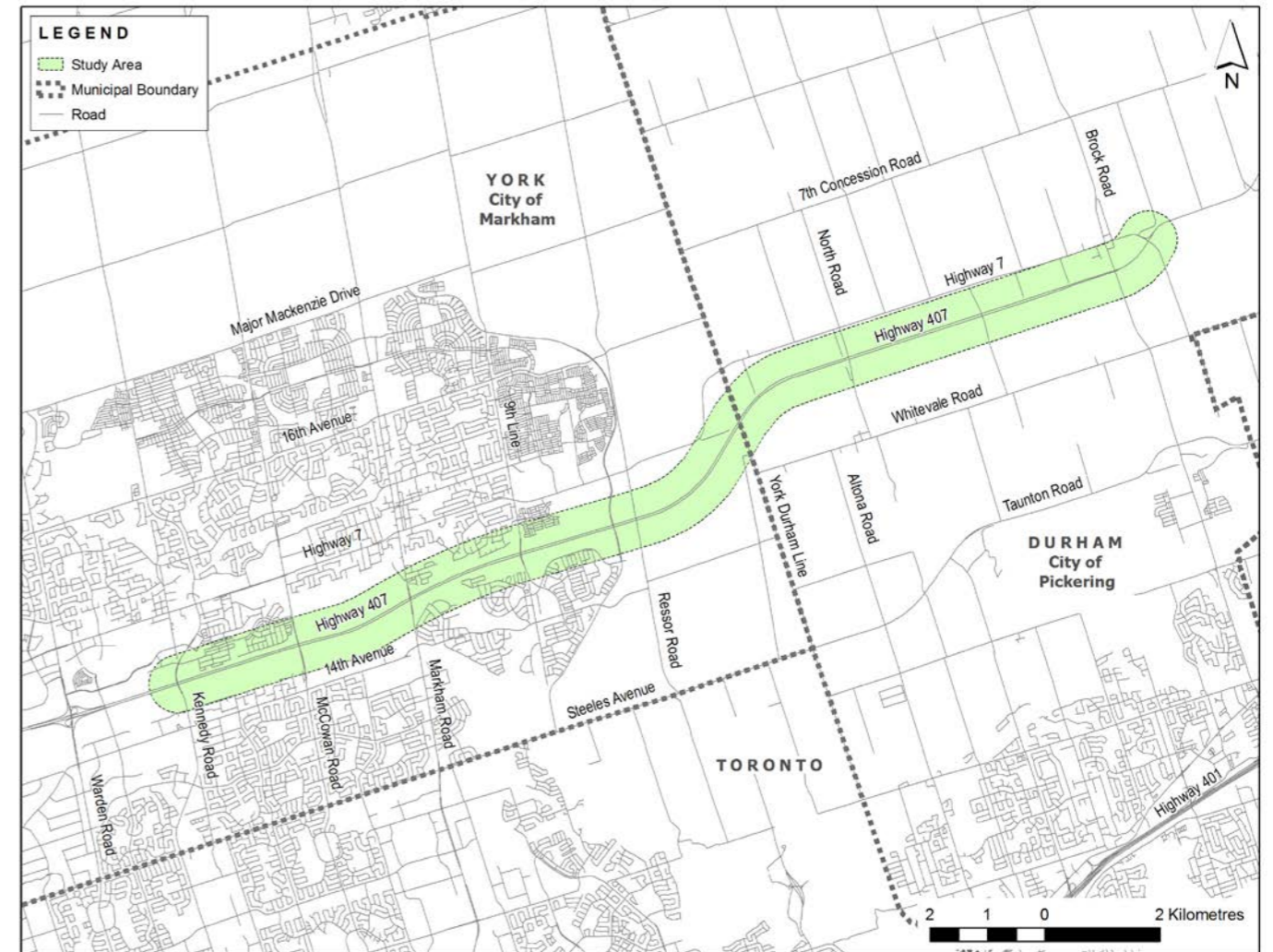
To support these objectives, the study scope required that the following activities be undertaken:

- Maintain and apply the comprehensive set of design standards for the 407 Transitway, created and approved during the preliminary design of the Highway 400 to Kennedy Road section.
- Update and develop detailed ridership estimates based on a 2031 horizon year with projection estimates to 2051;
- Gather existing conditions information and future municipal plans, and identify and evaluate alignment and station alternatives, and select a preliminary preferred design;
- Conduct detailed field investigations in support of the preliminary preferred option; assess the environmental effects and develop a mitigation plan for any negative impacts generated by the preferred design.
- Deliver a cost-effective, safe, and innovative preliminary design and staging plan for this 19.3 km section of the 407 Transitway for busway technology that allows for conversion to LRT in the future, promotes transit ridership and optimizes transit operation and integration; and,
- Recommend and present a phased implementation strategy;

E.1.3. Study Area

The study area encompasses the proposed section of the 407 Transitway corridor from west of Kennedy Road in Markham in the Region of York to east of Brock Road in the City of Pickering in the Region of Durham, including an area 500 meters on each side of the alignment as shown on **Figure E.2**.

FIGURE E.2: STUDY AREA

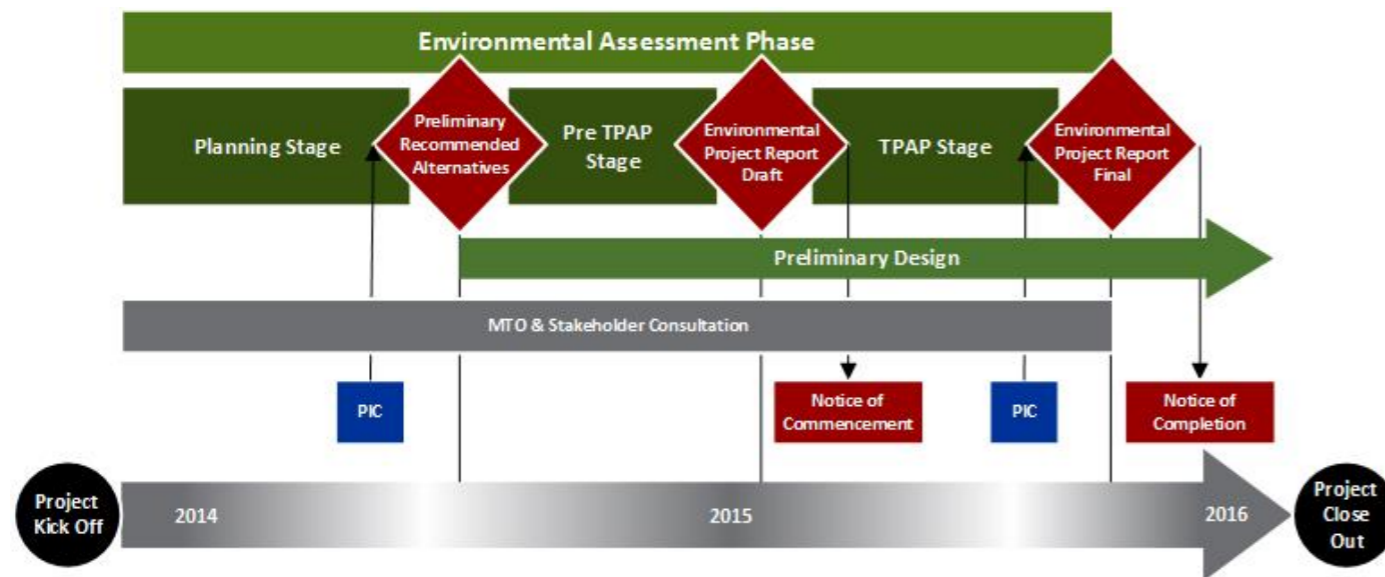


The boundaries in which the environmental effects were identified and assessed; and the reason(s) why these areas were considered sufficient, are explained in **Chapter 1** of this EPR.

E.1.4. Study Process

The assignment encompasses the Planning Phase and the Preliminary Design Phase of the project and are conducted following an integrated approach as illustrated in **Figure E.3**. The study comprises of three stages: the Planning Stage, the Pre- Transit Project Assessment Process (TPAP), and the TPAP stage. The Environmental Project Report (EPR) encompasses the background of the project, studies, analysis, functional and initial design, evaluation of alternatives, findings and recommendations of the completed stages. Consultation was carried out throughout the process.

FIGURE E.3: STUDY PROCESS



E.1.5. Statutory Requirements

Provincial Legislation - *Environmental Assessment Act of Ontario*

This study followed the Transit Project Assessment Process as per the *Transit Projects and Greater Toronto Transportation Authority Undertakings Regulation, Ontario Regulation 231/08*, June 2008. This process formally started concurrently with the publication of the “Notice of Commencement of TPAP”.

Other Provincial Legislation

The 407 Transitway project is subject to, and will be carried out in accordance with all applicable provincial legislation including the *Planning Act*, the *Public Transportation and Highway Improvement Act*, the *Freedom of Information Act*, and the *Environmental Protection Act*.

Federal Legislation - *Canadian Environmental Assessment Act 2012*

A review of the Canadian Environmental Assessment Act 2012 (CEAA 2012) and its regulation, the

“Regulations Designating Physical Activities[gazette.gc.ca]”, determined that this project is not identified as a “designated project” that requires an environmental assessment by the Canadian Environmental Assessment Agency, Canadian Nuclear Safety Commission or by the National Energy Board. Nevertheless, federal agencies and including Fisheries and Oceans Canada, Environment Canada, Transport Canada, Parks Canada and others were consulted throughout the study.

Policy Context

This study has considered the following plans and policies:

- Provincial Policy Statement;
- Places to Grow: Growth Plan for the Greater Golden Horseshoe;
- Move Ontario 2020;
- The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area ;
- York Region Official Plan and Transportation Master Plan;
- City of Toronto Official Plan;
- City of Markham Official Plan;
- Durham Region Official Plan;
- Durham Region Transportation Master Plan and Arterial Road Corridor Design Guidelines;
- Durham Region Transit Long Term Strategy; and,
- City of Pickering Official Plan.

E.2. Transportation Needs Assessment

E.2.1. 407 Transitway Role in the Greater Toronto and Hamilton Area

The 407 East Corridor and the rest of the outer Greater Toronto and Hamilton Area (GTHA) is projected to continue its rapid growth leading to an increase in east-west suburb-to-suburb travel. The intensification of urban growth centers in Markham, Richmond Hill, and Vaughan coupled with the development of the Seaton Community in Pickering will increase westbound travel demand in the northern GTHA. Without convenient rapid transit, this will lead to increased levels of auto congestion while reducing throughput, efficiency and regional economic vitality.

Higher order transit in this corridor is an important element of a future GTHA rapid transit network aimed at meeting growing travel demand, providing mobility for a variety of users and maintaining acceptable road performance. This section of the 407 Transitway is designed with the intention to:

- Serve as a high-speed transit link between Durham and York Region, serving major trip generators such as York University Keele Campus, the future York University Markham Campus, Urban Growth Centers in Markham, Richmond Hill and Vaughan, the Seaton Community and a potential Pickering Airport;
- Offer an attractive and competitive transportation alternative to driving with high-speed, frequent, and reliable service;
- Reduce traffic congestion, pollution and energy consumption associated with auto travel and auto oriented development;
- Provide high-quality transit for suburb-to-suburb travel;
- Provide point-to-point service for long cross-boundary trips in contrast to VIVA service , which is oriented

- towards serving shorter trips and intraregional demand;
- Implement a dedicated transit corridor that is unaffected by auto congestion, and,
- Reinforce the regional transit network as a key spine connecting to the GO rail network, the TTC subway network, existing and future BRT/LRT lines, and local transit services.

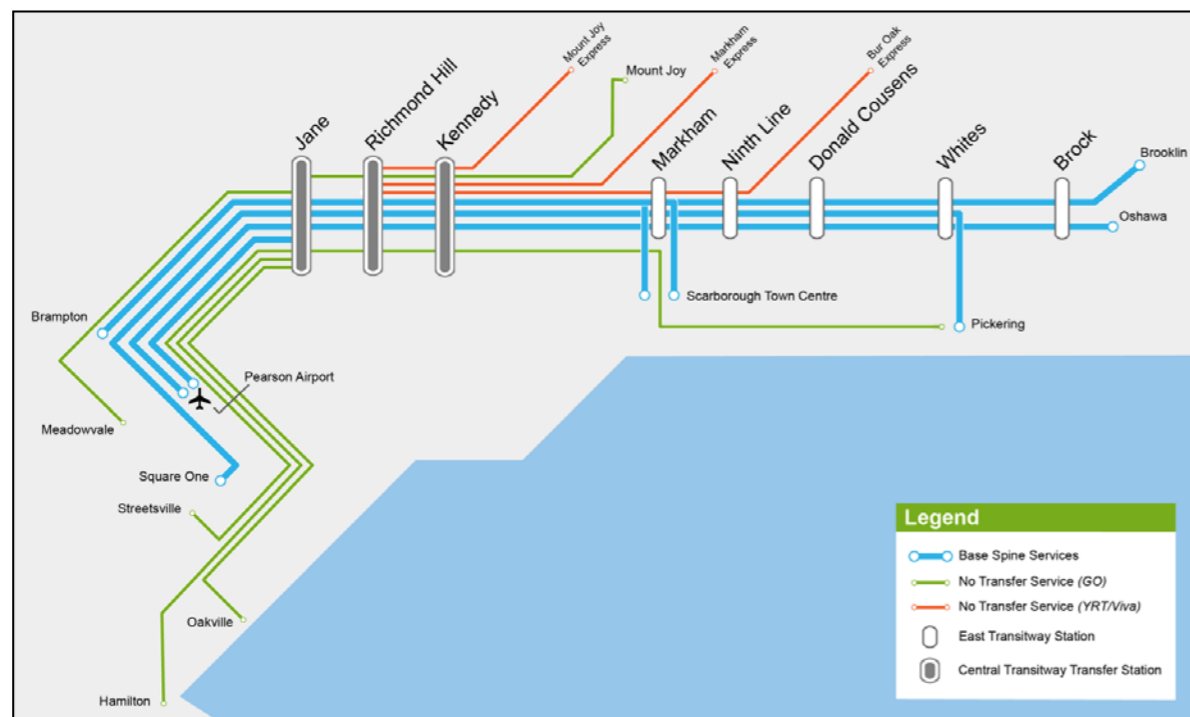
E.2.2. Route Structure and Operating Characteristics

The proposed 407 Transitway route structure was influenced by projected 2031 travel demand and existing transit routes. It was designed to be consistent with the preferred route structure developed during the EA of the central section of the 407 Transitway – from Highway 400 to Kennedy Road. The route structure assumes integrated bus operations serving key nodes like Markham Centre, Richmond Hill Centre, York University, and the Seaton Community.

In order to efficiently serve all transit markets in the corridor, two service types are suggested: base spine services, and no-transfer services. Base spine services consist of routes traveling along the 407 Corridor only. These routes may be express, semi-express or routes that stop at all stations. No-transfer services, also called interlining, consist of routes that may connect off the 407 Corridor locations of high demand, with specific stations. These routes could operate on regular basis or during special events, and could be operated by the Transitway operator or by the regional transit agencies.

The full complement of routes and proposed stations are shown in **Figure E.4** and are described below. Note that the conceptual route structure assumes that the central section of the Transitway has been built, and that other transit services such as GO Bus and YRT/VIVA buses are able to access the Transitway for portions of their trips.

FIGURE E.4: CONCEPTUAL 407 TRANSITWAY ROUTE STRUCTURE

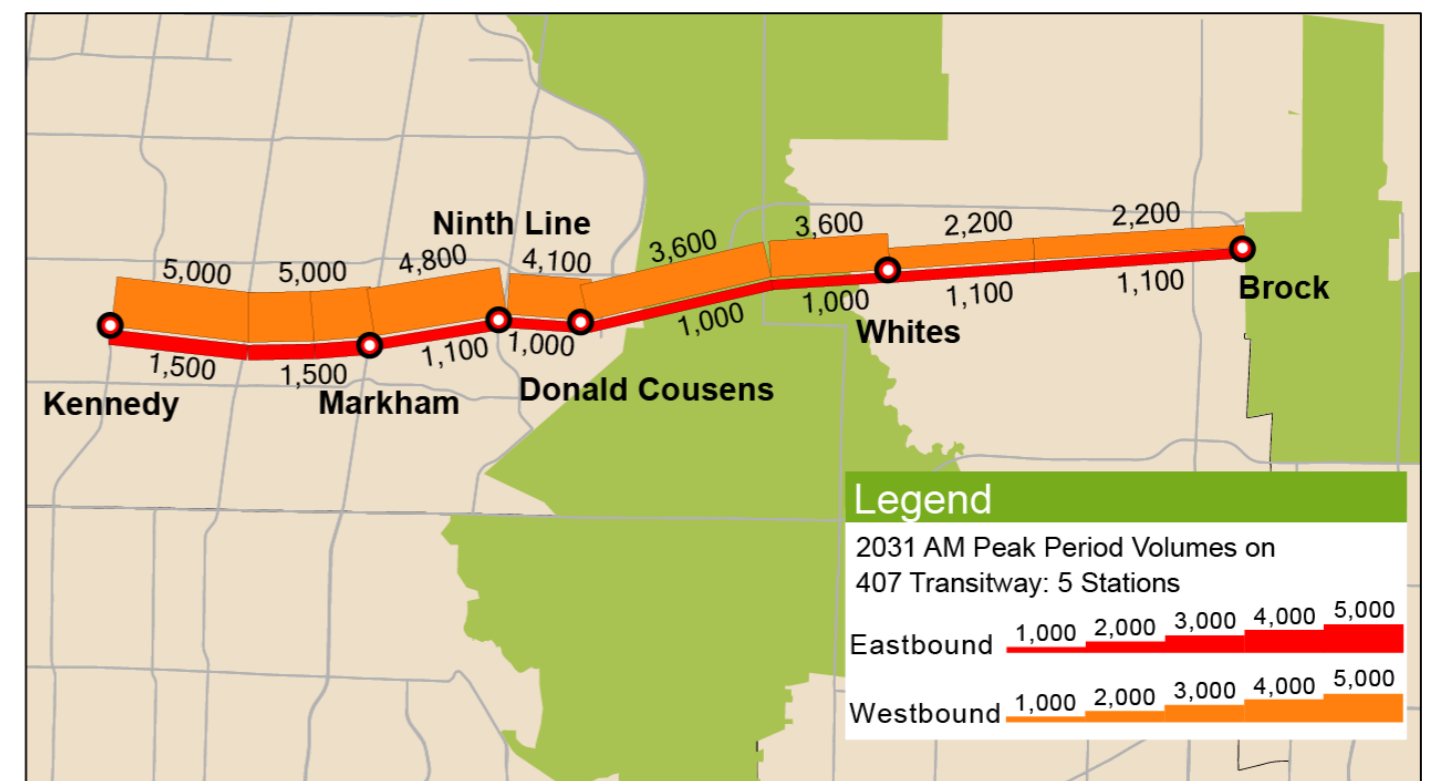


E.2.3. 407 Transitway Ridership Forecasts

For 2031, 407 Transitway Kennedy to Brock ridership forecasts have been developed using the Greater Golden Horseshoe Model (GGHM) for the 5 stations (6 including Kennedy) and the conceptual operating strategy shown in **Figure E.4**. **Figure E.5** shows the projected transit volumes on the Transitway between Kennedy Road and Brock Road. The eastern section has a peak point of 5,000 westbound a.m. peak period passengers entering Kennedy Station and the entire Transitway – including the central section – has peak point volumes of 11,500 passengers entering Richmond Hill (Yonge) Station. Demand is highly directional with more than three times as many westbound as eastbound passengers during the a.m. peak period.

Ridership for the East Transitway is based on current information available and accepted projects and is subject to change in the future as more accurate information becomes available. The study was developed based on the latest officially approved horizon (2031) at the time of this assignment. 2041 allocations are available to the municipal level only and have not been officially publicized. All relevant findings and conclusions will be confirmed prior to Detail Design, based on official figures at that time.

FIGURE E.5: 2031 PROJECTED AM PEAK PERIOD 407 EAST TRANSITWAY VOLUMES



E.2.4. Future Travel Demand 2031 to 2051

This study recognizes that it is critical to ensure the Transitway will be able to accommodate growth in travel demand in the corridor beyond the current 2031 travel demand forecasts. Individual station sites were examined for the potential to accommodate further growth and needs from 2031 to 2051. For station locations where site space is available, protection of additional land for future expansion of park-and-ride lots

was incorporated into the preliminary design and parking lot layouts.

E.3. Existing And Future Conditions

The description of the existing and future conditions provided a baseline for the generation of alternatives, assessment of environmental impacts and the identification of environmental protection measures and monitoring plans. The identification of the environmental features (i.e. transportation infrastructure, natural, social and cultural environment) involved the collection of primary and secondary source data including consultation with technical agencies. This was done in two steps: an inventory and analysis of existing conditions and an investigation as to how these conditions might change in the future. In general, the existing and future conditions can be categorized into the following topics and are presented in the associated sections:

- Natural Environment;
- Socio-Economic and Cultural Environment;
- Transportation; and,
- Utilities.

E.4. Identification Of Alternatives And Evaluation Process

The identification of potential station sites and subsequent evaluation of alternatives was carried out following a two-step screening process.

- Identification and evaluation and screening of station nodes
- Identification and evaluation and screening of station sites

As an initial step, all crossings of Highway 407 ETR with existing and future north-south main arterial roads, were considered potential station locations. Each node, was individually assessed based on the following criteria:

- **Physical and Environmental Constraints:** Presence of environmental features of provincial significance being affected by the facility within potential sites.
- **Ridership Effects:** Planned land development in catchment area; forecast ridership (boardings/alightings); transit integration; interlining opportunities; distance to adjacent stations.

As a result of this initial screening, 5 nodes were selected for station nodes: Markham Road, Ninth Line, Donald Cousens Parkway, Whites Road, and Brock Road.

For all nodes selected through the previous screening stage, sites on both southeast and southwest side of the Highway interchange were evaluated according to the criteria illustrated in **Figure E.6**.

The evaluation of alternatives process concluded the following:

Station Sites Evaluation Results

A detailed evaluation of the alternative sites, which consider environmental effects; Transitway operation; convenience to users by means of feasible transit connections; adequate vehicular and pedestrian accessibility; constructability ease; and costs. The following selected sites were identified:

Selected Station Sites

- Markham Road Station – Southwest Site
- Ninth Line Station – Southwest Site
- Donald Cousens Station – Southeast Site
- Whites Road Station – Southwest Site
- Brock Station – Southwest Site

Runningway Alignment Alternatives

In 1998, an EA from Markham Road to Brock Road Transitway Alignment was submitted and approved. The EA included a 60m swath for the Transitway alignment on the south side of the 407 ETR. An updated assessment conducted in the initial stage of this project, confirmed that the south side of the 407 ETR was the most feasible option for the Transitway, based on the following:

- Most of the lots adjacent to the Highway on the north side have already been developed or the land is planned to be developed; especially at potential station nodes; and
- Maintaining the alignment on one side of the 407 ETR would avoid long and very costly skewed bridges crossing the Highway.

Preliminary horizontal and vertical alignment alternatives were identified based on station site alternatives, environmental considerations, optimum travel time, passenger comfort, costs and others, and developed following the *407 Transitway Design Standards*.

FIGURE E.6: STATION SITES EVALUATION CRITERIA



407 ETR Interchanges in Markham, and beside the future Whites Road Expansion and Brock Road 407 ETR Interchanges in Pickering. The stations will consist of weather protected platforms, park and ride lots, Passenger Pick Up and Drop off (PPUDO) and bus facilities, all amenities related to active transportation, and special needs associated facilities. Bus, vehicular, and pedestrian access from the local road network is also a component of the proposed facilities.

A total of 17 new structures have been identified along the Transitway route. Bridge and underpass widths were defined based on lanes and sidewalk widths and side clearances were determined following the 407 Transitway Design Standards and the Geometric Design Standards for Ontario Highways (1994).

Where applicable, the existing structures of the 407 ETR were used for comparison purposes, as the profile of the Transitway was designed following the profile of the Highway wherever possible. Exceptions were made at specific locations due primarily to the presence of major underground utilities or natural features that prevented the runningway to cross under existing arterial roads.

Landscape treatments will accomplish a number of functions including slope stabilization, stream crossing restoration, naturalized planting sites, visual/wind buffers while generally improving the aesthetics of the corridor. Landscaping around the station sites and parking facilities will complement the surrounding land uses and present the stations as a visual asset to the local area.

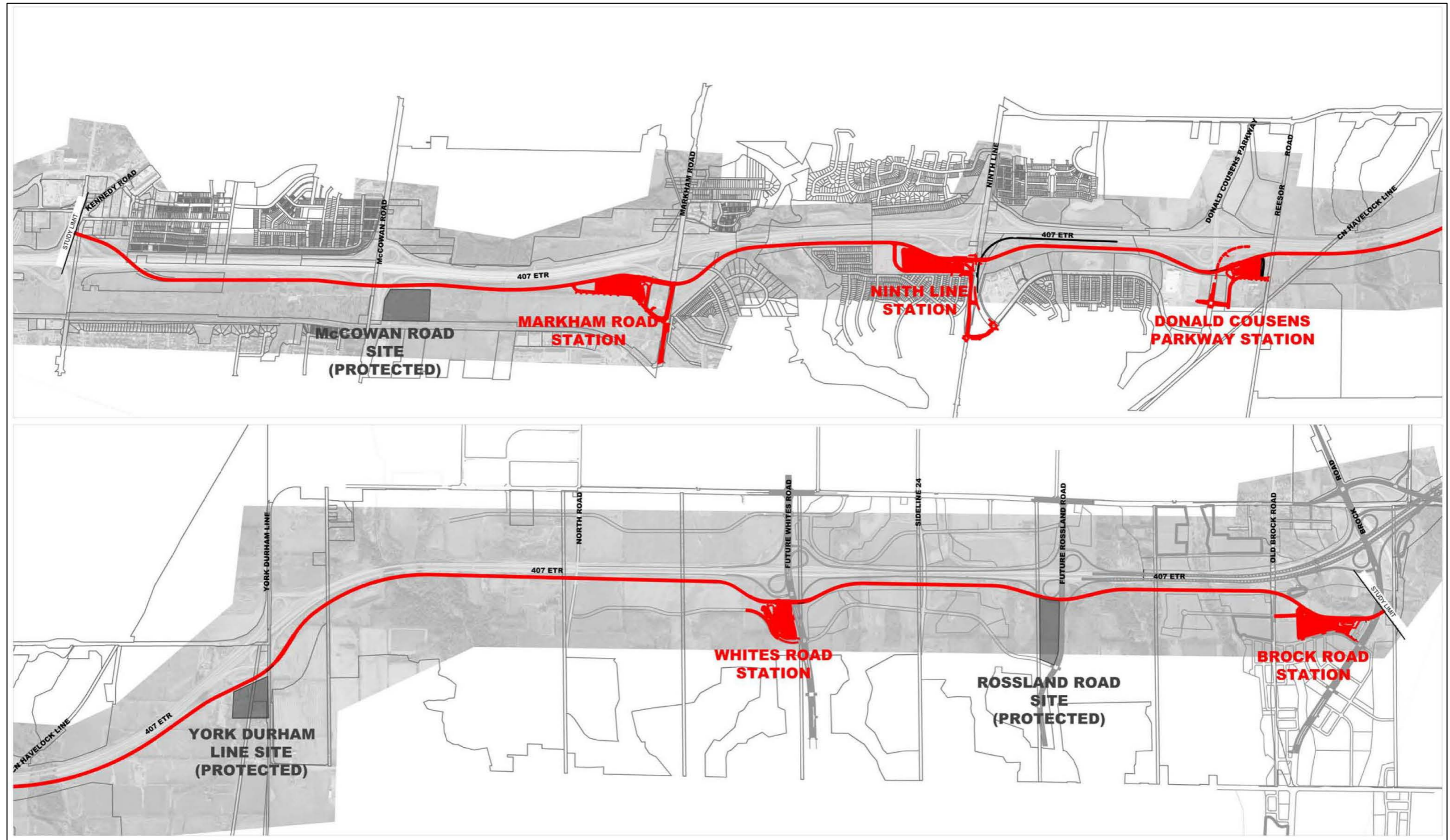
E.5. Final Project Description

As illustrated in **Figure E.7**, the technically preferred Transitway alternative has been planned for the operation of an intermediate capacity, regional rapid transit service provided either as BRT using single or double-decker coaches. The alignment design was developed to allow potential conversions to LRT if needed in the future. In both cases, the vehicle’s maximum in-service speed will be 100 kilometers per hour. This technology matches with that of the approved Highway 400 to Kennedy Road section.

The primary component of the Transitway infrastructure is the fully-grade separated runningway which, for BRT operation, is a two-lane runningway with paved shoulders and additional stopping lanes through station platforms. If the Transitway is converted to LRT system, the runningway will comprise a double-track mainline with crossover and storage tracks at regular intervals for operations and maintenance flexibility. The fully fenced runningway will incorporate access for emergency response vehicles at stations and appropriate intervals between.

In summary, five stations, spaced on average at 4 kilometers, are planned along this section of the Transitway, as illustrated in **Figure E.7**. The stations are located beside the Markham Road, Ninth Line and Donald Cousens

FIGURE E.7: PREFERRED ALTERNATIVE FROM EAST OF KENNEDY ROAD TO EAST OF BROCK ROAD



E.6. Impact Assessment, Mitigation And Monitoring

The *Transit Projects and Greater Toronto Transportation Authority Undertakings Regulation*, Ontario Regulation 231/08 under the *Environmental Assessment Act*, Section 9 (2) requires the proponent to prepare an Environmental Project Report (EPR) that contains the following information, among other requirements:

- Description of the environment that will be affected or might reasonably be affected;
- Anticipated potential impacts;
- Proposed mitigation measures to minimize, manage, prevent and avoid environmental effects; and,
- Proposed monitoring and contingency measures, if required.

An impact assessment was undertaken to identify the footprint, construction and operation impacts associated with the implementation of the 407 Transitway.

The impact assessment involved the application of the following steps:

1. Identify and analyze activities where the project, as described in **Chapter 5**, may interact with the existing environmental conditions described in **Chapter 3**.
2. Propose mitigation measures that can be implemented during construction or operation of the project.
3. Identify the residual environmental effects and their significance, if any.
4. Recommend monitoring activities during the construction and operation of the project.

The environmental effects of the undertaking can be classified under three categories:

- **Footprint Impacts:** Long term impacts on the existing environmental features located within the study area that will potentially be displaced or lost through the introduction of the Transitway;
- **Construction Impacts:** These are potential short-term disruption effects resulting from construction of the Transitway; and,
- **Operation and Maintenance Impacts:** These are potential long-term disruption effects resulting from the operation and maintenance of the Transitway.

The assessment covered three scenarios: 2014 Existing Condition; 2031 Background Condition (No Transitway); and 2031 Future Total Condition (With Transitway) and two time periods: A.M. peak hour and P.M. peak hour.

It is acknowledged that with the implementation of the 407 Transitway the number of buses traveling along this corridor will increase and there will be an addition of vehicles accessing the Transitway stations during the peak periods; however, the reduction of vehicle volumes along Hwy 407 ETR, and the other non-tolled east-west arterial roads such as Hwy 7, 16th Street and Major Mackenzie on the north side of Hwy 407, and 14th Street, Steeles Ave/Taunton Rd, Finch Ave. and even Hwy 401 south of Hwy 407, will more than offset any potential negative effects that the Transitway may cause. For example, assuming that for every three Transitway passengers, one private car has been removed from the corridor, on average the anticipated reduction will be over 1500 autos during a typical morning peak period (three hours).

While it was beyond the scope of this study to examine such a large complex transportation network to determine the Transitway's actual impacts on auto volumes, it is clear that the reduction will be substantial as well as the corresponding reduced air emissions.

Similarly, impacts of private vehicles accessing the five Transitway stations for park and ride and pick-up/drop-off activities must be balanced with the fact that commuters will no longer be using these vehicles for their work trip, instead, switching to transit at the stations.

Finally, bus technology is rapidly improving and with this, a reduction in emission levels.

E.7. Implementation Strategy

The presence of 407 ETR provides a unique opportunity to stage the implementation of the Transitway infrastructure maintaining operation and reliable transit service along the corridor as a function of demand needs, travel time and convenience to the users, and priorities for transit investment in the GGH.

In establishing the objectives for phased implementation of the Transitway, the current availability of the 407 ETR to Metrolinx services is assumed as a baseline phase. Phasing strategies assessed are based on a combination of part or parts of the existing 407 ETR service. From this starting point, the following objectives were adopted in defining candidate phasing strategies:

- Each phase implemented should not result in a significant increase in travel time through the East Section. Preferably, segment lengths should yield a travel time saving greater than the time penalty to divert from and to, the 407 ETR and phase limits selected must minimize the time to transfer from 407 ETR lanes to the new Transitway;
- Ideally, the sequence of implementation should correspond to the likely distribution of traffic congestion in the Hwy 407 ETR; as an example, the segment of the Hwy 407 ETR with highest traffic volumes from Kennedy Road to Brock Road is between Kennedy Road and Markham Road, consequently it will likely be the segment of runningway that is built first;
- Phase sequencing should be responsive to the zones with highest ridership potential to maximize benefits and exposure of dedicated Transitway service. Ideally, segment phasing should respond to the timing of adjacent developments (particularly UGCs) and provide access to the Transitway by all modes (local transit, park and ride, pick up and drop off, walk-in);
- Phase sequence should be responsive to bus interlining opportunities;
- Phase costs should result in a contract cash flow that MTO (or the funding agency) can accommodate in annual budgeting; and,
- Construction staging associated traffic diversion and delays that arterial road users will tolerate.

With a view to meeting the above objectives, potential Phasing Strategies being investigated include:

- A Baseline Strategy – Cross-regional Rapid Transit Service on the 407 ETR in mixed traffic;
- An Enhanced Baseline Strategy – Cross-regional Rapid Transit Service on 407 ETR with strategic station locations; and,
- Rapid Transit Service on newly-constructed 407 Transitway in specific segments, combined with service still operating on the 407 ETR.

Approval of this TPAP will enable the MTO, to pursue any one or more of the above strategies, or variations of them, within the limits of this TPAP.

E.8. Consultation Process

A consultation process has been undertaken throughout the study to assist in the planning and impact assessment process for the 407 Transitway. The consultation process was designed to address the requirements for *Ontario Regulation 231/08, Transit Projects and Metrolinx Undertakings*. Consultation was initiated in August 2014 well before the formal declaration of the project being undertaken under the Transit Project Assessment Process (TPAP), through the mailing of initial contact letters to stakeholders. The formal TPAP was initiated end of summer 2016.

Consultation was conducted with the government review agencies, technical agencies, local municipalities, the general public, property owners and Aboriginal communities.

The consultation process included the following types of consultation activities:

- Public notices;
- Liaison with relevant agencies including regulatory agencies, municipalities, interested parties and members of the public;
- Public Information Centers (PICs); and, responses to comments submitted.
- Property owners were notified beyond the required 30m of the project limits. The notification limits included all communities adjacent to the proposed Transitway facility.
- Project website.

Initial contact letters introducing the study and requesting available background information and/or comments were sent to agencies in August 2014. Two Technical Resource Group (TRG) meetings were held in January 2015 and April 2016. Meetings with various agencies were held throughout the study.

Two PICs were held in April 2015 and in June 2016.

Aboriginal communities were contacted throughout this study since August 2014.

E.9. Commitments To Future Action

During the TPAP, MTO worked closely with stakeholders to address and resolve issues or concerns identified. However, not all issues can be addressed within the context of a TPAP since the design of the 407 Transitway has been prepared at a preliminary design level and further details are required to be finalized during Detail Design, and Construction.

Commitments have been made as outlined in **Chapter 9** of this EPR to further address potential impacts during Detail Design and include continued consultation with all affected agencies and the public.