

circuit panels to support the systems listed above. Substations are usually constructed at-grade and are located within stations or underneath the running structure (for elevated sections).

TTC traction power requirements typically result in a distance between substations of about 1.5 km to 2 km. Due to the power requirements for lights and equipment at stations, these substations are usually located in the vicinity of stations.

The existing traction power substations at Kennedy, Lawrence East, Ellesmere, Scarborough Centre and McCowan Stations will remain part of each station but will undergo changes to accommodate the new vehicle requirements.

New substations are proposed along the extension with an average of 1.5 kilometre spacing. Exhibit 2-53 presents the proposed location of the traction power substations:

- At the south end of Production Drive;
- Centennial College;
- Sheppard Avenue;
- Bellamy Station; and
- Malvern Town Centre.

The typical substation structures (Exhibit 2-54) are approximately 11 metres by 4.6 metres and 4 metres high. Additional length and width may be required for providing access for maintenance and an attractive façade. These structures will be carefully sited so that they do not obstruct existing and future developments along the SRT corridor. The Sheppard East LRT will also require substation in this general vicinity according to the approved Sheppard East LRT Class EA. As such, the substation located on Sheppard Avenue will be co-ordinated between the SRT and the Sheppard East LRT during design. The final locations of the electrical substations will be further investigated in the detailed design stage.

Exhibit 2-53: Potential Substation Locations for SRT Extension

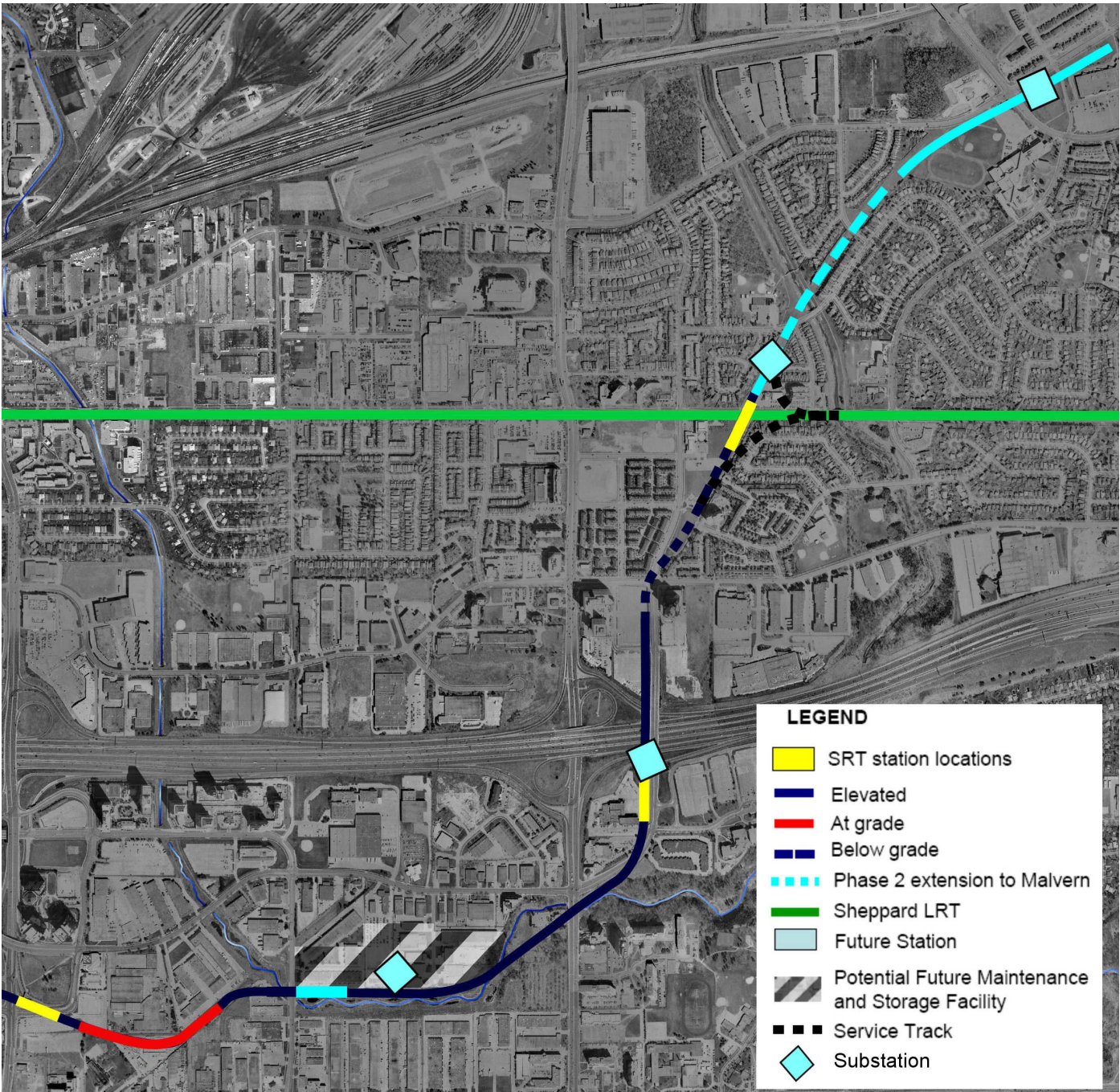


Exhibit 2-54: Example of a substation building for LRT

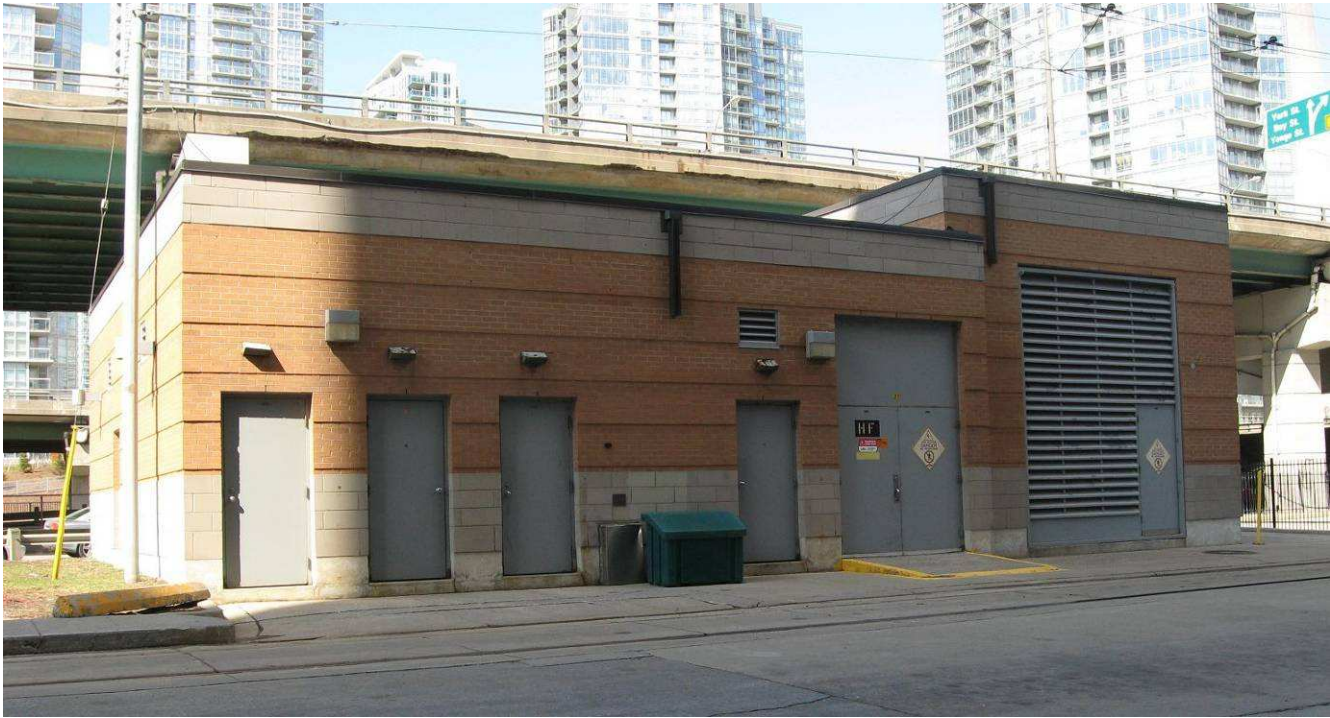
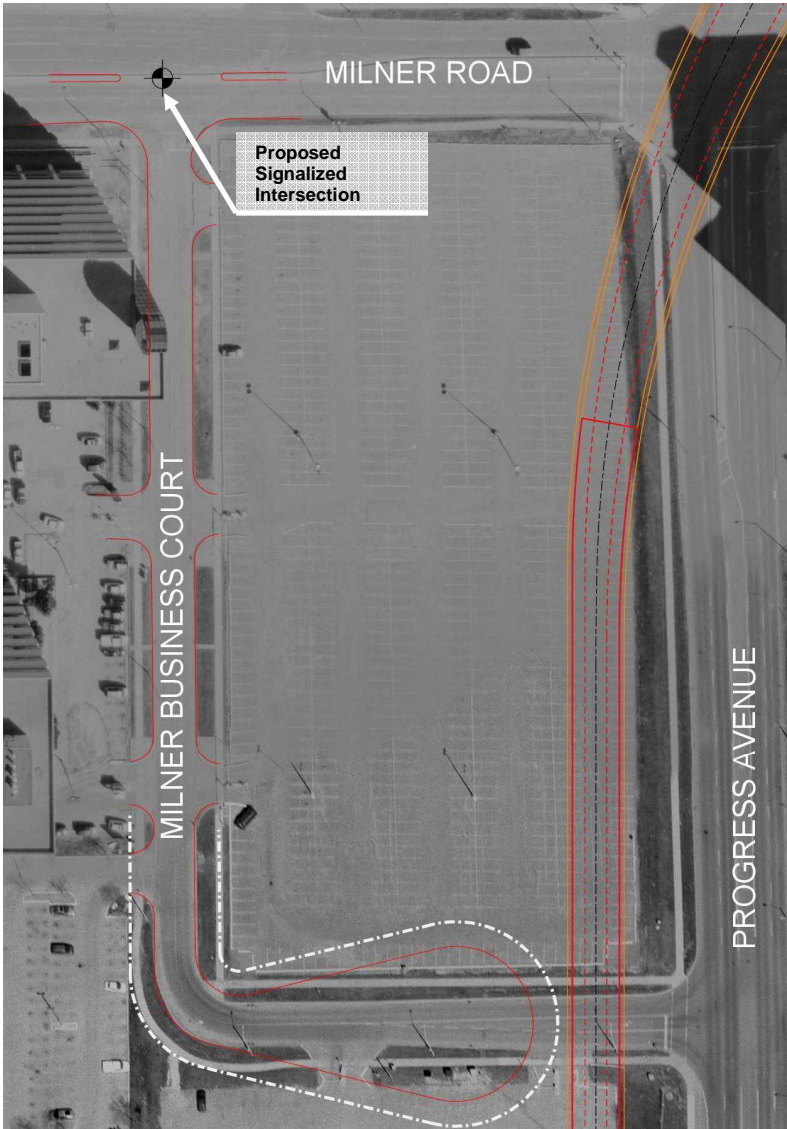


Exhibit 2-55: Milner Business Court / Progress Avenue access to be closed



2.4.12.6 Roadway Modifications

Changes to the road network associated with this project are limited to three locations:

- **Eglinton Avenue, between Birchmount Avenue and Midland Road** – The connection to Eglinton Crosstown LRT requires a slight shift in roadway alignment to the north. The Eglinton Crosstown LRT portal will be located east of Ionview Road and the platform/LRT stop will be located west of Ionview Road. East of Kennedy Station, the portal for the Scarborough-Malvern LRT will be west of Midland Avenue and the platform/LRT stop will be located east of Midland Avenue.
- **Milner Business Court** – Between Highway 401 and Milner Avenue, Milner Business Court intersects with Progress Avenue. Through this block, the alignment is transitioning from elevated to below-grade and is at-grade in the general vicinity of the aforementioned intersection. As an at-grade crossing cannot be supported by the operations of the SRT, Milner Business Court will be closed at Progress Avenue. Therefore, it is recommended that Milner Business Court be changed to a cul-de-sac west of the alignment. As this would redirect all traffic to Milner Business Court at Milner Avenue, it is proposed that this intersection be converted to allow all movements at a new signalized intersection (see Exhibit 2-55).

2.4.13 Construction Approach

This Transit Project requires major construction along the existing line as well as the proposed SRT extension.

2.4.13.1 *Kennedy Station and Conversion*

In order to accommodate the new larger vehicles through the Conversion Section, major modifications would be required for Kennedy, Lawrence East, Ellesmere, Midland, Scarborough Centre and McCowan Stations, including the lengthening of platforms and installation of overhead catenary system.

Temporary bus service will be introduced so that the work described above can be carried out while the SRT is shut down. Temporary bus terminals will be provided at Kennedy and Scarborough City Centre (see section 2.4.15.1). The shut down period is expected to last up to 3 years.

2.4.13.2 *Extension*

The following sections describe the construction methods proposed for this Undertaking.

2.4.13.2.1 *Above Grade Section Construction Methodology*

For the elevated portions of the alignment (between McCowan Station to Highway 401), piers would be cast in place. The running way sections would be pre-cast and installed either as a single piece or in a segmental nature.

Exhibit 2-56: Examples of construction for new elevated sections



Beams can be transported to the site on a truck and then lifted into place with a crane



Beams can be assembled in segments on site and put into place using precast segmental construction method.

2.4.13.2.2 *Cut-and-Cover Construction (for below grade sections)*

The below-grade section to be constructed as part of Phase 1 is approximately 900 metres long with a considerable amount of special needs (station and special trackwork) which must be constructed by cut and cover due to the complex nature of the structure. Furthermore, tunnelling would not be economical for the short distance. Therefore, all below-grade construction is proposed to be undertaken using a cut-and-cover approach.

This method involves excavating the ground surface to a sufficient depth to construct the tunnel structure and ancillary facilities. The sides of the excavation are usually supported by vertical temporary walls to minimize the volume of material excavated and to protect adjacent facilities and buildings. The walls require cross-bracing or tiebacks for support. Once the construction excavation is complete, the contractor builds the structure from the bottom to the top of the structure. Once the structure is complete, the remaining excavation is backfilled and the surface is reinstated.

Exhibit 2-57: Examples of open cut construction for below grade sections



Area is excavated down to track level. To minimize impacts, soil retention systems are used.



The concrete tunnel is poured and then the surface is reinstated.

2.4.14 *Decommissioning of Existing McCowan Car House and Yard*

The current maintenance and storage capabilities of the existing McCowan carhouse and yard are inconsistent with and inadequate for the new vehicle technology and increased fleet size. Furthermore, the proposed mainline alignment is in conflict with the existing carhouse. Therefore, as part of this project, the existing tracks and buildings will be removed.

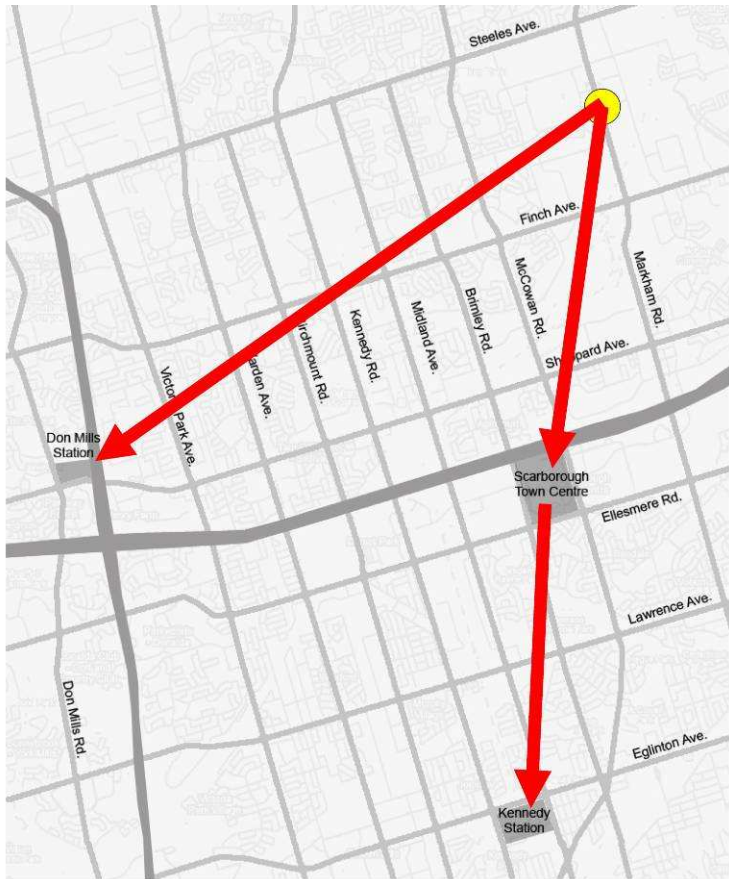
2.4.15 *Replacement Service during SRT Shut Down*

During reconstruction of the SRT, train service cannot operate. TTC customers will be accommodated by very frequent express bus service between Scarborough Centre Station and Kennedy Station. It is expected that some bus routes that now terminate at Scarborough Centre Station will be extended to operate to Kennedy Station, and that service will be increased on other bus routes in north-east Scarborough that operate to the Yonge and Sheppard Subways.

The temporary service changes and the temporary terminals are expected to be required for up to three years.

Temporary bus terminals will be required at Scarborough Centre Station and at Kennedy Station to accommodate the additional bus service, and to permit construction to take place at the existing facilities. These are described in the following sections.

Exhibit 2-58: Affected area for replacement bus service during SRT shut down

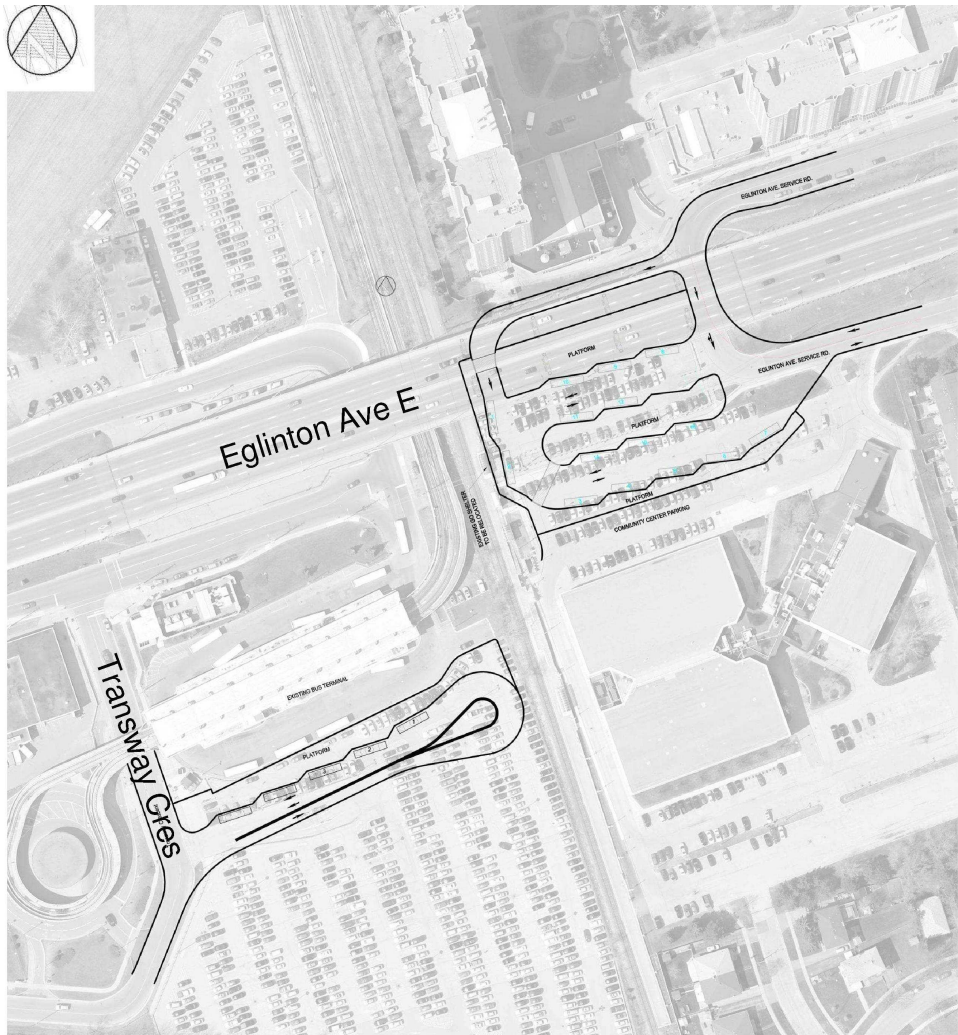


Details on timing and scheduling of buses and other routes affected during construction would be confirmed and communicated to the public through a series of notifications prior to the shut down.

2.4.15.1 Temporary Bus Terminals at Kennedy Station

One or more temporary bus terminals will be established to serve SRT users at Kennedy Station during construction. The construction period is expected to last for approximately 3 years. The two proposed sites for the temporary bus terminals are at the Community Centre opposite Kennedy Station, on the east side of the GO corridor and at the existing Kennedy Station South Commuter Parking Lot. A conceptual layout for the temporary bus terminals is shown in Exhibit 2-59 below. The number of bus bays required at either location, and consequently the ultimate footprints and layouts for each will be determined during the design process, based on final bus routings and an evaluation of passenger access/egress capacities of the various station entrances.

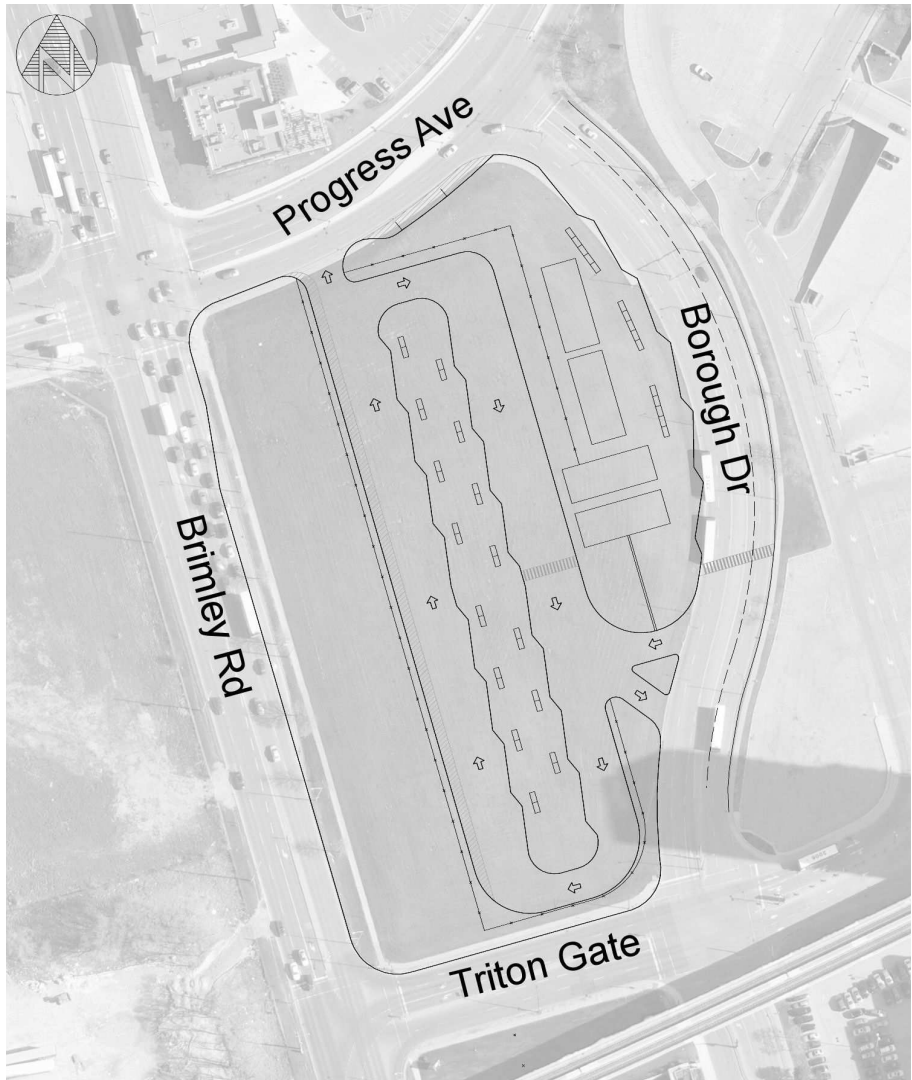
Exhibit 2-59: Temporary bus terminal at Kennedy Station



2.4.15.2 Temporary Bus Terminals at Scarborough City Centre

The replacement bus service will introduce more TTC buses into the Scarborough Centre area. Furthermore, the conversion of the Scarborough Centre Station requires the temporary closure of the existing bus terminal (in order to accommodate equipment and scaffolding for the upper level reconstruction). Therefore, TTC proposes to construct a temporary bus terminal that will facilitate loading and unloading of existing bus service and SRT replacement service in a single facility within the Scarborough Centre area. As illustrated in Exhibit 2-60, it is proposed that this be located upon unused or underused lands within the mall boundary. The final location and configuration will be developed in consultation with the mall owners, Toronto Transportation, GO Transit and TTC.

Exhibit 2-60: Temporary bus terminal at Scarborough Centre



2.4.15.3 Temporary Construction Sites and Easements

Construction of this magnitude requires additional working space. Heavy equipment maintenance, storage/ material lay-down areas, and temporary easements for elements like temporary road diversions or temporary replacement parking are a requirement of construction.

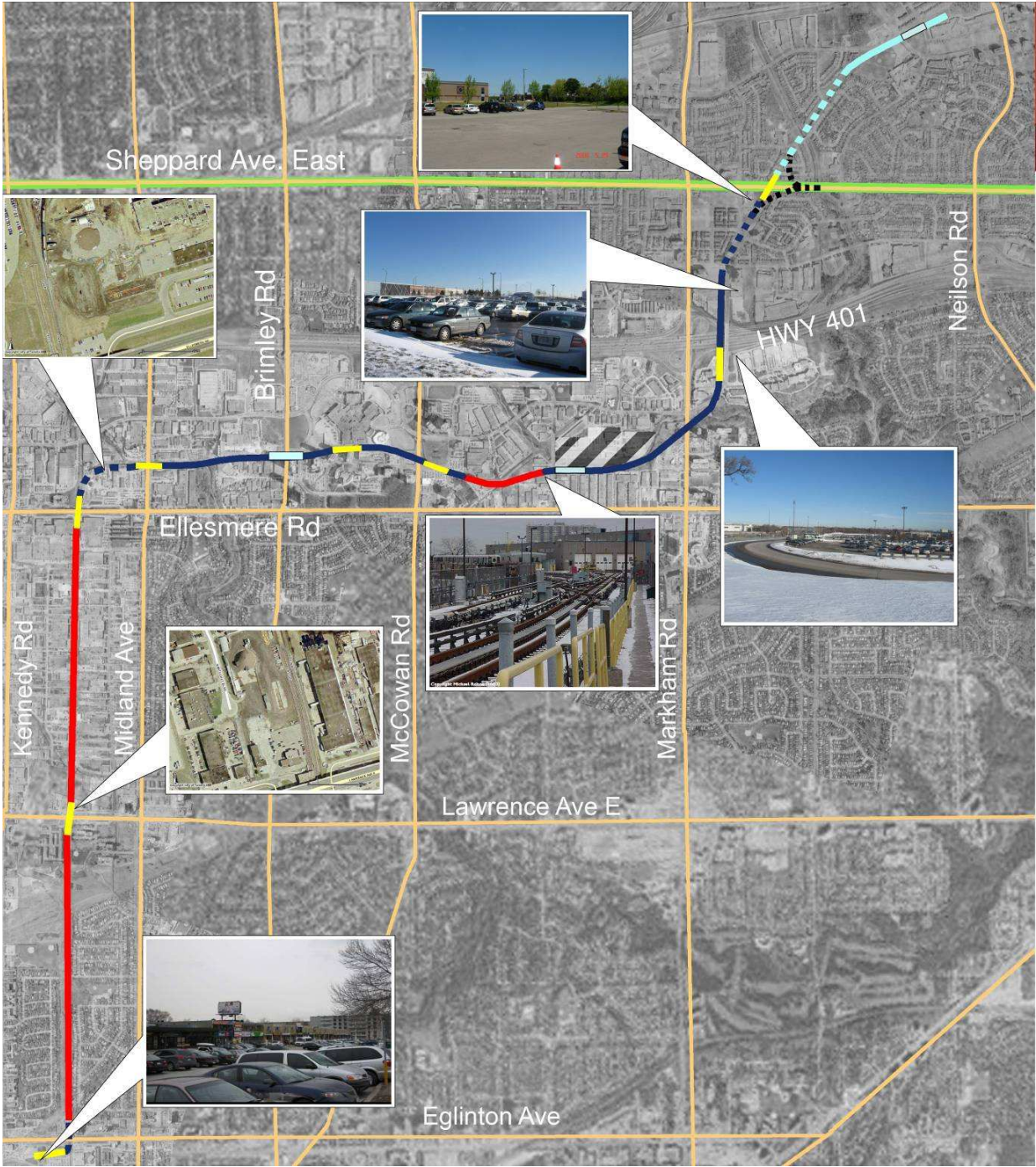
During construction, areas immediately adjacent to the SRT will be required for the removal of excavated material as well as the delivery of material and equipment for the construction of the proposed works.

Through the design stage the number and size of work zones will be confirmed. Some possible sites include:

- The north and south parking lot at Kennedy Station;
- The existing TTC maintenance and storage facility east of McCowan Station; or
- Existing parking lots and open spaces north and south of Highway 401.

Once construction is complete, these areas will be reinstated.

Exhibit 2-61: Possible work zones



2.5 Utilities

A number of utilities cross the existing and proposed extension of the SRT. Through ongoing consultation with municipalities and utility companies, an initial review and confirmation of existing utilities has been undertaken as part of the Transit Project Assessment. A preliminary identification of utility impacts has been included in Appendix J.

During the design stage, there will be a thorough examination of existing utilities and if necessary, relocation and modification of utilities will be undertaken. Major utilities that are found to be within the right-of-way may be relocated prior to excavation to maintain service or temporarily suspended through the open cut. The appropriate utility companies will be contacted prior to commencing excavation. In addition, utility relocation might require alternate and temporary re-arrangement of vehicular and pedestrian flows due to changes in road conditions such as reduced traffic lanes. Mitigation measures such as a traffic management strategy and maintaining transit and pedestrian access will be examined as part of the detailed design phase.

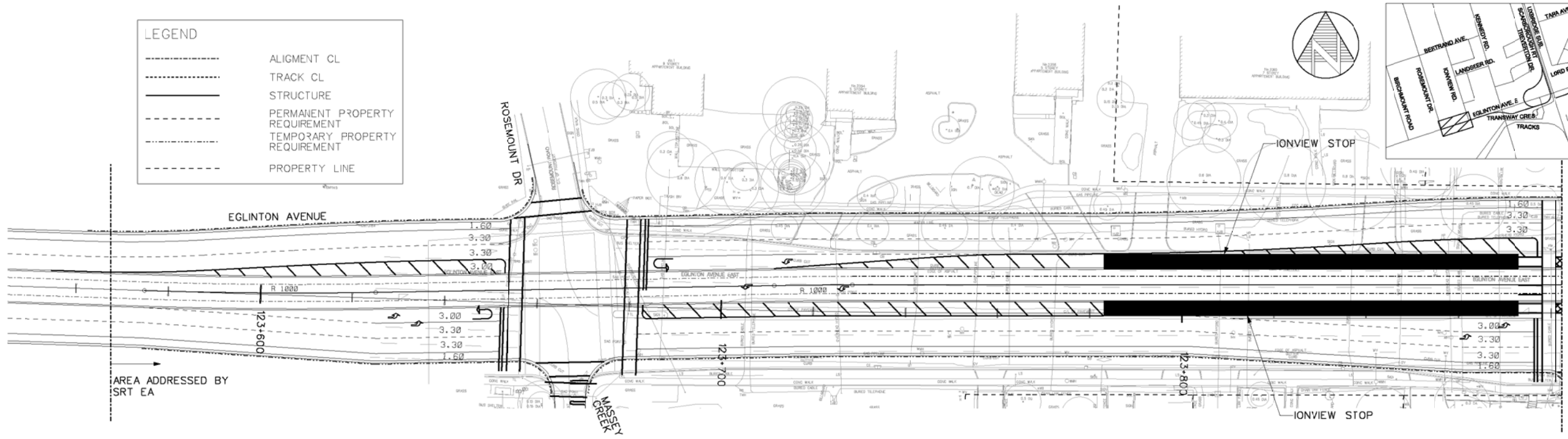
Current minimum line clearances to Hydro One Networks will be respected. Access to Hydro One facilities will be maintained. Any grading, excavating, filling or other civil work close to the structures will employ appropriate measures to maintain the integrity of the structures/foundations. The proponent will continue to consult with Hydro One during detail design to address concerns identified.

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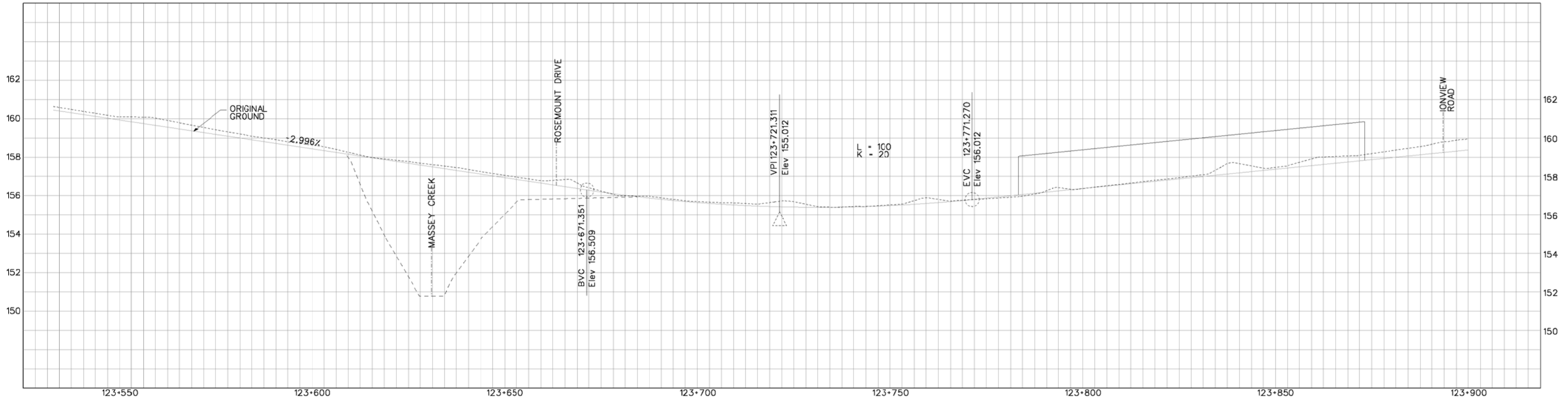
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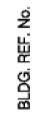
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DRAWING No.	REVISIONS	REVISIONS	AECOM	DRAWN: J. ARICO CHECKED: R. PETTIGREW CORRECT: _____ SCALE: 1:500 1:100	KENNEDY STATION REDEVELOPMENT CONCEPTUAL DESIGN OPTION "A1-FINAL-100702" PLAN & PROFILE-EC-LRT TRACKS (1) FROM STA. 123+500 TO STA. 123+900	Plot Date: 9/24/2010 TORONTO TRANSIT COMMISSION TRANSIT CITY Dwg. No. KDY-C-001 Sheet No. 01



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SHEET No.

DRAWING No.**AECOM**

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CHECKED	R. PETTIGREW	2010/09/24	
CORRECT			

SCALE	0	5	10	15	20m
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KENNEDY STATION REDEVELOPMENT
CONCEPTUAL DESIGN
OPTION "A1-FINAL-100702"
PLAN & PROFILE-EC-LRT TRACKS (2)
FROM STA. 123+900 TO STA. 124+250

Plot Date: 9/24/2010	
	
TORONTO TRANSIT COMMISSION TRANSIT CITY	
Dwg. No. KDY-C-002	Sheet No. 02