Table 2-7: Analysis of non revenue service connections

Objectives	McCowan	Progress at Grade	Markham	Below Grade Connection at Sheppard	SUMMARY
	Sheppard/McCowan connection, along McCowan Rd, down to Ellesmere and connect to existing yard via Ellesmere.	Sheppard/Progress down Progress ave until Milner, cross over at 401 Bridge going above grade.	Sheppard/Markham down Markham, along Milner, into Milner business Court, cross over at 401 Bridge going above grade.	Connects to Mainline north of Sheppard Station	
A) Minimize Adverse Environmental Effects	◕	◑	◕	●	The below grade connection at Sheppard is the most preferred as it has the lowest impact to the residents area constructed, but displaces existing houses. The below grade option impacts at Highland Creek bridge can be mitigated as improvements to the existing Sheppard bridge are also required for the Sheppard LRT. The Progress option has its impacts to the local residential community.
B) Support Population and Employment Growth	●	◕	◕	◕	Only the McCowan corridor has the potential to be upgraded for revenue service to meet an Official Plan objective.
C) Technical Issues	◔	●	◑	●	McCowan has the highest impacts to both transit and traffic operations and therefore is least preferred. From a transit operations issue, the below grade connection at Sheppard or Progress provides the most operation flexibility.
D) Cost	◑	●	◕	◔	Due to its length, the McCowan connection has the highest capital cost and requires the most ongoing opertation and maintenance cost. The Progress option has a significantly lower capital cost in comparison to all other options. The below grade connection will incur additional costs in the future when Phase 2 is implemented.
Overall Summary	◔	●	◑	◕	
		Recommended			

2.3.2.5 Consultation and changes to Service Connection through TPA process

Following the Notice of Commencement, community concerns raised during the April 2010 public open houses regarding the technically preferred option (Progress option) were discussed at the Toronto Transit Commission and City of Toronto Committees resulted in a council decision to select the underground service connection (Sheppard option).

The decision made by City council to use the below-grade connection was based on several factors including

1) Community reaction to the relative adverse effects between the alternatives being considered - There were numerous petitions against the Progress service connection from the public. The preference was the below-grade option.

2) The project team provided City council a review of the strengths and weaknesses of the two options under consideration. This included relative impacts to the local community (noise, traffic, aesthetics, property impacts, etc).

3) Cost benefit - The city council determined that though it is of a higher cost, the benefits to the community by selecting a below-grade connection is justifiable.

On June 8, 2010, Toronto City Council approved a change in the Scarborough RT project scope for the section of the alignment north of Highway 401.

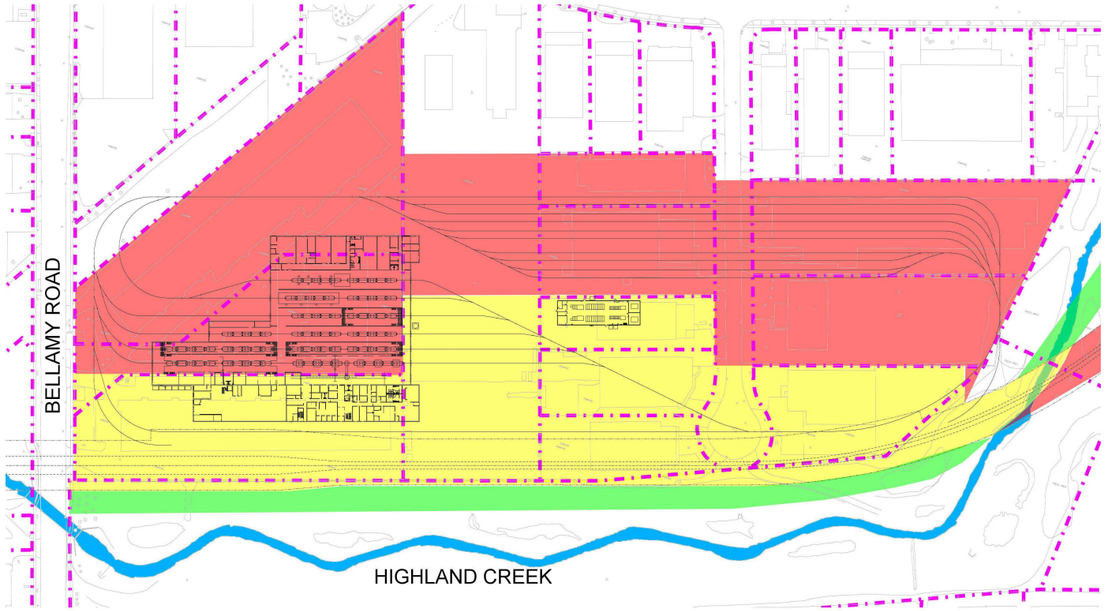
The service connection used for running trains in and out of service to / from the proposed Sheppard East Maintenance and Storage Facility will no longer be located on Progress Avenue (running from Milner to Sheppard). Instead the service connection (Sheppard Option) will run underground and will connect to the Sheppard LRT line via a portal structure on Sheppard Avenue (Exhibit 2-30).

Exhibit 2-30: Underground Service Connection (Sheppard Option)

2.3.3 Long Term Maintenance Needs

When additional Transit City projects are constructed, the Sheppard East Maintenance and Storage Facility will be unable to accommodate the SRT fleet, and therefore a new facility would be required. It was determined that the best location for a future SRT Maintenance and Storage Facility would still be the Bellamy location as selected in the 1992 EA (see Appendix A-7 for details). However, the overall spatial requirements for the new extension and fleet would be greater than what was originally identified in the 1992 EA (area shown below in yellow). Exhibit 2-31 illustrates the additional area requirements over the original 1992 EA.

Exhibit 2-31: Future Potential Maintenance and Storage Facility



2.4 Preferred Design

Based on the analysis and evaluation of options, the SRT includes the following key design components as illustrated in Exhibit 2-32:

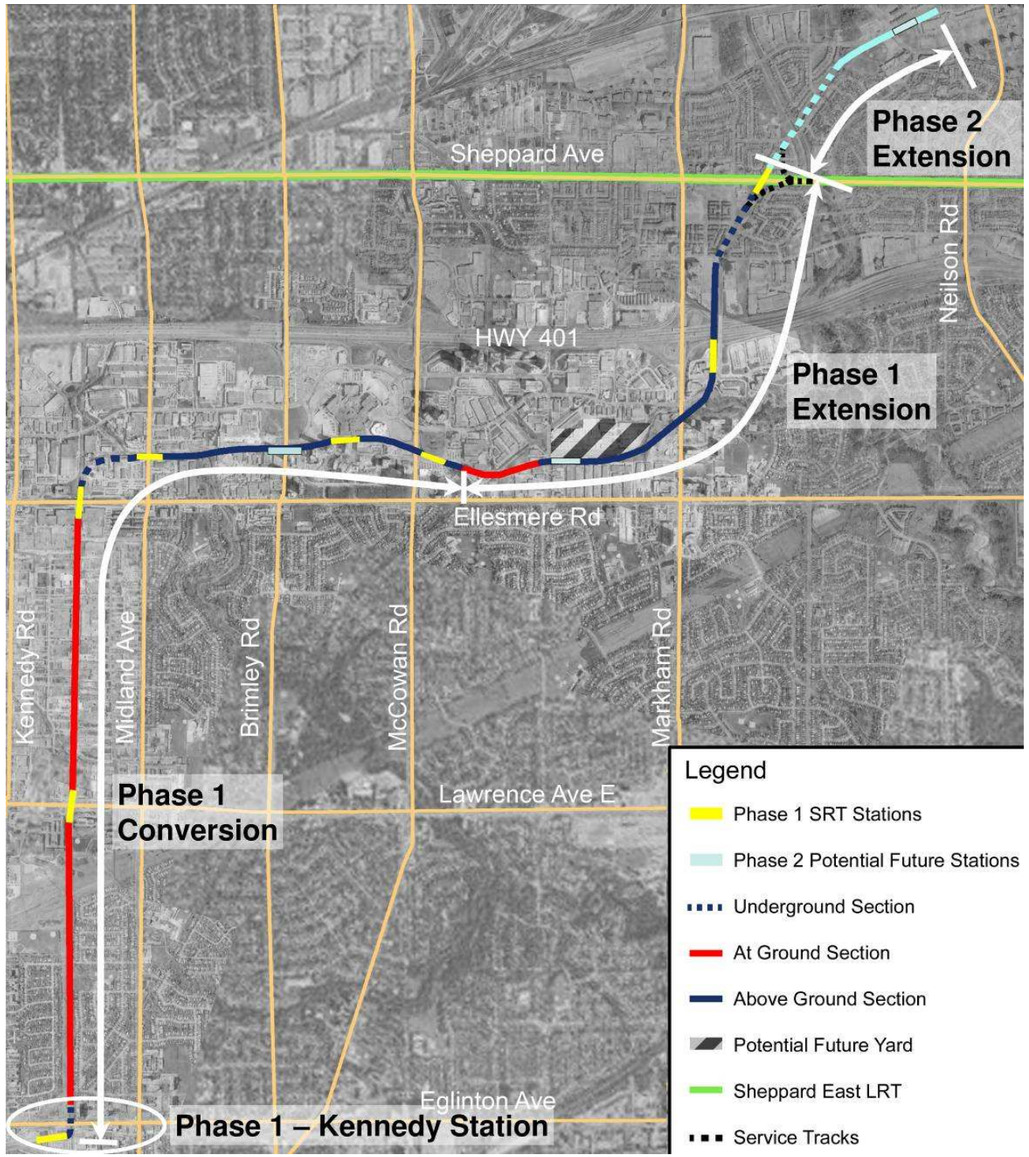
- A complete reconstruction of the SRT connection at Kennedy Station that provides a more convenient transfer from the SRT to the Bloor-Danforth Subway and provides connections for the future Eglinton Crosstown and Scarborough-Malvern LRT lines;
- Modifications to the existing SRT stations of Lawrence East, Ellesmere, Midland, Scarborough Centre and McCowan Stations to accommodate longer trains as well as the platform height and overhead power requirements of LRT vehicles;
- Extension of the SRT from McCowan Station to Malvern Town Centre with stations at Centennial College, Sheppard Avenue and Malvern Town Centre;
- Protection for future SRT stations at Bellamy Road and Brimley Road;
- Bus terminals and passenger pick-up and drop-off facilities at Sheppard Avenue and Malvern Town Centre;
- Provision of an undergroung non-revenue service connection from the SRT to the SELRT;
- Protection for a future maintenance and storage facility at Bellamy Road and Progress Avenue; and,
- Supporting structures including traction power substations, emergency exit buildings and ventilation shafts in underground sections from Milner Avenue to McLevin Avenue along the abandoned rail corridor.

Due to funding constraints, the extension of the SRT into Malvern will be undertaken in two phases:

- **Phase 1:** the SRT will be extended from McCowan Station to Sheppard Avenue and will include new stations at Centennial College and Sheppard Avenue. The station at Sheppard Avenue will include a bus terminal and passenger pick -up and drop-off and a high quality transfer from the Sheppard East LRT to the SRT.
- **Phase 2:** the SRT will be extended further from Sheppard Avenue to Malvern Town Centre, when funding becomes available.

The following describes in greater detail, the preferred design elements. While changes may occur during the preliminary design or detailed design stages, any changes should not alter the intent of the recommended undertaking. Following this chapter are plans associated with the recommended SRT project. The drawings also include concepts for each of the stations (both for the existing alignment as well as the extension).

Exhibit 2-32: The Recommended SRT Project



2.4.1 Running Structures

Special structures are required for track work that is not at grade. This includes elevated structures on bridges and below grade structures in tunnels. The final approach and structural details would be subject to refinement during design but these have been developed conceptually so that impacts could be assessed (see Series C drawings appended to this chapter). The following sections describe the design approach in each location with further discussion provided in Section 4 (impacts and mitigation).

2.4.1.1 Final Concepts for ECLRT and SMLRT

The EPR's for both the Eglinton Crosstown and Scarborough Malvern LRT lines deferred final decisions on these lines in the vicinity of Kennedy station. With the completion of this TPA, planning for both lines is now complete and this EPR seeks approval for the deferred sections on both projects.

From the west of Kennedy Station on Eglinton Avenue East, the Eglinton Crosstown LRT will operate at surface in a dedicated centre median right-of-way, including a stop at Ionview Road, and then transition to a portal east of Ionview Road. The alignment will continue underground into Kennedy Station.

From the east of Kennedy Station on Eglinton Avenue East, the Scarborough-Malvern LRT will also operate at surface in a dedicated centre median right-of-way, including a stop at Midland Avenue, and then transition to a portal west of Midland Avenue.

2.4.1.2 Conversion

The SRT includes the ongoing use of the existing dedicated right-of-way comprising at-grade, below-grade and elevated sections from Kennedy Station to McCowan Station. The entire SRT project will be based upon the ongoing use of the existing fully exclusive right-of-way alignment.

2.4.1.3 Existing Tunnel (north of Ellesmere Station)

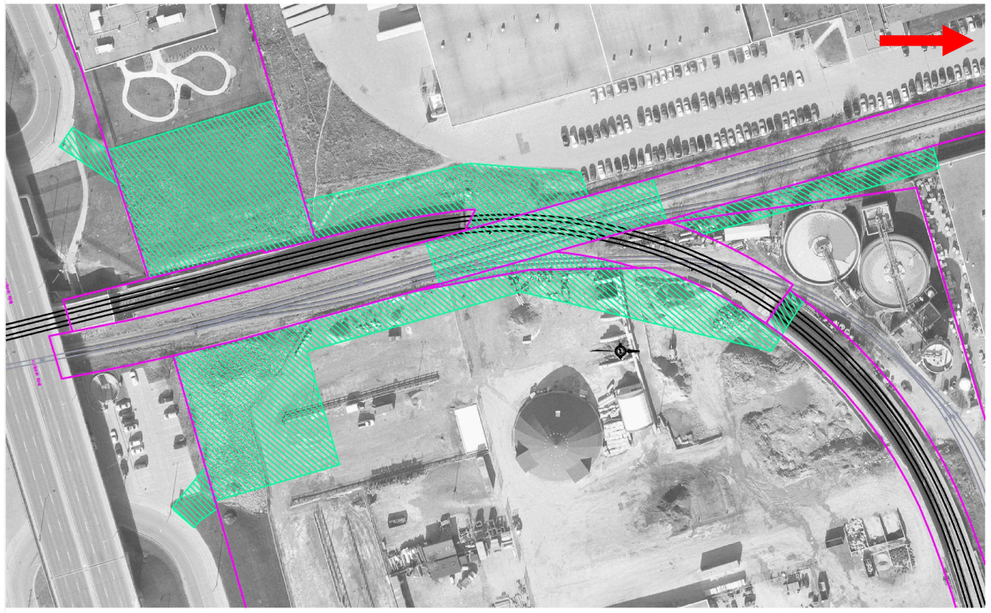
The existing tunnel north of Ellesmere Station is approximately 100m in length. It lacks the overhead clearances required for the new LRT vehicles. The resulting key scope for the tunnel is the repositioning of the GO tracks above the structure to allow the overlying soils to be excavated and the structure's roof removed. This would allow for a revised final structure configuration with increased vertical clearances.

The tunnel reconstruction is a significant stand-alone effort based on the three active tracks above the structure. One of the tracks is a GO Transit line which would require near-continuous maintenance of service. The other two tracks are freight spur tracks that appear to be used infrequently and should allow extended shutdown periods for reconstruction.

The current preferred scheme calls for the temporary realignment of all three tracks. Following the temporary realignment of the GO tracks and the freight tracks, excavation could advance down to the tunnel roof, which would subsequently be demolished. A new tunnel structure would then be built and the overlying tracks would be reinstated. This concept would require approval from both GO Transit and CN.

Preliminary discussions have determined that some of the sidings can be eliminated provided that their reinstatement is protected for in the future.

Exhibit 2-33: Tunnel reconstruction and temporary rail diversion for GO Stouffville Line



2.4.1.4 Structure at Future Brimley Station

The existing guideway would have to be removed in the area of the proposed Brimley Station. The existing superstructure is made up of pre-stressed, post-tensioned concrete girders that form a guideway for the trains to travel on an infill slab. The infill slab is post tensioned to the exterior girders. A new station would require a platform on either side of the guideways for passengers. The existing elevated guideway geometry does not allow for the inclusion of a platform due to the location of the girders. Removal of any girders to accommodate a platform slab would require removal of the infill deck since they are integrally connected. Therefore the full removal of the guideway would be required. In addition, any station structure would be much wider than the existing guideway elements. This may require that the existing piers be removed as well. These were designed to accommodate only the existing guideways both from a structural standpoint, and from a geometric standpoint – not any additional platform or roof infrastructure. Therefore, any proposed station at Brimley would require removal of the existing elevated guideway superstructure, and most likely the guideway substructure as well.

2.4.1.5 Extension

For the extension, the new exclusive right-of-way will also utilize below-grade, at-grade and elevated running structure. The preferred alignment connects to the existing McCowan Station, runs at-grade to just west of Bellamy Road, rises over Bellamy Road and is elevated to north of Highway 401. The alignment then transitions to below-grade via a portal before Milner Avenue, passes under Sheppard Avenue East and proceeds under Highland Creek at Mammoth Hall Trail. After crossing under Highland Creek, the alignment then transitions through a portal into an elevated structure near McLevin Avenue (see Exhibit 2-34 to Exhibit 2-36 for details).

Exhibit 2-34: SRT Extension Alignment