Environmental Effects

The environmental effects for the Scarborough RT are classified as follows:

- **Displacement of Existing Features by the SRT Facilities** – Permanent impacts to existing features located within the footprint of the SRT as they are physically altered to accommodate works at Kennedy Station, the conversion of the existing line and the extension.

- **Construction Impacts** – Temporary impacts, occurring only during construction activities.

- **Operations and Maintenance Impacts** – Ongoing and long-term impacts occurring during operations and maintenance activities.

- These effects and proposed measures to mitigate any negative effects are summarized in the following panels.

Displacement of Existing Features

- **NATURAL ENVIRONMENT:** The project will involve several new crossings of the Highland Creek. All facilities will be designed and located, where feasible, to minimize negative effects and will be coordinated with other improvement plans for this watershed. No harmful alteration of fish habitat is anticipated for this project. The impacts on vegetation will be mitigated to the extent possible through avoidance, minimizing the extent of vegetation removals, protecting vegetation to remain and restoring vegetation that is removed. Impacts and mitigation measures will be reviewed with City of Toronto Parks, Forestry and Recreation and the Toronto and Region Conservation Authority (TRCA).

- **CONTAMINATED SOILS & GROUNDWATER:** Contaminated soils and groundwater will be managed in accordance with provincial legislation and regulations.

- **UTILITIES:** Utilities and pipelines will be relocated and/or supported.

- **CULTURAL RESOURCES:** A number of locations along the alignment have been identified as areas with potential for archaeological remains. No heritage features will be affected by this project.

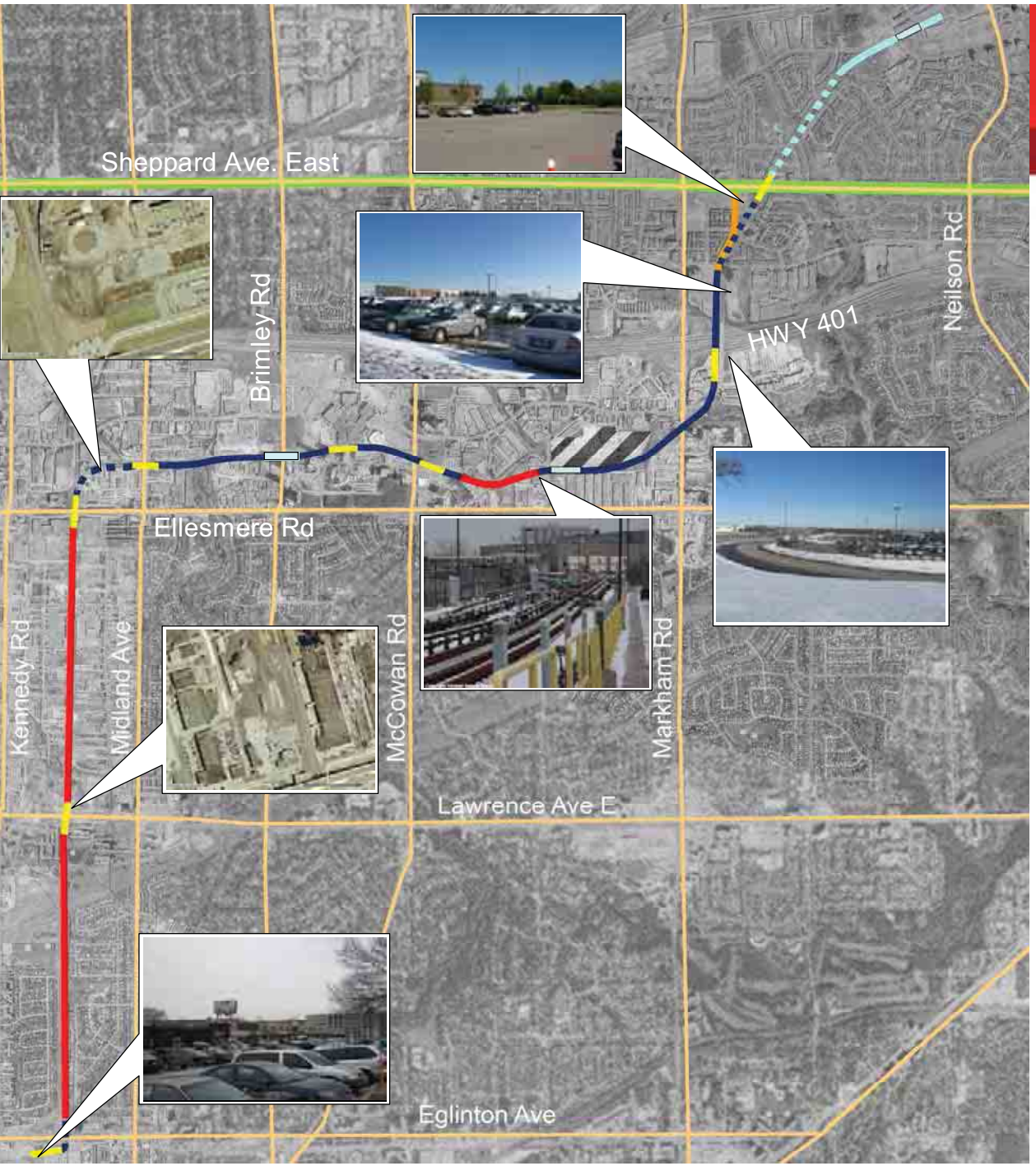
- **PROPERTY:** To execute the project, full and partial acquisitions will be required. In addition, there will be temporary property requirements to facilitate construction. The plans on boards #51 to 69 illustrate the approximate property requirements. The requirements will be confirmed during detailed design.

In support of this project, extensive investigations were undertaken to identify environmental features. Ask one of the staff if you would like to review the draft reports tonight.

Construction Impacts

Measures will be implemented during construction to avoid, minimize or mitigate adverse environmental impacts including:

- Erosion and sedimentation control
- Best management practices to minimize release of dust and other airborne pollutants and mud and litter
- Reinstatement of temporary work sites following construction
- Development and implementation of transit management plans to maintain transit service during the period when the existing SRT is shut down.
- Restriction of truck haul of construction materials, equipment and tunnelling spoils to arterial roads
- Noise and vibration control
- Construction staging and sequencing to mitigate the potential impacts to the community to the extent possible
- Ongoing management and monitoring of construction activities.



Possible Work Zones

During construction, areas immediately adjacent to the SRT are 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 lots at Kennedy Station
- The existing TTC yard east of McCowan station
- Existing parking lots and open spaces north and south of Highway 401

Once construction is complete, these areas will be reinstated

Construction Methods

For elevated sections, columns are constructed on site and then beams are placed on top

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

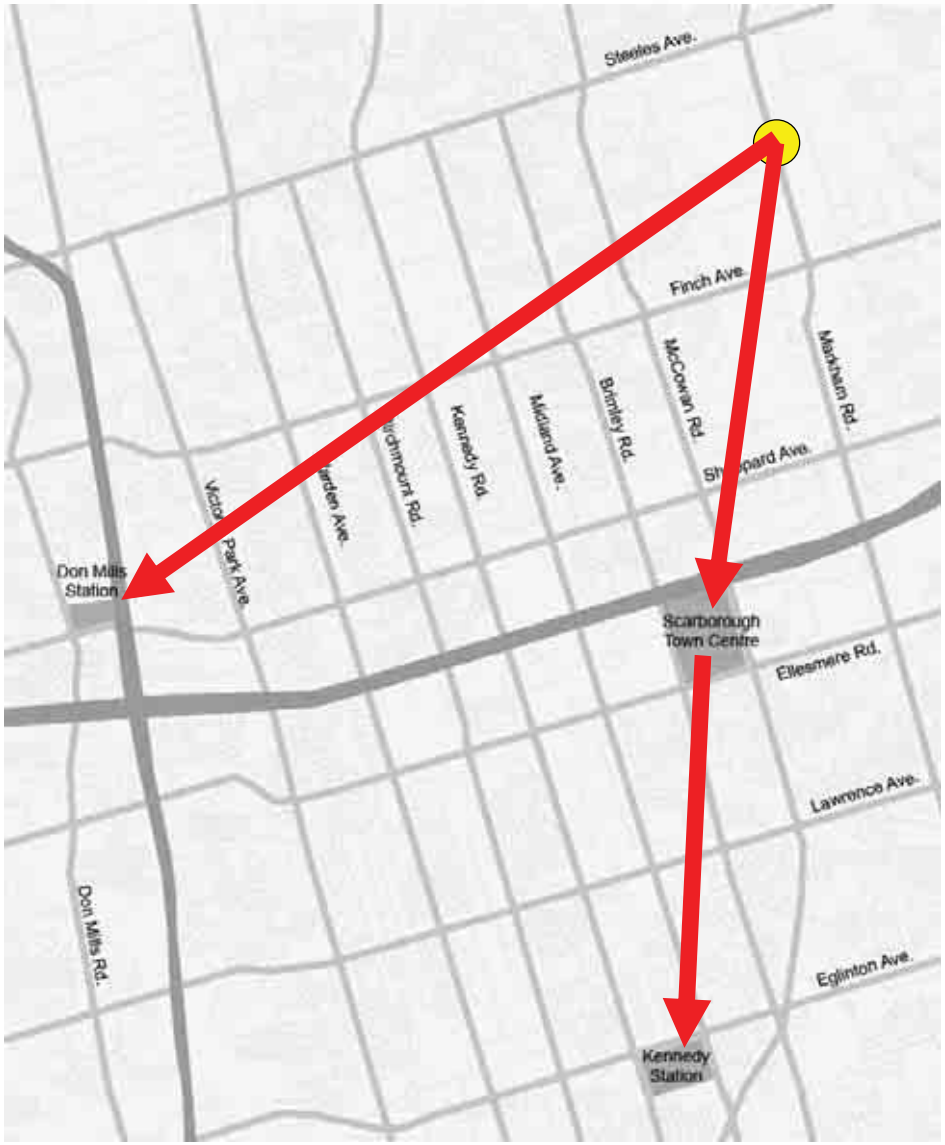
Beams can be assembled in segments on site and put into place using precast segmental construction method.

For below grade sections, construction is done by cut and cover

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.

Temporary Bus Service



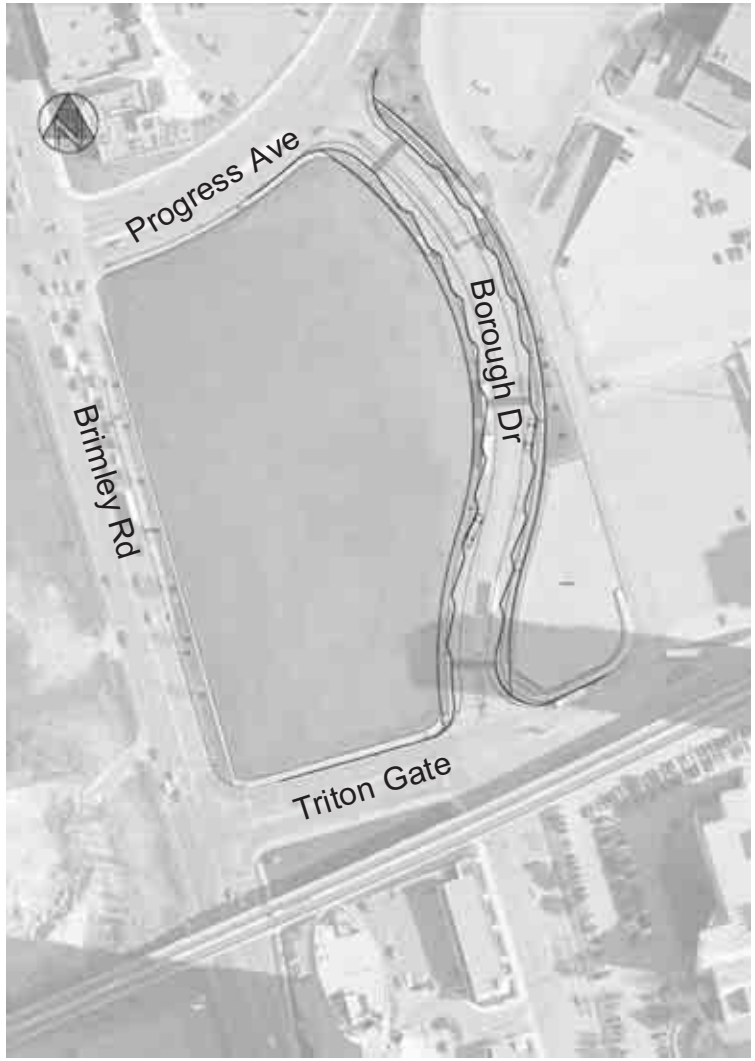
During reconstruction of the Scarborough RT, train service will not operate. TTC customers will be accommodated by very frequent express bus service between Scarborough Centre Station and Kennedy Station. It is expected that some bus routes that now terminate at Scarborough Centre Station would be extended to operate to Kennedy Station, and that service would 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.

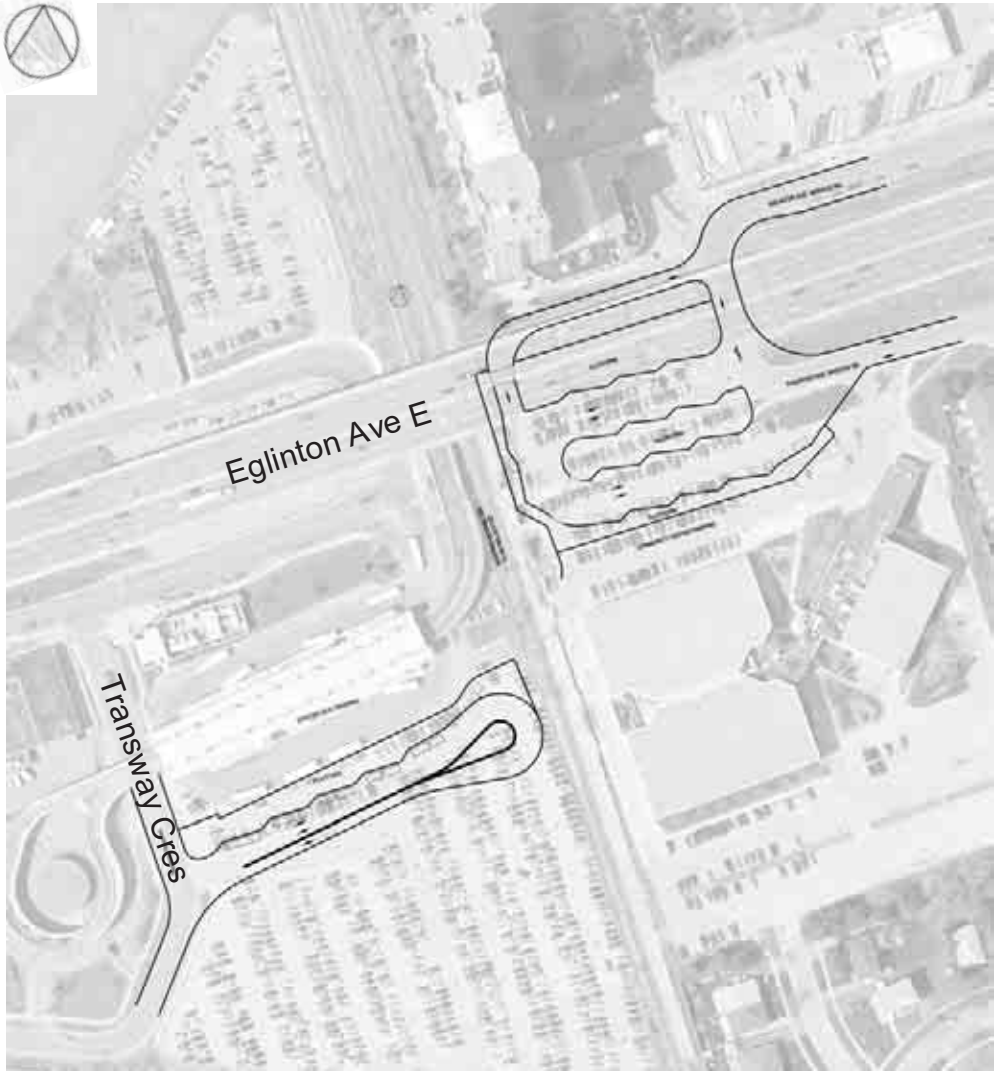
Temporary bus terminals will be required at Scarborough Centre Station and at Kennedy Station to accommodate the additional bus service, and to permit construction to take place at the existing facilities.

Temporary Bus Terminals

Scarborough Centre Station



Kennedy Station



Operations and Maintenance Impacts

Measures will be implemented during operations and maintenance to avoid, minimize or mitigate adverse effects including:

- Stormwater run-off will be treated in accordance with applicable City of Toronto wet weather flow management plan, Toronto and Region Conservation Authority (TRCA) and Ministry of the Environment (MOE) requirements.

- Noise generated by LRT vehicles and by bus terminal operations will be attenuated in accordance with MOE noise protocols (see following boards for details).

- Vibration generated by LRT vehicles is attenuated through TTC's most current track and vehicle technologies as well as the setback distances.

- The potential for traction power stray current will be controlled using isolated and insulated power supplies.

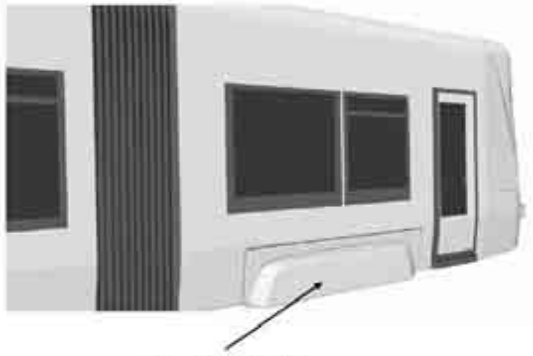
- A preservation strategy will be developed, if required, for possible archaeological remains in the study area.

Noise and Vibration

- New vehicles:
  - Comprehensive noise and vibration control plan – rigorous testing of prototypes
  - Specific new features should reduce noise and vibration

- New track:
  - Rubber pads in structures that reduce the transmission of vibrations to the ground
  - Continuously welded rail
  - Ongoing maintenance of tracks and vehicles

- Results:
  - Vibration minimal at distances greater than 15m.
  - The current SRT alignment sound levels from Eglinton to the existing terminal at McCowan are expected to experience a noise reduction as a result of new vehicle technology.



Bogie skirts reduce wheel noise while improving safety and aesthetics.

Continuously welded rail eliminates the use of rail joints, resulting in a quieter operation.

Rubber sleeves isolate the rail from the concrete road bed, which reduces noise and vibration.

Turns and switches as required at Sheppard Avenue and Progress Avenue will be constructed with larger curves in comparison to the current streetcar network and are constructed with a polyurethane pad to reduce noise and vibration.

Assessing Noise and Vibration

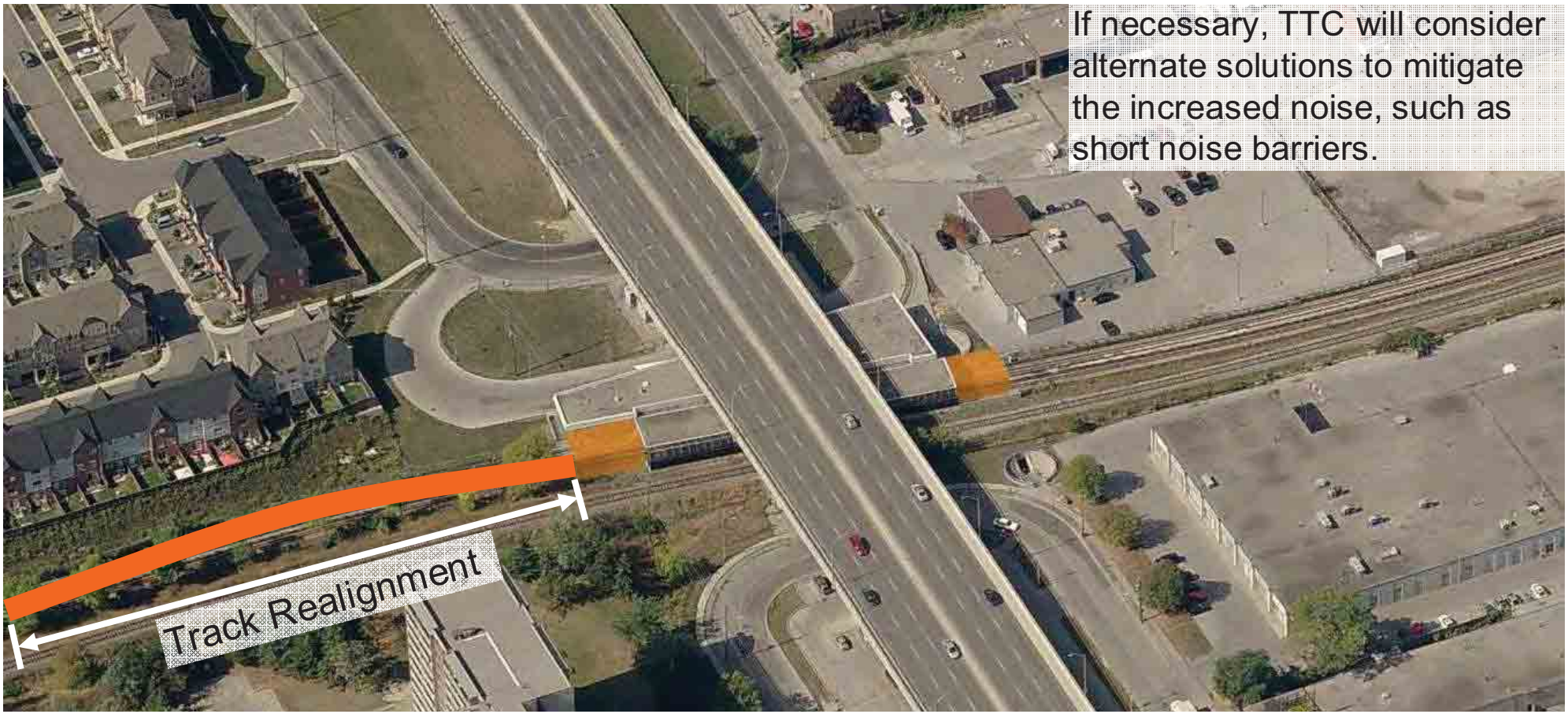
As part of this study, several noise and vibration investigations were undertaken which comprises analytical modeling and field measurements. The results identified the following areas where potential adverse effects may occur as a result of the project:

- Changes to the track associated with improvements for Lawrence East Station
- The service connection on Progress Avenue, between Milner and Sheppard
- The Sheppard East Bus Terminal
- The future Malvern Station

- Locations where field measurements taken for ambient noise
- Location of possible noise exceedances where mitigation may be required
- Location of possible vibration exceedances where mitigation may be required
- Modeled receptors with no impacts identified

Lawrence East
Noise & Vibration

The changes at Lawrence East station may require a shift of the track alignment towards the townhouses. This may increase noise level, which may be mitigated by the new vehicle technology.



If necessary, TTC will consider alternate solutions to mitigate the increased noise, such as short noise barriers.

Service Connection on Progress
Noise & Vibration

The service track on Progress Avenue warrants special consideration. TTC is committed to work with the community to plan the best solution:

Due to curve in track at Sheppard Avenue, noise levels may increase during the night. Possible solutions include:

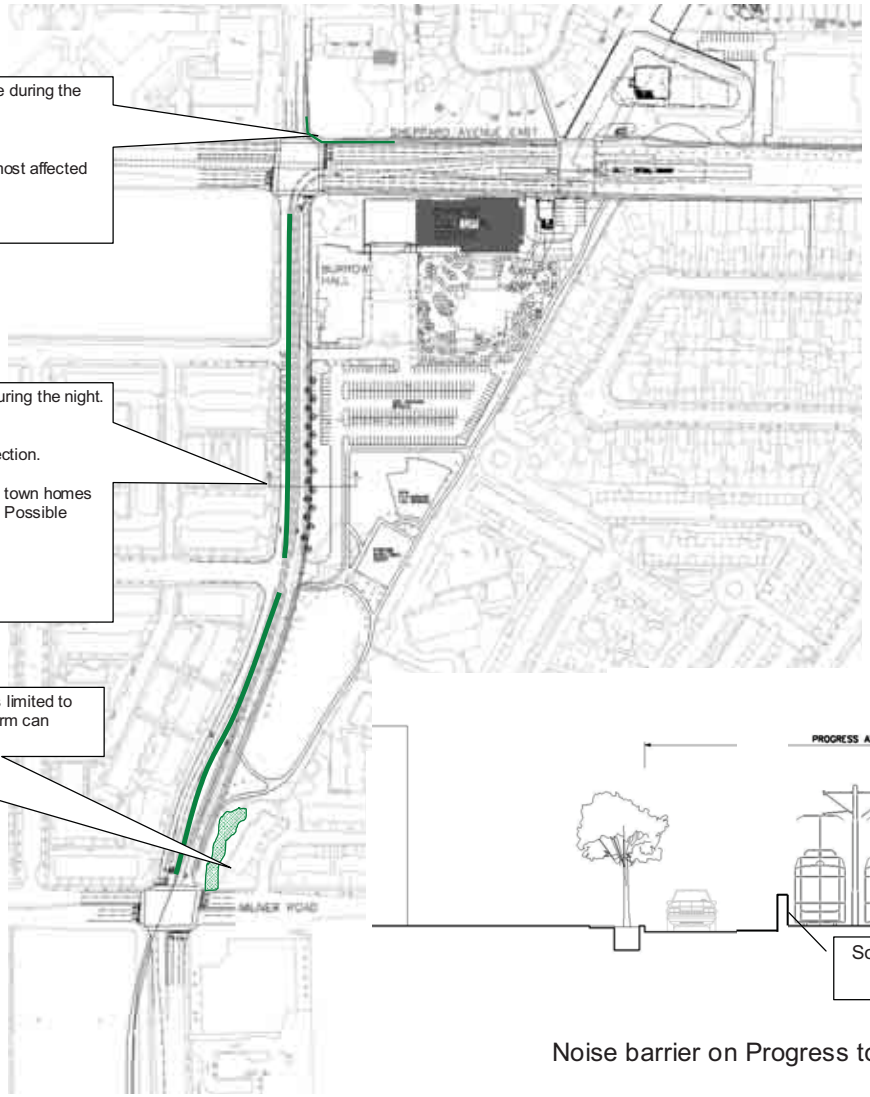
•Control the speed of the vehicle as they enter the curved section.
•Install noise barriers on the north side of Sheppard to shield those most affected by the noise increase.

Noise levels for the service tracks south of Sheppard may increase during the night. Possible solutions include:

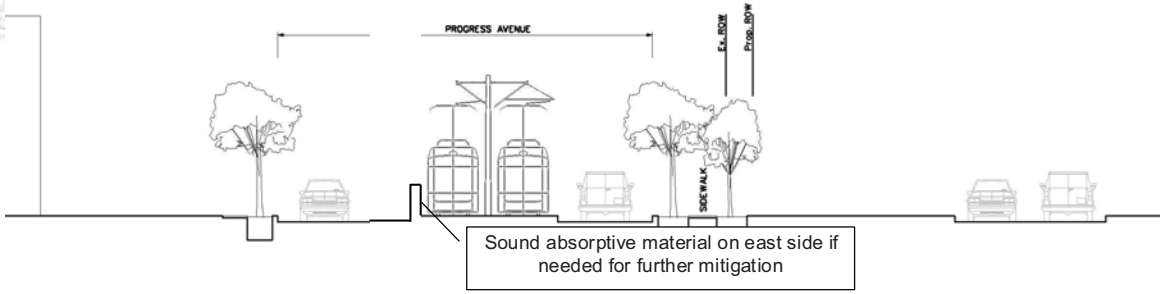
•Control the speed limit between Sheppard and Milner through this section.

•Install noise barrier on the west side of LRT right of way to shield the town homes from the primary source of noise – where the track and wheels meet. Possible treatment includes a 0.7 m high barrier.

Potential adverse noise impacts for homes east of Progress Avenue is limited to the town homes on the northeast corner of Milner and Progress. A berm can mitigate noise in this instance.



Noise barrier:



Noise barrier on Progress to control noise at the source.

Sheppard East Station

A sound barrier up to 6 metres high is proposed at the Sheppard East bus terminal on the west, north and east sides to mitigate noise associated with the proposed bus terminal.

A sound barrier up to 6 metres high will mitigate noise for the lower floors of the condominium. There is currently no recommended practical solution for noise mitigation for the upper floors. TTC is committed to working with the owners of the condominium to develop an optimal solution for this specific location.

The noise from the bus terminal is not predicted to increase over the existing ambient noise levels resulting from Sheppard Avenue.

Sound barriers are not proposed for the south side of Sheppard Avenue.

This example is an existing wall approximately 4.5 m high. The upper panel is clear to allow sunlight through while still mitigating noise impacts.

Malvern Station

- Potential noise impacts have been identified around the future Malvern Station.

- Similar noise mitigation treatments as discussed for Phase 1 components may be employed. TTC is committed to update the noise and vibration analysis prior to implementing Phase 2.

Future Malvern Station

Air Quality

The SRT project will have an overall positive impact on air quality on a regional scale.

As part of this study, an investigation of potential impacts on air quality in the local area surrounding the proposed bus terminals has been conducted for the preferred design. This analysis has concluded that the proposed bus terminals will not have a significant impact on air quality at the local level.

For construction related air quality, Toronto Transit Commission requires that contractors submit a comprehensive Environmental Control and Methods Plan to address, among other elements, dust control.

LEGEND

- TTC PROPOSED STRUCTURE
- TTC PROPOSED TEMPORARY CONSTRUCTION EASEMENT
- PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT – POSSIBLE PROPERTY REQUIREMENT
- STRUCTURE – POSSIBLE PROPERTY REQUIREMENT

Property requirements will be confirmed during detailed design.

Kennedy Station Property

LEGEND

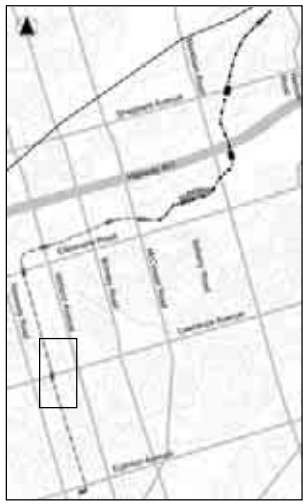
- TTC PROPOSED STRUCTURE
- TTC PROPOSED TEMPORARY CONSTRUCTION EASEMENT
- PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT – POSSIBLE PROPERTY REQUIREMENT
- STRUCTURE – POSSIBLE PROPERTY REQUIREMENT

Property requirements will be confirmed during detailed design.

Lawrence East Station Property

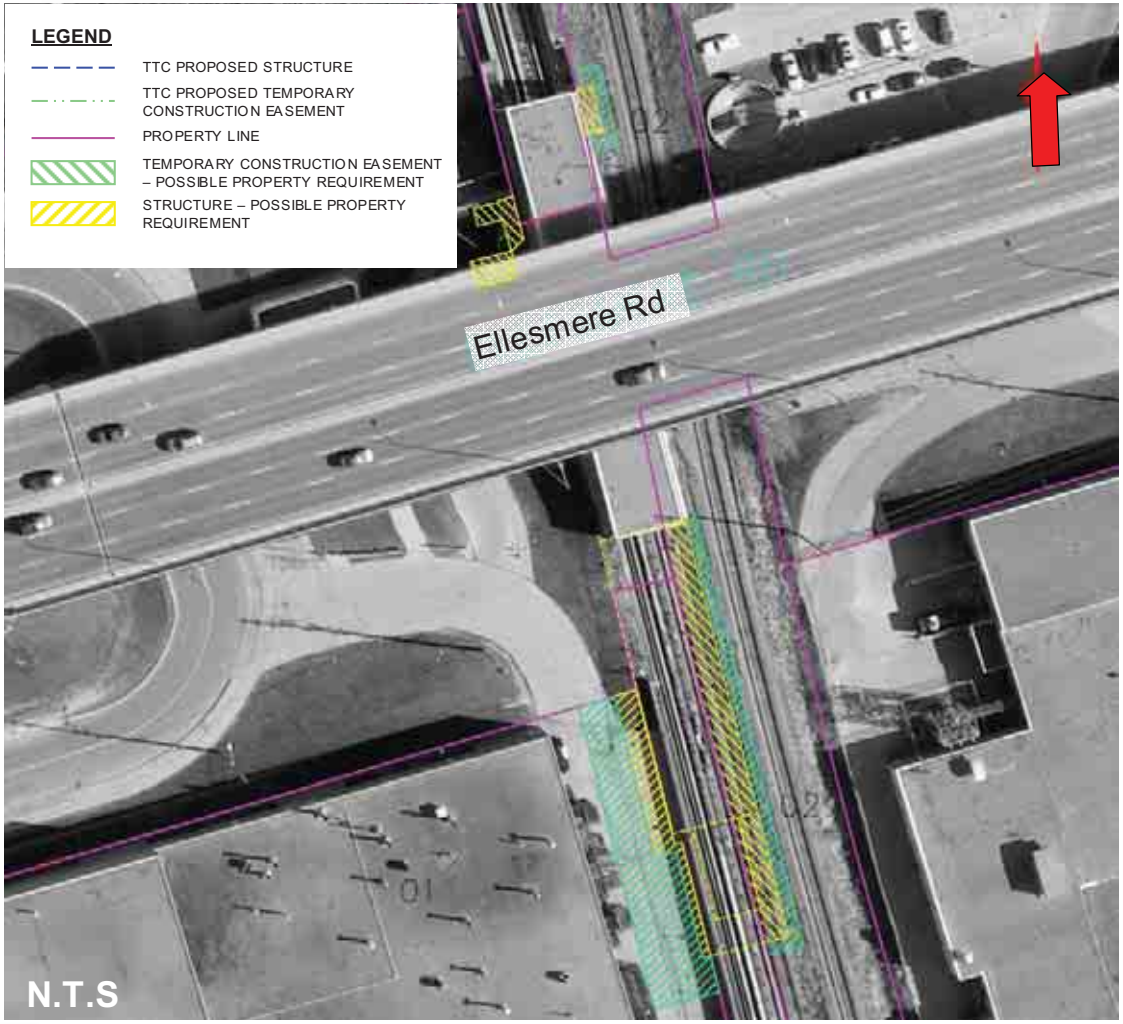
LEGEND

- TTC PROPOSED STRUCTURE
- TTC PROPOSED TEMPORARY CONSTRUCTION EASEMENT
- PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT – POSSIBLE PROPERTY REQUIREMENT
- STRUCTURE – POSSIBLE PROPERTY REQUIREMENT
- TRACK REALIGNMENT – POSSIBLE PROPERTY REQUIREMENT
- TRACK REALIGNMENT – POSSIBLE PROPERTY REQUIREMENT



Property requirements will be confirmed during detailed design.

Ellesmere Station Property



Property requirements will be confirmed during detailed design.

GO Underpass Property

LEGEND

- TTC PROPOSED STRUCTURE
- TTC PROPOSED TEMPORARY CONSTRUCTION EASEMENT
- PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT – POSSIBLE PROPERTY REQUIREMENT
- STRUCTURE – POSSIBLE PROPERTY REQUIREMENT

Property requirements will be confirmed during detailed design.