REPORT FOR ACTION

Safety Barriers along the Leaside Bridge – Feasibility Study Update

Date: March 26, 2025
To: Infrastructure and Environment Committee
From: General Manager, Transportation Services
Wards: Wards 14-Toronto-Danforth, Ward 15- Don Valley West

SUMMARY

The Leaside Bridge, also known as the Millwood Overpass Bridge (Bridge ID 105), has been identified as a high-risk location for suicide. Research indicates that implementing barriers on bridges can significantly reduce suicide deaths, without leading to increased deaths at other locations.

In response to the request from City Council, as well as work planned by Transportation Services following the report Item 2018.EX34.16 adopted by Executive Committee, Transportation Services worked with Engineering & Construction Services to conduct a barrier feasibility study for Leaside Bridge and an associated Heritage Impact Assessment (HIA).

This report outlines the study's findings, evaluates potential alternatives, and provides a summary of next steps to move forward with implementing a permanent solution that balances safety, aesthetics, functionality, constructability and cost.

HELP IS AVAILABLE

If you or someone you know is at risk of suicide, seek help right away. Support is available from experienced professionals who are ready to listen and assist.

In an emergency: Call **911** if you are in immediate danger, experiencing a crisis, or need urgent medical assistance.
For suicide support: Call or text **9-8-8** for free, 24/7, and confidential support.
For other services: Call **211** to be connected to mental health and social services.
For more resources: Visit the City of Toronto's Mental Health Resources page.
You are not alone—help is just a call, text, or click away.

RECOMMENDATIONS

The General Manager, Transportation Services recommends that:

1. Infrastructure and Environment Committee receive this report for information.

FINANCIAL IMPACT

The preliminary design work, including public consultation, is estimated to cost approximately $500,000. Funding will be requested as part of the Transportation Services 2026-2035 Capital Budget submission process for City Council consideration and approval.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial implications.

DECISION HISTORY

On July 24 and 25, 2024, City Council requested the General Manager, Transportation Services report to the Infrastructure and Environment Committee by the first quarter of 2025 on the feasibility of implementing a permanent barrier on the Leaside Bridge (ID 105) to improve public safety and mitigate suicide attempts.
https://secure.toronto.ca/council/agenda-item.do?item=2024.IE15.9

In May 2018, the Executive Committee adopted for information, a report from the Medical Officer of Health on Interventions to Prevent Suicide from Bridges: An Evidence Review and Jurisdictional Scan. This report provides an overview of the burden of suicide deaths from bridges in Toronto, the evidence of the effectiveness of interventions to prevent suicide from bridges, as well as information on interventions used by other jurisdictions.
https://secure.toronto.ca/council/agenda-item.do?item=2018.EX34.16

COMMENTS

As a vital transportation link in Toronto, the Leaside Bridge is an eleven-span “Warren truss” bridge supported by concrete piers that carries Millwood Road over the Don Valley Parkway, Don River and GO Transit Bala Subdivision railway. The subject bridge was originally constructed in 1927, rehabilitated in 1955, widened in 1968, and further rehabilitated in 1983 and 2004 (see location map and bridge photo in Attachment A).

In response to the action requested by City Council on July 24 and 25, 2024 (Item 2024.IE 15.9), a Feasibility Study for Enhanced Barriers on Leaside Bridge along with an associated Heritage Impact Assessment, was initiated by Transportation Services staff with consultant oversight from Engineering & Construction Services.

Feasibility Study Summary

The Feasibility Study included the following design objectives:

- The barrier design should be at least 2.5-3.0 m high (from top of the sidewalk), minimize toe or footholds, and effectively deter people from climbing over the top.

- The barrier design should achieve an aesthetically pleasing appearance that is visually cohesive with other bridge components and durable over time.

- The barrier design should achieve “a good balance” between meeting functional and aesthetic criteria.

- The barrier design should be sensitive to the unique context: Leaside Bridge, considering its visual character, views of the natural ravine, and the local community.

In line with these design objectives, various enhanced barrier options were analyzed and evaluated. The alternatives, along with their advantages and disadvantages, are summarized below and illustrated in Attachments B1-B7:

- Alternative 1 - Horizontal Nets: A minimalist design approach with nets below the bridge deck. This option maintains unobstructed views but comes with high costs and constructability challenges.

- Alternative 2 - Barrier with Vertical Rods/Cables: Thin vertical rods or cables that are difficult to climb while allowing for an unobstructed view. However, they create a security-focused aesthetic, which may not be visually appealing.

- Alternative 3 - Barrier with Horizontal Rods/Cables: Horizontal steel rods or cables angled inward to prevent climbing over the top. This is a cost-effective design, however, compromises aesthetics and provides footholds for individuals skilled at climbing.

- Alternative 4 - Tempered Glass Barrier: Aesthetically pleasing panels that deter climbing and maintain visibility. However, this option adds significant static load to the bridge and requires high maintenance.

- Alternative 5 - Green Wall Barrier: A mesh screen with planters for greenery. While visually appealing in summer, it obstructs views, adds static load, and requires extensive ongoing maintenance.

- Alternative 6 - Angled Mesh-Link Frame: Angled steel frames with mesh that deter climbing. This cost-effective design is robust but partially obstructs views.

- Alternative 7 - Angled Vertical Tubes: Rows of vertical tubes angled away from the bridge. A minimalist design that deters climbing but obstructs views at certain angles.

In the Feasibility Study, the alternatives were assessed based on the following criteria:

- Cost: Includes initial investment, maintenance, and replacement costs, determined using a Life Cycle Cost Analysis.

- Aesthetics: Evaluates visual impact for pedestrians and observers, aiming to preserve the bridge's architectural integrity.

- Constructability: Considers ease of installation, given the bridge's existing structure, utilities, and environmental conditions.

- Durability & Maintenance: Assesses the barrier's ability to withstand weather and wear and ongoing maintenance needs.

- Ease of Inspection: Examines the accessibility for routine inspections to ensure functionality and safety.

- Effectiveness: Measures the barrier's ability to prevent climbing or jumping while maintaining safety.

- Public Safety: Evaluates the barrier's impact on visibility, pedestrian comfort, and ability to deter undesirable behavior such as littering, graffiti, and vandalism.

Based on the criteria outlined above, in the Feasibility Study Alternative 6 (Mesh-Link Angled Frame) and Alternative 7 (Angled Vertical Tubes) are identified as the most preferred options, due to their functional effectiveness, low costs, simple and clean design, ease of constructability, and minimal long-term maintenance needs. The advantages and disadvantages of all seven alternatives considered, are summarized in Table 1 of this report.

Additionally, the Feasibility Study recommends that, based on structural analysis in accordance with the Canadian Highway Bridge Design Code (CHBDC), the bridge may require strengthening before any barriers can be installed because of additional loads they may impose. Further, given that the existing sidewalk and parapet walls are over 20 years old, a detailed inspection of these components is necessary to assess their condition and determine whether they can support the additional load from new barriers or if repairs or other improvements would be required prior to barrier installation. Further testing of the concrete and steel is needed to confirm.

Heritage Impact Assessment (HIA) Summary

In April 2005, Leaside Bridge was added to the City's Municipal Heritage Register for its cultural and historical value.

The Leaside Bridge is an eleven-span Warren truss bridge supported by concrete piers and abutments. It is the oldest, longest and has the most spans of the Warren deck truss bridges in the City, making it a key example of this bridge-type locally. The bridge was built using innovative construction techniques and designed by Frank Barber, a

prominent engineer in southern Ontario. It is recognized for its scale, rapid construction, and strength, which allowed for deck widening without major changes to the structure. The Leaside Bridge is significant as a vital link across the upper Don Valley, supporting the growth of Leaside and East York, and is an important architectural and cultural landmark in Toronto.

In conjunction with the Feasibility Study, a Heritage Impact Assessment (HIA) was carried out by a separate consulting firm to evaluate the feasibility of adding safety barriers while preserving the bridge's cultural and historical significance.

The HIA approach consisted of the following:

- Consultation with the City of Toronto;
- A description of the bridge;
- A summary of the cultural heritage value or interest of the property;
- An evaluation of potential project impacts of the proposed development; and,
- The provision of suggested strategies for the future conservation of the heritage attributes.

The evaluation of the potential impacts of the barrier design options considers major types of negative impacts, including direct impacts such as the removal of heritage attributes, and indirect impacts such as vibrations, dust, visual obstructions, and changes to setting or views. The specific potential impacts include, but are not limited to:

- Destruction of any, or part of any, significant heritage attributes;
- Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance;
- Shadows created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden;
- Isolation of a heritage attribute from its surrounding environment, context or significant relationship;
- Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features;
- A change in land use such as rezoning from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces; and
- Land disturbances such as a change in grade that alters soils and drainage patterns, that adversely affect an archaeological resource.

These impacts were assessed in the HIA for eight barrier options (the seven alternatives in the Feasibility Study, plus Do Nothing) to minimize disruption to the character and setting of heritage features.

The HIA concludes that among all barrier alternatives, Alternative 1 – Horizontal Net is the heritage preferred alternative as it would not result in any direct or indirect negative impacts to the cultural heritage value or interest of the subject bridge.

Understanding that the selection of a preliminary design recommendation will be based on deliberation by the City weighing a variety of criteria as presented in the Feasibility

Study, in addition to a public information session, the HIA also identifies Alternative 4 - Tempered Glass Barrier as the next preferred alternative from a cultural heritage perspective, proposing very minor view obstruction, followed by Alternative 2 - Barrier with Vertical Rods/Cables, Alternative 3 - Barrier with Horizontal Rods/Cables, and Alternative 6 - Angled Mesh-Link Frame, which are equally preferred and also propose minor view obstruction.

Summary Comments from Transportation Services

The two reports (Feasibility Study and HIA) present independent recommendations regarding the barrier design alternatives. Transportation Services has reviewed and compared these recommendations.

The Feasibility Study concludes that Alternative 1 – Horizontal Net is neither constructible nor effective in providing the necessary protection and Alternative 4 - Tempered Glass Barrier poses high costs and significant loading risks.

While the HIA assesses cultural heritage impacts, the Feasibility Study and preliminary design process will consider factors such as constructability and costs, which may inform the decision-making process for option selection.

Of all the alternatives studied, Alternative 6 - Angled Mesh-Link is the only option recommended in both the Feasibility Study and HIA.

Alternative 7 – Angled Tubes is another option favoured in the Feasibility Study. Although it is not preferred in the HIA due to its potential negative impact on views from the bridge deck, it remains a preferred choice for consideration, due to its cost-effectiveness, constructability, and superior ability to deter climbing, compared to other alternatives. This option has been selected for other bridge safety barriers, such as those at Overlea Bridge and Sunnyside Pedestrian Bridge. Further consideration of heritage preservation factors will be undertaken during the detailed design process, including consultation with relevant City divisions, such as City Planning regarding Cultural Heritage and Urban Design.

The preferred options, as outlined in the Feasibility Study and HIA reports, with the comments provided by Transportation Services, are summarized in the Table 1, below.

Table 1 Assessment Summary of Barrier Alternatives

Alternative (Alt #)	Feasibility Study Recommendation	Heritage Impact Assessment (HIA) Ranking	Remarks by Transportation Services
Alt #1 - Horizontal Nets	**Not Recommended**, neither constructible nor effective in providing the necessary protection	**Ranking No.1 -** not visible from the bridge deck	Concur with the Feasibility Study
Alt #2 - Barrier with Vertical Rods/Cables	**Not Recommended**, not visually appealing	**Ranking No.3** - following Alternatives #1 and #4	Concur with the Feasibility Study
Alt #3 - Barrier with Horizontal Rods/Cables	**Not Recommended**, compromises aesthetics and provides footholds for individuals skilled at climbing.	**Ranking No.3** following Alternatives #1 and #4	Concur with the Feasibility Study
Alt #4 - Tempered Glass Barrier	**Not Recommended**, adds significant static load to bridge, requires high maintenance	**Ranking No.2,** very minor view obstruction	Concur with the Feasibility Study, plus the concern of wind load
Alt #5 - Green Wall Barrier	**Not Recommended**, adds static load, requires extensive maintenance	**Not ranked/preferred**, have the most indirect, negative impact on views from the bridge deck	Concur with both the Feasibility Study and HIA
Alt #6 - Angled Mesh-Link Frame	**Recommended**	**Ranking No.4** following Alternatives #1 to #4	Concur with the Feasibility Study, the first preferred option
Alt #7 - Angled Vertical Tubes	**Recommended**	**Not ranked/preferred**, have the most indirect, negative impact on views from the bridge deck	This option was preferred by City Planning in the Overlea Bridge and Sunnyside Pedestrian Bridge projects; further consultation is required

To finalize the selection between Alternatives 6 and 7, further consultations with relevant City divisions, the local community and the public, are necessary, with consideration of technical, aesthetic, cost, and heritage preservation factors.

A routine bridge inspection conducted in 2022 indicated that the overall condition of the Leaside Bridge is "Good" and does not require state-of-good-repair (SOGR) rehabilitation before 2028. However, the Feasibility Study recommends that, based on structural analysis, the bridge may require strengthening prior to the installation of any safety barriers because of additional loads they would impose. Additionally, as the existing sidewalk and parapet walls are over 20 years old, a detailed inspection of these components is necessary to assess their condition and determine whether they can support the new barriers, or if repairs or other improvements are required prior to barrier installation.

Further coordination and consultation will be necessary for option selection and design refinement. Based on the results of new inspections assessing the bridge's condition and the capacity to support the barriers, as well as available timelines and funding, the approach for delivering the safety barriers—either as part of a bundled state-of-good-repair (SOGR) bridge rehabilitation or as a standalone project—will be determined.

Next Steps

1. Feasibility Study and HIA (Completed 2024 - 2025)
2. Predesign, Structural Testing and Internal & Public Consultations (2025 - 2026)
3. Detailed Design (confirming the preferred alternative, pre-design outcomes including engineering and costs, and recommendation for detailed design including if standalone or bundled with SOR) (2026 - 2027)
4. Construction (2028 or later, pending the outcome of detailed design and subject to available funding)

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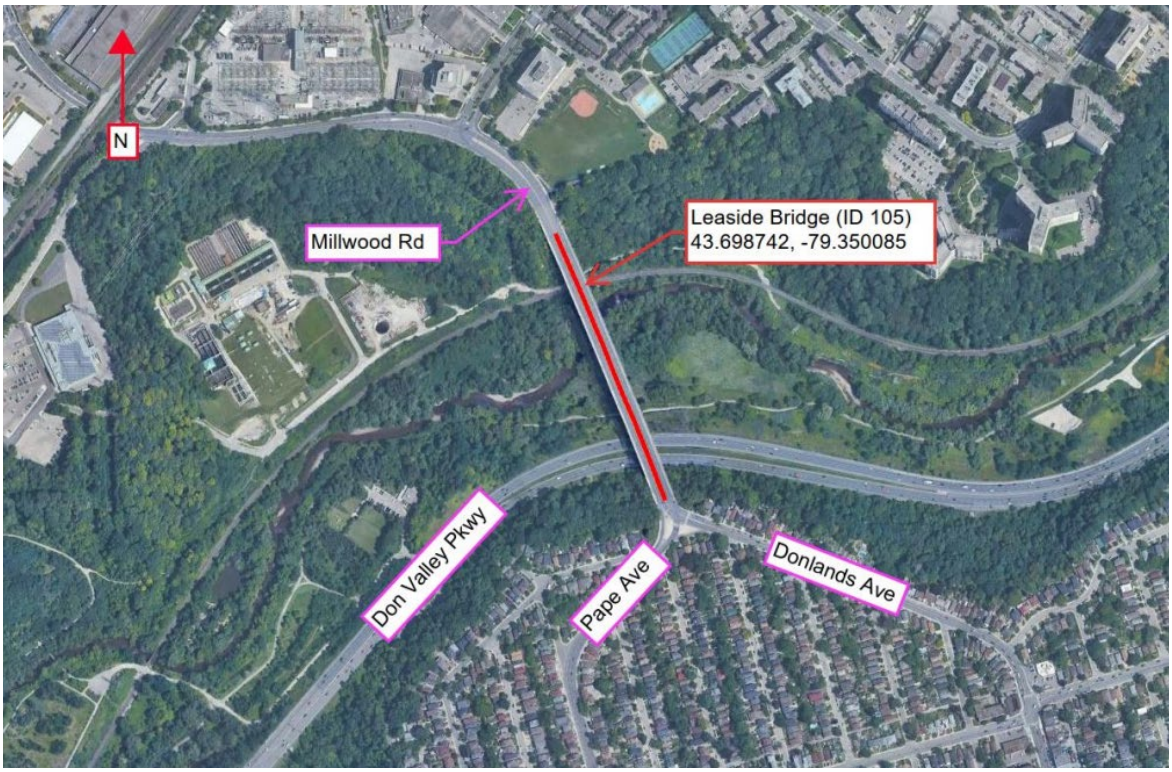
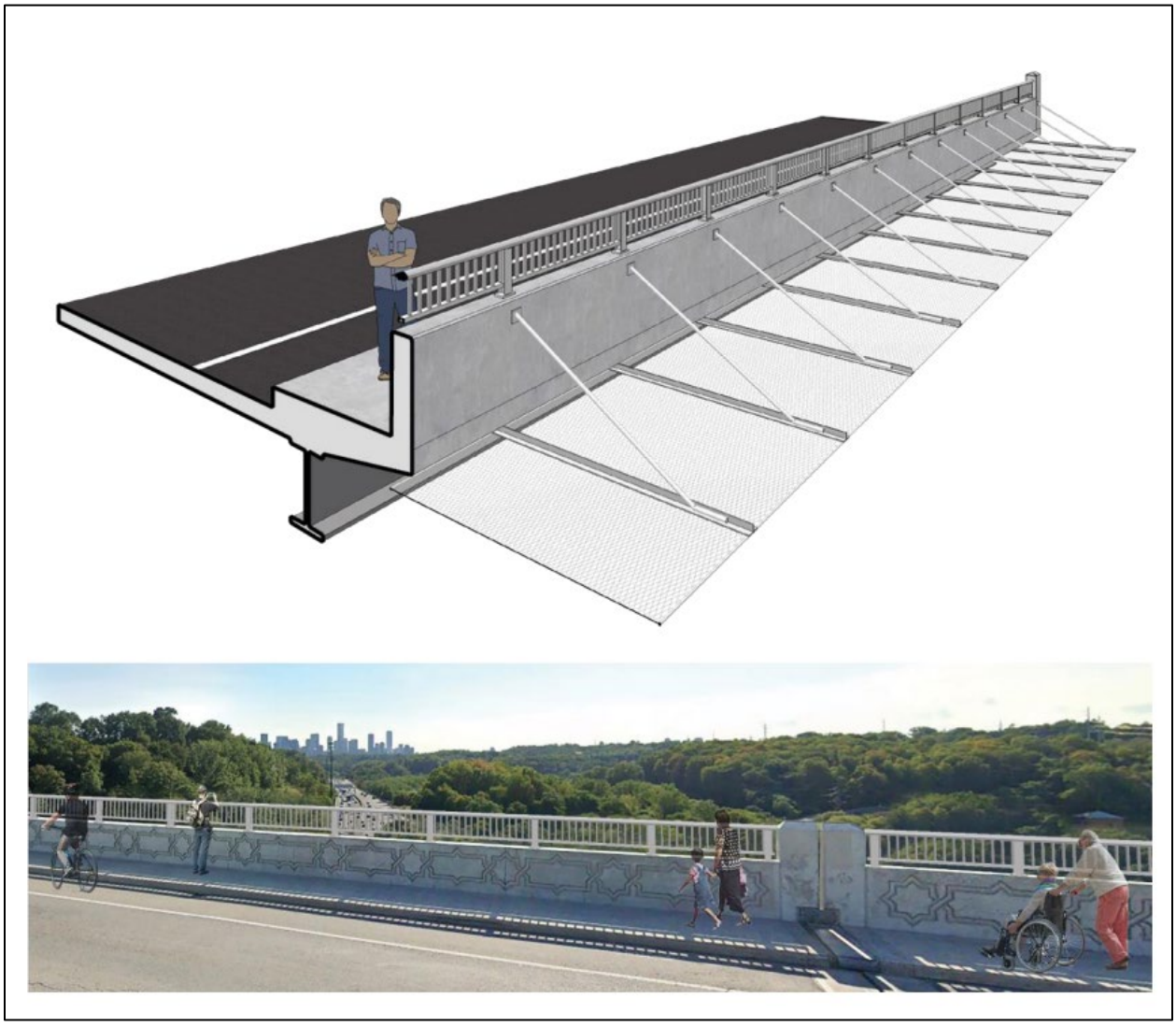
ATTACHMENTS

Attachment A – Bridge Location Map & Photo
Attachment B1 – Alternative 1: Horizontal Nets
Attachment B2 - Alternative 2: Barrier with Vertical Rods/Cables
Attachment B3 - Alternative 3: Barrier with Horizontal Rods/Cables
Attachment B4 – Alternative 4: Tempered Glass Barrier
Attachment B5 – Alternative 5: Green Wall Barrier
Attachment B6 – Alternative 6: Angled Mesh-Link Frame
Attachment B7 – Alternative 7: Angled Vertical Tubes

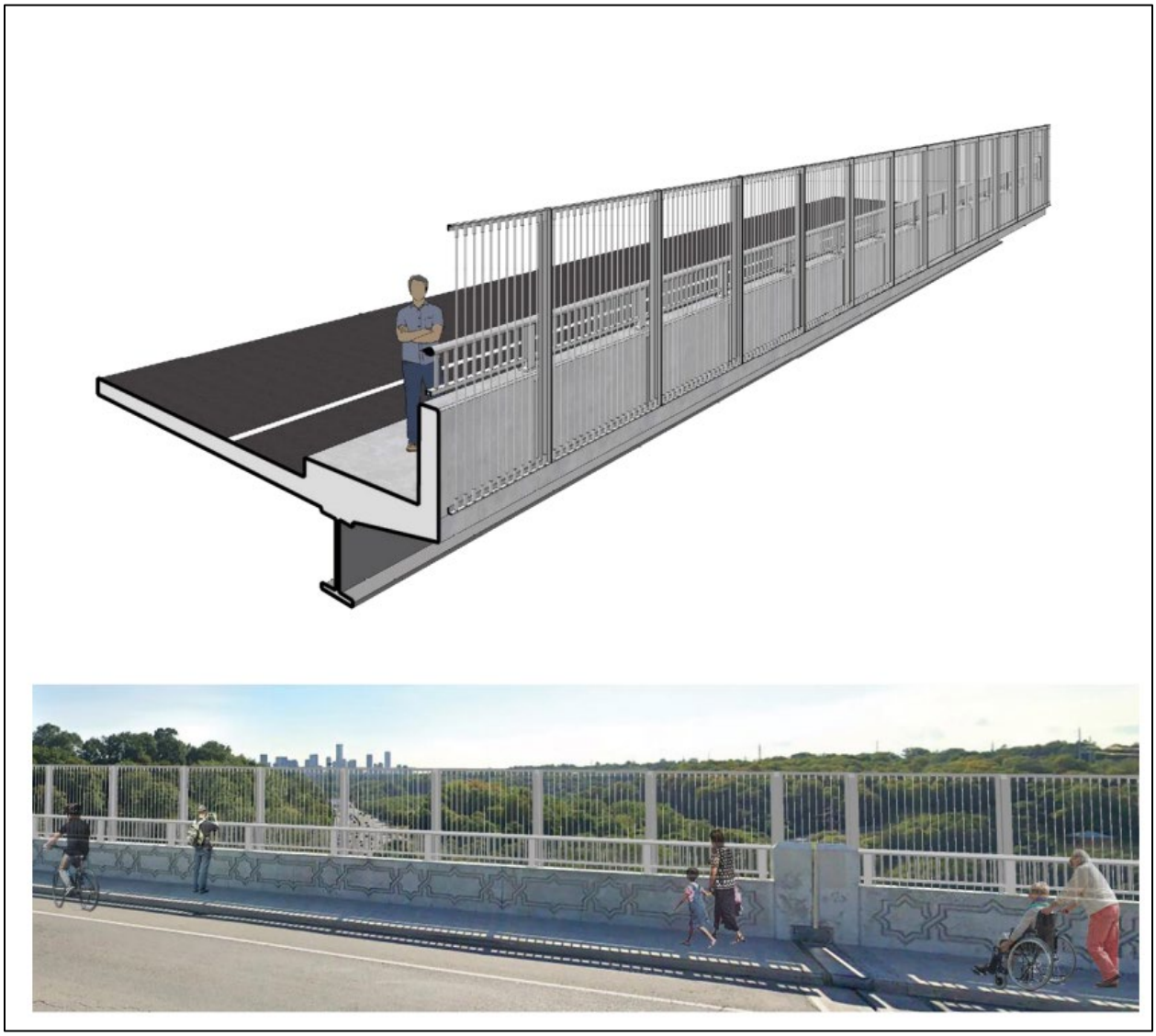
Attachment A – Bridge Location Map & Photo



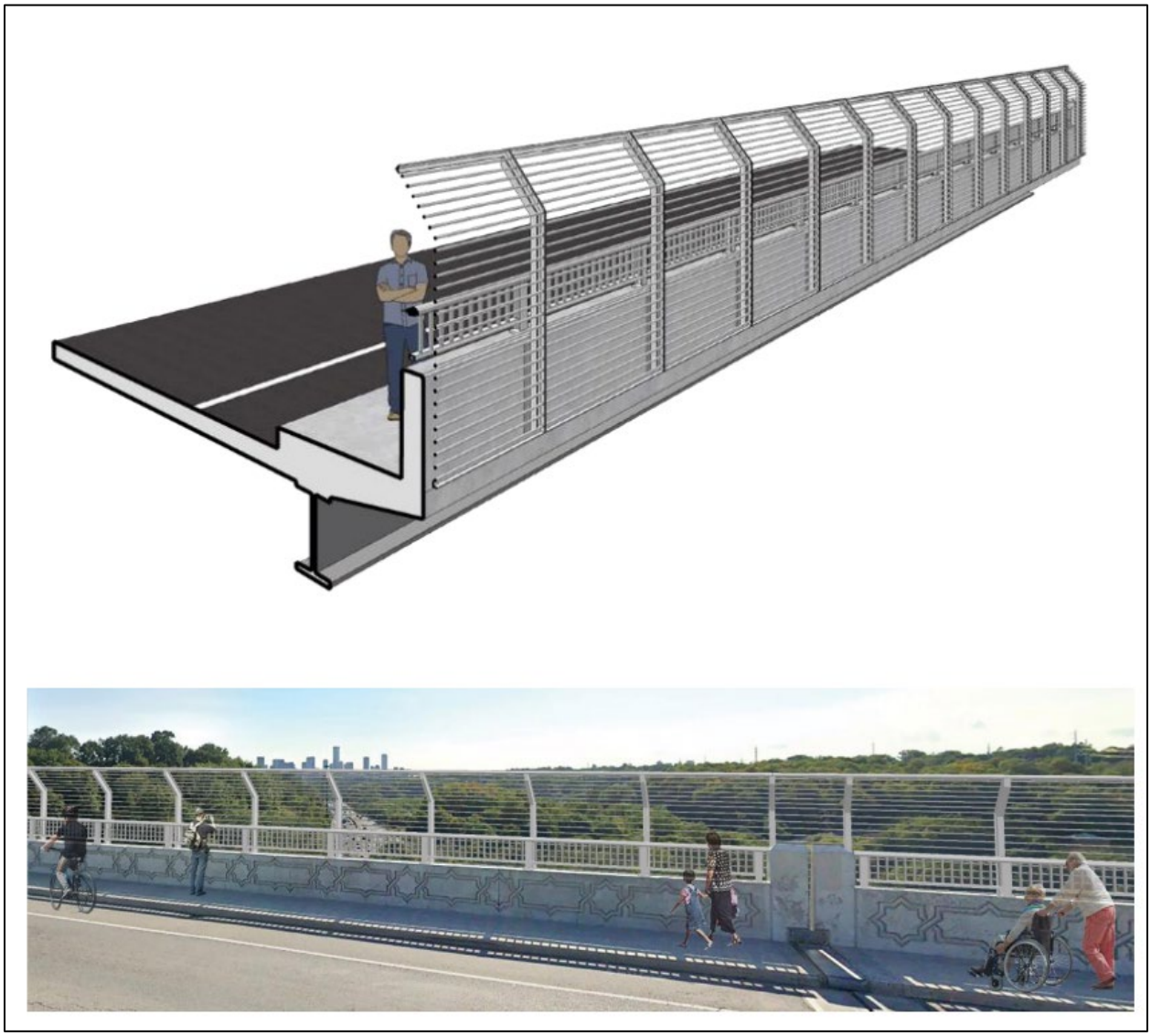
Attachment B1 – Alternative 1: Horizontal Nets



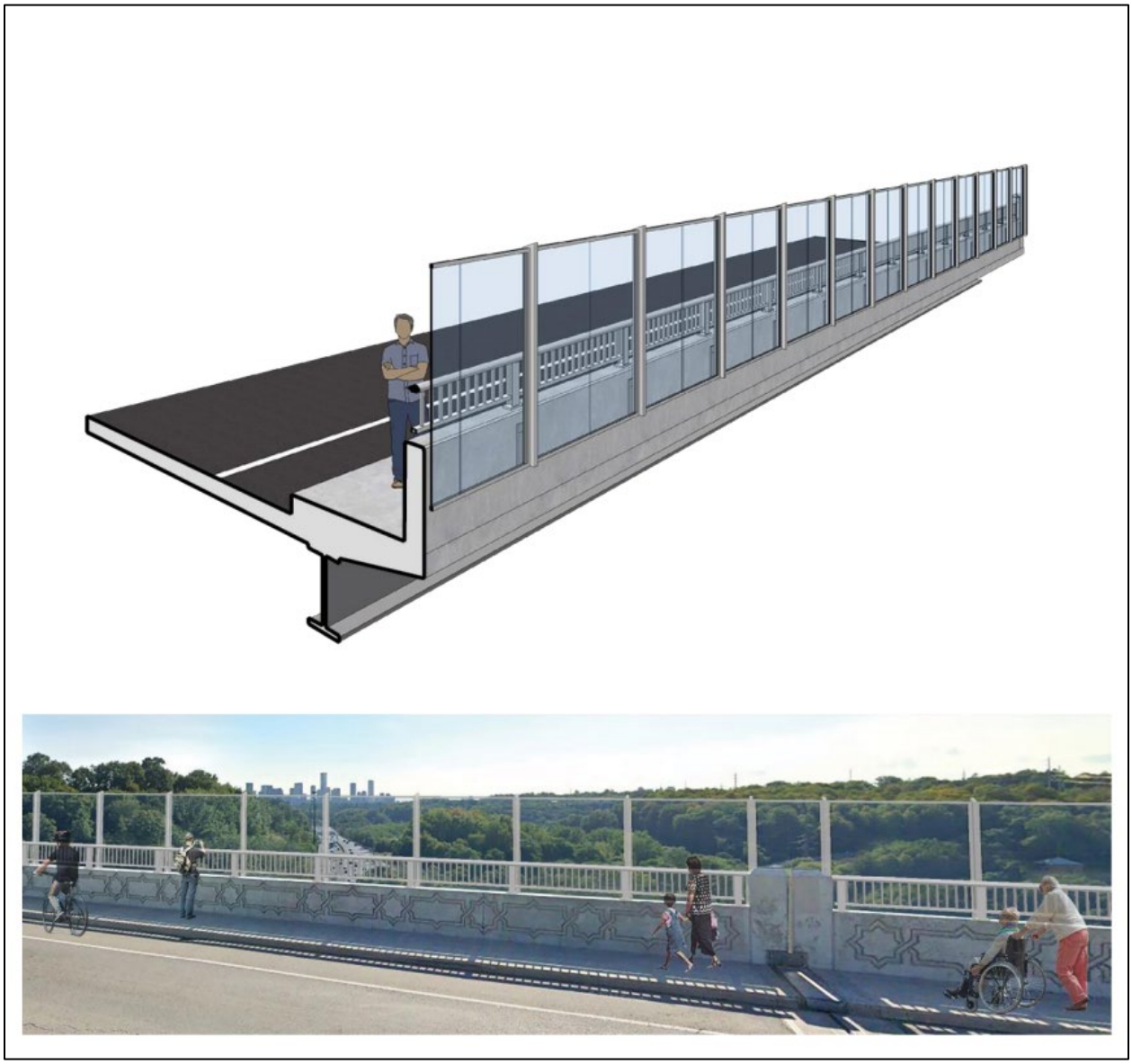
Attachment B2 - Alternative 2: Barrier with Vertical Rods/Cables



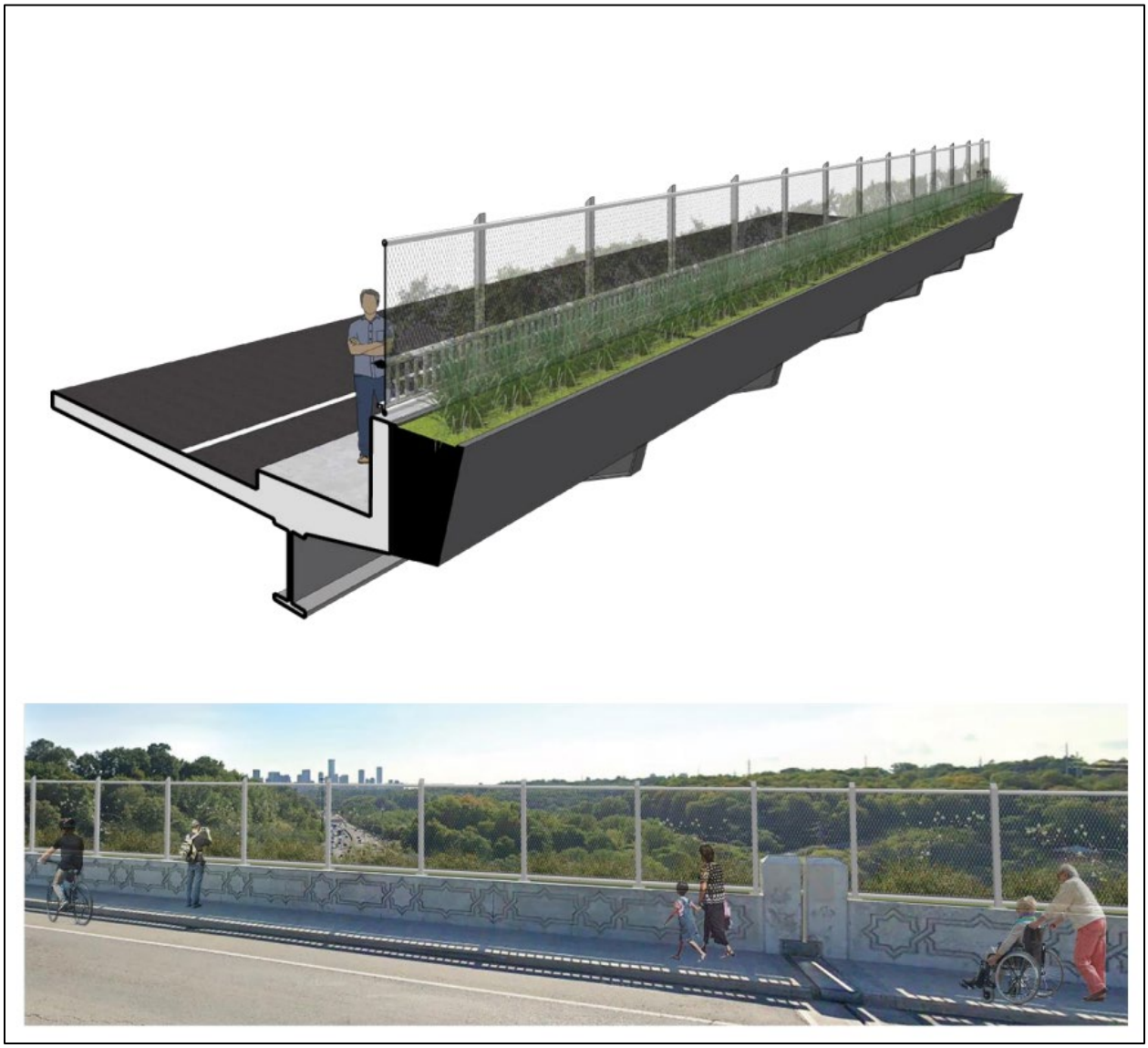
Attachment B3 - Alternative 3: Barrier with Horizontal Rods/Cables



Attachment B4 – Alternative 4: Tempered Glass Barrier



Attachment B5 – Alternative 5: Green Wall Barrier



Attachment B6 – Alternative 6: Angled Mesh-Link Frame

Attachment B7 – Alternative 7: Angled Vertical Tubes