

**MEMO**

**TO:** Laura Archila  
**FROM:** Brendan Quinn  
**SUBJECT:** City of Mississauga, Willow Lane Culvert HIA  
Guide Rail Treatment Alternatives  
**DATE:** April 30, 2021

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**Introduction**

WSP Canada Group Limited was retained by the City of Mississauga to complete a Heritage Impact Assessment, including the review of alternatives for the traffic barriers on the Willow Lane Culvert over a tributary of the Credit River in Meadowvale. Upon completion of the assessment, the City of Mississauga and the Meadowvale Village Heritage Conservation District Advisory Subcommittee reviewed the options and requested that WSP provide additional treatment alternatives for the existing steel beam guide rail to help it better fit the cultural heritage character of the area. This memo outlines potential treatment alternatives that could be considered at this location.

**Background**

The culvert is located on Willow Lane, approximately 30m north of Old Derry Road in the Meadowvale Village heritage area. Willow Lane is a two-lane residential street that dead-ends approximately 250m from Old Derry Road. A structure rehabilitation of the culvert in 2019 included deck repairs and new sidewalks, traffic barriers, steel beam guide rail on the approaches, armour stone walls in the channel and asphalt/waterproofing.

In the initial assessment of the approach guide rails, WSP recommended the removal of the existing energy attenuator and treatments and provided three options for replacing the guide rail. Option 1 to remove the existing guiderail on southeast corner and replace with shorter length guide rail flared beyond clear zone is the preferred option as it maintains a high level of safety at a lower additional cost. Option 2 to replace existing guiderail with a poured concrete wall is considered too cost prohibitive for this project and Option 3 to remove existing guiderail entirely does not provide an adequate level of safety or meet minimum requirements.

With Option 1, the Meadowvale Village Heritage Conservation District Advisory Subcommittee was noted that the guide rail still maintains an aesthetic look that does not suit the cultural heritage of the area and the City would like to consider treatment alternatives that can be applied to the guide rail to limit its impact on the character of the area. WSP has provided four alternatives below that can be considered for this location.

### **Guide Rail Treatment Alternatives**

#### **Alternative 1: Replace guide rail type**

One proposed alternative is to replace the current steel beam guide rail with a type of guide rail that has a heritage look more appropriate to the surrounding area and a minimal visual impact. In the current configuration, the culvert approaches are protected by steel beam guide rail that is in accordance with the Ontario Provincial Standards (OPS). These are approved products that have been tested to confirm they provide an affective level of safety. If the City wishes to remove this guide rail and replace it with an alternative style such as timber rails or masonry walls, the product would need to provide the same level of safety as the steel beam guide rail. The OPS does not include these alternative styles of barrier, however the American Association of State Highway and Transportation Officials (AASHTO) standards include a number of alternative barrier options that may better suit the cultural heritage character of the area and have been crash test approved to similar requirements as the OPS. Examples of these in the AASHTO Roadside Design Guide include Merritt Parkway or steel-backed timber rail (Figure 1) and stone masonry wall consisting of precast reinforced concrete faced with natural stone (Figure 2). Both options have been crash tested to meet NCHRP Report 350, TL-3 safety performance conditions.

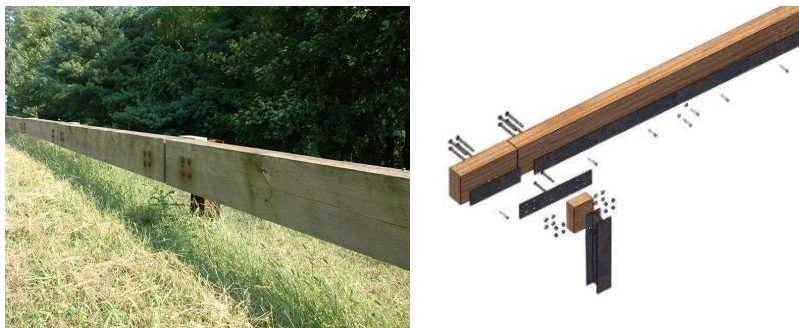


Figure 1. Merritt Parkway Guide Rail/Steel-Backed Timber Rail



Figure 2. Stone Masonry Wall/Precast Masonry Wall

As noted above, an option to replace the guide rail with concrete barrier that matches the style of the barrier on the culvert was included in the initial assessment, however this option was deemed to be cost prohibitive for this project. The alternative barrier styles found in the AASHTO standards are not typically found in Ontario and are considered premium products that would require a more specialized design. Some factors affecting this design and the preferred choice of barrier style would be end treatments and the ability to connect to the culvert structure. These factors would significantly increase the cost and could make these alternatives cost prohibitive to the project as well.

It was noted during the Meadowvale Heritage Conservation District Advisory Subcommittee meeting that the steel guide rail on Willow Lane has a bright, shinier look to it when compared to existing guiderail throughout the city and it was proposed that it be replaced by steel with a more weathered look or red colour found elsewhere. The shiny look of the guide rail is due

to the galvanization of the steel because it is new. Over time its colour will change to a more weathered look due to exposure. Galvanization is required to protect the durability of the steel to maintain the structural stability and provide longevity. Steel beam guide rail found elsewhere that is red in colour is generally due to rusting which can happen if the steel is not galvanized. This affects structural stability of the guide rail which reduces the performance and level of safety it provides. The Subcommittee provided several other examples of wooden barriers found elsewhere to be considered for the Willow Lane culvert location, however these barriers are typically used as barriers for pedestrians/cyclists and have not been designed to withstand vehicle impacts and would therefore not be suitable for this location.

Estimated Cost: Varies significantly depending on the type of barrier chosen. Estimated minimum of \$60,000. Specialized products not typically found in Ontario, such as the steel-backed timber rail, could carry a much higher cost.

#### **Alternative 2: Planting vegetation**

Given the rural character of the area and the abundance of surrounding vegetation, another alternative to reduce the aesthetic impact of the guide rail is to include plantings around the guide rail. Soft plantings such as shrubs and perennials could be installed below and behind the guide rail and allowed to grow and overhang the rail, or vines that are allowed to grow along the rail, provided the plantings do not obstruct the path of vehicles or pedestrians. Trees should not be planted in front of the guide rail as they would create an unprotected hazard for vehicles.

Estimated Cost: \$4,000 to \$5000

#### **Alternative 3: Painting guide rail**

In order to mask the appearance of the guide rail and blend in more to the surrounding area, one alternative is to paint the existing guide rail. A colour or design can be chosen that suits the historical heritage of the area. Over time paint may require regular maintenance if it becomes damaged or weathered due to exposure. A challenge with painting guide rail is ensuring the paint bonds properly with the galvanized steel. The galvanized steel must be treated and primed prior to painting. If not properly bonded to the steel, the paint will flake off over time. This process requires new material to be applied so the existing guide rail would need to be removed and replaced. Painting would not affect the structural integrity or performance of the guiderail.

Estimated Cost: \$60,000 to \$80,000

#### **Alternative 4: Vinyl wrap application**

Similar to painting, another alternative to mask the appearance of the guide rail is to apply a decorative vinyl wrap. These wraps can be printed with an unlimited variety of colours or designs and can more easily be applied to the existing guide rail. Vinyl wrap would not affect the structural integrity or performance of the guide rail. In the event of damage, the vinyl wrap can easily be removed and replaced. The City of Mississauga is currently evaluating the use of these vinyl wraps for a project on Lakeshore Rd and if successful this alternative could be applied to the Willow Lane culvert.

Estimated Cost: \$2,000