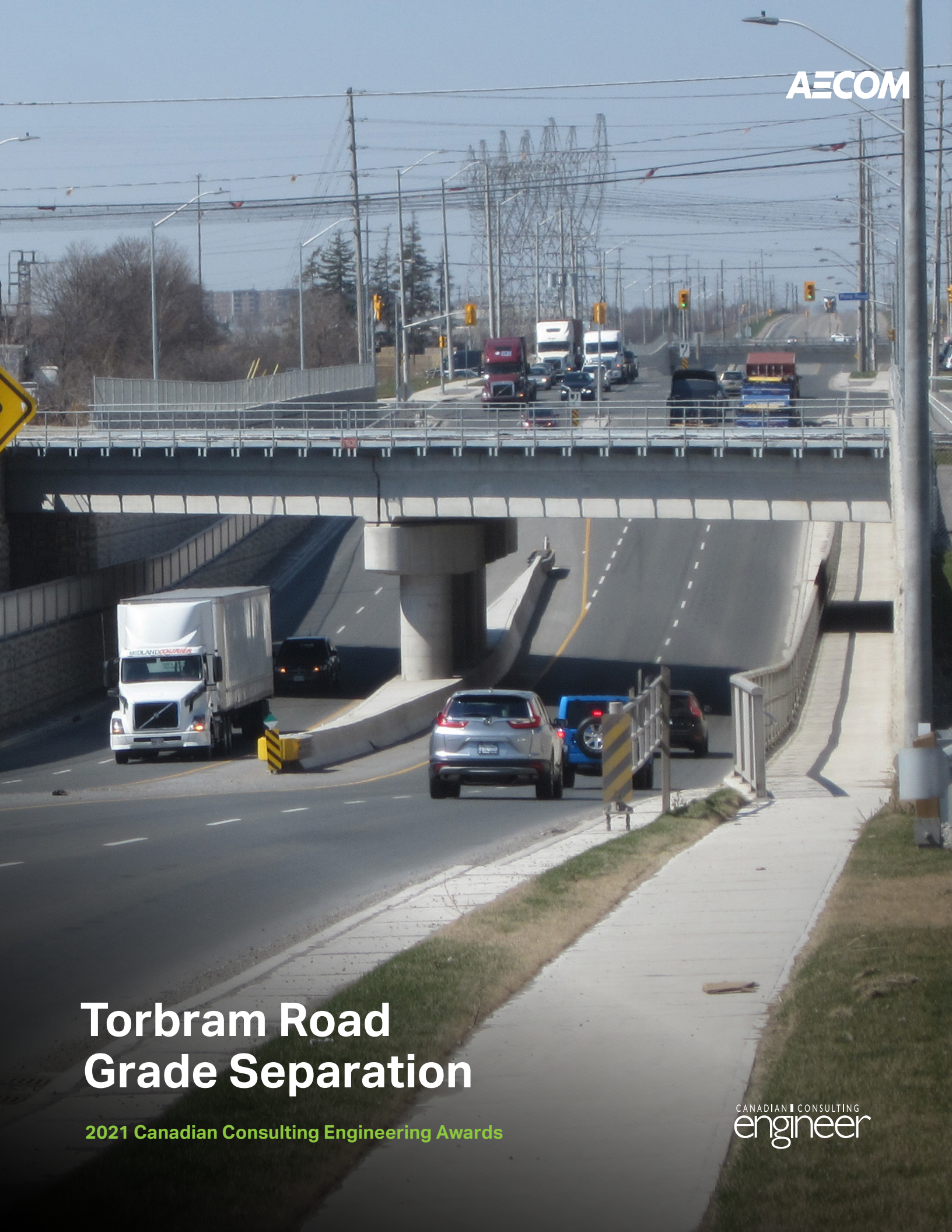


# Torbram Road Grade Separation

2021 Canadian Consulting Engineering Awards

CANADIAN CONSULTING  
engineer



**Torbram Road is a major four lane collector road separating Malton and Brampton.**

**The Torbram Road Grade Separation project involved the construction of two underpass grade separations below the busy train tracks to eliminate the road/rail at-grade crossings on Torbram Road at the CN Halton Subdivision and the Metrolinx Weston Subdivision.**

**The result is faster travel and no delays at rail crossings on Torbram Road.**

**AECOM provided preliminary and detailed design, construction administration and inspection services for the City of Mississauga.**

# Contents

<b>Innovation</b>	<b>7</b>
<b>Complexity</b>	<b>8</b>
<b>Social and/or Economic Benefits</b>	<b>11</b>
<b>Environmental Benefits</b>	<b>12</b>
<b>Meeting Client needs</b>	<b>15</b>



PROJECT NAME  
**Torbram Road Grade Separation**

CLIENT:  
**City of Mississauga**



Above:  
CN Halton Subdivision Grade Separation post-construction

Cover:  
Metrolinx Weston Subdivision Grade Separation post-construction





Erection of concrete box girders

## Innovation

To ease commuter congestion and increase pedestrian safety, the City of Mississauga, in partnership with the City of Brampton, CN and Metrolinx entered into an agreement to replace two at-grade rail crossings on Torbram Road with grade separations. Work on the Torbram Road Grade Separation project included construction of two rail carrying grade separation structures and associated retaining walls, road and rail diversions, road reconstruction, substantial utility relocations, sanitary sewer replacement, a storm water pumping station, culvert replacement and creek channel improvements, street lighting, integrated artwork and architectural finishes of all exposed concrete fascia at the retaining walls and bridge structures. The project is located north of Kimbel Street in the City of Mississauga and south of Hwy 407 in the City of Brampton.

The Torbram Road Grade Separation is one of the first applications of non-standard CN-approved prestressed concrete box girders. These girders had been used for the first time, within a similar timeframe as this project, on another AECOM assignment involving a rail track crossing over the Don River. The proposal to use these girders on this project underwent detailed technical and constructability/durability review by CN's Chief Engineer and was approved in early 2007. These were originally sourced through an American supplier but are now being manufactured in Canada.

These single-voided girders are smaller than standard CN prestressed box girders and can span openings up to 21 metres, while standard CN prestressed concrete box girders span openings up to 14 metres. Due to their capacity, these girders are a cost-effective replacement for structural steel girders and/or post tensioned decks for openings between 14 and 21 metres. The single-track superstructure on this project uses four of these girders that are laterally post tensioned after the erection in place. Beyond increasing span capacity, these girders are less expensive to install and use less materials.

In addition, the grade separations on this project were very deep and did not permit the gravitational discharge of storm sewers. This required the installation of a stormwater pumping station at the Weston Grade Separation. The Torbram Road Stormwater Pumping Station was constructed to serve the two underpasses for the disposal of stormwater runoff from a 2.45 hectare catchment collected by a storm sewer system located along Torbram Road with a peak design flow capacity of 600 L/s, discharging to the existing branch of Mimico Creek, for all storm events up to and including the 25-year return storm.



Detour on the extreme left and stormwater pumping station on the extreme right



## Complexity

This project involved numerous stakeholders whose requirements had to be considered. Stakeholders also had supplementary goals they hoped to achieve including improving the Mimico Tributary and relocating high pressure gas mains using jack and bore trenchless techniques. Property enhancements were also performed for nearby businesses including Canamex, Weston Forest and at CN's Malport Yard.

AECOM managed a multi-disciplinary team and coordinated among stakeholders to secure permits and approvals with TRCA, Metrolinx, CN, Peel Region, the Cities of Mississauga and Brampton, utility companies and other regulatory bodies. The work also involved extensive stakeholder management and public engagement. While the project was underway, the Georgetown Corridor was built to provide a rapid connection between Downtown Toronto and Georgetown, while also servicing Pearson International Airport. Metrolinx reclassified a service track at Weston to a mainline that added more capacity and increased train frequency from four trains to 30 trains per day. This created additional traffic congestion at the at-grade crossing and increased delays for construction crews. Metrolinx also imposed stringent requirements regarding the installation of shoring and piles within the railway corridor. Design challenges included:

- road detours with two temporary at-grade crossings protected with gates and electronic signalling
- staged construction with two major multitrack shifts at each subdivision executed during full road closures and temporary detours for vehicular and pedestrian traffic
- installation of temporary railway shoring of diverted tracks at both subdivisions
- extensive temporary and permanent relocations of existing utilities
- design of new storm sewers and a pumping station, as well as temporary bypass and permanent sanitary sewers and watermains
- replacement of Mimico Tributary Culvert and creek channel enhancements
- extension of Mimico Creek Tributary culvert under Metrolinx Weston Subdivision
- new Mimico Creek Tributary Twin Culvert at Weston Forest







Metrolinx Weston Subdivision Grade Separation pre-construction

## Social and/or economic benefits

The project is located in a heavy industrial area with significant traffic from trucks and other large commercial and industrial vehicles. With the regular train schedule, vehicles were often held up waiting for long commuter and freight trains to pass.

When the Georgetown Corridor was upgraded and Union Pearson Express was constructed, the frequency of the passenger trains at Weston Subdivision was increased from four trains per day to 30 trains each day. Drivers who were on rigid delivery schedules were significantly challenged to maintain efficient goods movement.

By allowing train traffic to pass over the roadway at the CN Halton Subdivision and the Metrolinx Weston Subdivision, the two new grade separations alleviated this congestion among heavy trucks and industrial vehicles and eliminated the delays experienced by the local business community.

The grade separations also allow those living and working in the area to experience fewer hold ups from the trains and ultimately reduced their travel time to and from their jobs and other regular activities. What's more the construction of the grade separations significantly improved pedestrian safety by eliminating foot traffic over the railway tracks.



CN Halton Subdivision Grade Separation pre-construction



## Environmental benefits

There were several elements on the Torbram Road Grade Separation project that enhanced the local environment and introduced substantial resiliency and climate protection components including the following:

- By reducing the extensive queuing experienced by the large number of vehicles stuck at the tracks as they waited for long freight and passenger trains to pass, greenhouse gas emissions have been reduced significantly.
- The realignment and other Improvements made at the Mimico Creek Tributary including the installation of a structural culvert will alleviate issues during heavy storms and significant weather events and will help mitigate potential flooding in the area.
- As part of this project, the team also collected and disposed of 3300 cube metres of contaminated materials present at track level since the initial track construction.
- Artwork and aesthetically pleasing architectural finishes were incorporated on all exposed concrete fascia at the retaining walls and bridge structures to enhance the appearance of the roadway.



Construction of the stormwater pumping station



Construction of the stormwater pumping station



Metrolinx Weston Subdivision Grade Separation during construction





# Meeting client needs

AECOM had excellent working relationships with the City of Mississauga, the City of Brampton, Metrolinx and CN, and we were able to work effectively among all the different project participants and stakeholders. Our team fully understood their needs and goals, and because we had considerable experience in the design and construction of municipal and railway grade separations, we also understood CN’s and Metrolinx’s unique and very specific stakeholder requirements as they related to this project.

As a result of our history dealing with projects of a similar nature, all stakeholders had a unique level of comfort with our team. Our wealth of applicable experience enabled us to identify the key issues, provide effective solutions and allowed for timely acquisition of necessary project approvals. In addition to the items listed under innovation and project complexity, the project team successfully addressed the following client needs and design challenges:

- detailed road design of new wider cross section of Torbram Road to enhance vehicular and pedestrian traffic
- Mimico Creek Tributary realignment and channel improvements to mitigate risks of local flooding
- design of rail carrying structures and new structural culvert at realigned Mimico Creek Tributary, eliminating traffic congestion and flooding issues
- temporary bypass sanitary sewers and watermain to maintain service during the construction
- design of grade separation retaining walls and elevated sidewalk retaining walls for enhanced traffic experience
- Architectural finishes of all exposed concrete fascia at the retaining walls and bridge structures for enhanced travel experience
- Driveway improvements to property owners in the project limits, enhancing the local businesses operations



## About AECOM

AECOM is the world's premier infrastructure consulting firm, delivering professional services throughout the project lifecycle – from planning, design and engineering to program and construction management. We partner with our clients in the public and private sectors to solve their most complex challenges and build legacies for generations to come. On projects spanning transportation, buildings, water, governments, energy and the environment, our teams are driven by a common purpose to deliver a better world. AECOM is a Fortune 500 firm and its Professional Services business had revenue of approximately \$13.6 billion in fiscal year 2019. See how we deliver what others can only imagine at [aecom.com](https://aecom.com) and [@AECOM](https://twitter.com/AECOM).