

DAVENPORT DIAMOND DESIGN DIRECTION

January 18, 2016

DAVENPORT DIAMOND

We need to separate freight and passenger rail traffic at the Davenport crossing



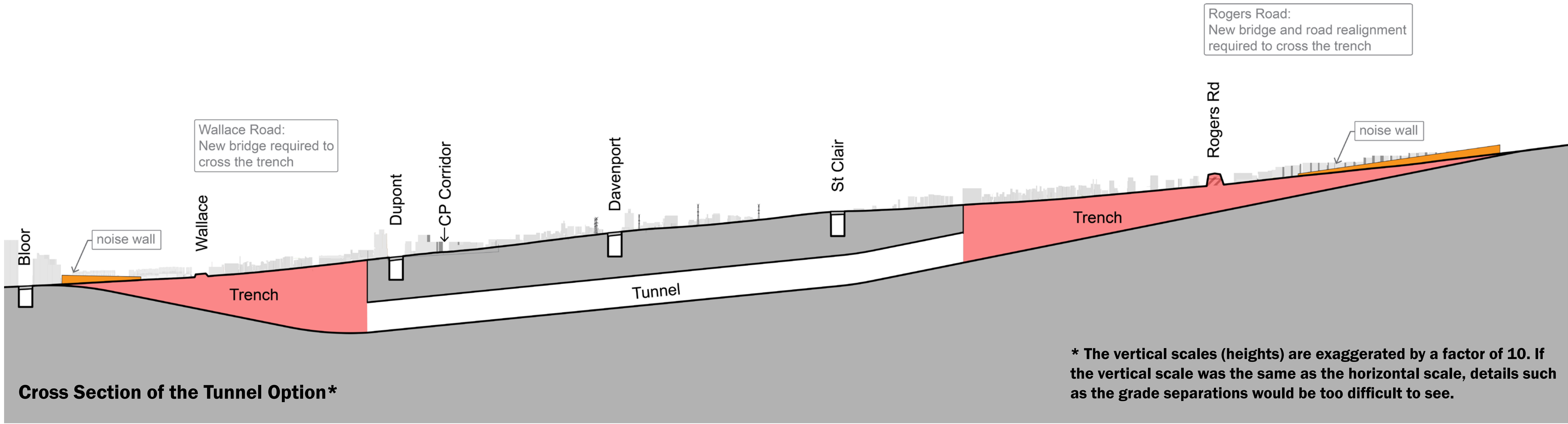
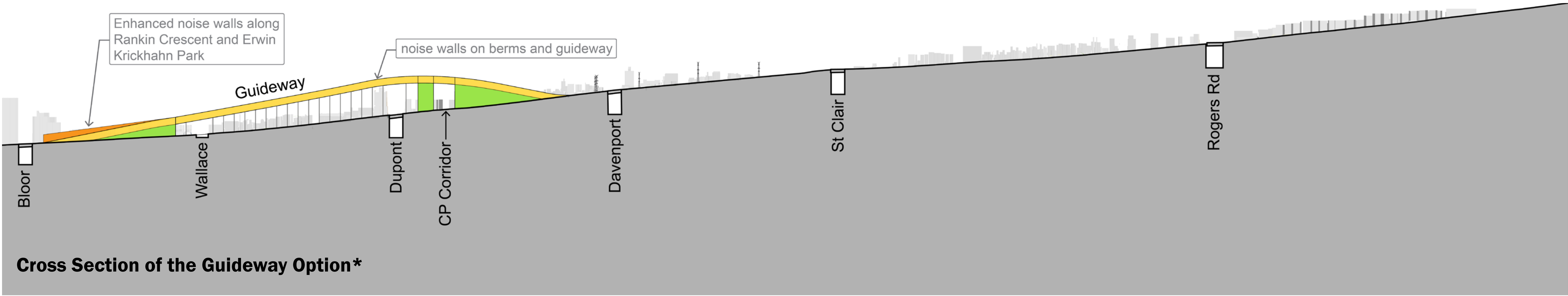
The Canadian Pacific (CP) line is one of the busiest freight corridors in Canada. Nineteen east-west freight trains travel along this corridor every day. The CP freight line crosses a set of north-south tracks at Davenport which carry about 4 million GO train passengers a year along the GO corridor. This level crossing is called a rail ‘diamond’ – and the Davenport Diamond is one of the last high-traffic rail crossings in Toronto.

By 2025, the plan is to offer two-way, all-day 15-minute service with a new fleet of electrified trains for a projected annual ridership of 22 million.

For residents of Toronto, regular, all-day 15-minute GO Train service will mean new, faster transit options for getting around the city and a transportation network that can support the business growth and investment that is needed for a vibrant, healthy local economy for generations to come. Running more frequent, reliable scheduled service will not be possible with the long delays that would be caused by freight train traffic at the crossing. Removing the Davenport Diamond will mean a greater level of reliability and safety for trains travelling through the Davenport community.

DAVENPORT DIAMOND

Removing the rail crossing is complicated for several reasons



Can the CP freight line run above or below the GO corridor?

The simple answer is no: the CP line falls under federal jurisdiction, which means that it cannot be forced to build a new bridge or tunnel for its trains. There are also basic engineering constraints: because the freight trains running along the corridor are much longer and heavier than GO passenger trains, the slope of any bridge or tunnel would need to be much more gradual, lengthening the span and impacts of any new structure. Not only would this be very costly, it would also be in conflict with the recently constructed West Toronto Diamond Grade Separation.

Passing under the GO tracks would mean constructing an almost 6 km trench running from Runnymede Road to Christie Street, with new road overpasses at each of the nine north-south streets, as well as reconstructing the West Toronto Diamond Grade Separation. The trench would create significant engineering problems for the CP line, including the connection to its Lambton freight yard and its two connections to CP's MacTier subdivision that runs north from the former West Toronto Diamond. Going over would involve an almost six kilometre bridge which would create similar significant engineering problems for the CP line to connect with their Lambton freight yard and the two connections to its MacTier subdivision.

Geography

Even though it might look flat, the GO corridor climbs a significant slope as it travels from Bloor Street West past Davenport Road and onwards to St. Clair Avenue West. Between Bloor Street West and Dupont Street, the land rises 7.7 metres. Between Dupont and St. Clair, the land rises 11.5 metres. Combined, this natu-

ral slope is the equivalent of a three-storey building. This slope is an important factor in deciding whether to build an underpass or overpass.

Throughout construction, GO Transit must maintain regular service for the 10,000 passengers who take the train each day. We are also committed to minimizing inconvenience for drivers, cyclists and pedestrians who use neighbouring roads and sidewalks. Construction impact is one of several factors we consider when evaluating different infrastructure choices.

What about the Missing Link Report?

The Missing Link Report has been mentioned as an alternative approach. The Missing Link is a study looking at the possibility of building a new corridor that would divert freight traffic off the Milton and Kitchener corridors to allow for the increase of GO train service to communities along the lines. Metrolinx has been working with rail and municipal partners on this study, however, for it to become a reality, it would require competitors CP and CN to work together and agree to share the same corridor, considerable new government funding to purchase the line which is estimated to be \$5 billion, and an environmental assessment. This process could take more than a decade and will severely limit GO Transit's ability to provide urgently needed rail services to passengers. Should all these pieces come together, the increase in passenger train traffic would still result in the removal of the Davenport Diamond to improve reliability and safety.

OVER OR UNDER? OVERPASS OR TUNNEL?

Two engineering options

There are two options to separate the GO passenger line from the CP freight line at the Davenport Diamond: Go over or go under. Metrolinx has carefully studied the engineering and construction challenges, community impact and cost of building either a tunnel or a raised overpass.

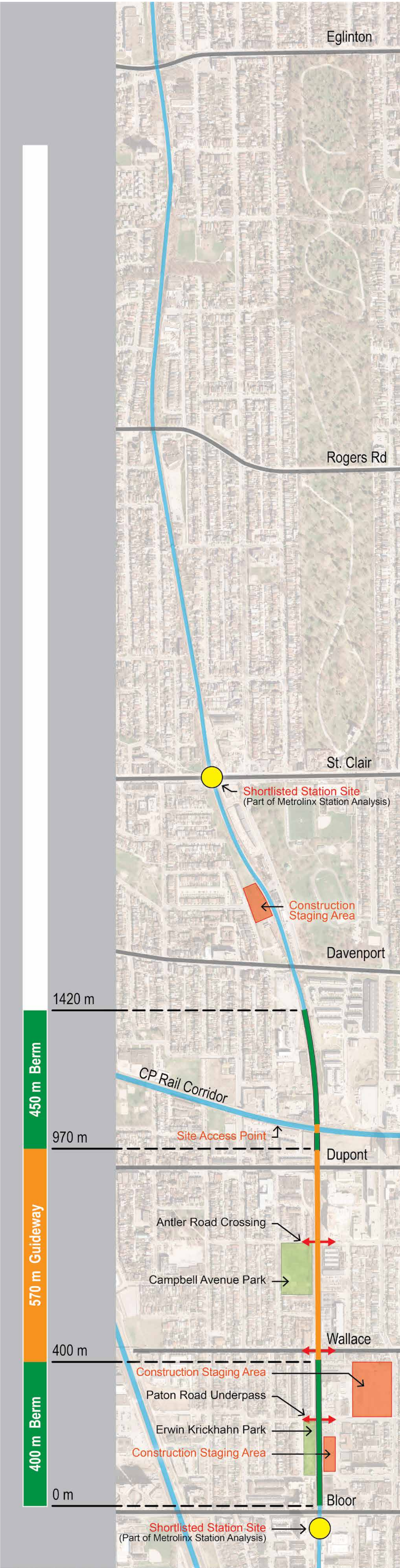
Both options support two-way, all day transit service by separating passenger and freight rail traffic, and both create the potential to add a new future GO station at Bloor Street West. Both options share a starting point just north of Bloor Street West, which is necessary to protect for a potential future station at this location. In comparative

terms, the tunnel option would cover an area to the north of about 4 km, compared to an overpass, which covers 1.4 km. Both options were evaluated to look at their impact on the community and the region, including:

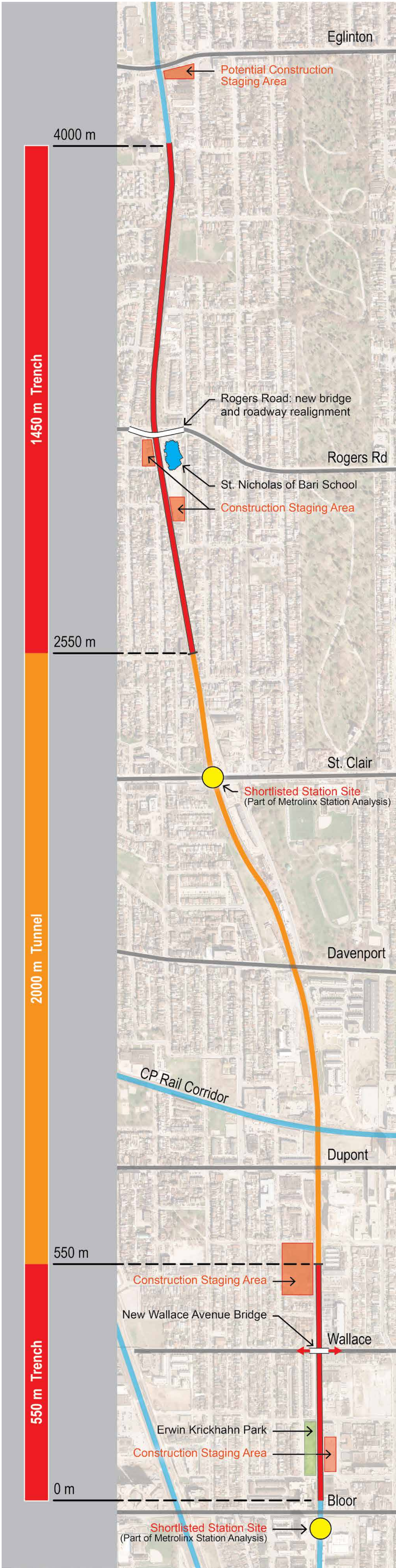
Key Questions	Overpass	Tunnel
1. Will they support the regional transit network and a new station at Bloor Street?	<ul style="list-style-type: none">• Support two-way all-day transit service by separating passenger rail and freight rail traffic• Create the potential to add a new GO station at Bloor Street	<ul style="list-style-type: none">• Support two-way all-day transit service by separating passenger rail and freight rail traffic• Create the potential to add a new GO station at Bloor Street
Assessment <i>Both options support provincial objectives for frequent two-way, all-day GO service and make it possible to develop a new station at Bloor Street</i>		
2. How much is it expected to cost?	<ul style="list-style-type: none">• The Overpass is estimated to cost between cost \$195-\$210+ Million to construct• Includes design and public realm improvements in the form of integrated art, lighting, Greenway/multi-use pathway and structural design	<ul style="list-style-type: none">• The Tunnel is estimated to cost \$625-\$675 Million to construct
Assessment <i>The Overpass option will be less than a third of the cost of the Tunnel option. This includes consideration for the additional money that will be spent on public realm improvements to help integrate the Overpass into the neighbourhood</i>		
3. How will construction affect the community?	<ul style="list-style-type: none">• 2 years to construct• Construction will impact 1.4 km• Approximately 3,900 people are impacted who live within 150m• Moderate construction noise impacts for a shorter term (2 years)• Localized vibration impacts during during pier construction• Soil disturbance and disposal is limited• The Siberian Elms at Campbell Avenue Park can be protected• Limited temporary easements will be required for the construction• Construction of the overpass will only require a short-term closure of Wallace Avenue, which will be lowered by 0.5 metres• Approximately 120 trucks a day at peak period expected	<ul style="list-style-type: none">• 5 to 6 years to construct• Construction will impact a 4 km area• Approximately 6,600 people are impacted who live within 150m• Significant construction noise impacts at staging and trenched areas with moderate construction noise in tunneled areas for a longer term (5 to 6 years)• 76 individual property parcels are affected by construction, with 24 needing to be purchased, for a total area of approximately 34,680m2• Significant vibration impacts for the entire length of the tunnel and trenched areas. Vibration impacts driven in the south trench will travel significantly farther due to soil conditions• Extensive piles need to be installed to build trenches leading to• significant construction noise• Approximately 300 trucks a day at peak period expected• Campbell Avenue Park will be used as the main tunnel support site. This will require the removal of mature trees• 16 properties will be impacted including St. Nicolas of Bari School property• Construction of the tunnel approaches will require a prolonged closure of Wallace Avenue during construction which will be raised by about 1 metre affecting adjacent property access• Significant vibration impacts for the entire length of the tunnel and trenched areas. Vibration impacts driven in the south trench will travel significantly farther due to soil conditions.
Assessment <i>The Overpass option results in the least amount of impact during construction. The Tunnel option results in a significantly longer construction period and impacts an area 20% larger than the Overpass option. The need to build trench walls at either end of the tunnel will result in significantly more noise for adjacent communities. Staging requirements will require numerous sites throughout the neighbourhood, extensive truck traffic and the loss of mature trees at Campbell Avenue Park. The Overpass option can be built without using or acquiring any additional properties. In contrast, the Tunnel option will require temporary construction and permanent property requirements.</i>		
4. What will the long-term impacts be on the neighbourhood?	<ul style="list-style-type: none">• Will require 2m high noise walls along the entire elevated structure• No significant vibration impacts. There will be less vibration with the overpass than felt today because the structure absorbs the vibration• Once electrified there are no impacts on air quality from this service• Visible impacts from surrounding streets, open spaces and adjacent buildings. The structure will be most visible along Wallace Avenue and Dupont Street	<ul style="list-style-type: none">• Results in substantial visual impact at Rogers Road where the street will be raised 7.5 m to cross the rail corridor• Rumbling underground vibration will be felt and heard by residents adjacent to 2 km tunnel similar to TTC subway tunnels• Increase in operational noise impacts at trenched areas with a reduction in noise impacts at tunnel openings• Once electrified there are no impacts on air quality from this service• Will have a significant impact on St Nicholas of Bari School as the creation of a new Rogers Road overpass will cut off car access to the school from the north and create a large retaining wall immediately in front of the school.• Approximately 6,600 residents live within 150 m of the trenches at the north and south ends of the tunnel• Will not enable a connection at Paton Road.• East-west public space connections at Wallace Avenue and Paton Avenue would not be possible; road connection at Earls court Park remains the same
Assessment <i>The Overpass option results in greater visual impact to the Davenport community than the Tunnel option. The Tunnel option would impose different visual and public-realm impacts; it would require 2 km of fenced-in approach trenches as well as raising Rogers Road by 7.5m. The Tunnel option would also impact St. Nicholas of Bari School.</i>		
5. What are the long-term neighbourhood opportunities?	<ul style="list-style-type: none">• Will result in 2 new east-west connections, one at Paton Road and one at Antler Street/Lappin Avenue• Will result in a new 1.5km multi-use path along the length of the overpass from Davenport Road to Bloor Street West• Creates the potential to extend the new trail south to meet with the planned extension of the West Toronto Railpath, and north through Earls court Park to St. Clair Avenue• Create public space at Wallace Avenue to support and grow the emerging retail strip• Significant investment in public realm improvements including a naturalized landscape strategy and new plantings along the length of the overpass and a new multi-use path from Davenport Road to Bloor Street West, including a pedestrian and cycling bridge over the CP Rail Corridor.	<ul style="list-style-type: none">• A 2 km residential area between Campbell Avenue Park and Innes Avenue pedestrian bridge would benefit at the buried section of the Tunnel from the removal of long-term visual impact• Will result in 1 new east-west connection at Antler Street/Lappin Avenue; and could enable a new connection at Campbell Avenue Park.• Offers the potential to create a new 1.2km multi-use path from north of St. Clair Avenue West to the CP rail corridor. This path would not be connected to transit to the north or south to Bloor Street West since the trench occupies the full width of the right-of-way, precluding a continuous north-south greenway connecting parks, transit and neighbourhoods.• The new trail could connect with the proposed Green Line and the Sandra Park Trail.• The neighbourhoods next to trenches will be further sterilized by the presence of the trenches and the barriers• The cost of the Tunnel option will mean that there is limited budget available to make improvements to streets, parks and open spaces.
Assessment <i>The Overpass option results in the most improvement to neighbourhood connectivity and more significant street, park and open space improvements. The Overpass option will establish two new east-west connections, and the multi-use path that gets built with it will have greater potential to connect with destinations outside of the neighbourhood, including the West Toronto Railpath. Metrolinx will continue to work with the City of Toronto as many of these public realm considerations will involve ongoing negotiation and discussion with the City of Toronto and other stakeholders to implement.</i>		

OVER OR UNDER? OVERPASS OR TUNNEL?

Two engineering options



Overpass Option



Tunnel Option

The Overpass Option Challenge

For trains to be able to pass over the CP tracks, a 570 metre bridge would be needed, with berms located at either end. The berm along Erwin Krickhahn Park will be naturalized. Overall, this Guideway option needs less space than the tunnel because it takes advantage of the natural slope of the land. The Guideway would be constructed in an existing residential and mixed-use neighbourhood, with most of the visual and construction impacts in the middle section where the Guideway is elevated. The main design challenge is to physically and visually lighten the bridge structure, and to design the space beneath the bridge to be safe and beautiful. The design has maximized the extent of the berms at either end to shorten the length of the bridge to reduce the visual impact of the structure.

What it Would Look Like

The bridge would extend 570 metre between Wallace Avenue and just south of Davenport Road, bookended to the north and south by sloping, bermed green walls or vertical retaining walls.

The Tunnel Option Challenge

For trains to pass under the CP tracks and return to current grade just north of Rogers Road, a 4 km tunnel and two trenches would be needed. The tunnel portion would be buried 5 metres below ground to avoid utilities and city infrastructure. Since GO trains can only climb a maximum slope of 2%, the tunnel requires a lot of space to burrow down and return to grade, and this is made even more challenging by working against the rising slope of the land. Two new overpasses would be needed as part of this option to allow existing roads to pass over the trenches impacting residential and commercial properties whose access will be impacted by the road becoming elevated.

What it Would Look Like

The 550 metre southern trench would start descending 25 m north of Bloor Street West and continue 200 m north of Wallace Avenue beside Campbell Avenue Park. The tunneled portion of the 11.4 metre diameter tunnel would extend 2 km, re-emerging 150 metres south of the Innis Avenue Pedestrian Bridge. To re-connect with the existing track alignment near Eglinton Avenue, West the northern trench would extend 1.5 km through residential and industrial neighbourhoods. The trenches would be bordered by over 2 km of five metre-high noise walls.



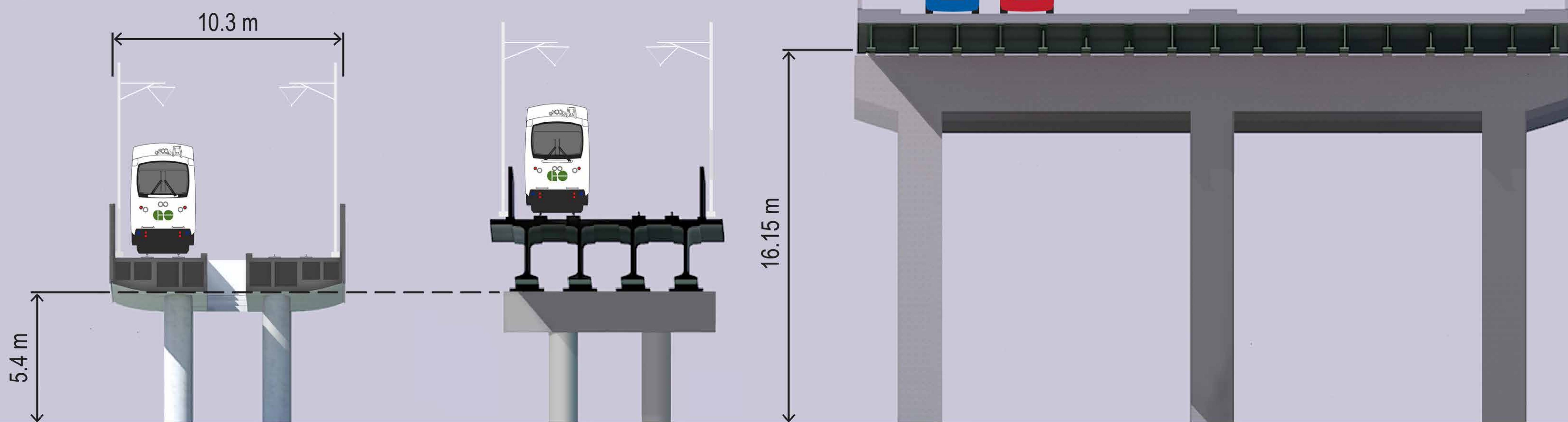
View of Rogers Road reconfiguration looking west toward St. Nicholas of Bari School (on the left)



View of tunnel trench and noise wall looking south from Innes Avenue

THE GUIDEWAY

Minimizing the impact



Cross section of the “designed” Guideway located at Campbell Avenue Park. This diagram shows the lighter structure achieved through creative engineering and design, including the continuous “skylight” between the two train tracks and stainless steel rails along the edge of the Guideway.

Cross section of a typical “engineered” guideway located at Campbell Avenue Park, showing the scale necessary for a two-train structure.

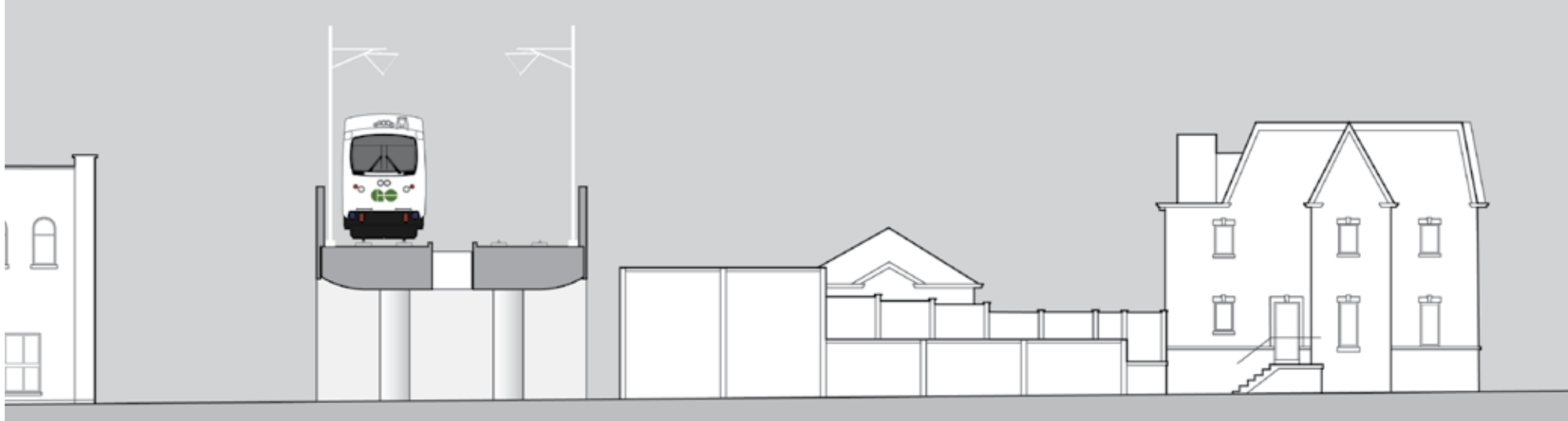
Cross section of the Gardiner Expressway, located at Fort York. This diagram shows its height and width compared to the “designed” and “engineered” Guideway sections.

Lightening the Bridge

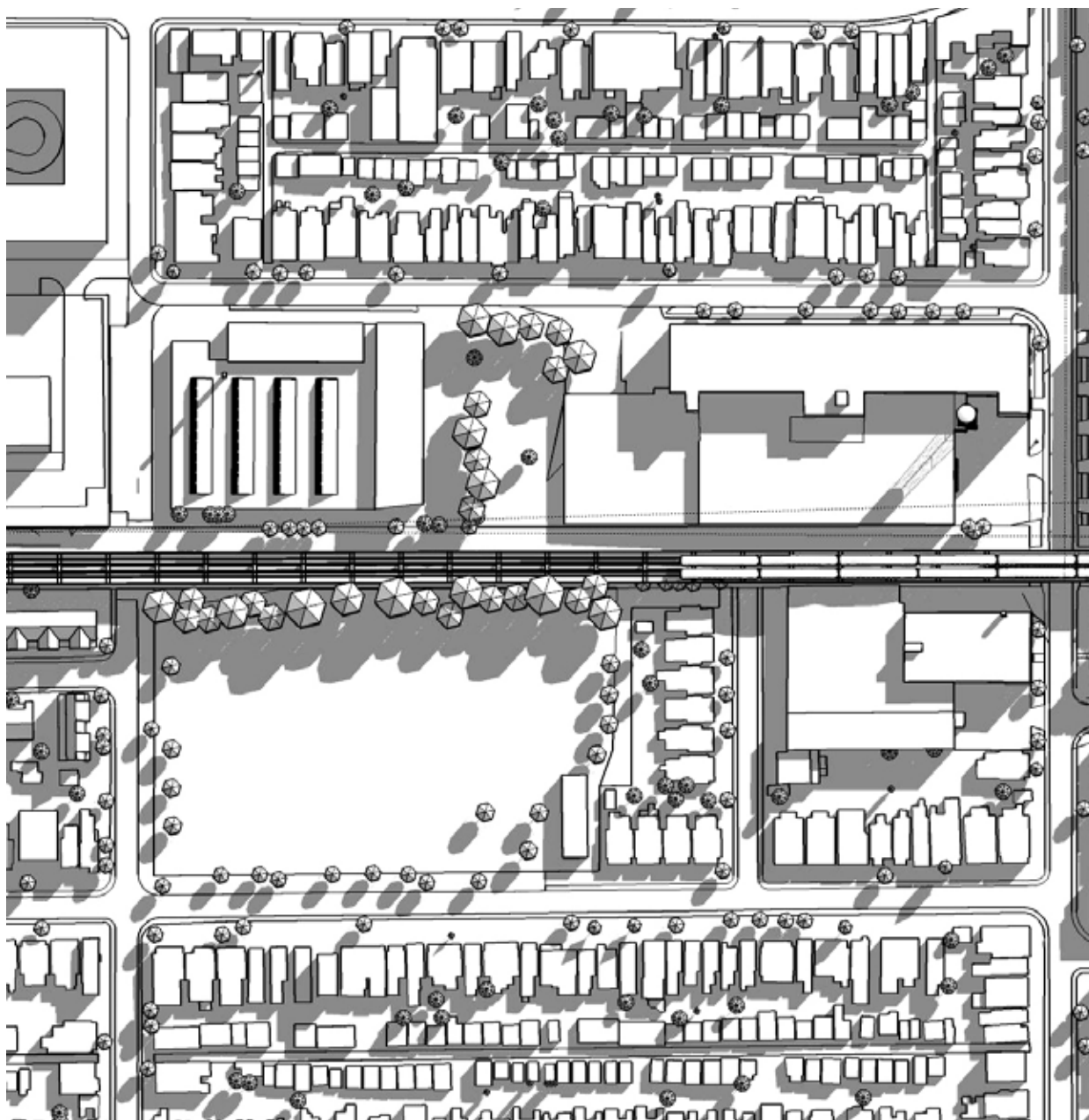
The primary goal of the Guideway structural design is to lighten its mass and visual impact. The length of the approach berms at either end have been maximized, so that the length of the elevated Guideway is 570 metres from the previous 847 metres – a reduction of a third. The depth of the Guideway is minimized by using twinned round columns every 16 metres. This design is very different than a typical raised highway overpass such as the Gardiner Expressway, which is much larger, and sits on pre-cast I-shaped beams sitting on concrete beams and columns, which can create an unwelcoming, graffiti-prone environment with poor lighting beneath. Instead, the Guideway uses an innovative box structure, slightly tapered at the edge to lighten the silhouette. The round and narrow profile of the double columns enhances safety by increasing visibility. The double columns also enable the skylight to run through the centre of the Guideway, allowing light and water through to support plantings and activities below.

At Campbell Avenue Park, the underside of the Guideway is between 5.0 metres and 5.8 metres above ground, and between 8.6 metres and 9.4 metres to the top of the stainless steel cladding. Approaching Dupont Street, the underside is 6.4 metres above ground, and 7 metres above ground at its highest point where it crosses the CP track just north of Dupont Street. The overall effect of the design is a physically and visually lighter bridge with safer, naturally lit spaces underneath that are capable of sustaining partial sun native plantings. Shadow studies show fairly minimal shadowing impact of the bridge on the residential properties next to the rail corridor.

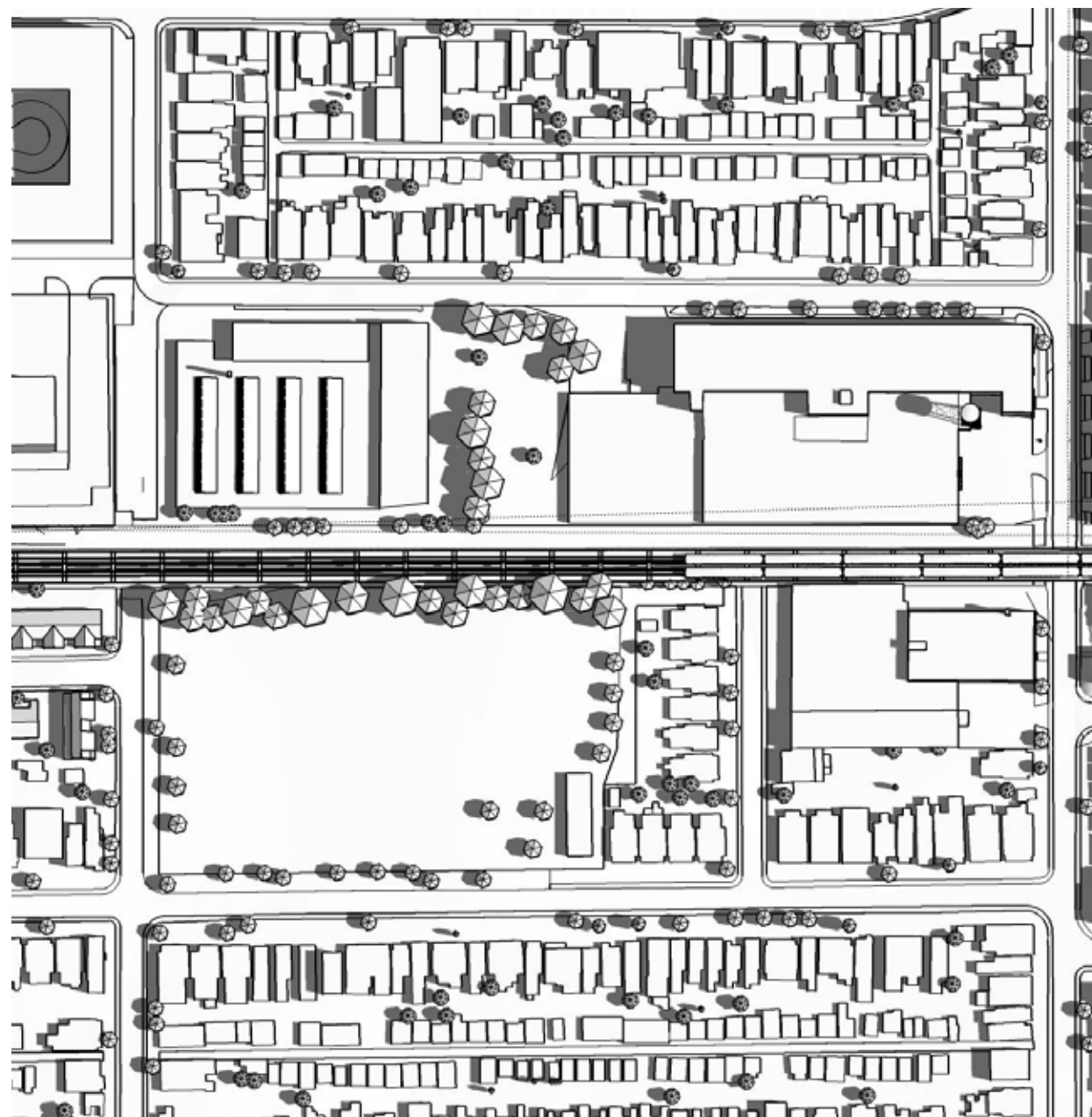
The top of the Guideway stainless steel cladding at the residential area near Wallace Avenue is just over 7.5 metres high, about the same height as the peak of the typical two-storey houses in the neighbourhood. The skylight allows for significant natural light beneath the structure. The laneway at the back of the houses north of Erwin Krickhahn Park would have a similar condition to the existing shadow condition cast by the existing noise wall. The impact of the shadowing of the bridge on the trees at Campbell Avenue Park is minimal since the canopy of these mature Siberian Elms is mostly above the level of the bridge.



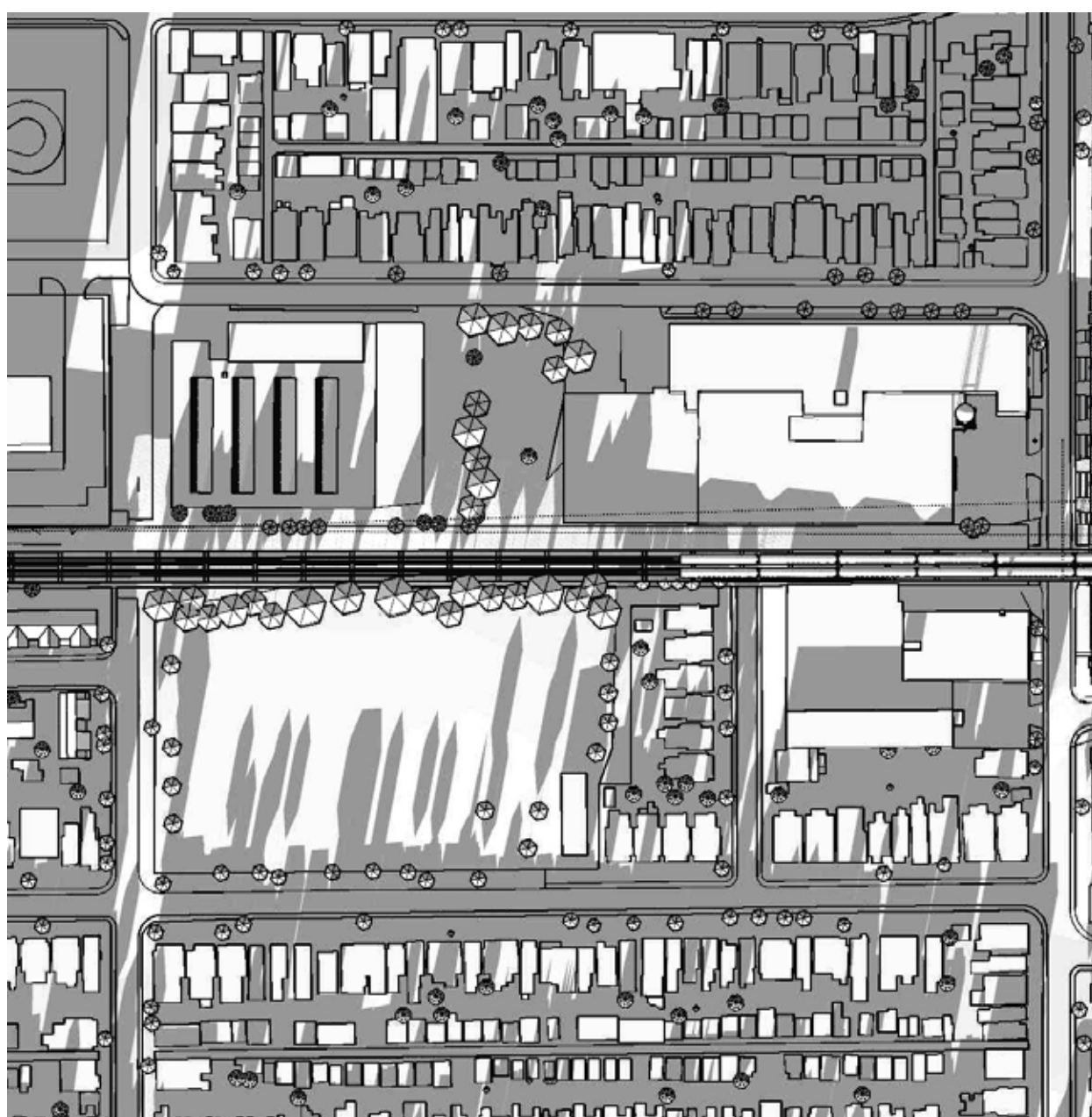
Section through the Guideway at Wallace Avenue showing scale relative to existing noise wall



Campbell Avenue Park, Dec 21st 9:00 a.m.



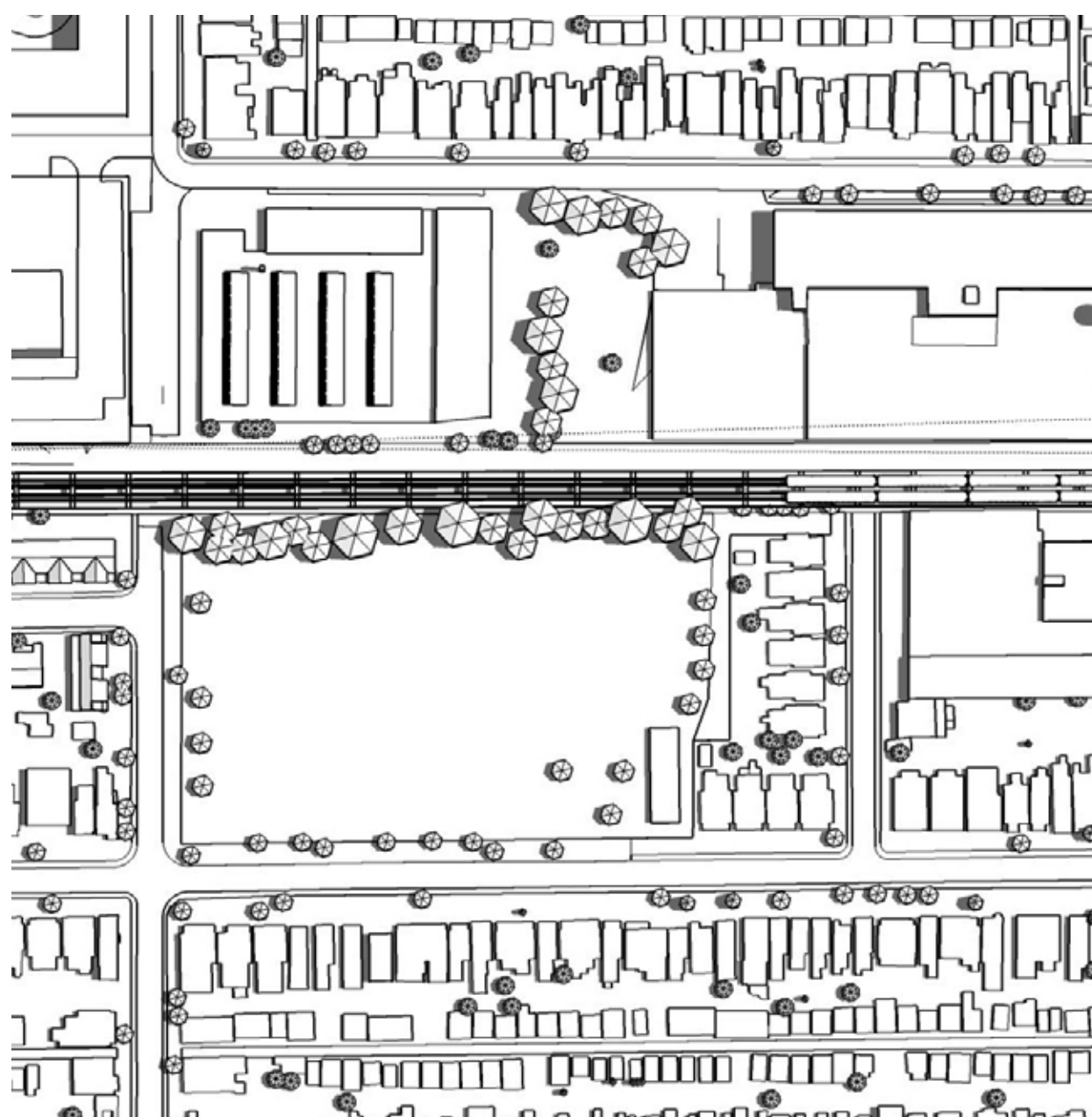
Campbell Avenue Park, Dec 21st 12:00 p.m.



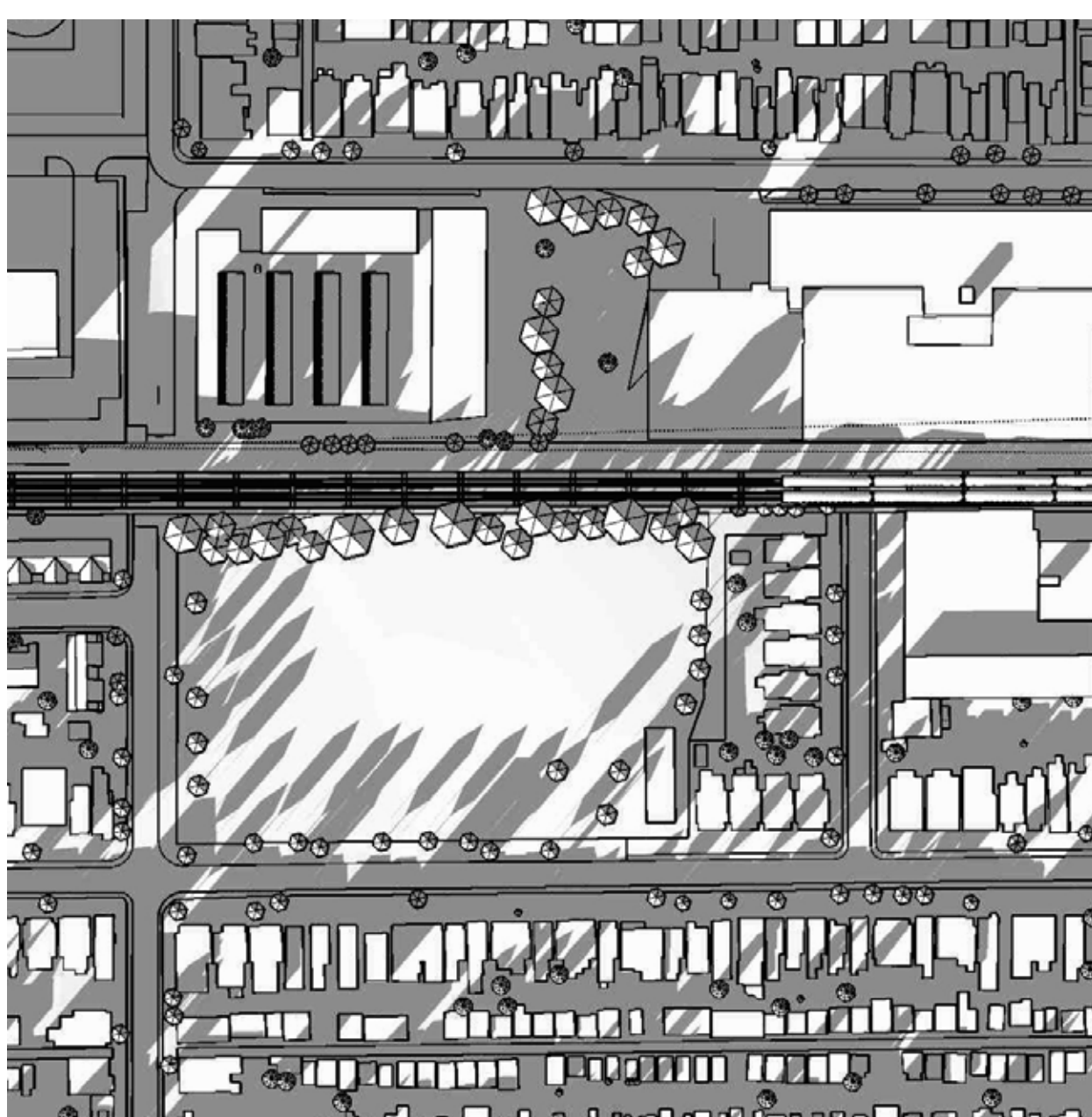
Campbell Avenue Park, Dec 21st 5:00 p.m.



Campbell Avenue Park, June 21st 7:00 a.m.



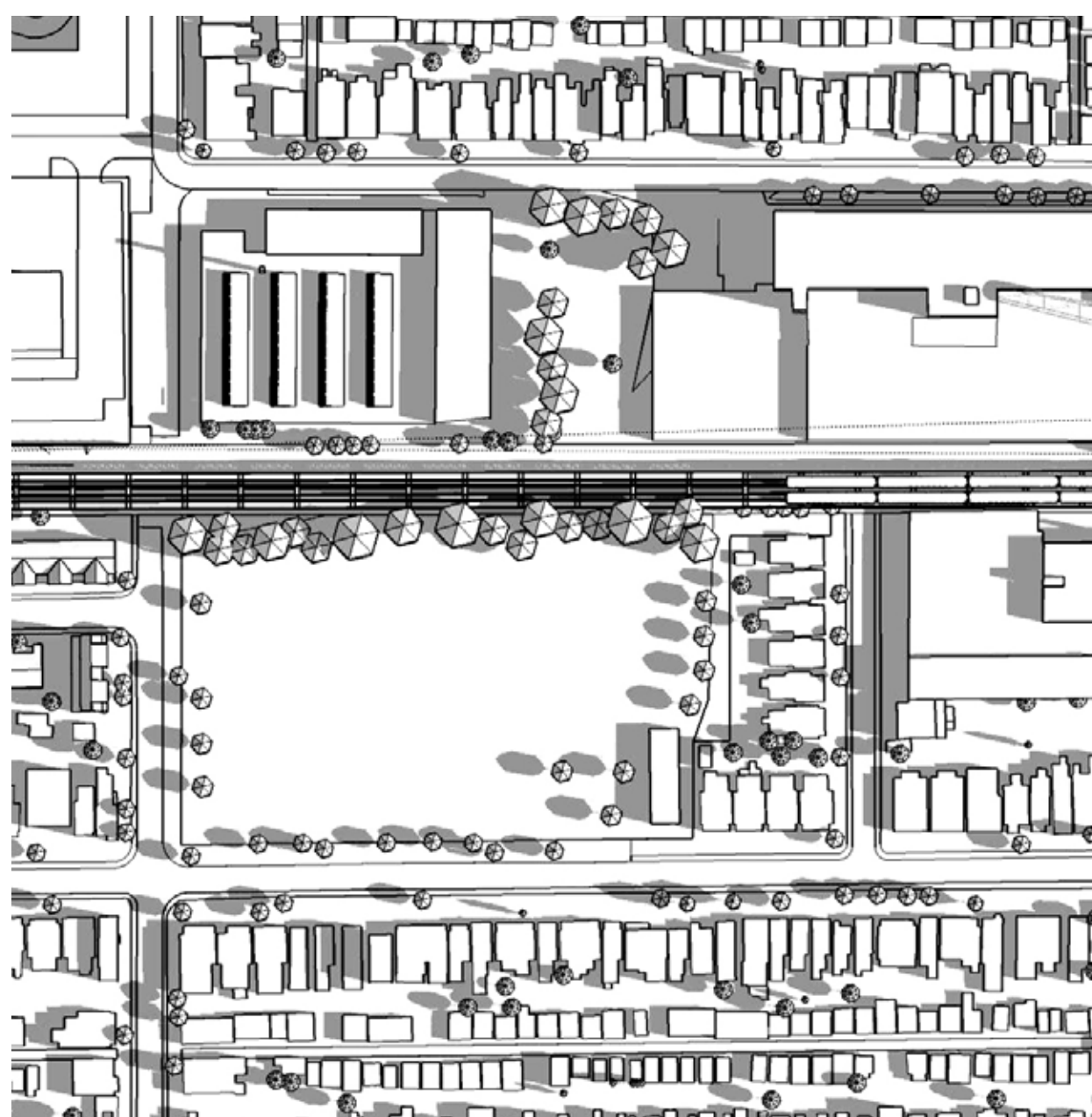
Campbell Avenue Park, June 21st 12:00 p.m.



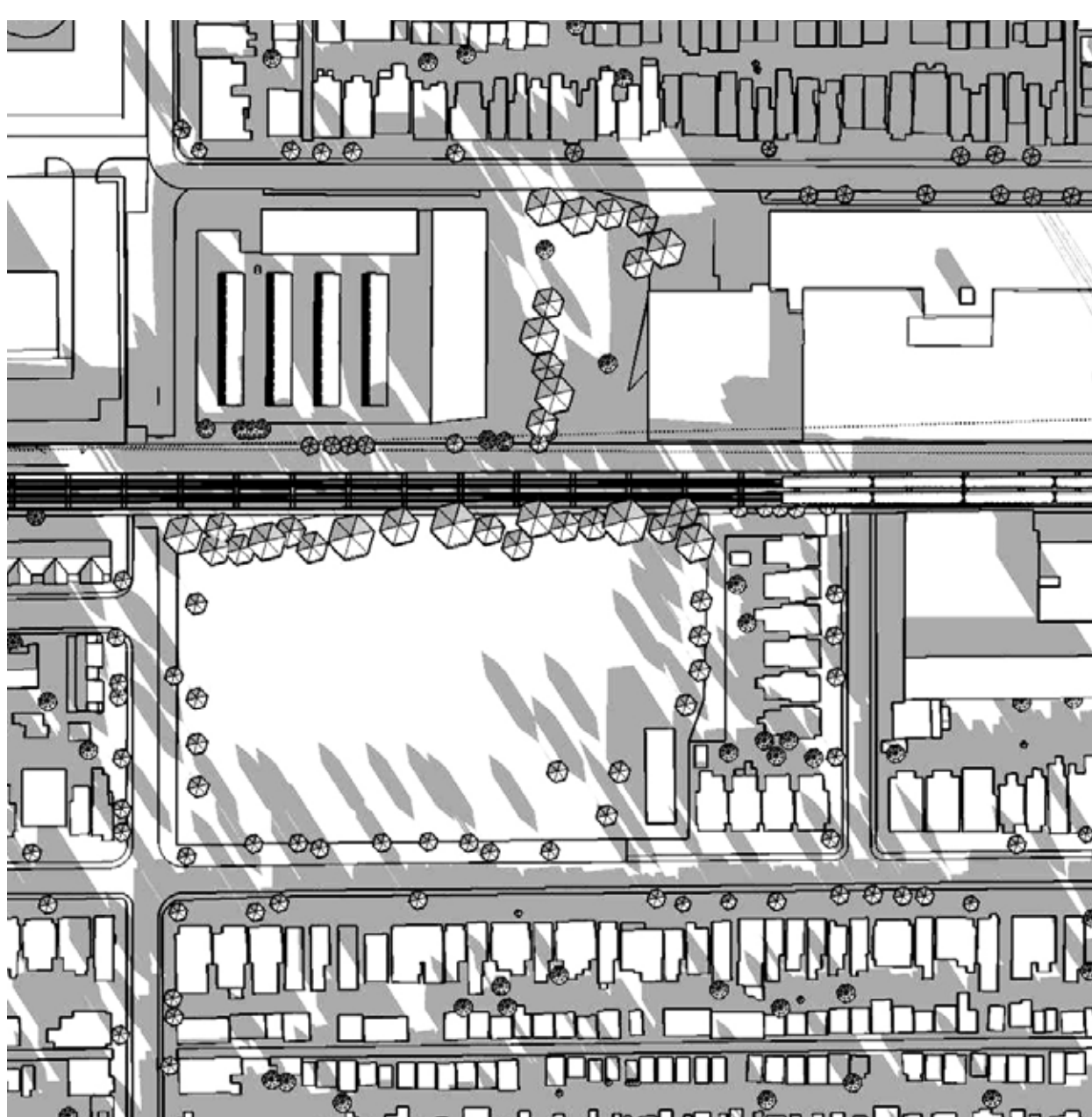
Campbell Avenue Park, June 21st 5:00 p.m.



Campbell Avenue Park, Sept 21st 8:00 a.m.



Campbell Avenue Park, Sept 21st 12:00 p.m.



Campbell Avenue Park, Sept 21st 5:00 p.m.

Shadow Studies at Campbell Avenue Park

THE PRELIMINARY GUIDEWAY AND GREENWAY CONCEPT

Building responsible, green transportation infrastructure



Above: Initial Guideway and Greenway design focuses on green, community-friendly spaces. View looking south beneath the Guideway where it opens to Campbell Avenue Park.

The initial Guideway and Greenway concept takes a progressive design approach to building advanced, community-friendly transportation infrastructure.

A modern Guideway has been specially designed with a continuous ribbon of lightly polished steel panels to gently reflect light, blend in with its surroundings, and visually lighten the structure. The length of the raised Guideway or bridge has been minimized to 570 metres, and its structure elegantly shaped with thin round columns that make it lighter. It reduces noise by eliminating the clacking noise at the Diamond, and incorporating noise and vibration control at the base of the columns.

Beneath the Guideway will be a new linear park that builds on the success of the West Toronto Railpath. This Greenway will connect local streets

and parks, and provide a range of all-season amenities to cyclists and pedestrians. The Greenway also features a new pedestrian bridge over the existing Davenport Diamond, a new linear park at Wallace Avenue to support and enhance the existing retail strip, a new illuminated path for pedestrians and cyclists reconnecting Paton Road. Public art installations will be prominently sited along the Greenway, particularly at east-west connections.

THE PUBLIC REALM PLAN

A plan based on community input

This design approach to the Guideway and Greenway has involved some of Canada's most talented experts in a unique design challenge, resulting in a preliminary design concept that minimizes the extent and visual appearance of the Guideway. The design concept shown is a first step in an evolutionary process that will invite feedback from the community as it evolves. It was developed by convening a number of Canada's top architects, landscape architects, urban designers and engineers in a collaborative design workshop.** This plan has been influenced by a "lead with design" spirit to shape a public realm that is a place of pride for the neighbourhood and the city.

This map shows key features of the public realm, which are grounded in community input expressed by representatives from the local community.* Metrolinx is committed to funding the enhanced Greenway and Guideway design features (including public art, lighting, landscaping and pathways, engineering enhancements and stainless steel railing) as well as an allocation for ongoing maintenance.

Key features of the Public Realm Plan for the Guideway and Greenway include:

- New community connections, excellence in public space and naturalized landscape design, creative under-Guideway programming, minimization of the visual impact of the Guideway, and close attention to safety and security
- Pedestrian and cycling bridge over the CP tracks
- Protection for a future station on the Barrie Corridor at Bloor Street West with connections to the new pedestrian and cycling trail and parking for bicycles
- In addition to the Integrated Art Strategy, Metrolinx is open to establishing an Endowment Fund using a community governance model for temporary art, community and cultural activity on the Greenway before construction begins in 2019. While funding will be set aside for this purpose, Metrolinx will continue to work with the City and local partners to develop a model for overseeing the endowment.

The plan also reflects a number of less visible elements important to the quality of residents' life during and after construction of the Greenway and Guideway, including commitment to a maximum number of diesel trains to be capped at 36 per day beginning in 2017 until electrification is implemented, rising to up to 180 vehicles per day with full electrification.

While Metrolinx and the City of Toronto are engaged in a process, many of these public realm considerations will involve ongoing negotiation and discussion with the City of Toronto and other stakeholders to implement. They include:

- Extension of the proposed multi-use trail south of Bloor Street West to connect with the future extension of the West Toronto Railpath as part of Metrolinx's mandate to improve the coordination and integration of all forms of transportation including active, since Metrolinx does not own sufficient land to realize this goal alone
- Resolving road grading issues at Dupont Street to improve pedestrian connectivity
- Pedestrian and cycling bridge connecting the Greenway with Earlscourt Park with provisions to connect with the Greenway in the future
- Operation maintenance, park planning, signage and wayfinding
- Metrolinx will reach out to permit commercial and residential building owners directly adjacent to the multi-use trail access from their properties where it does not pose safety concerns

* In spring 2015, Metrolinx began to develop its proposal for the Davenport section of the GO Barrie line. 10,000 letters were mailed to randomly selected households throughout the Davenport neighbourhood inviting residents to volunteer to be a part of a unique process. This process — called a Residents' Reference Panel — unfolded over four Saturdays as 36 local residents met to learn about the engineering and design challenges involved in removing the Davenport rail crossing and twinning tracks on the GO Barrie line. The panel put forward 89 recommendations for building the Guideway, creating a new path system, reducing local impacts and providing other community amenities. Many of these recommendations find their way directly into design features, while others will inform future discussions with the City since they may be subject to joint jurisdiction.

** Under the leadership of Metrolinx's Design Excellence team and Capital Projects Group, the following award-winning designers were brought together to design the Greenway and Guideway: Pat Hanson, Diana Gerard, and Raymond Chow of gh3 architects, Douglas Birkenshaw Architect, Duff Balmer of Perkins+Will, Craig Lamatti of Urban Strategies Inc., and Biljana Rajlic and Mark Armstrong of Hatch Mott McDonald. The Metrolinx Design Excellence Team includes Beth Kapusta, Renée Pettigrew, John Potter, and Margaret Goodfellow.



Connection to Earlscourt Park

Ramp to connect Greenway to south side of Davenport

Track meets grade south of Davenport Road

Patterned concrete retaining wall along industrial edge

Green retaining wall along residential edge

New Greenway extends north over CP track

New pedestrian and cycle bridge

Public art location

Existing heritage bridge extends across Dupont

South sidewalk raised to connect proposed public library to Greenway

Linear park extends north from Campbell Avenue Park with enhanced lighting and safety features

New east-west pedestrian and cycling connection
Location for public art

New linear park connects to Campbell Avenue Park

Preservation of mature Siberian Elms

Campbell Avenue Park

New 20m wide multi-use trail and linear park Greenway adjacent to and beneath bridge

Wallace Square multi-purpose flexible community event area/linear park

Potential extension area for Wallace Square

New east-west connection, including plaza, plantings and public art

Start of elevated bridge portion of Guideway

Patterned retaining wall plus noise wall for enhanced sound mitigation for houses on Rankin Crescent where warranted

Remove existing underpass and concrete barrier

New east-west pedestrian and cycling connection under Guideway connecting Greenway trail to Erwin Krickhahn Park

Location of public art

2m noise wall

Erwin Krickhahn Park

Landscape berm adjacent to park

Guideway rises at 2% grade

New multi-use Greenway on east side of rail right-of-way

Potential future connection south to West Toronto Railpath

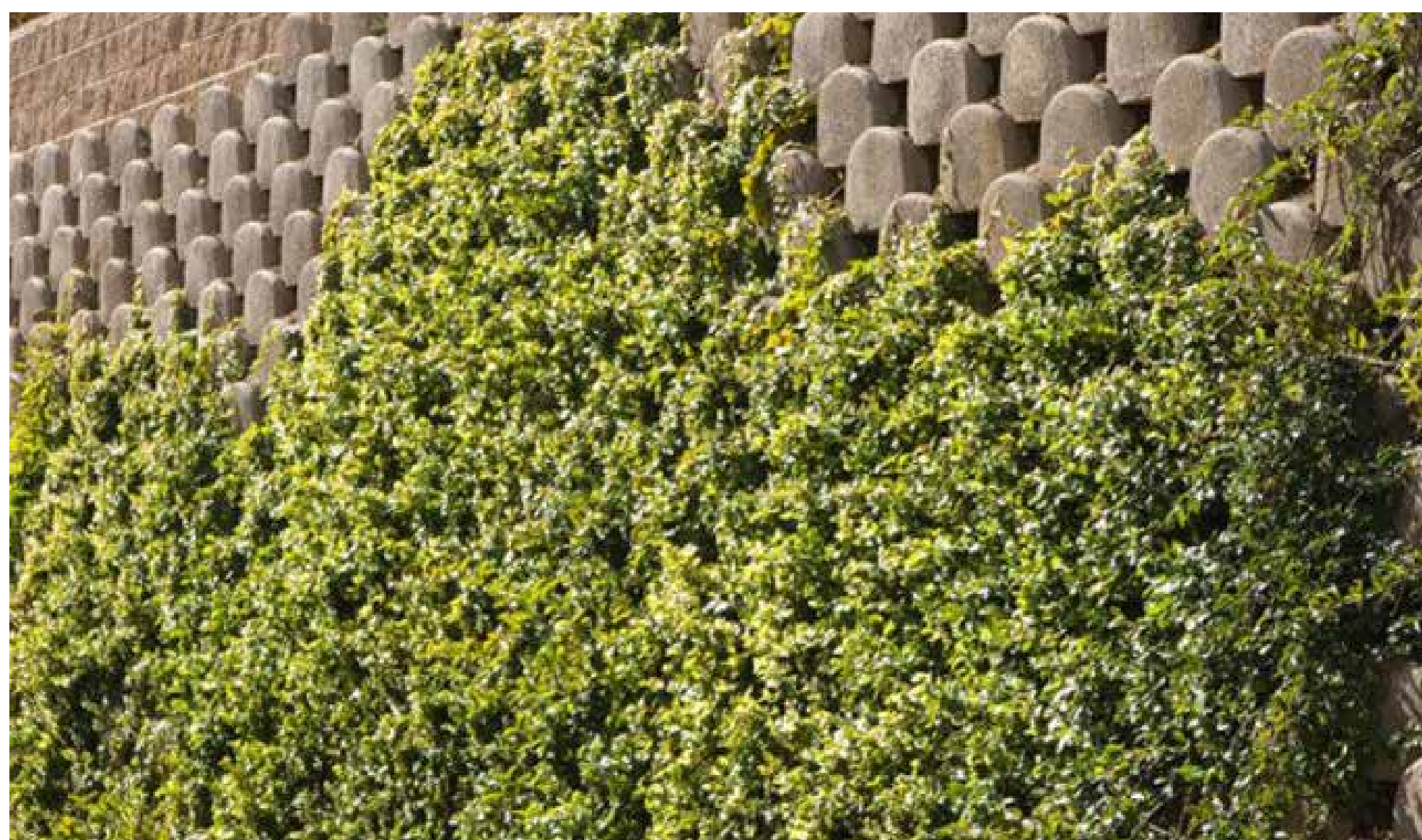
Site preserved for potential future Barrie corridor station

THE GUIDEWAY

Advanced electrified transit infrastructure



Above: evening view looking south showing how integrated light-themed public art can be used at the new east-west pedestrian and cycling connection at Antler Street/Lappin Avenue.



Example of the type of green mechanically stabilized earth wall that would be used where the rail is adjacent to residential areas.



Sample of the stainless steel cladding that forms a continuous ribbon along the edge of the Guideway to “reflect” the sky and local surroundings, lightening its visual impact. Different levels of reflectivity can be achieved by brushing the surface.

What is the Guideway?

The Guideway is designed as a modern, state-of-the-art structure that will carry a new fleet of electrified double-decker GO trains along the GO Corridor. Its concrete structure is shaped to lighten its visual impact and create safe and beautiful passages with new pedestrian, cycling and vehicular connections underneath

With high-efficiency engineering and advanced architecture, the Davenport Guideway serves as a model for a new generation of modern, electrified transit infrastructure. It has been designed with three goals: to minimize the length of the elevated bridge portion, to make it as visually and physically light as possible, and to integrate safety feature such as lighting and slender columns within the engineered structure.

This elevated portion has been minimized in the design to a 570-metre section between Wallace Avenue to just north of Dupont Street. The Guideway is bookended at either end by sloping, bermed green walls or vertical retaining walls. Overhead wires known as catenaries deliver the electricity that will power the trains. The Guideway is about 10 metres wide. The existing rail corridor is 20 metres wide. The Guideway supports two trains—one travelling north and one travelling south—separated by a 1.6-metre gap.

The design of the Guideway was informed by resident concerns about the impacts from the elevated bridge portion on the community. This has resulted in an initial design that maximizes the length of the berms at either end, and minimizes the extent of the elevated Guideway to reduce neighbourhood impact.

A naturalized bermed approach starts just north of Bloor Street West and continues nearly 300 metres to Wallace

Avenue, where the elevated Guideway begins.

In residential areas such as Wallace Avenue, the retaining wall takes the form of a green wall—a sloping, modular, planted retaining wall set in front of the structural wall of the Guideway. Where there is no space to slope and plant, an architectural precast patterned wall system will be used. Two different types of retaining wall (or mechanically stabilized earth wall, MSE wall for short) are located at the north and south end of the Guideway: green walls and patterned walls.

At the north end, the solid part of the Guideway resumes just north of Dupont Street, extending 450 metres to meet grade just south of Davenport Road. To the east, ramps are integrated into the retaining wall. Solid patterned walls are used where the Guideway backs onto industrial areas to the west.

The bridge has several unique design features:

- Next-generation integrated engineering creates the lightest possible bridge structure
- A “skylight” running the length of the bridge lets in natural light—
- creating a safe and inviting Greenway beneath
- Polished stainless steel paneling on the length of the bridge helps to mask the Guideway by reflecting local surroundings such as trees, buildings and sky
- A bridge with 2 m high integrated noise walls acts as a sound barrier from wheel noise, which is the most significant noise source for electrified trains
- Textured, white-tinted concrete and integrated structure creates a more pleasing architectural finish to the underside of the bridge
- Simple, elegant round columns are designed for lightness and safety;
- A continuous LED strip lights at the top of columns
- Light-themed artworks animate and demarcate east-west connections

THE GUIDEWAY

Designed to reduce noise and blend in with its surroundings



Top: View looking southwest beneath the Guideway at the new pedestrian and cycle connection between Lappin Avenue and Antler Street.

Above: View looking west along Wallace Avenue showing the burnished stainless steel ribbon of the guideway.

Skylight

Where the Guideway is elevated, it is divided in two to create a continuous “skylight” designed to bring light and rainwater to the area under the bridge. This makes it safer for people by increasing visibility and fosters plant growth in the landscaped areas beside the multi-use path.

Lighting the Guideway

Integrated lighting includes light halos at columns to up-light the structure and downlight the Greenway below, while minimizing the light pollution to nearby residences. The underside of the Guideway is white concrete to improve reflectivity and lighten its appearance.

Stainless Steel Bridge Surface

The face of the Guideway’s noise wall is a continuous ribbon of polished plate stainless steel. This material has a number of unique attributes: its slightly variable, softly mirrored surface reflects the colours and textures of its surroundings, visually reducing the scale of the Guideway by camouflaging it into its neighbourhood context. Where the stainless steel bridges over roads, its finish will be more burnished to minimize glare. Where it is adjacent to parks, open spaces or residential areas, it could be more selectively reflective. Stainless steel has the advantage of being easier than concrete to clean off graffiti, which will be part of a regular maintenance routine as required. Community input can inform the particulars of how this material can be adapted to the specifics of the neighbourhood context.

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Train Noise and Vibration Mitigation

The noise and vibration studies for the Guideway identify that there would be a significant reduction in noise (up to 12 dB) in the Diamond area with reductions up to 20 dB for areas immediately adjacent to the Diamond. For sound mitigation, acoustic treatment includes sound absorptive treatment on the inside of the 2m sound barrier. Taller barriers at grade will be examined during detailed design, as well as vibration mitigation through bridge

bearing pads. A full report on noise and vibration will be available in May, 2016.

Integrating Art

Public art on the underside of the Guideway will emphasize points of entry and newly created neighbourhood links under the Guideway. Four important east-west connections—at Wallace Square, Campbell Avenue Park (Antler Street/Lappin Avenue), Paton Road and Dupont Street—are designated for artworks intended to animate and inspire. A high-quality public art program will use light, colour, and reflective materials to activate these places of community connectivity. Art treatments fully integrated with architectural elements and lighting will support safe, active use.

Vandalism Prevention

Several strategies will be used to address vandalism including using the Crime Prevention Through Design (CPTED) principles. As well, Metrolinx will employ its anti-graffiti strategy, which has public art at its core to prevent vandalism. Generally, the stainless steel on the edge of the Guideway is difficult to graffiti where it is raised, and as a surface it is easier to clean than concrete.