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Noise and Vibration Impact Assessment Report

Dundas Bus Rapid Transit Mississauga East Project

Date: February 2022

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Authors

Report Prepared By:

Leaman Chow, P.Eng.
Acoustic Engineer

Report Reviewed By:

Alan Oldfield. MEng, CEng(UK), P.Eng.
AVP, Department Manager – Air + EHS +Acoustics – Canada Region

Approved By:

Joanne Wang, M.E.S., MCIP, RPP
Senior Environmental Planner

Executive Summary

ES 1. Project Background and Study Purpose

In 2020, Metrolinx completed the Dundas Bus Rapid Transit Initial Business Case, which recommends a preferred Bus Rapid Transit alignment, and supportive service concept along Dundas Street between Kipling Station, in the City of Toronto, through the City of Mississauga and Halton Region, to Highway 6 in the City of Hamilton. AECOM Canada Limited (AECOM) was retained by Metrolinx and the City of Mississauga to evaluate the proposed 48-kilometre transit corridor. The evaluation involves the completion of the Preliminary Design, Preliminary Design Business Case and Transit Project Assessment Process.

A Transit Project Assessment Process is a focused environmental impact assessment process created specifically for transit projects. The process involves a pre-planning phase followed by a regulated (up to 120 days) consultation and documentation period. These phases include consultation, assessment of impacts, development of measures to mitigate negative impacts, and documentation. Consultation occurs with the public, stakeholders and Indigenous Nations throughout the process. Following these phases, there is a 30-day public review period where the public has the opportunity to review the Environmental Project Report (EPR) and provide additional comments, followed by a 35-day Minister’s review period.

The preliminary design phase will build upon the pre-planning completed as part of the Transit Project Assessment Process. In this phase, the project team will utilize the environmental impact assessment from the Transit Project Assessment Process to refine the Bus Rapid Transit design to a 30% design level. The Preliminary Design Business Case analyzes the Dundas Bus Rapid Transit corridor against strategic objectives, financial and economic impacts and operations considerations. The Preliminary Design Business Case will compare the corridor against a business-as-usual scenario (i.e., without the project).

In 2018, the Dundas Connects Master Plan (Dundas Connects) was completed by the City of Mississauga. It guides future development and intensification along the Dundas Street Corridor in the City of Mississauga. Bus Rapid Transit, cycling infrastructure, and an enhanced public realm for pedestrians were among the recommendations in the Plan. Dundas Connects is being implemented through various studies and initiatives, including this Transit Project Assessment Process.

The Dundas Bus Rapid Transit Mississauga East Project (the Project) includes the planning and design of a 7-kilometre Bus Rapid Transit corridor from Confederation Parkway to the City of Toronto boundary at Etobicoke Creek, within the City of

Mississauga. This Noise and Vibration Impact Assessment Report (the Report) has been prepared to support the Dundas Bus Rapid Transit – Mississauga East Transit Project Assessment Process.

The purpose of this report is to document the noise and vibration impact assessment of the Project, considering both the construction and operational phases of the Project. The relevant assessment guidelines, methods and assumptions are outlined in this report, along with predicted noise and vibration impacts and a discussion on requirements for mitigation and monitoring.

Refer to **Section 1** for more information related to Project background and Study purpose.

ES 2. Methodology

This assessment determined the potential impacts at noise or vibration sensitive receptor (Receptor) locations. Zones of Influence were developed to define the geographic areas within which receptors may be exposed to unmitigated construction noise and vibration levels higher than limits for annoyance and building damage. The Zones of Influence were used to inform the identification of areas where mitigation measures may be required. Where the sound and vibration levels were predicted to exceed the defined limits, mitigation measures were introduced in the acoustic model to reduce the impact in order to demonstrate the feasibility of complying with the defined limits.

Noise during Project operation was assessed based on Ontario Ministry of Transportation guidelines and the City of Mississauga's noise barrier policy. Road traffic was modelled considering expected traffic and bus service volumes. The future sound levels with and without the Project were compared to determine the impact.

ES 3. Existing Conditions

The Mississauga East segment of the planned Dundas Bus Rapid Transit corridor is approximately 7 kilometres in length spanning from Confederation Parkway to the City of Toronto boundary at Etobicoke Creek, within the City of Mississauga. The Study Area along the corridor includes a variety of land use zoning designations generally including commercial, residential, employment and open spaces. The existing ambient sound levels are generally dominated by an "urban hum", or the aggregate sound of many unidentifiable noise sources due to the mixture of various anthropogenic activities, primarily road traffic.

ES 4. Potential Impacts, Mitigation Measures and Monitoring Activities

The acoustic modelling results indicated that many, but not all Receptors are located within the Zone of Influence for noise and vibration during Project construction and operation activities. A detailed analysis of construction and operation noise at Receptor locations confirmed that several exceedances were anticipated during construction and operation activities. Therefore, some Receptor or activity specific mitigation measures were incorporated in the acoustic model to reduce the Project impact and determine the feasibility of compliance with the defined limits for noise. These mitigation measures were selected with the objective of having the least possible impact on the Project (e.g., construction schedule) while also considering the technical, operational, administrative, and economic feasibility for each. The mitigations incorporated in the acoustic modelling included barriers (construction and operation) and the replacement of tonal backup alarms with broadband type alarms (construction).

It was determined that the implementation of mitigation measures was either not feasible or not applicable according to the Mississauga Policy 09-03-03 for some receptor locations. Following the inclusion of mitigation measures for the remaining locations, acoustic model prediction results indicated that noise during construction would not be exceeded. During operation one receptor location would continue to exceed the 60 dBA sound level by 4 dB. Additional general mitigations or best practices as well as recommended monitoring and follow up activities are also provided that would serve to reduce the potential Project noise and vibration impacts. Examples of these best practices include public engagement, acoustic enclosures, and no idling policies.

ES 5. Future Studies

The assessment of potential noise and vibration impacts was completed based on the draft 10% design of the planned Bus Rapid Transit corridor. As changes to the inputs used in this assessment may occur during detailed design, it is recommended that, during detailed design, the noise and vibration analyses be re-assessed to accommodate relevant changes to the inputs that were used for this analysis. If there were any relevant changes to the inputs used, an additional analysis would be required in order to confirm the findings of this study. The purpose of the updated analysis would be to reflect the updated inputs so that the impacts, mitigation measures, and monitoring requirements are accurate to the most recent design details. Changes that may trigger an assessment update include changes to variables such as roadway alignment, overall traffic volumes, day/night splits, grading, etc. Finally, it is also recommended that prior to construction, the pre-construction vibration study be assessed for any changes to the inputs. Should there be any changes to inputs during detailed design, the pre-construction vibration study shall be updated. Additionally, pre-construction building inspections shall be completed for fragile or heritage buildings identified along the corridor.

ES 6. Permits and Approvals

Provincial noise or vibration permits or approvals are not anticipated to be required. This will be confirmed during the next Project phases.

Metrolinx as a Crown agency of the Province of Ontario is exempt from certain municipal processes and requirements. In these circumstances, Metrolinx will engage with the municipalities to incorporate municipal requirements as a best practice, where practical, and may obtain associated permits and approvals.

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1. Introduction

1.1 Background

Previous municipal planning studies and the Metrolinx Initial Business Case confirmed the need for improved bus transit infrastructure along Dundas Street. Metrolinx is now advancing plans for the Dundas Bus Rapid Transit corridor. More than 20 kilometres of the 48 kilometre Bus Rapid Transit corridor will operate in bus lanes or in a dedicated right-of-way, separate from other traffic, allowing faster and more reliable transit connections.

In 2020, Metrolinx completed the Dundas Bus Rapid Transit Initial Business Case, which recommends a preferred Bus Rapid Transit alignment, and supportive service concept along Dundas Street between Kipling Station, in the City of Toronto, through the City of Mississauga and Halton Region, to Highway 6 in the City of Hamilton. AECOM Canada Limited (AECOM) was retained by Metrolinx and the City of Mississauga to evaluate the proposed 48-kilometre transit corridor. The evaluation involves the completion of the Preliminary Design, Preliminary Design Business Case and Transit Project Assessment Process.

A Transit Project Assessment Process is a focused environmental impact assessment process created specifically for transit projects. The process involves a pre-planning phase followed by a regulated (up to 120 days) consultation and documentation period. These phases include consultation, assessment of impacts, development of measures to mitigate negative impacts, and documentation. Consultation occurs with the public, stakeholders and Indigenous Nations throughout the process. Following these phases, there is a 30-day public review period where the public has the opportunity to review the Environmental Project Report (EPR) and provide additional comments, followed by a 35-day Minister’s review period.

The preliminary design phase will build upon the pre-planning completed as part of the Transit Project Assessment Process. In this phase, the project team will utilize the environmental impact assessment from the Transit Project Assessment Process to refine the Bus Rapid Transit design to a 30% design level. The Preliminary Design Business Case analyzes the Dundas Bus Rapid Transit corridor against strategic objectives, financial and economic impacts and operations considerations. The Preliminary Design Business Case will compare the corridor against a business-as-usual scenario (i.e., without the project).

In 2018, the Dundas Connects Master Plan (Dundas Connects) was completed by the City of Mississauga. It guides future development and intensification along the Dundas Street Corridor in the City of Mississauga. Dundas Connects was developed over a 2-year period with extensive consultation from the public. It was endorsed by City Council on June 18, 2018. Bus Rapid Transit, cycling infrastructure, and an enhanced public realm for pedestrians were among the recommendations in the Plan. Dundas Connects is being implemented through various studies and initiatives, including this Transit Project Assessment Process.

The Dundas Bus Rapid Transit Mississauga East (the Project) includes the planning and design of a 7-kilometre Bus Rapid Transit corridor from Confederation Parkway to the City of Toronto boundary at Etobicoke Creek, within the City of Mississauga. The Project has been submitted under the Government of Canada's Investing in Canada Infrastructure Program and is currently awaiting approval. This Noise and Vibration Impact Assessment Report (the Report) has been prepared to support the Dundas Bus Rapid Transit – Mississauga East Transit Project Assessment Process.

1.2 Purpose of the Report

The purpose of this Report is to document the noise and vibration impact assessment of the Project based on the draft 10% design, considering both the construction and operational phases of the Project. The relevant assessment guidelines, methods and assumptions are outlined in this report, along with predicted noise and vibration impacts and a discussion on requirements for mitigation and monitoring.

1.3 Study Area

The Project Area is the area of direct disturbance required for the construction and operation of the Project. The Project Area is shown in **Figure 1**. The Study Area for the Noise and Vibration Impact Assessment is shown in **Figure 2**. The Study Area extends 500 metres beyond the Project Area and is based on the recommended extents from the Metrolinx Environmental Guide for Noise and Vibration Impact Assessment (Metrolinx Guide) (Metrolinx 2020). This accounts for the recommended distances for both Bus Rapid Transit (300 metres) and Construction (500 metres) project types. The predominant land uses within the Study Area include a combination of low-rise, mid-rise and high-rise residential as well as commercial and industrial land uses.

2. Methodology

Municipal, regional, and provincial legislation or guidelines address assessment and provide limits for noise, vibration, or both due to project construction and operation activities. The Metrolinx Guide provides a framework for noise and vibration assessments of transit projects including Bus Rapid Transit. The Metrolinx Guide was developed by industry subject matter experts with contributions from the Ontario Ministry of the Environment, Conservation and Parks and provides direction for the assessment of and limits to noise and vibration impacts due to project construction and operation activities. The assessment for the Project was undertaken in accordance with the definitions and methods defined within the Metrolinx Guide relevant to the Project. These methods are further specified in the following sections.

2.1 Sensitive Receptors

This assessment determined the potential impacts at noise or vibration sensitive receptor (Receptor) locations. These Receptors were defined as locations where people may typically live, sleep, learn or pray, in accordance with the Metrolinx Guide. The selection of Receptor locations considered factors including the:

- Separation distance between Receptors and Project source(s);
- Shielding from intervening structures between Receptors and Project source(s);
- Background sound or vibration levels at Receptors; and
- Level of sensitivity of the Receptor.

Receptors were identified based on aerial and street imagery as well as input from Metrolinx and the City of Mississauga. Within distinct areas of sensitive land uses, groupings of Receptors were identified and selected to represent the potential worst-case impacts due to Project activities. It is not typically necessary to undertake calculations for every Receptor along the corridor, especially for those that are farther away since those locations will have an equal or lesser impact. A summary of the identified Receptors applicable to the construction and operation assessments is provided in **Appendix B**.

2.2 Noise During Construction

The limits for noise during construction activities for a project are described by noise exposure limits in the Metrolinx Guide. These limits were adapted from the United States Federal Transit Administration publication Transit Noise and Vibration Impact

Assessment (2006) and Federal Highway Administration publication Highway Construction Noise Handbook (2006). The noise exposure limits are defined as sound level limits of varying time-based equivalent sound levels (i.e., day, night, 15 minute and maximum) during the daytime or nighttime periods that also depend on the land use of the noise sensitive receptor. A summary of these limits is provided in **Table 1**.

Table 1: Construction Noise Exposure Limits

Land Use	L_{eq} (16-h, 8-h) (dBA)		L_{eq} (15-minute) (dBA)		L_{max} (dBA)	
	Day	Night	Day	Night	Day	Night
Residential – Weekday	Louder of: 75 or Baseline+5	Louder of: 65 or Baseline+5	85	75	90	80
Residential – Weekend & Holiday	Louder of: 70 or Baseline+5	Louder of: 60 or Baseline+5	75	65	90	80
Institutional	Louder of: 70 or Baseline+5	Louder of: 60 or Baseline+5	75	65	90	80
Commercial	Louder of: 80 or Baseline+5	None	None	None	None	None
Industrial	Louder of: 85 or Baseline+5	None	None	None	None	None

Notes:

1. Weekday L_{eq}(day) and L_{eq}(night) are over a 16-hour and 8-hour period, respectively. Weekend and holiday L_{eq}(day) and L_{eq}(night) are over a 14-hour and 10-hour period, respectively.
2. The weekday daytime period is 7:00 am – 11:00 pm while the weekend and holiday one is 9:00 am to 11:00 pm.
3. The weekday nighttime period is 11:00 pm – 7:00 am while the weekend and holiday one is 11:00 pm – 9:00 am.
4. Weekend commences at 10:00 pm on Friday and ends at 7:00 am on Monday.
5. Noise measurements should be made continuously over the applicable averaging time and should exclude spurious events such as aircraft or non-project rail passbys.
6. All L_{max} noise measurements made with sound level meter set to slow-scale response.
7. Institutional buildings include schools, universities, child daycare centres, hospitals, old age homes, and churches where exposure to noise may be less tolerable.
8. All limits apply to the noise-sensitive receptor and are measured outdoors as close as practical to the building façade or outdoor living area; typically, that means at the lot-line of the receptor property. For large properties in rural settings where buildings and living areas may be setback from lot-lines and construction areas, lot-line measurements can be extrapolated to remote receptor locations on the subject property.

The Metrolinx Guide provides limits for the daytime and night-time equivalent sound levels as the louder of up to a 5 dB increase above baseline or an absolute limit as defined in **Table 1**. This assessment considers the predicted sound level due to the Project activities compared with the defined absolute limits. This approach is considered conservative since:

- The absolute limit would be used if the baseline sound level were equal to 5 dB below the absolute limit, or lower; and

- The absolute limit would be more restrictive if the baseline sound level were higher than 5 dB below the absolute limit.

Additional baseline noise measurements may be conducted immediately prior to construction in order to refine these limits. A detailed description of the equipment and activities used for the assessment is provided in **Appendix C**.

A Zone of Influence was developed to define the geographic area within which receptors may be exposed to unmitigated noise levels higher than the defined limits. The Zone of Influence was used to identify areas where mitigation measures should be considered. Further detailed analyses at each Receptor location was conducted using a more robust prediction method to determine the noise level for each.

Additional details regarding the modelling methods are provided in **Section 2.6**.

2.3 Vibration During Construction

The limits for ground-borne vibration during construction activities for a project are described by absolute limits in the Metrolinx Guide. These limits were developed based on the Ministry of Environment and Energy and GO Transit publication Noise and Vibration Protocol (1995) and the City of Toronto's By-Law No. 514-2008 (2008) which address public annoyance and building damage, respectively. Further, these limits are based on root mean square velocity and peak particle velocity levels in millimetres per second (mm/s) for public annoyance and building damage, respectively. The peak particle velocity vibration limits are also dependent on the frequency of vibration. The Metrolinx Guide notes that stricter vibration limits for building damage as defined by the U.S. Federal Transit Administration may be required for fragile or heritage buildings. A summary of the vibration limits applicable to this assessment is summarized in **Table 2**.

Table 2: Construction Vibration Limits

Limit Type	Vibration Limit (mm/s)
Public Annoyance	Root mean square velocity not to exceed 0.14 mm/s or current conditions (whichever is higher)
Building Damage (Normal)	Peak Particle Velocity limit according to frequency (Hz): ■ < 4 Hz ..... 8 mm/s ■ 4 Hz to 10 Hz ..... 15 mm/s ■ > 10Hz ..... 25 mm/s
Building Damage (Fragile or Heritage)	Peak Particle Velocity limit of 3 mm/s

Notes:

1. Vibration is assessed as close as possible to building foundation, typically within 5 m.
2. The vertical component of vibration is used to assess compliance with criteria.

The assessment compared the predicted vibration level due to the Project activities with the limits defined in **Table 2**. The equipment and activities associated with Project construction described in **Appendix C** were used for this assessment. This is considered a conservative approach since this limit is the most restrictive.

A Zone of Influence was developed to define the geographic area within which receptors may be exposed to unmitigated vibration levels higher than the defined limits. The Zone of Influence was used to identify areas where mitigation measures should be considered.

Additional details regarding the modeling methods are provided in **Section 2.6**.

2.4 Noise During Operation

The criteria for assessing road traffic noise are based on the Ontario Ministry of Transportation publication Environmental Guide for Noise (Ontario Ministry of Transportation, 2008) and the City of Mississauga Policy No. 09-03-03, Noise Attenuation Barriers on Major Roadways. The limits for noise during operation activities for a project are described by an allowable change compared with the future ambient sound levels and an absolute limit. Noise levels are calculated in Outdoor Living Area locations based on the 16-hour equivalent traffic noise level between 07:00 am and 11:00 pm. Outdoor Living Areas are generally located 1.2 m above the existing ground surface at a distance of 3 m from the nearest façade and may include areas such as patios, decks, terraces and backyards.

The sound level limits ($L_{eq,16hr}$) for Bus Rapid Transit projects along roadways (excluding highways) are:

- +5 dB relative to future ambient sound level, or
- 60 dBA within the City of Mississauga, and 65 dBA outside the City of Mississauga.

In order to determine the change in future ambient sound level, the predicted sound level of the Bus Rapid Transit operations was added to the predicted future ambient sound level. These predictions were compared with the allowable limits to determine if an exceedance was expected. Mitigation measures were investigated where an exceedance of the allowable limits was found.

Future ambient sound levels (i.e., future without Project) for each receptor location were determined by predictive modeling. Peak AM traffic volumes were provided by AECOM traffic analysts for 2041 Business-as-Usual (BAU) (May 2021). The future ambient sound levels include traffic related to proposed Metrolinx projects, but rail and aircraft

sources are not generally included. In practice, there may be some influence in the overall noise level at any Receptor from ambient noise sources including rail and aircraft traffic. Ambient noise sources were not included in this modelling. The assessment is therefore considered to have used a conservative approach because the baseline level used for determining the impact will be lower than if these sources were included.

2.5 Vibration During Operation

There are no quantitative limits or methods of assessment for the assessment of vibration during project operation defined in the Metrolinx Guide or in other provincial and federal guidelines. However, the U.S. Federal Transit Administration publication Transit Noise and Vibration Impact Assessment Manual (2018) notes that “Because the rubber tires and suspension systems on buses provide vibration isolation, it is unusual for buses to cause ground-borne vibration or noise problems.” In addition, within the context of environmental assessments in the province of Ontario, vibration impact assessments for rubber-tired vehicle projects has historically not been completed. In consideration of the above, a quantitative vibration assessment from operation of the Bus Rapid Transit was not completed.

With respect to ground-borne vibration or noise problems, it is uncommon for rubber-tired vehicles to be a source of concern. The US Federal Transit Administration notes that “For most issues with bus-related vibration, such as rattling of windows, the cause is almost always airborne noise and directly related to running surface conditions such as potholes, bumps, expansion joined, or other discontinuities in the road surface (usually resolved by smoothing the discontinuities).” The quality of the road surface condition upon commencement of operation is not controlled by the project or its design. Rather, the condition will be dependant on the quality of workmanship of the contractor who should complete the Project free from discontinuities, potholes or bumps. Finally, ongoing maintenance of the road surface would be within the purview of the City of Mississauga.

2.6 Modelling

Acoustic model predictions were completed based on assumptions related to inputs such as traffic data, equipment activities, quantities, and usage. These assumptions are provided in **Appendix C**.

2.6.1 Noise During Construction

Noise emissions sources for the construction of road works and infrastructure for the Project include mobile and stationary equipment such as excavators, asphalt pavers

and power generators. Detailed construction staging and equipment has not yet been developed for the Project. However, six potential construction activities and associated equipment were identified and assumed to be the most energy intensive (i.e., highest levels of noise and vibration):

1. Existing Asphalt Removal and Site Preparation;
2. Paving New Asphalt;
3. Station Construction Installation;
4. Soil Excavation and Stockpiling;
5. Culvert Construction; and
6. Bridge Construction.

The Metrolinx Guide provides a method for predicting sound levels due to construction noise at points of reception which incorporates geometric spreading calculations (excluding ground topography and duty cycles of construction equipment.

The equation for the prediction of the propagation of noise is as follows:

$$L_{eq}(\text{point of reception}) = SPL_{equipment\ @\ ref} - 20 \log (D_{point\ of\ reception} / D_{ref}) + 10 * \log(D.C.)$$

Where: $L_{eq}(\text{point of reception})$ = sound level of the piece of equipment at the point of reception (dBA),

$SPL_{equipment}$ = sound pressure level of equipment at a reference distance (usually 15 m or 50 ft),

$D_{point\ of\ reception}$ = straight line distance from equipment to point of reception (m),

D_{ref} = reference distance provided in $SPL_{equipment}$ (m), and

$D.C.$ = fraction of time, or duty cycle, that a piece of equipment usually operates.

The total sound level at a point of reception is determined by the logarithmic sum of the predicted values for each source (i.e., individual equipment) associated with the construction activities. However, this method for predicting receptor sound levels does not account for variables that may affect the propagation of sound especially in an urban area including reflections, shielding, and ground absorption. Nevertheless, this method was used as a screening level assessment to determine the Zone of Influence where an exceedance may occur.

Receptor specific sound levels due to construction activities were predicted using CadnaA modelling software which implements sound propagation methods as defined in International Organization for Standardization (ISO) standards:

- ISO 9613-1:1993 Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere; and
- ISO 9613-2:1996 Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

The ISO prediction method used in CadnaA is more robust when compared with the Metrolinx Guide by incorporating the additional variables affecting sound propagation. Model predictions were completed for each construction activity either:

1. Specific to a fixed location for which an activity occurs (e.g., bridge construction); or
2. In segments of 1 km for linear activities (e.g., paving).

2.6.2 Vibration During Construction

Construction vibration Zones of Influence were predicted using reference equipment source levels and assumed equipment operations for the construction activities and equipment provided in **Appendix C**. The U.S. Federal Transit Administration includes procedures for predicting vibration transmission which incorporate a distance attenuation equation to estimate vibration levels from reference source levels. As a result, the predictions provide a reasonable estimate for a wide range of soil conditions. The distance attenuation equation is as follows:

$$\text{Peak Particle Velocity} = (\text{Reference vibration velocity}) \times (D_{ref}/D)^{1.5}$$

Where: D_{ref} is the reference distance at which the reference vibration level is given and D is the distance from the equipment to the receiver.

The building damage limits are based on in-ground vibration levels, adjacent to the building. Perceptible vibrations would result from in-building floor vibrations, but the limits for construction vibration perceptibility are taken as in-ground vibration levels. This approach is consistent with the U.S. Federal Transit Administration procedures.

For the determination of the Zone of Influence for public annoyance, the resultant peak particle velocity may be converted to an approximate root mean square velocity value. In accordance with the U.S. Federal Transit Administration procedure for construction vibration analysis, a crest factor (ratio of peak particle velocity to maximum root mean square velocity) of 4 was used in the following equation.

$$\text{Approximate root mean square velocity} = \text{Peak particle velocity} \div 4$$

2.6.3 Noise During Operation

Noise emission predictions due to road traffic were based on the methods provided by the Ministry of the Environment (now the Ministry of the Environment, Conservation and Parks) publication Ontario Road Noise Analysis Method for Environment and Transportation (1990). Model predictions in accordance with Ontario Road Noise Analysis Method for Environment and Transportation are based on methods developed by the U.S. Federal Highway Administration. This assessment method evaluates a reference sound level and applies adjustments based on the gradient of the roadway, pavement surface, distance between road and Receptor, topography and any shielding between the source and a Receptor location.

The predictive analysis was performed using the STAMSON modeling software developed by the Ministry of the Environment, Conservation and Parks. STAMSON implements a computerized version of the algorithms defined in Ontario Road Noise Analysis Method for Environment and Transportation and Sound from Trains Environmental Analysis Method.

When assessing buses using the Ontario Road Noise Analysis Method for Environment and Transportation algorithms, they are classified as “medium trucks”. However, using the medium truck reference sound source characteristics does not account for the routing of exhaust to roof level for modern buses. Therefore, an adjusted source height of 2.4 m for the Bus Rapid Transit buses was used in this assessment to reflect the heightened acoustic centre considering the roof level exhaust.

3. Existing Conditions

The Mississauga East segment of the planned Dundas Bus Rapid Transit corridor is approximately 7 kilometre in length spanning from Confederation Parkway to the City of Toronto boundary at Etobicoke Creek, within the City of Mississauga. The Study Area along the corridor includes a variety of land use zoning designations generally including commercial, residential, employment and open spaces. The existing ambient sound levels are generally dominated by an “urban hum”, or, the aggregated sound of many unidentifiable noise sources due to the mixture of various anthropogenic activities, primarily road traffic.

4. Potential Impacts, Mitigation Measures and Monitoring Activities

4.1 Noise During Construction

A Zone of Influence was determined for each identified construction activity described in **Section 2.6.1** and provides a screening distance for which the Project noise may exceed the sound level limits. A summary of the Zone of Influence distances for each activity is provided in **Table 3** and **Figure 3** to **Figure 20**. The results provided in **Table 3** represent the Zones of Influence based on the sound level limits for daytime residential weekday construction activities only since it was assumed that Project construction activities will occur during the daytime hours on weekdays only.

Table 3: Construction Noise Zone of Influence

Construction Activity	Zone of Influence (m)							
	Daytime ($L_{eq,16hr}$)				15-Minute ($L_{eq,15min}$)		Maximum (L_{max})	
	Residential	Institutional	Commercial	Industrial	Residential	Institutional	Residential	Institutional
Existing Asphalt Removal & Site Preparation	77	136	43	25	38	109	27	27
Paving New Asphalt	72	128	41	23	33	104	25	25
Station Construction Installation	48	84	27	15	23	71	16	16
Soil Excavation and Stockpiling	46	82	26	16	24	76	18	18
Culvert Construction	43	77	27	15	20	63	14	14
Bridge Construction	72	128	41	23	32	99	22	22

Model prediction results for specific Receptor locations for each construction activity are summarized in **Table 4** to **Table 6**. Highlighted results identify a predicted exceedance of the sound level limit.

The prediction results are based on construction activities occurring during the daytime only. An additional assessment would be required if nighttime activities are planned in the future to determine the predicted noise impact. Based on the results, no exceedances were predicted when comparing with the limits for the maximum allowable sound level (L_{max}). However, prediction results indicated that exceedances are expected for the unmitigated Project construction activities when comparing with the daytime equivalent ($L_{eq,16hr}$) and 15-minute equivalent ($L_{eq,15min}$) sound level limits.

Table 4: Construction Noise Prediction Results – Daytime Equivalent Sound Level ($L_{eq,16hr}$)

Receptor ID	Sound Level Limit ($L_{eq,16hr}$)(1)	Predicted Construction Sound Level $L_{eq,16hr}$ (dBA)					
		Existing Asphalt Removal(2)	Paving New Asphalt(2)	Station Construction Installation(3)	Soil Excavation and Stockpiling(3)	Culvert Construction(3)	Bridge Construction(3)
C_01	80	72	72	45	46	35	64
C_02	80	78	78	74	79	48	45
C_03	70	73	72	66	67	53	45
C_04	75	64	63	51	52	49	41
C_05	75	66	65	50	51	49	41
C_06	70	72	72	56	57	59	40
C_07	75	60	59	50	51	46	39
C_08	75	58	58	50	51	45	39
C_09	75	75	74	62	63	49	43
C_10	75	62	62	43	45	31	41
C_11	75	77	76	61	62	41	49
C_12	80	73	73	54	55	36	44
C_13	75	76	75	74	75	40	51
C_14	75	71	70	72	75	34	50
C_15	75	70	70	69	71	33	42
C_16	75	73	72	62	63	0	54
C_17	75	55	54	38	43	0	45
C_18	75	65	64	54	55	0	59
C_19	70	72	71	53	54	0	76
C_20	75	69	68	70	71	0	67
C_21	75	65	65	57	61	0	74
C_22	75	61	60	47	48	0	66
C_23	75	77	76	65	66	0	59
C_24	75	72	71	73	75	0	54
C_25	75	65	65	64	65	0	49
C_26	75	62	62	59	61	0	50
C_27	80	78	78	78	84	0	44
C_28	70	73	72	73	74	0	43
C_29	75	76	76	75	76	0	43
C_30	75	58	58	60	60	0	40
C_31	70	62	61	62	63	0	37
C_32	70	54	54	58	59	0	26

Notes:
1. Daytime sound level limit only since construction activities do not occur during night or weekends and holidays.
2. Prediction represents worst case (i.e., nearest) 1 km segment of construction for linear activities.
3. This activity is localized to specific Receptor locations only. A 0 dBA sound level prediction means that no impact was predicted.

Table 5: Construction Noise Prediction Results – 15 Minute Equivalent Sound Level

Receptor ID	Sound Level Limit ($L_{eq,15min}$)(1)(2)	Predicted Construction Sound Level $L_{eq,15min}$ (dBA)					
		Existing Asphalt Removal(3)	Paving New Asphalt(3)	Station Construction Installation(4)	Soil Excavation and Stockpiling(4)	Culvert Construction(4)	Bridge Construction(4)
C_01	NA	76	76	49	51	39	68
C_02	NA	83	82	79	84	52	49
C_03	75	77	77	71	72	57	49
C_04	85	68	68	56	57	53	45
C_05	85	70	70	54	56	53	45
C_06	75	77	76	61	62	63	44
C_07	85	64	64	54	56	49	43
C_08	85	62	62	54	56	49	42
C_09	85	79	78	66	68	53	47
C_10	85	66	66	47	50	34	45
C_11	85	81	80	66	67	46	53
C_12	NA	77	77	59	60	40	48
C_13	85	80	80	79	79	44	56
C_14	85	75	74	77	80	38	55
C_15	85	75	74	74	76	37	46
C_16	85	77	77	67	68	0	58
C_17	85	59	59	42	48	0	49
C_18	85	69	69	59	60	0	63
C_19	75	76	76	57	58	0	80
C_20	85	73	73	74	76	0	71
C_21	85	70	69	62	66	0	78
C_22	85	65	65	52	53	0	70
C_23	85	81	81	70	71	0	63
C_24	85	76	76	77	80	0	59
C_25	85	70	69	68	70	0	53
C_26	85	66	66	64	66	0	54
C_27	NA	82	82	82	89	0	48
C_28	75	77	76	77	79	0	47
C_29	85	80	80	80	81	0	47
C_30	85	62	62	64	65	0	44
C_31	75	66	65	66	68	0	41
C_32	75	58	58	63	64	0	29

Notes:
1. Daytime sound level limit only since construction activities do not occur during night or weekends and holidays.
2. NA – No defined sound level limit
3. Prediction represents worst case (i.e., nearest) 1 km segment of construction for linear activities.
4. This activity is localized to specific Receptor locations only. A 0 dBA sound level prediction means that no impact was predicted.

Table 6: Construction Noise Prediction Results – Maximum Sound Level

Receptor ID	Sound Level Limit (L_{max})(1)(2)	Predicted Construction Sound Level L_{max} (dBA)					
		Existing Asphalt Removal(3)	Paving New Asphalt(3)	Station Construction Installation(4)	Soil Excavation and Stockpiling(4)	Culvert Construction(4)	Bridge Construction(4)
C_01	NA	79	79	45	54	42	71
C_02	NA	85	85	74	87	55	52
C_03	90	80	79	66	75	60	52
C_04	90	71	70	51	60	56	48
C_05	90	73	72	50	58	55	47
C_06	90	79	79	56	65	66	46
C_07	90	67	66	50	59	52	46
C_08	90	65	65	50	58	51	45
C_09	90	82	81	62	71	56	49
C_10	90	69	69	43	53	36	47
C_11	90	83	83	61	70	48	56
C_12	NA	80	80	54	63	42	51
C_13	90	83	82	74	82	47	58
C_14	90	78	77	72	83	40	57
C_15	90	77	77	69	78	40	48
C_16	90	80	79	62	71	0	60
C_17	90	62	61	44	50	0	52
C_18	90	72	71	54	63	0	66
C_19	90	79	78	53	61	0	83
C_20	90	76	76	70	79	0	74
C_21	90	72	72	60	68	0	80
C_22	90	68	68	54	56	0	72
C_23	90	84	83	72	74	0	66
C_24	90	79	78	80	83	0	61
C_25	90	72	72	71	73	0	56
C_26	90	69	69	59	68	0	57
C_27	NA	85	85	54	91	0	51
C_28	90	79	79	50	81	0	50
C_29	90	83	83	63	83	0	50
C_30	90	65	65	67	68	0	47
C_31	90	69	68	69	63	0	44
C_32	90	61	61	65	44	0	31

Notes:
1. Daytime sound level limit only since construction activities do not occur during night or weekends and holidays.
2. NA – No defined sound level limit
3. Prediction represents worst case (i.e., nearest) 1 km segment of construction for linear activities.
4. This activity is localized to specific Receptor locations only. A 0 dBA sound level prediction means that no impact was predicted.

4.2 Vibration During Construction

A Zone of Influence was determined for each construction activity and limit type related to public annoyance and building damage. Occurrences where Receptors were identified to be within the Zones of Influence for various limit types or activities are provided in **Table 7**. A mapping of the Zone of Influence for each activity is provided in **Figure 21** to **Figure 26** and summarized in **Table 8**.

Table 7: Zones of Influence With Receptors by Activity and Limit Type

Limit Type	Receptor Within Construction Activity Zone of Influence? (Yes/No)					
	Existing Asphalt Removal	Paving New Asphalt	Station Construction Installation	Soil and Excavation Stockpiling	Culvert Construction	Bridge Construction
Public Annoyance	Yes	Yes	Yes	Yes	No	Yes
Building Damage	Yes	Yes	No	Yes	No	Yes
Building Damage Fragile or Heritage	Yes	Yes	No	Yes	No	No

Table 8: Construction Vibration - Zone of Influence by Activity

Limit Type	Construction Activity Zone of Influence (m)[1]					
	Existing Asphalt Removal	Paving New Asphalt	Station Construction Installation	Soil and Excavation Stockpiling	Culvert Construction	Bridge Construction
Public Annoyance (0.14 mm/s RMSV) [2]	19	34	17	19	19	128
Building Damage – Normal (8 mm/s PPV) [3]	3	6	3	3	3	22
Building Damage – Fragile or Heritage (3 mm/s PPV) [3]	6	11	6	6	6	41

Notes:
1. Zone of Influence area measured as the distance from an activity boundary
2. RMSV - Root Mean Square Velocity
3. PPV - Peak Particle Velocity

4.3 Noise During Operation

The sound levels at Receptor locations were predicted for the “without project” and “with project” scenarios for the year 2041 and are summarized in **Table 9**.

Table 9: Operation Noise Prediction Results

Receptor ID	Assessment Year: 2041			Exceeds Noise Limit? (Yes/No)	
	"Without Project" Predicted $L_{eq,16hr}$ (dBA)	"With Project" Predicted $L_{eq,16hr}$ (dBA)	Predicted Noise Impact(1) (dBA)	+5 dB Above Ambient	60 dBA Maximum
O_01	71	71	0	No	Yes
O_02	62	62	0	No	Yes
O_03	63	63	0	No	Yes
O_04	65	66	1	No	Yes
O_05	70	71	1	No	Yes
O_06	62	62	0	No	Yes
O_07	69	69	0	No	Yes
O_08	66	67	1	No	Yes
O_09	69	70	1	No	Yes
O_10	61	62	1	No	Yes
O_11	62	62	0	No	Yes
O_12	64	64	0	No	Yes
O_13	70	71	1	No	Yes
O_14	66	66	0	No	Yes
O_15	58	58	0	No	No
O_16	56	56	0	No	No
O_17	67	68	1	No	Yes

Notes: 1. Arithmetic difference between "With Project" and "Without Project" scenarios.

Based on the results provided in **Table 9**, the traffic noise impacts due to the Project were predicted to be from 0 to 1 dB when comparing the future "Without Project" and "With Project" scenarios. However, the sound levels were predicted to exceed the 60 dBA limit described in **Section 2.4**.

4.4 Mitigation Measures and Monitoring Activities

The acoustic modelling results indicated that Receptors are located within the Zone of Influence for noise and vibration during Project construction and operation activities. A detailed analysis of construction and operation noise at Receptor locations confirmed that several exceedances were anticipated. Therefore, some Receptor or activity specific mitigation measures were incorporated in the acoustic model to reduce the Project impact and determine the feasibility of compliance with the defined limits for noise. The mitigation measures were selected with the objective of having the least possible impact on the Project (e.g., construction schedule) while also considering the technical, operational, administrative, and economic feasibility for each.

Additional general mitigations and recommended monitoring activities are also provided that would further reduce the potential Project noise and vibration impacts.

4.4.1 Project Construction Modelled Mitigations

Detailed Project construction model prediction results indicated that the daytime ($L_{eq,16hr}$) and 15-minute ($L_{eq,15min}$) equivalent noise limits would be exceeded for several activities and Receptor locations. Specific mitigation measures incorporated in the acoustic model to reduce the noise impact included:

1. The replacement of tonal backup alarms for equipment to broadband type for all construction activities with the exception of culvert construction; and
2. Addition of 3 m high and 45 m long hoarding or barrier on the north side of Dundas for bridge construction located near Cawthra Road and Dundas Street (See **Figure 27**).

Mitigated modelling results for construction noise is provided in **Table 10** and **Notes:**

1. Daytime sound level limit only since construction activities do not occur during night or weekends and holidays.
2. Prediction represents worst case (i.e., nearest) 1 km segment of construction for linear activities.
3. This activity is localized to specific Receptor locations only. A 0 dBA sound level prediction means that no impact was predicted

Table 11 for $L_{eq,16hr}$ and $L_{eq,15min}$, respectively. Results are not reported for L_{max} since no exceedances were predicted for the unmitigated scenario. Following the implementation of mitigation measures, prediction results indicated that there were no longer exceedances of the sound level limits.

Table 10: Mitigated Construction Noise Prediction Results – Daytime Equivalent Sound Level ($L_{eq,16hr}$)

Receptor ID	Sound Level Limit ($L_{eq,16hr}$)(1)	Predicted Mitigated Construction Sound Level $L_{eq,16hr}$ (dBA)					
		Existing Asphalt Removal(2)	Paving New Asphalt(2)	Station Construction Installation(3)	Soil Excavation and Stockpiling(3)	Culvert Construction(3)	Bridge Construction(3)
C_01	80	68	67	40	38	35	61
C_02	80	74	73	69	72	48	42
C_03	70	68	68	61	60	53	43
C_04	75	59	59	46	45	49	38
C_05	75	61	60	45	43	49	38
C_06	70	68	67	51	49	59	39
C_07	75	56	55	44	43	46	36
C_08	75	54	53	44	43	45	36
C_09	75	70	69	56	55	49	40
C_10	75	58	57	43	38	31	38
C_11	75	72	71	61	54	41	46
C_12	80	69	68	54	48	36	41
C_13	75	72	71	74	67	40	48
C_14	75	66	65	72	67	34	46

Receptor ID	Sound Level Limit ($L_{eq,16hr}$)(1)	Predicted Mitigated Construction Sound Level $L_{eq,16hr}$ (dBA)					
		Existing Asphalt Removal(2)	Paving New Asphalt(2)	Station Construction Installation(3)	Soil Excavation and Stockpiling(3)	Culvert Construction(3)	Bridge Construction(3)
C_15	75	66	65	69	63	33	40
C_16	75	69	68	62	55	0	50
C_17	75	52	50	38	36	0	44
C_18	75	60	59	54	47	0	55
C_19	70	68	67	53	48	0	63
C_20	75	64	64	70	64	0	64
C_21	75	61	60	57	53	0	74
C_22	75	56	56	42	41	0	63
C_23	75	73	73	60	59	0	56
C_24	75	67	67	68	68	0	52
C_25	75	61	61	58	57	0	47
C_26	75	58	58	54	53	0	47
C_27	80	74	74	73	76	0	41
C_28	70	68	68	69	66	0	40
C_29	75	72	72	70	68	0	40
C_30	75	54	54	55	53	0	38
C_31	70	57	57	56	55	0	35
C_32	70	49	49	53	52	0	25

Notes:
1. Daytime sound level limit only since construction activities do not occur during night or weekends and holidays.
2. Prediction represents worst case (i.e., nearest) 1 km segment of construction for linear activities.
3. This activity is localized to specific Receptor locations only. A 0 dBA sound level prediction means that no impact was predicted

Table 11: Mitigated Construction Noise Prediction Results – 15 Minute Equivalent Sound Level

Receptor ID	Sound Level Limit ($L_{eq,15min}$)(1)(2)	Predicted Construction Sound Level $L_{eq,15min}$ (dBA)					
		Existing Asphalt Removal(3)	Paving New Asphalt(3)	Station Construction Installation(4)	Soil Excavation and Stockpiling(4)	Culvert Construction(4)	Bridge Construction(4)
C_01	NA	70	69	42	42	39	68
C_02	NA	76	75	71	75	52	49
C_03	75	70	70	63	63	57	49
C_04	85	61	61	49	49	53	45
C_05	85	63	62	47	47	53	45
C_06	75	70	69	53	53	63	44
C_07	85	57	57	47	47	49	43
C_08	85	56	55	47	46	49	62
C_09	85	72	71	58	58	53	43
C_10	85	60	59	40	41	34	42
C_11	85	74	73	58	58	46	39
C_12	NA	71	70	52	51	40	39
C_13	85	73	73	71	71	44	38
C_14	85	68	67	69	71	38	37
C_15	85	68	67	66	66	37	37
C_16	85	71	70	59	59	0	41
C_17	85	53	52	37	39	0	39

Receptor ID	Sound Level Limit ($L_{eq,15min}$)(1)(2)	Predicted Construction Sound Level $L_{eq,15min}$ (dBA)					
		Existing Asphalt Removal(3)	Paving New Asphalt(3)	Station Construction Installation(4)	Soil Excavation and Stockpiling(4)	Culvert Construction(4)	Bridge Construction(4)
C_18	85	62	61	51	51	0	47
C_19	75	69	69	51	51	0	42
C_20	85	66	66	67	67	0	49
C_21	85	63	62	54	56	0	48
C_22	85	58	58	44	44	0	41
C_23	85	74	74	62	62	0	52
C_24	85	69	69	70	71	0	44
C_25	85	63	62	60	61	0	58
C_26	85	60	59	56	57	0	66
C_27	NA	76	75	75	80	0	65
C_28	75	70	69	71	69	0	71
C_29	85	74	73	72	72	0	63
C_30	85	56	55	57	56	0	56
C_31	75	59	58	59	59	0	52
C_32	75	51	51	55	56	0	47

Notes:
1. Daytime sound level limit only since construction activities do not occur during night or weekends and holidays.
2. NA – No defined sound level limit.
3. Prediction represents worst case (i.e., nearest) 1 km segment of construction for linear activities.
4. This activity is localized to specific Receptor locations only. A 0 dBA sound level prediction means that no impact was predicted

4.4.2 Project Operation Modelled Mitigations

Model prediction results indicated that although the noise impact as a result of the Project would not exceed the allowable change (+5 dB), the maximum 60 dBA sound level stipulated by the City of Mississauga Policy No. 09-03-03 would be exceeded.

Existing noise barriers are located along Dundas Street. These existing noise barriers have been included in the model predictions. In situations where exceedances of the sound level limit remain despite the existing noise barriers, modifications (e.g., height increase) may be proposed as mitigation. Existing noise barrier locations are provided in **Figure 28**. Mitigation measures (i.e., noise barriers) were incorporated in the acoustic model with the consideration of technical, operational, administrative, and economic feasibility. Noise barriers may be constructed of a combination of earth berms and physical walls (e.g., concrete, vinyl). The City of Mississauga policy is to limit physical walls to a height of 3 m. Barrier heights greater than 3 m would therefore be required to be a combination of physical walls and earth berms. Further study by the proponents to confirm the feasibility of the modelled mitigation measures (e.g., maximum height, aesthetics, etc.) included in this assessment is necessary prior to finalization. This feasibility assessment will be completed during detailed design. The unmitigated and

mitigated results as well as mitigation analysis notes is summarized in **Table 12**. The locations and extents of the included barriers is also provided in **Figure 28**.

Table 12: Modelled Mitigation Measures – Operation Noise

Receptor ID	Unmitigated Sound Level $L_{eq,16hr}$ (dBA)	Mitigated Sound Level $L_{eq,16hr}$ (dBA)	Sound Level Limit $L_{eq,16hr}$ (dBA)	Modelled Mitigation Measure(s) Notes
O_01	71	No Change	60	Note 1.
O_02	62	No Change	60	Note 2.
O_03	63	No Change	60	Note 2.
O_04	66	No Change	60	Note 2.
O_05	72	64	60	5 m high barrier. Note 3.
O_06	62	No Change	60	Note 2
O_07	69	No Change	60	Note 4.
O_08	67	No Change	60	Note 2.
O_09	70	No Change	60	Note 1.
O_10	62	No Change	60	Note 2.
O_11	62	No Change	60	Note 2.
O_12	64	58	60	1.8 m high barrier along overpass. Note 3.
O_13	71	No Change	60	Note 1, 4.
O_14	66	No Change	60	Note 2.
O_15	58	No Change	60	No Mitigation Required.
O_16	56	No Change	60	No Mitigation Required.
O_17	68	No Change	60	Note 5.

Mitigation Notes:

1. Not technically or operationally feasible to install a barrier that would reduce the sound level by at least 5 dB due to insufficient space caused by large gaps for driveways or entryways.
2. This Receptor location is not adjacent to Dundas street and so does not meet the installation criteria of Policy 09-03-03.
3. The feasibility of noise barriers is currently being determined by the proponents. As such, this mitigation measure is subject to change based on that determination.
4. Not technically feasible to reduce the sound level by at least 5 dB due to physical noise wall height limitation of 3 m and insufficient space for earth berm to be constructed.
5. As per the City of Mississauga, this receptor is located in a mixed-use commercial location where the type of business occupying may change over time, and correspondingly mitigation is not applicable.

The barriers and modelling analysis results should be reviewed and reassessed during detailed design to confirm the necessity and extents for each. Following the inclusion of mitigation measures, O_05 and O_07 continued to exceed the absolute sound level limit by 4 dB and 2 dB, respectively.

4.4.3 General Mitigation Measures and Monitoring Activities

Preliminary recommendations for general mitigation measures to reduce the potential impact of Project construction and operation noise or vibration impacts are provided in **Table 13**.

Table 13: Summary of Potential Noise and Vibration Effects and Recommendations

Environmental Component	Potential Effect	Mitigation Measure(s)	Monitoring
Construction Noise	■ Environmental noise may cause annoyance and affect human health. The magnitude of the noise effects resulting from construction varies depending on: – Scale, location, and complexity – Construction methods, processes, and equipment – Duration of activities near sensitive receptors – Number and proximity of sensitive areas to construction area	■ The following general mitigation measures may be considered to decrease the potential noise impact: – Replace standard vehicle backup alarms with broadband alarms – Inform local residents as practicable of construction activities identifying type of construction and duration – Use acoustic enclosures and mufflers for site power generators – Use activity or equipment specific noise barriers – Minimize simultaneous operation of equipment where possible – Implement no idling policy where practicable	■ Develop a Construction Noise Management Plan and incorporate the following requirements: – The Constructor will monitor noise where the management plan indicates that noise exposure limits may be exceeded. The Constructor will submit reports to the Contracting Authority describing the monitoring conducted and summarize the data collected for the reporting period. – The Constructor will make provision for monitoring for investigation of persistent complaints. ■ The specifics of monitoring duration and location will depend on the activity location, type of activity, receptor location, etc. as per the Metrolinx Guide.
Construction Vibration	■ Exposure to vibration may result in public annoyance and complaints. ■ Vibration may cause damage to buildings and other structures.	■ The following general mitigation measures may be considered to decrease the potential vibration impact, particularly where Receptors are located within the Zone of Influence: – Reduction in vehicle speed – Changes to operational sequencing – Changes to equipment layout or access routes – Utilize equipment with low vibration emissions where possible – Operate construction equipment on lower vibration settings where available – Maximize distance between equipment and Receptors where feasible – Review vibration assessment based upon refined site staging, construction areas, and equipment prior to the commencement of construction, and update if necessary	■ Develop a Construction Vibration Management Plan and incorporate the following requirements: – Pre-construction building inspections of the potentially impacted buildings adjacent to construction are to be undertaken. – The Constructor will monitor vibration where the management plan indicates that vibration limits may be exceeded. The Constructor will submit reports to the Contracting Authority describing the monitoring conducted and summarize the data collected for the reporting period. – The Constructor will make provision for monitoring for investigation of persistent complaints. ■ The specifics of monitoring duration and location will depend on the activity location, type of activity, receptor location, etc. as per the Metrolinx Guide.
Operational Noise	■ Environmental noise may cause annoyance or hinderance in the enjoyment of an outdoor living area as well as affect human health.	■ In accordance with the Metrolinx Guide, noise attenuation barriers up to 5 m in height may be considered. Based on the Mississauga Policy No. 09-03-03, barriers should span a complete block to ensure their effectiveness.	■ Complete regular or routine maintenance on fleet vehicles to reduce the potential for undesired sound characteristics (e.g., tonal or cyclical) that may cause an overall increase in noise missions. ■ Maintain BRT laneways with smooth surface to avoid additional noise that may be caused by rough or uneven (e.g., potholes) surfaces as vehicles drive along the corridor.

4.5 Final 10% Design

The final 10% design has been developed since the completion of the assessment which was based on the draft 10% design. The final 10% design incorporated changes that may impact the noise or vibration prediction results at the identified receptors. Broadly, these changes included roadway realignments and changes to structural requirements at some infrastructure locations.

Roadway realignments may increase or decrease the predicted sound levels for both construction and operation. Nevertheless, based on the magnitude of the change of the alignment in the final 10% design, the overall findings in this study would not be affected.

Changes to structural requirements may result in different construction equipment usage, staging and phasing than what was assumed for the purposes of this assessment. Regardless, since detailed construction information has not yet been developed, a prediction of the resultant change compared with the draft 10% design cannot be determined. Correspondingly, while the prediction results at some assessed locations may change, the overall findings of the assessment do not.

5. Future Studies

The assessment of potential noise and vibration impacts was completed based on the draft 10% design of the planned Bus Rapid Transit corridor. As changes to the inputs used in this assessment may occur during detailed design, it is recommended the design be assessed for any corresponding changes to the inputs that were used for the analyses. If any changes to the inputs used in the analyses are required, a revision to the assessment would be required in order to confirm the findings of this study. The purpose of the updated analysis would be to reflect the updated inputs so that the impacts, mitigation measures, and monitoring requirements are accurate to the most recent design details. Changes that may trigger an assessment update include changes to variables such as roadway alignment, overall traffic volumes, day/night splits, grading, etc. Finally, it is also recommended that prior to construction, the pre-construction vibration study be assessed for any changes to the inputs. Should there be any changes to inputs during detailed design, the pre-construction vibration study shall be updated. Additionally, pre-construction building inspections shall be completed for fragile or heritage buildings identified along the corridor.

6. Permits and Approvals

At this time, provincial noise or vibration permits or approvals are not anticipated to be required. This will be confirmed during the next Project phases.

Metrolinx as a Crown agency of the Province of Ontario is exempt from certain municipal processes and requirements. In these circumstances, Metrolinx will engage with the municipalities to incorporate municipal requirements as a best practice, where practical, and may obtain associated permits and approvals.

7. References

City of Mississauga, April 13, 2011:
Corporate Policy & Procedure: Noise Attenuation Barriers on Major Roadways (Policy #: 09-03-03).

City of Toronto, May 2008:
By-Law No. 514-2008.

Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT), 2011:
Highway Traffic Noise: Analysis and Abatement Guidance.

Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT), August 2006:
Construction Noise Handbook.

Federal Transit Administration, U.S. Department of Transportation, September 2018:
Transit Noise and Vibration Impact Assessment Manual.

ISO (International Organization for Standardization), 1993:
Standard 9613-1, Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of absorption of sound by the atmosphere.

ISO (International Organization for Standardization), 1996:
Standard 9613-2, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

ISO (International Organization for Standardization), 2003:
Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures.

Metrolinx, October 2020:
Environmental Guide for Noise and Vibration Impact Assessment - Environmental Programs and Assessments.

Ontario Ministry of the Environment, 1990:
STEAM – Sound from Trains Environmental Analysis Method.

Ontario Ministry of the Environment, 1996:
STAMSON v5.03: Road, Rail and Rapid Transit Noise Prediction Model.

Ontario Ministry of the Environment, August 1978:
Model Municipal Noise Control By-Law", including Publication NPC-115 – Construction Equipment.

Ontario Ministry of the Environment, August 2013:
Publication NPC-300, Environmental Noise Guideline - Stationary and Transportation Sources – Approval and Planning.

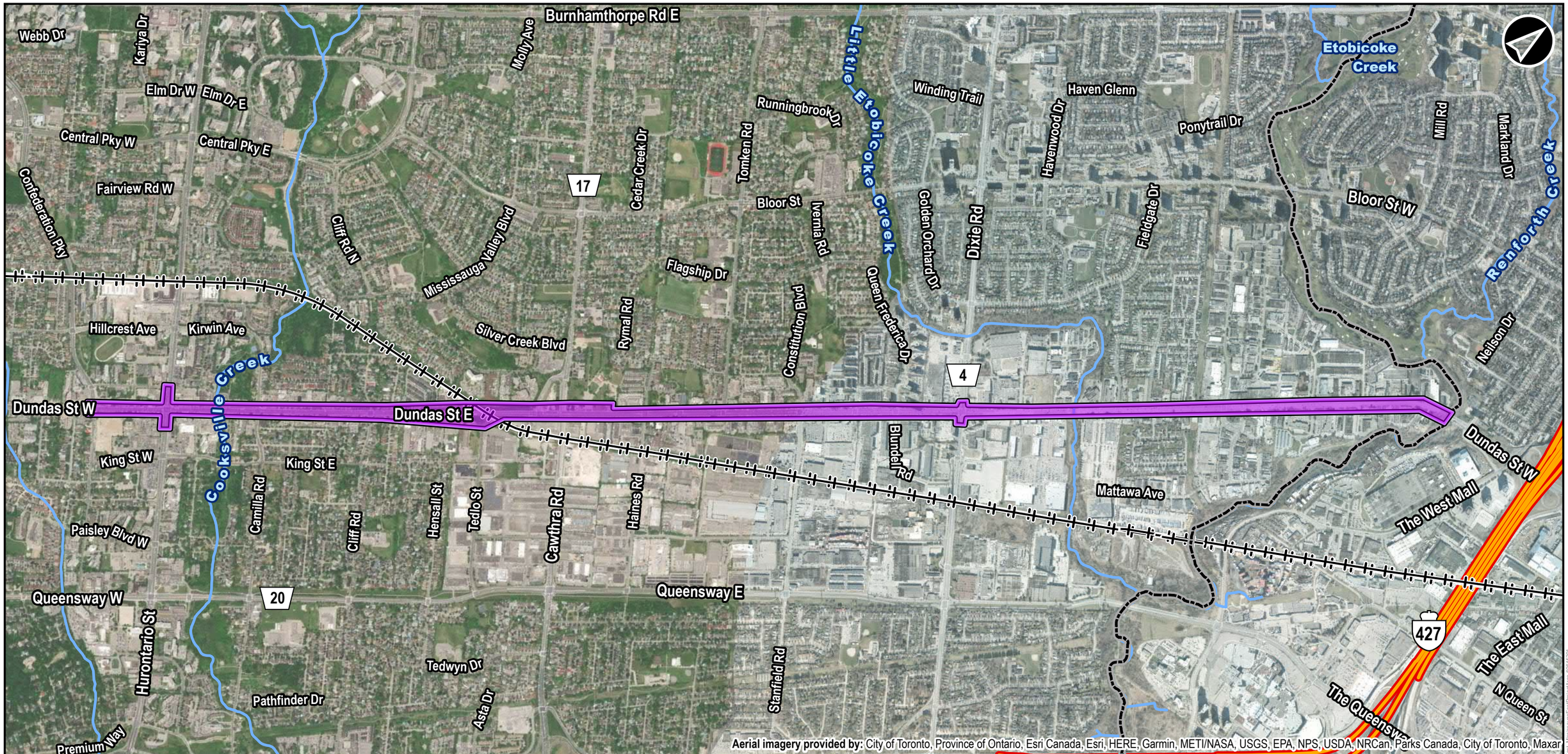
Ontario Ministry of the Environment, October 1989:
ORNAMENT - Ontario Road Noise Analysis Method for Environment and Transportation.

Ontario Ministry of Transportation, October 2006 updated July 2008:
Version 1.1, Environmental Guide for Noise.

AECOM

Appendix A

Figures



Legend

Mississauga East Project Area

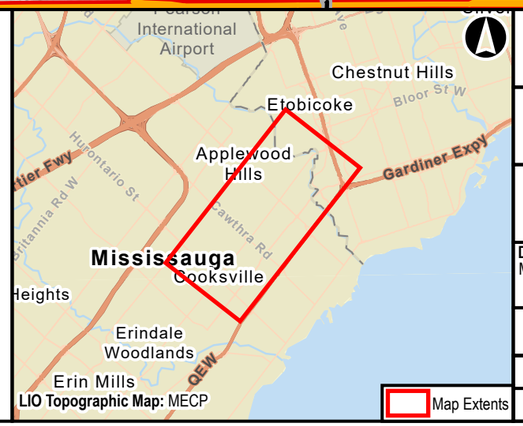
Base Layers

Municipal Boundary

Railway

Primary Highway

Watercourse



Dundas Bus Rapid Transit

Mississauga East Project Area

0 200 400 800 1,200 Meters

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH

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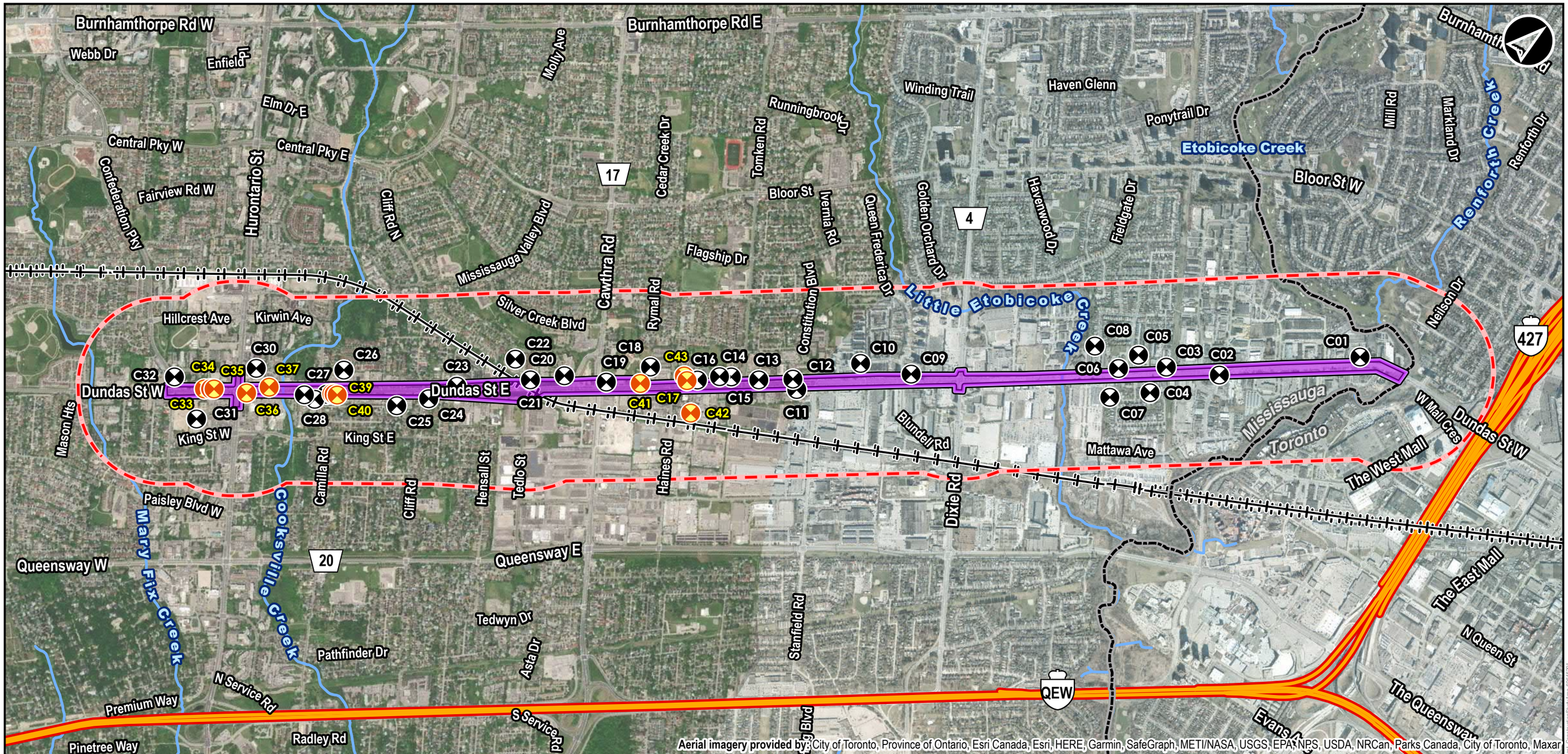
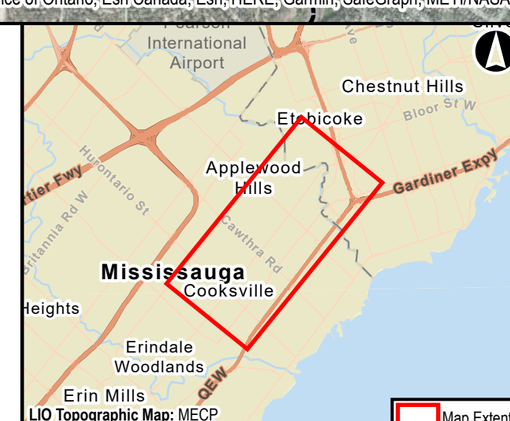


Legend

- Construction Receptors
- Heritage Property Receptor
- Construction Noise and Vibration Study Area
- Mississauga East Project Area

Base Layers

- Municipal Boundary
- Railway
- Primary Highway
- Watercourse



Dundas Bus Rapid Transit

Mississauga East Noise and Vibration Construction Study Area

0 200 400 800 1,200 Meters

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH

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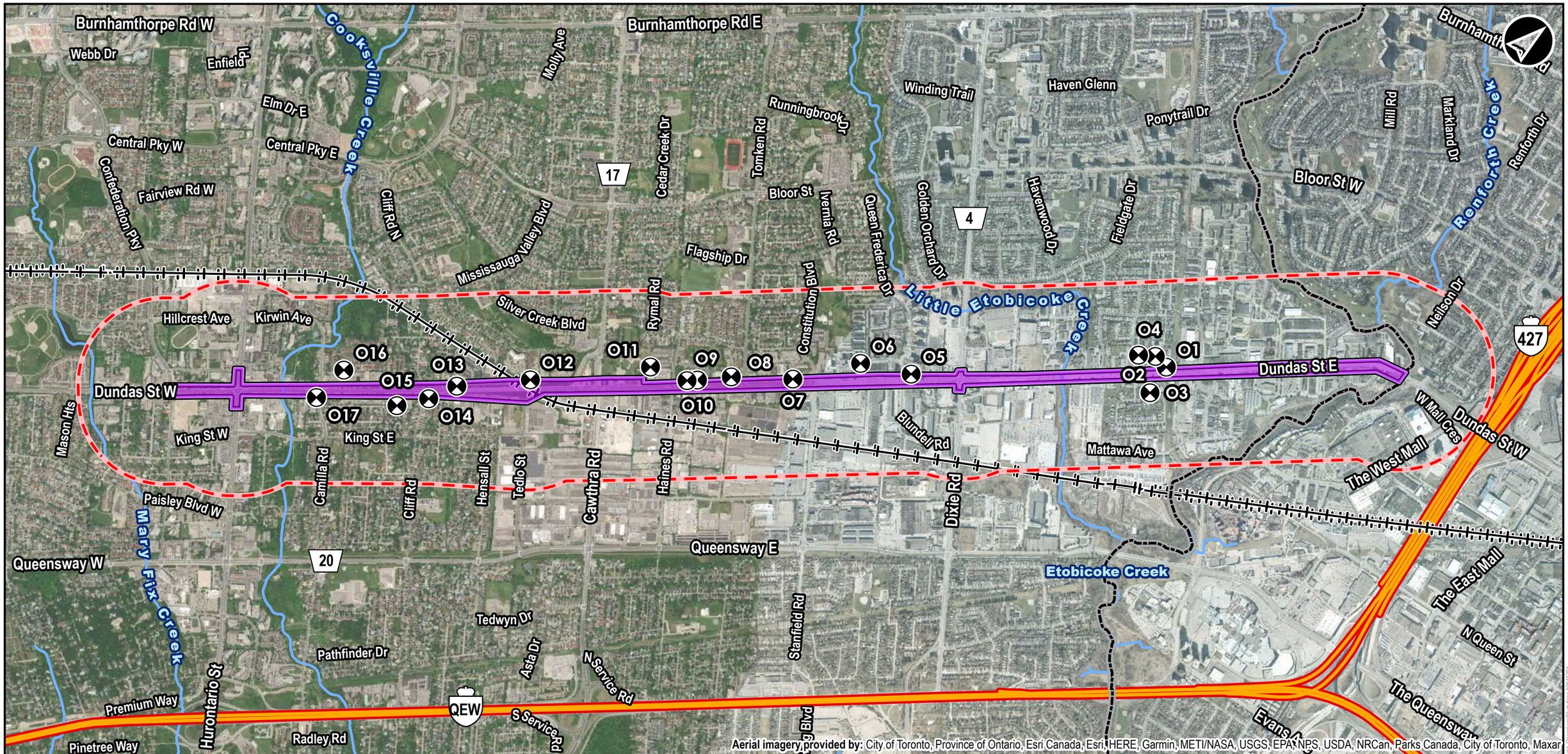

Legend

- Operations Receptor
- Noise and Vibration Study Area
- Mississauga East Project Area

Base Layers

- Municipal Boundary
- Railway
- Primary Highway
- Watercourse

Dundas Bus Rapid Transit

Mississauga East Noise and Vibration Study Area

0 200 400 800 1,200 Meters

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH

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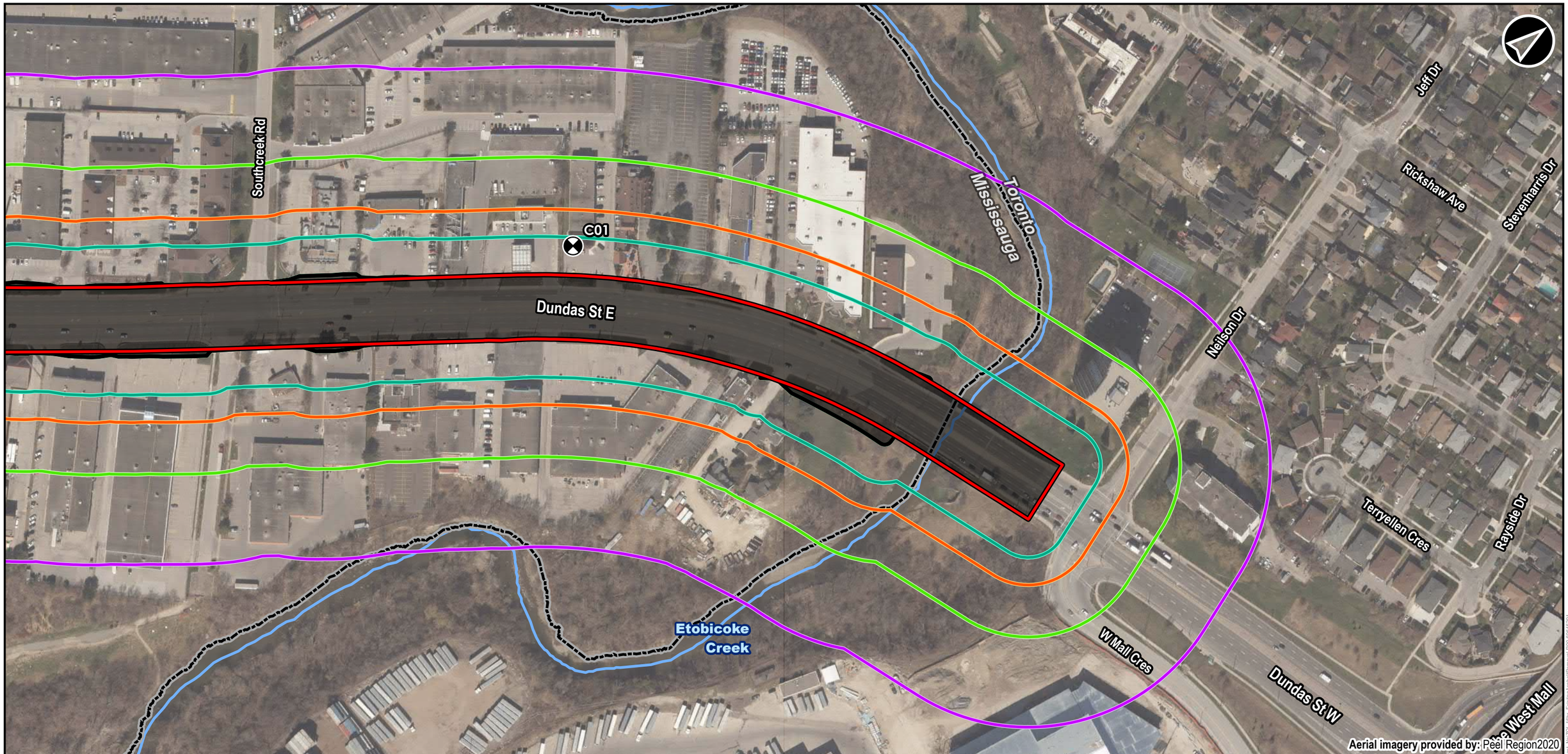


Legend

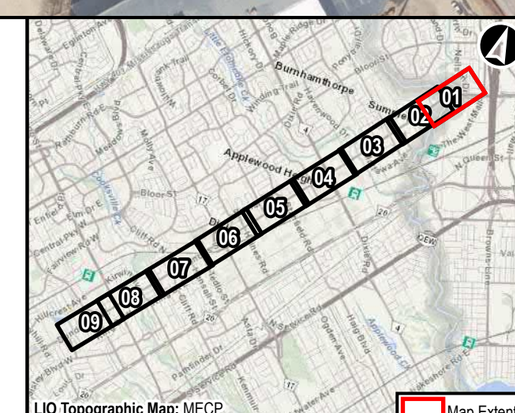
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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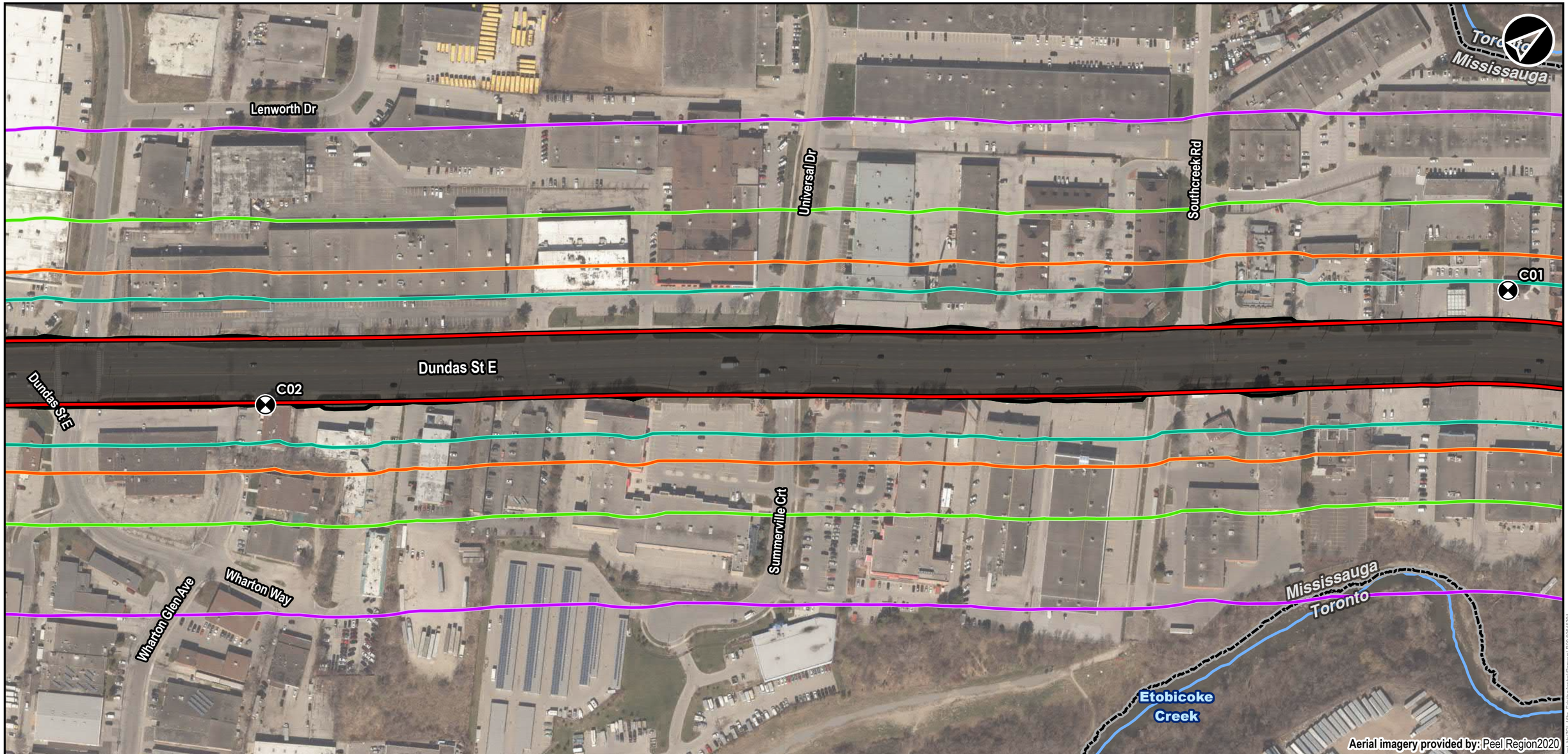


Legend

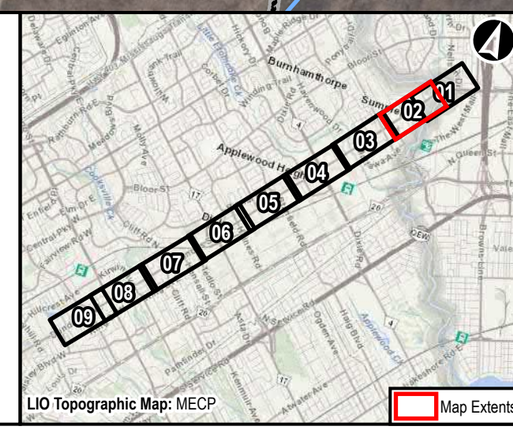
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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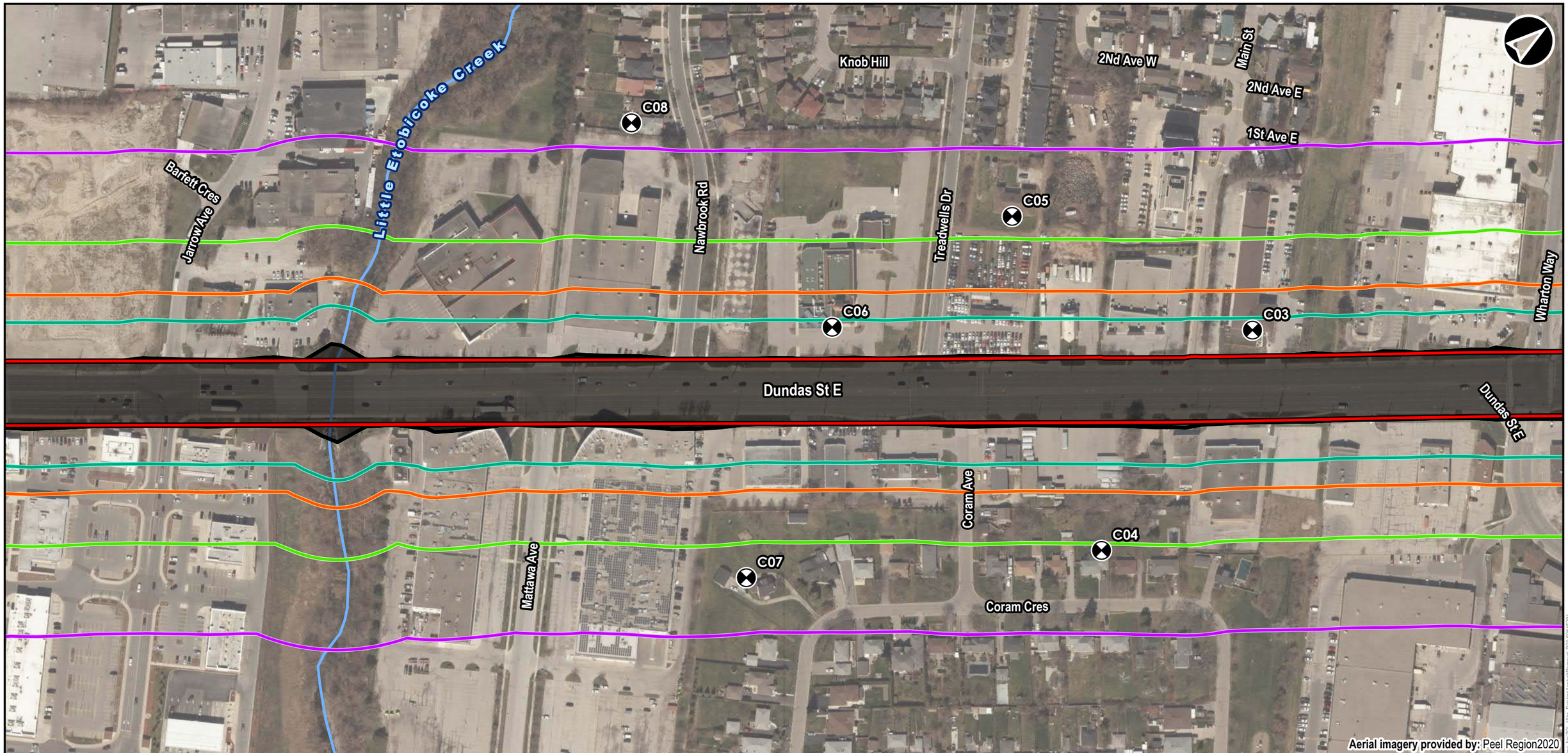


Legend

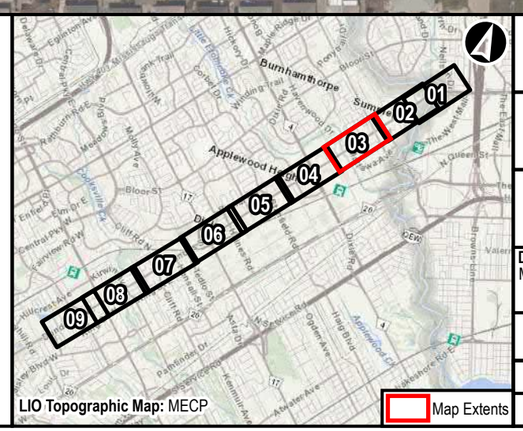
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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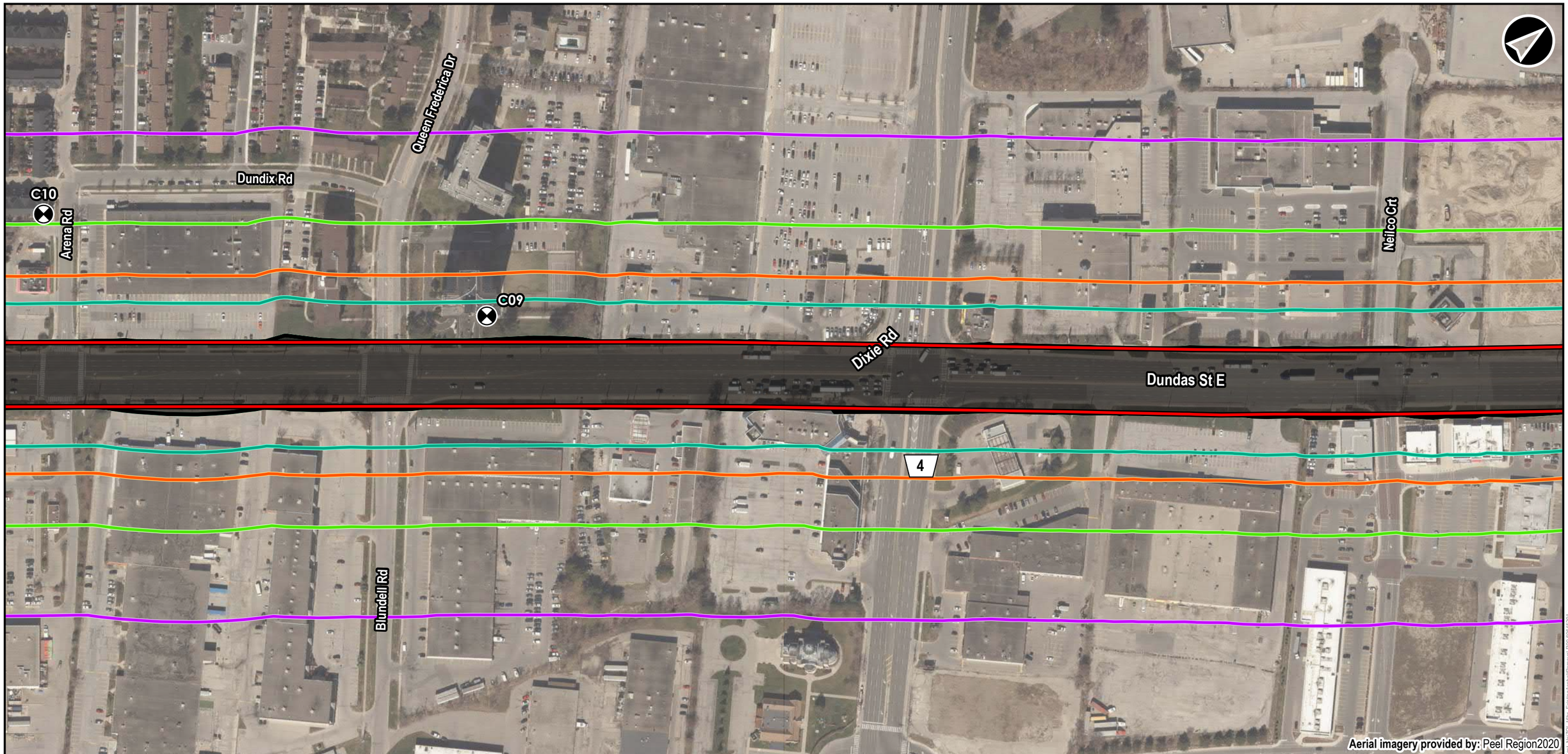

Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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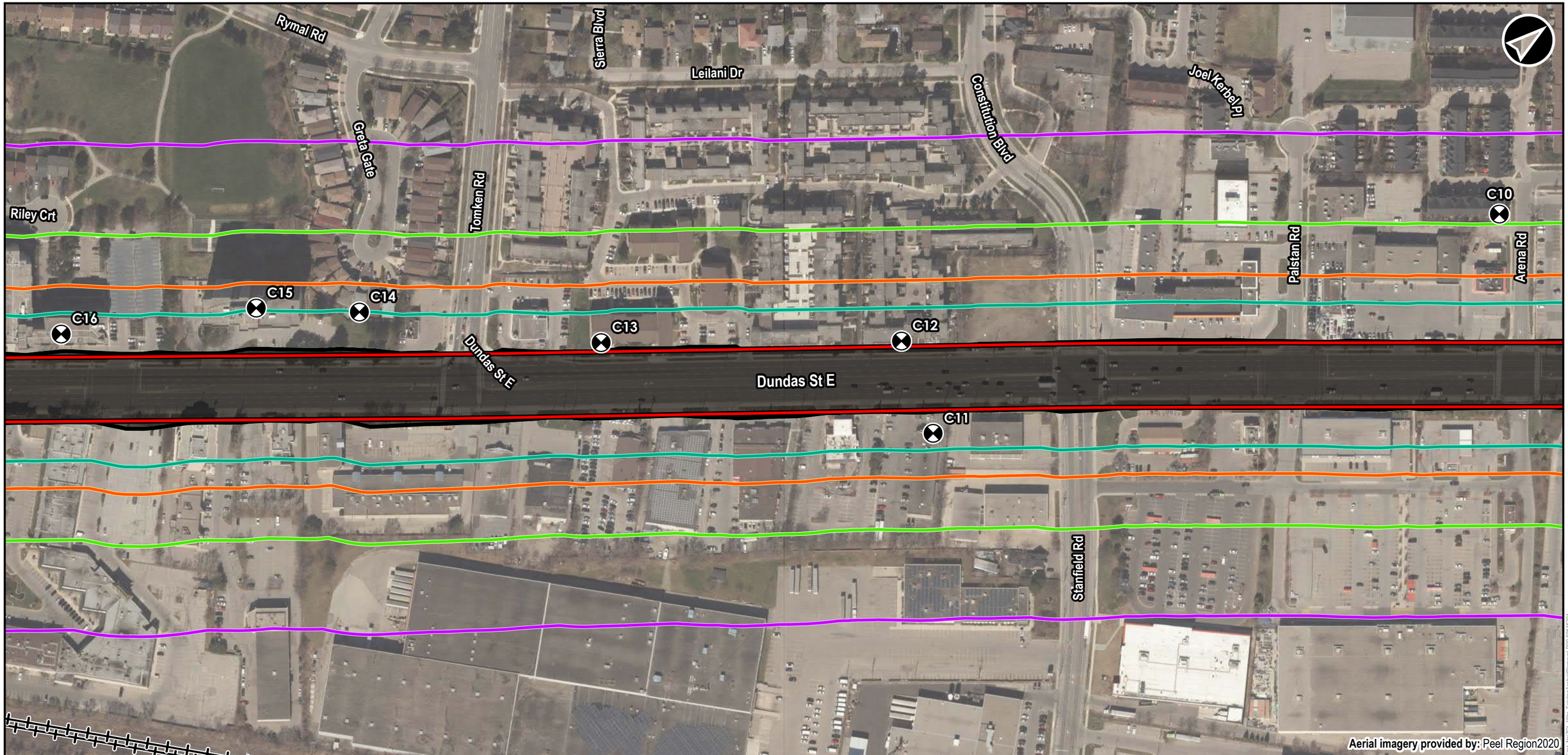

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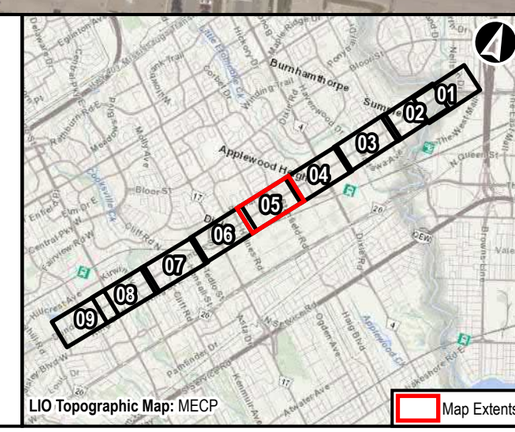
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

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NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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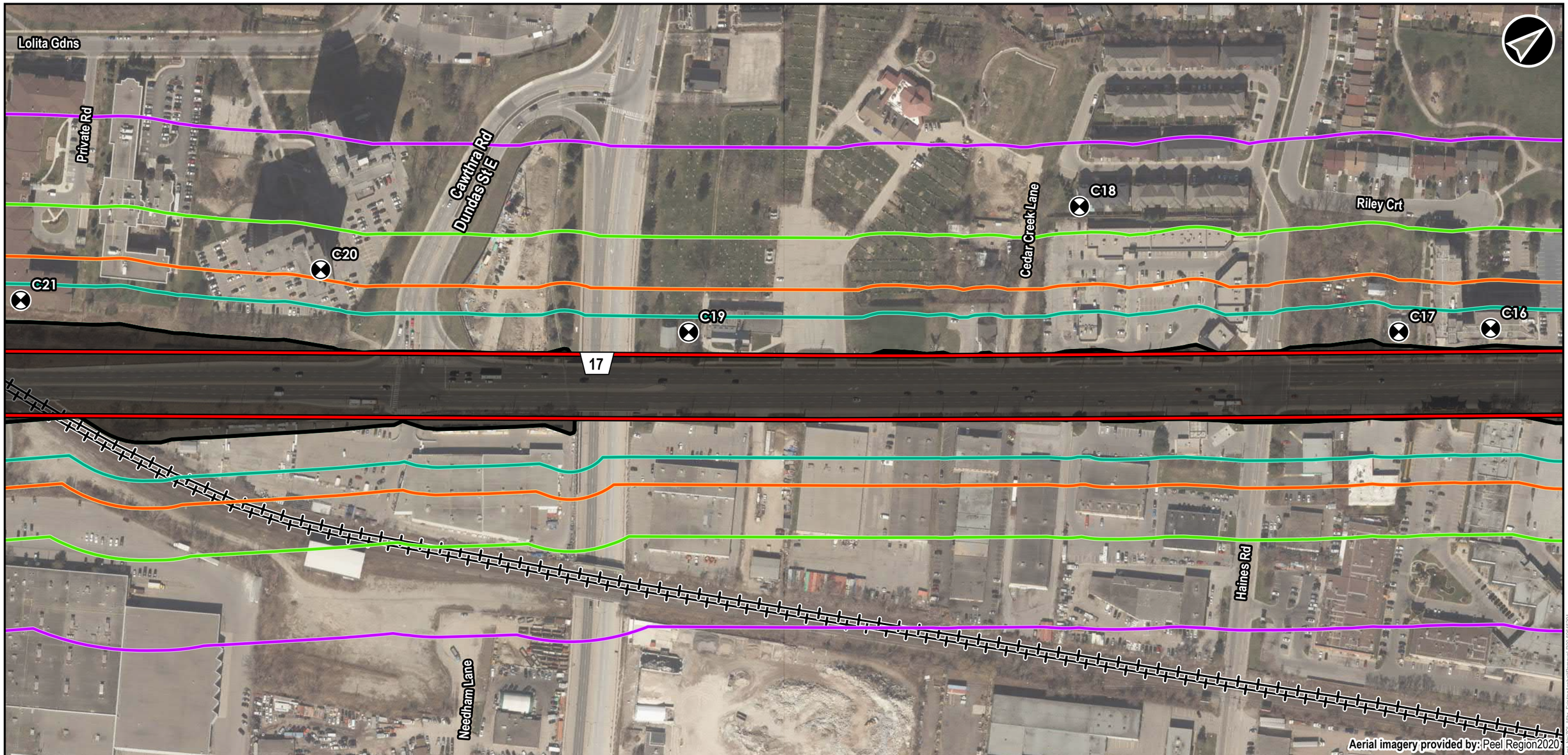


Legend

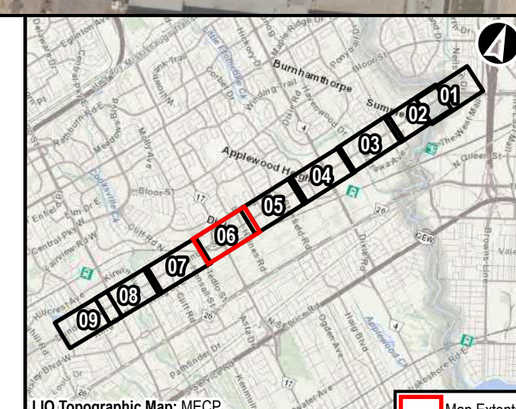
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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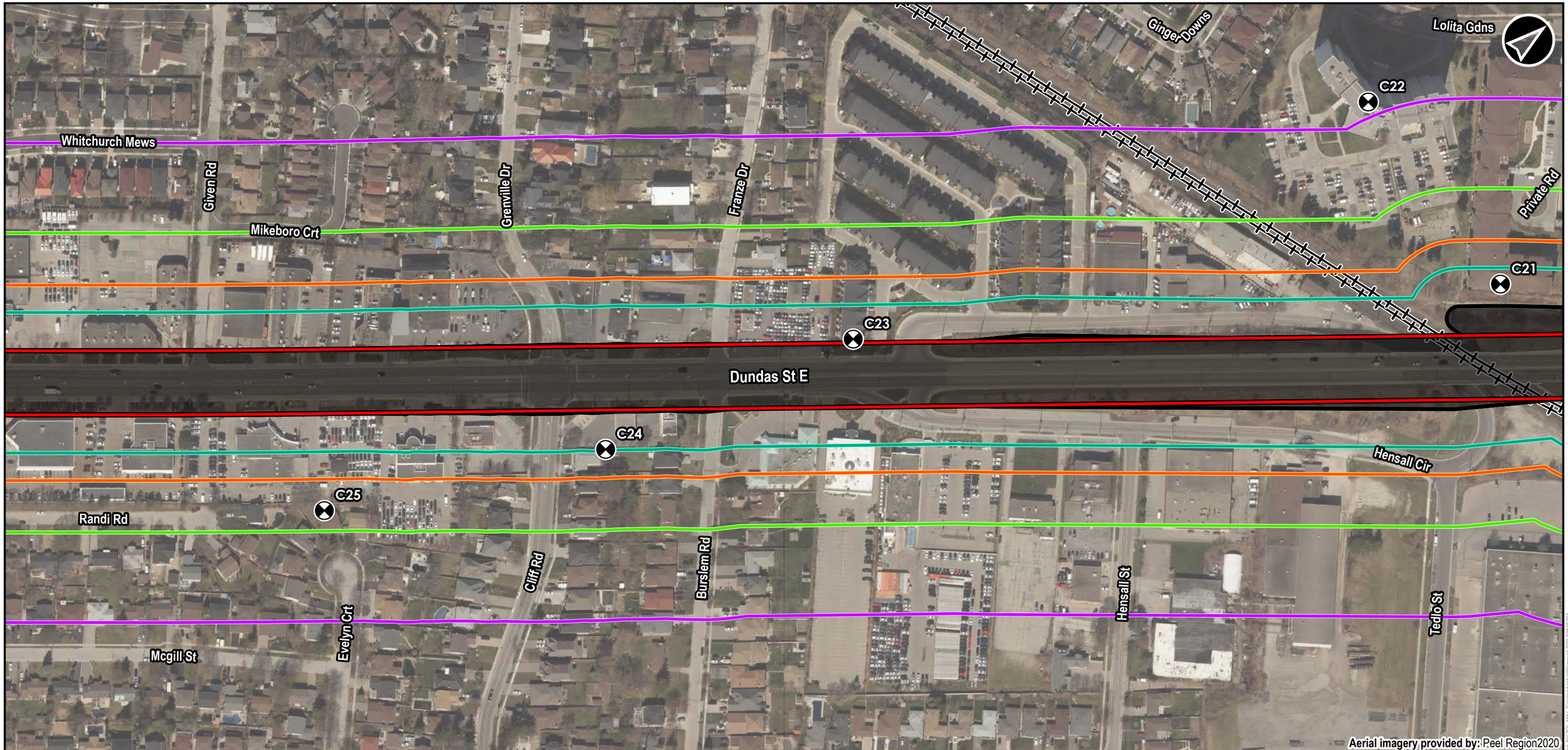

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- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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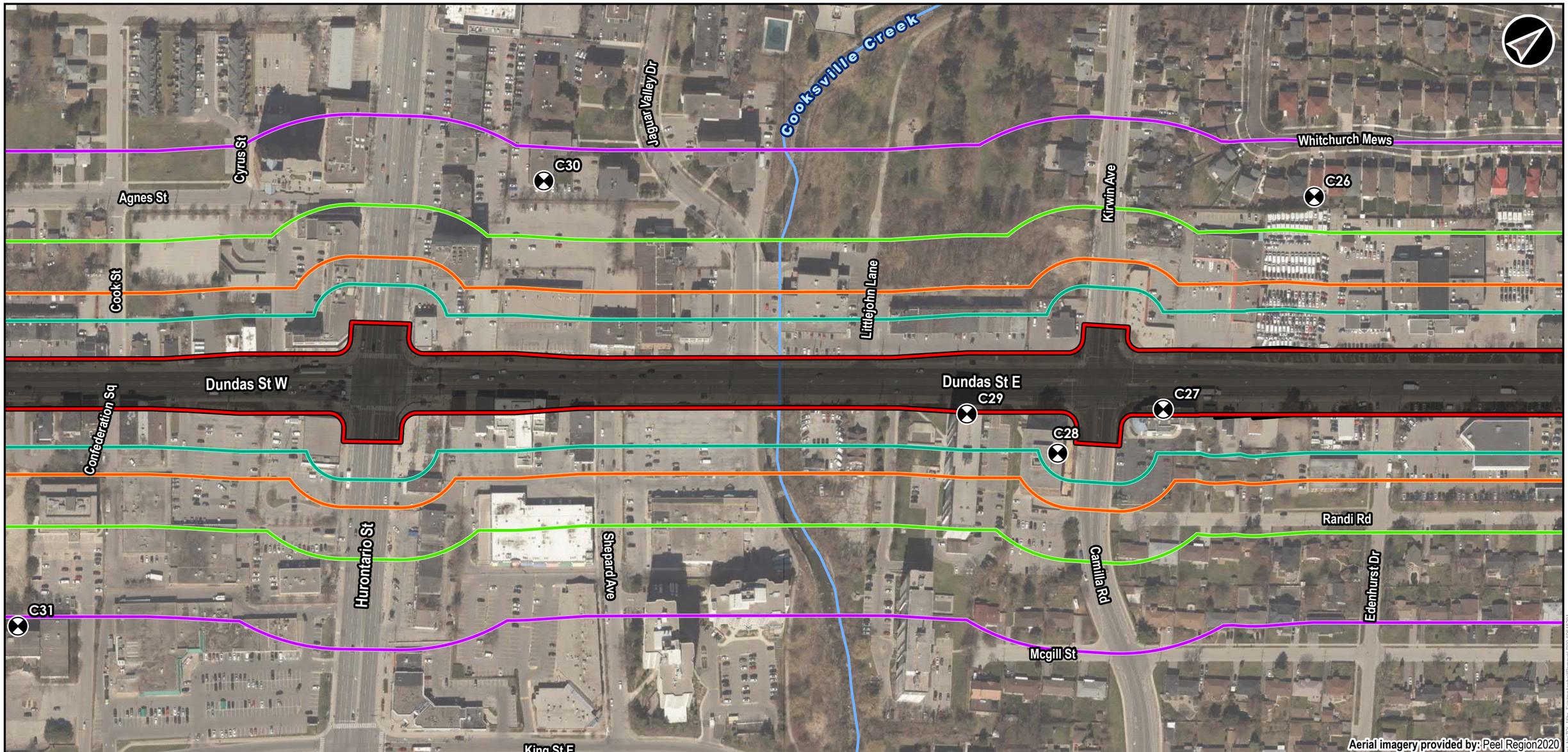

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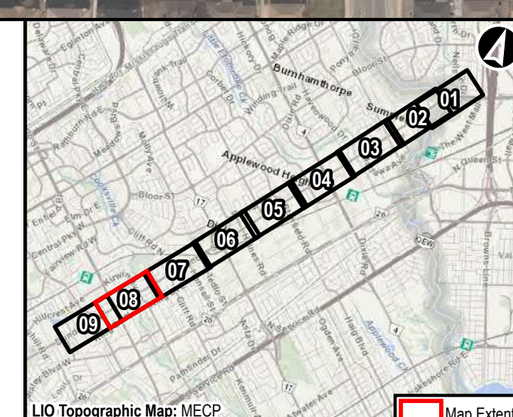
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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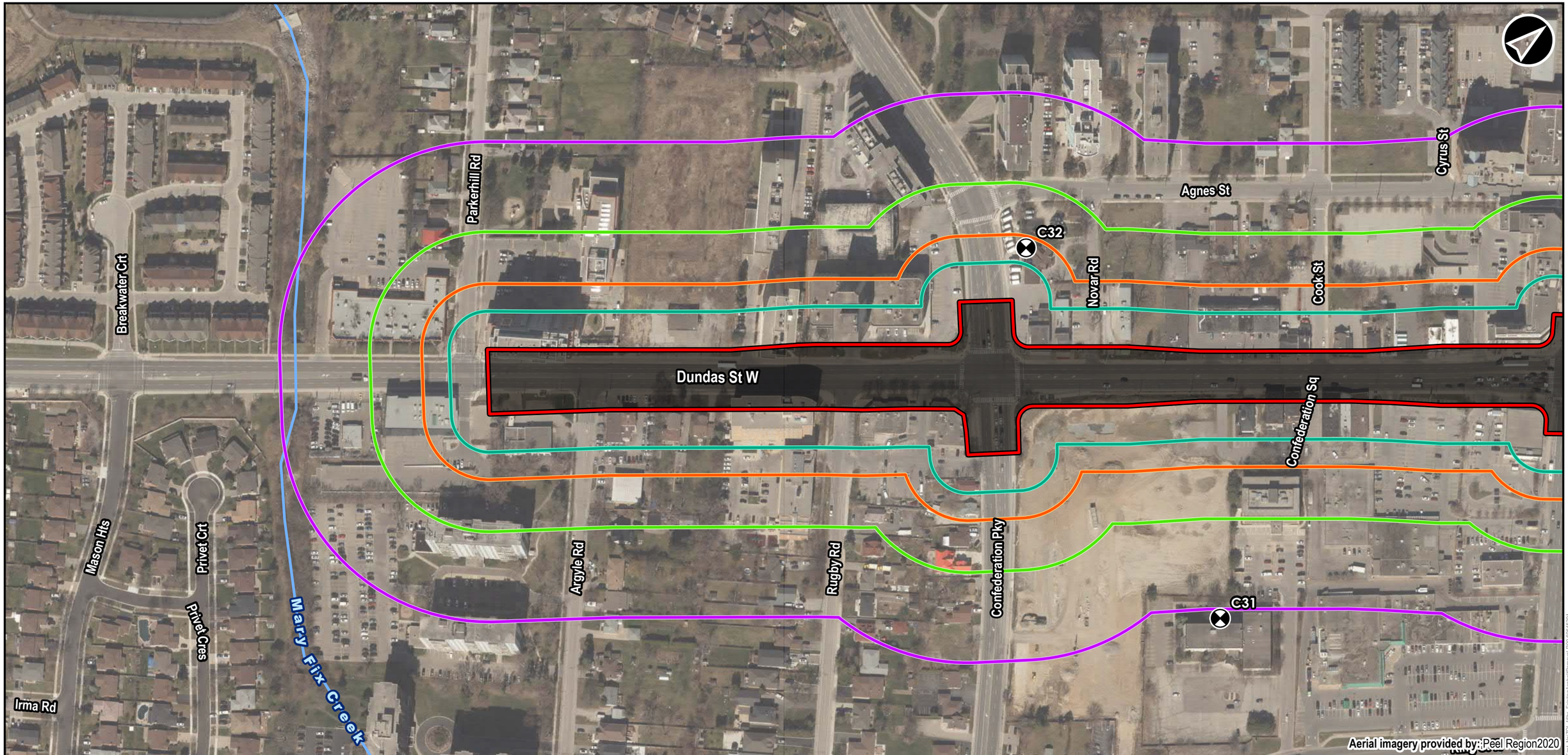

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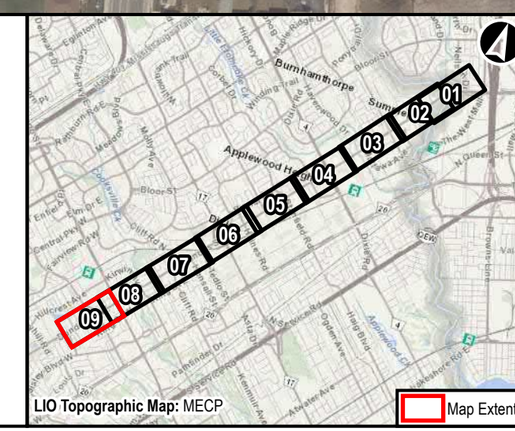
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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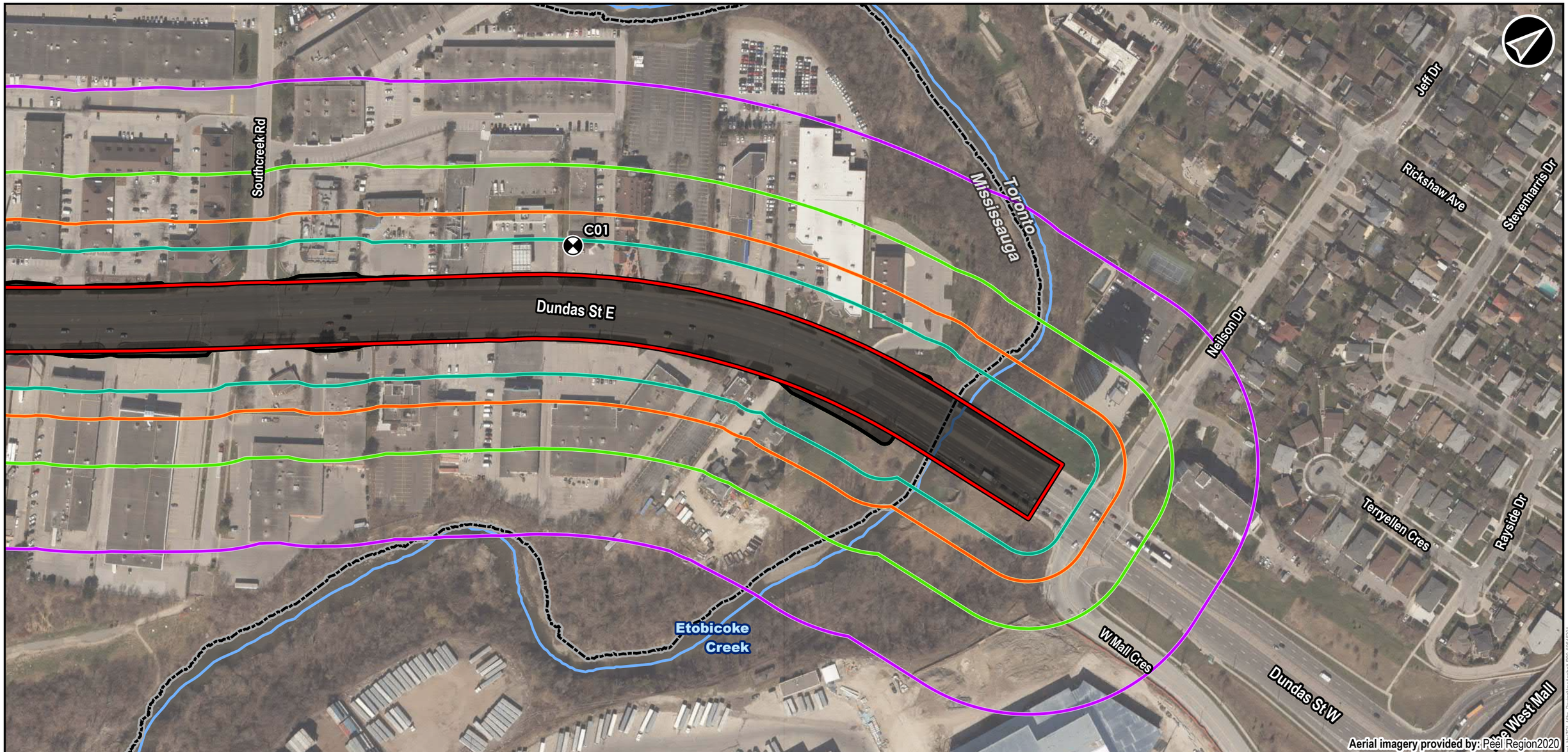

Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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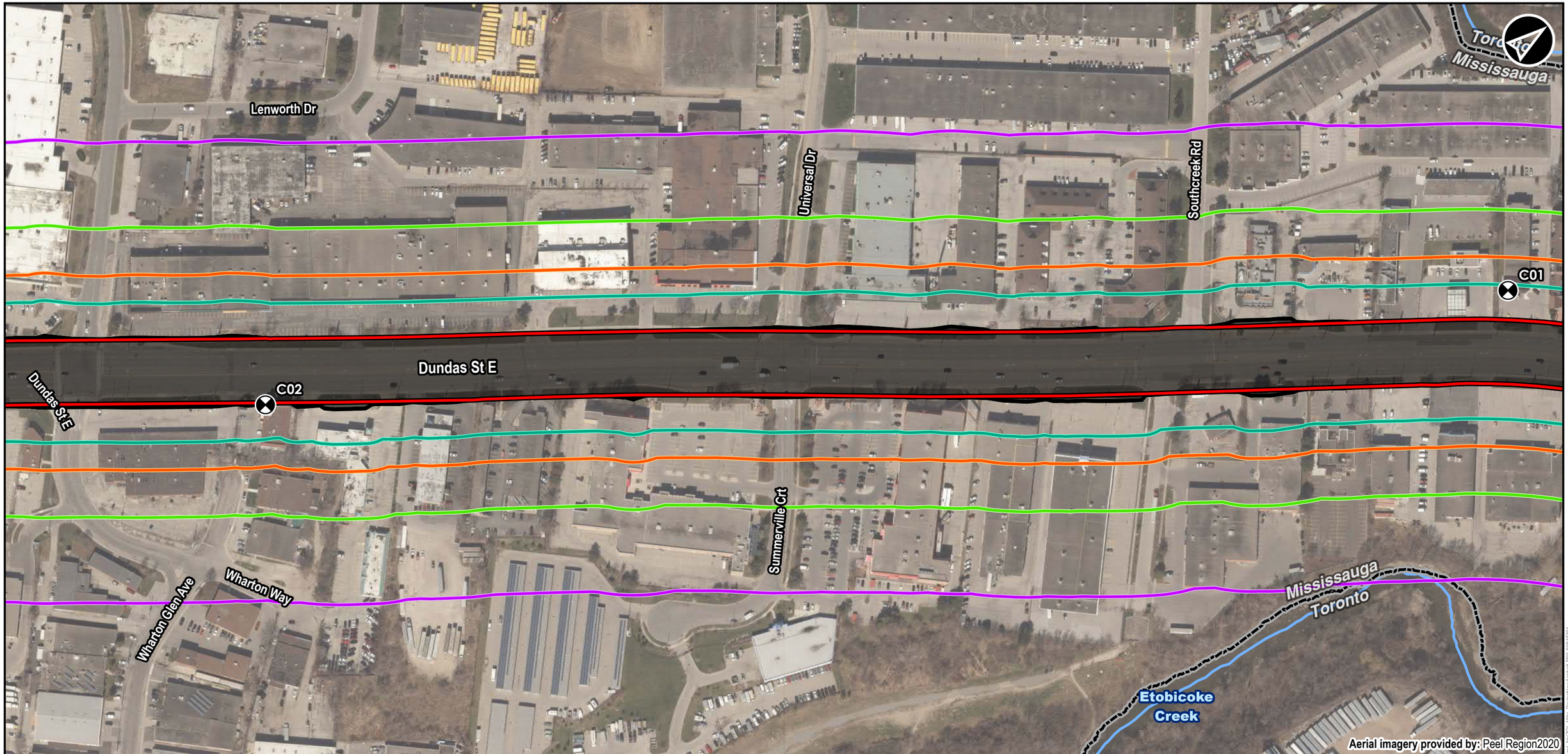


Legend

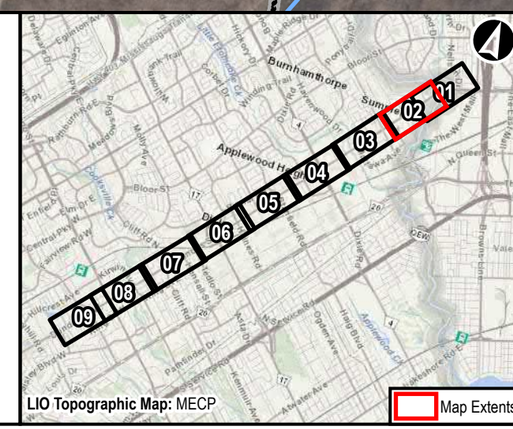
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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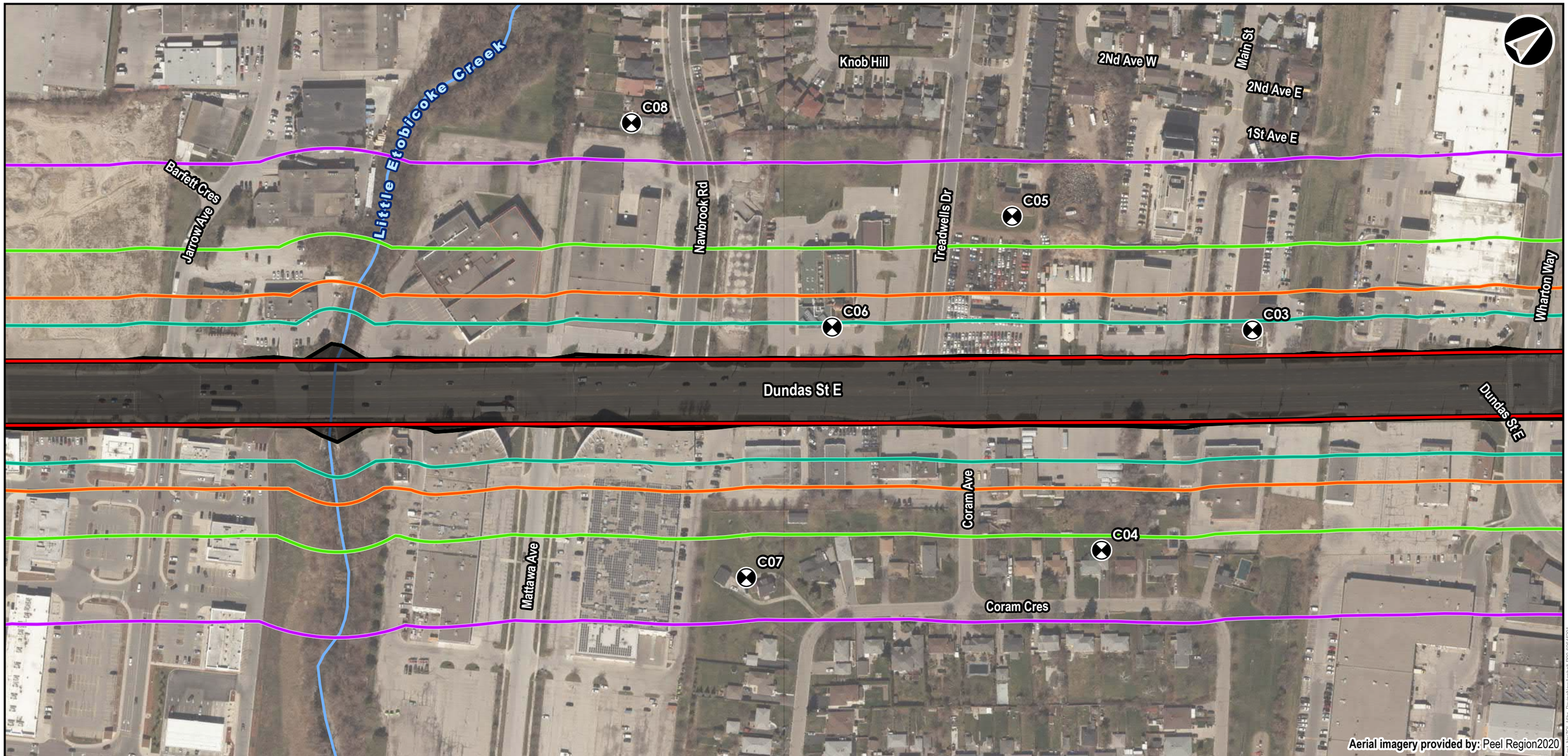


Legend

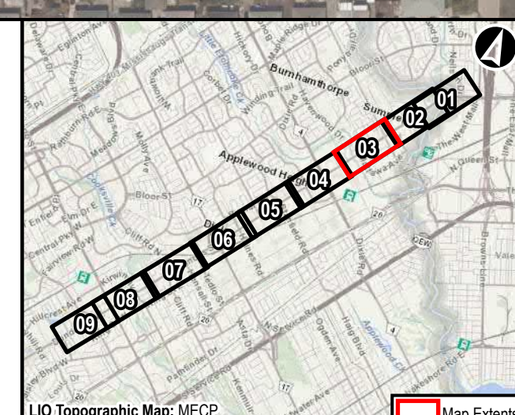
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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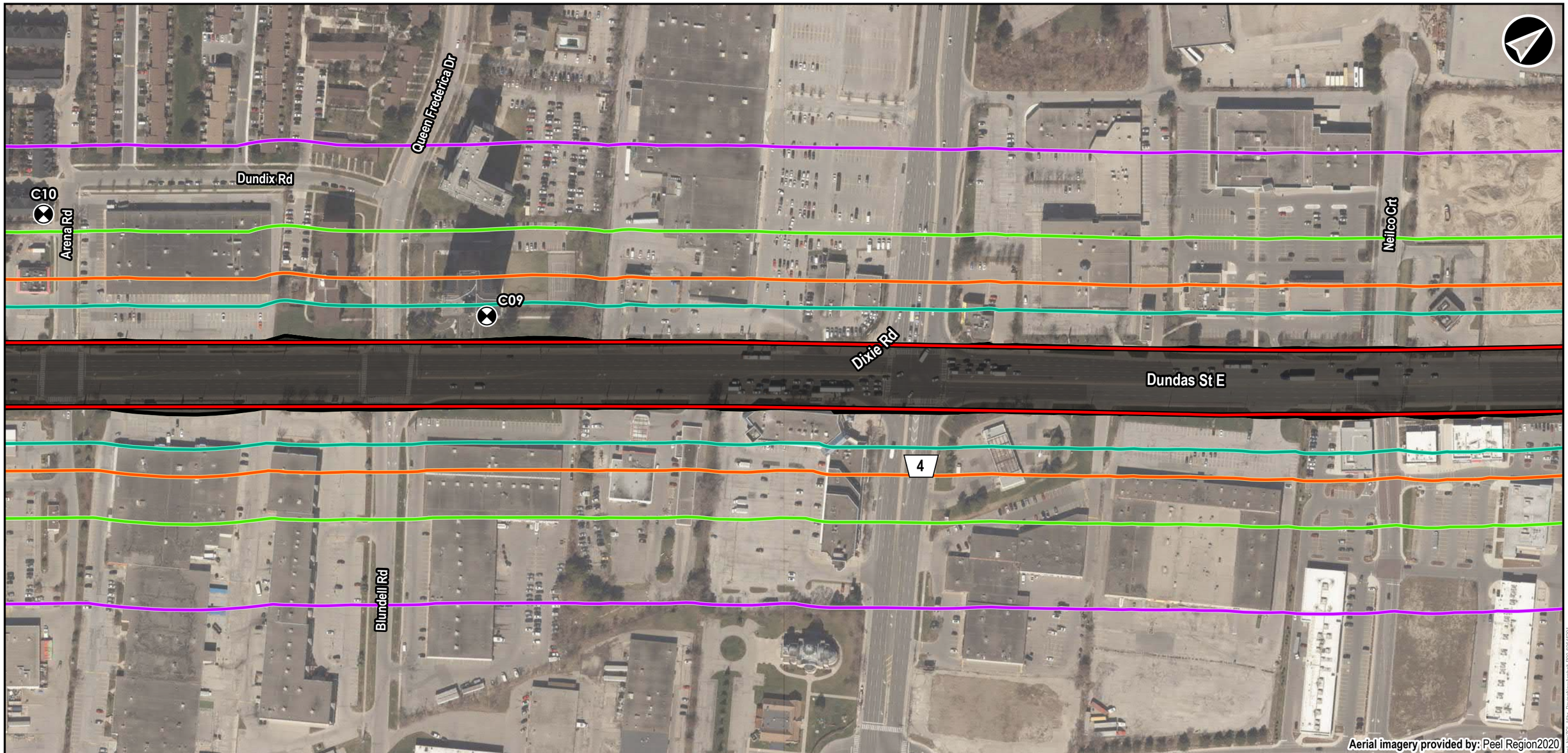

Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

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NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

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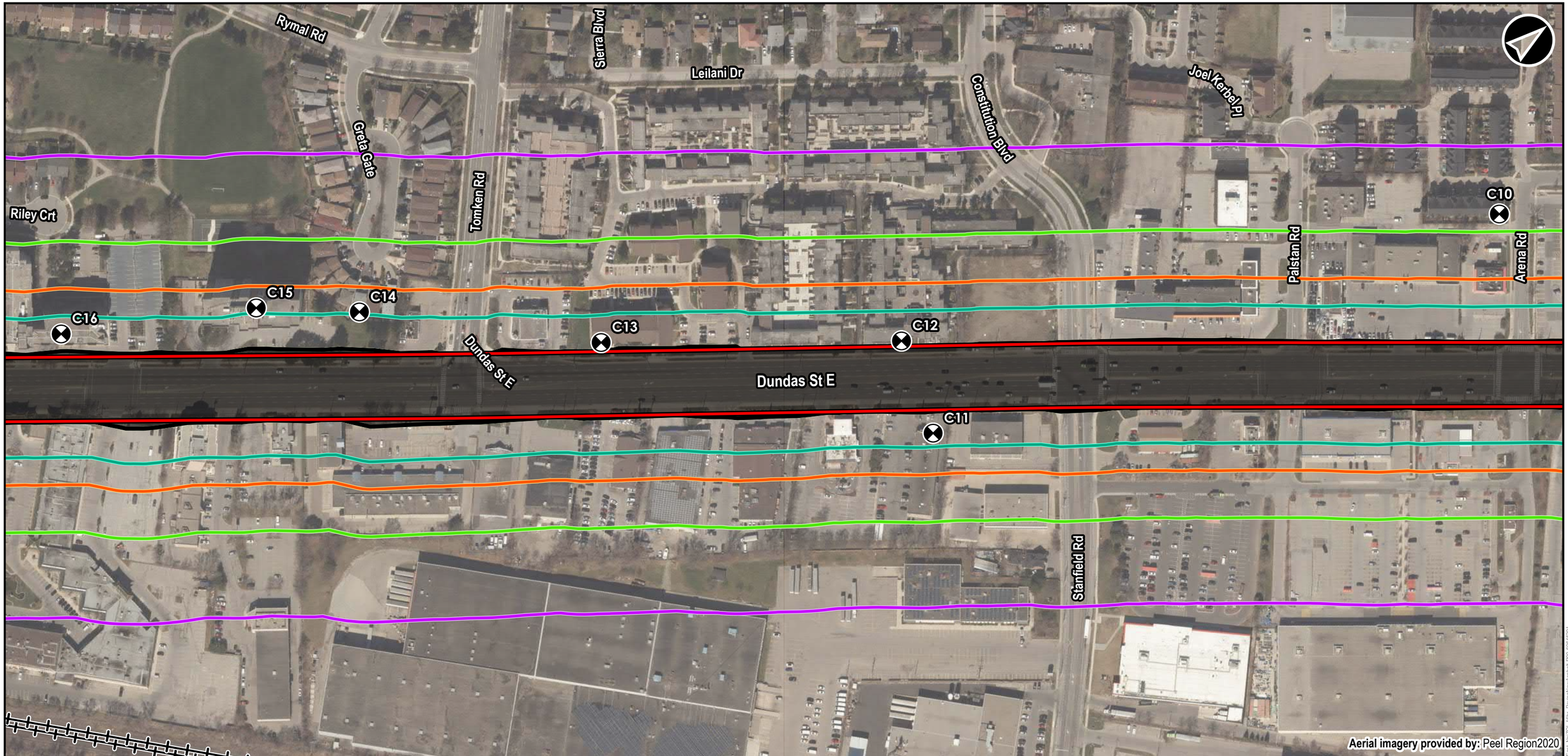

Legend

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Zone of Influence

- Residential Receptors
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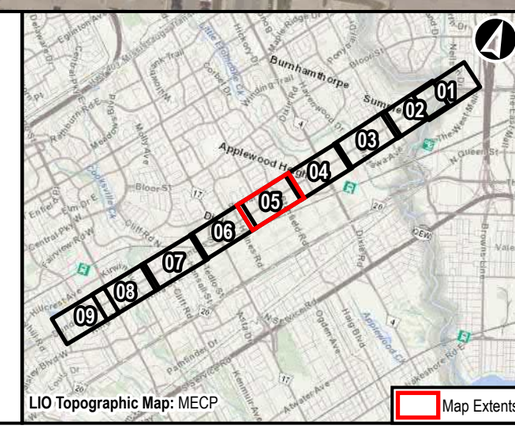
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

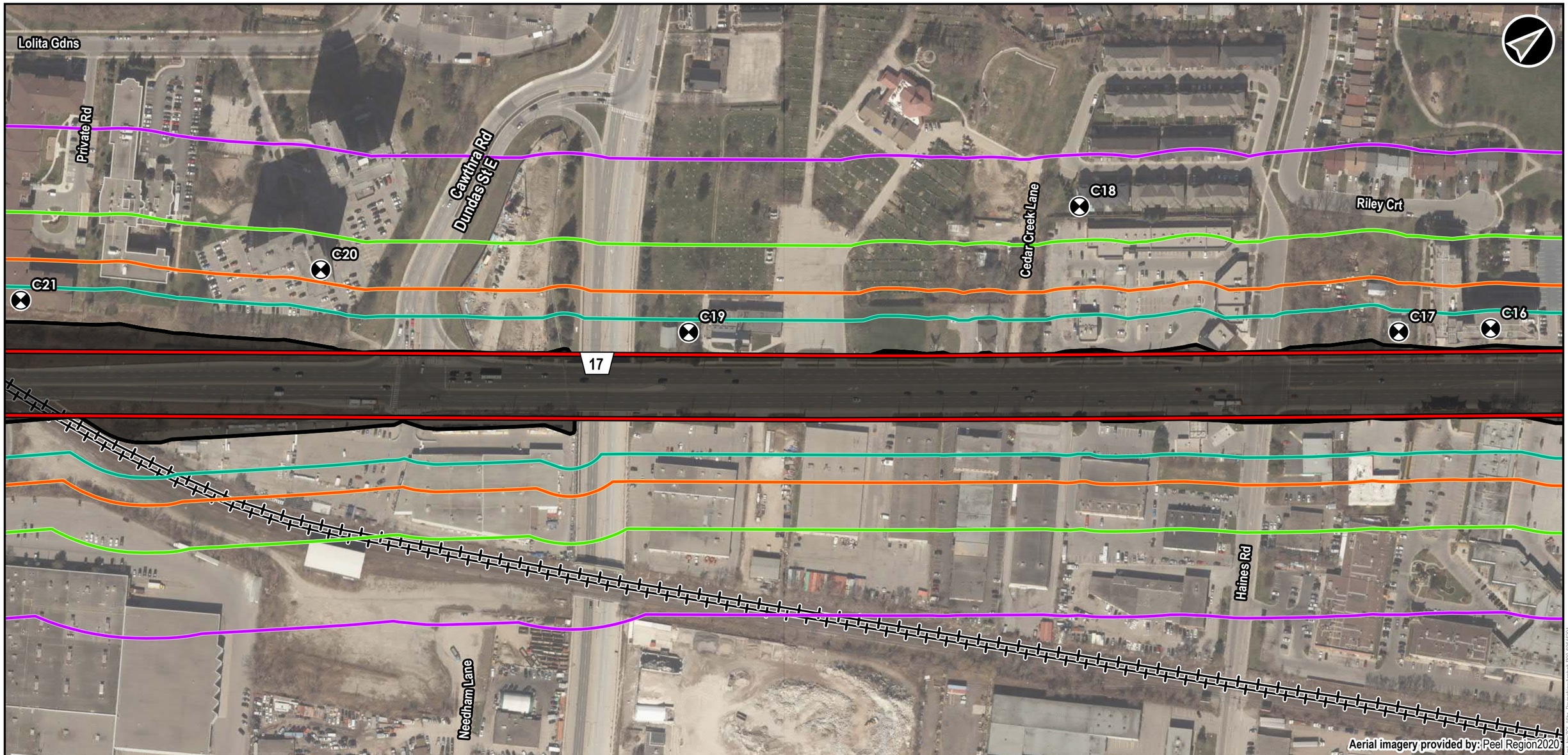
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 4-05**
P:60645291	Rev:00	



Legend

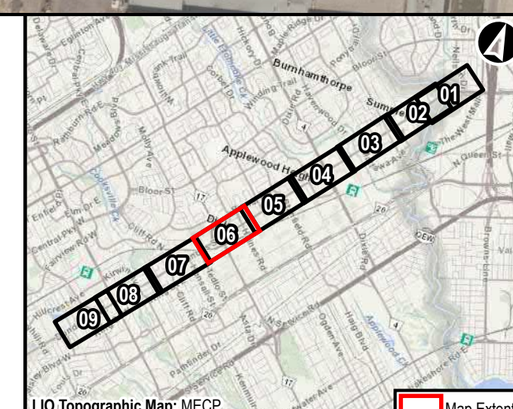
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

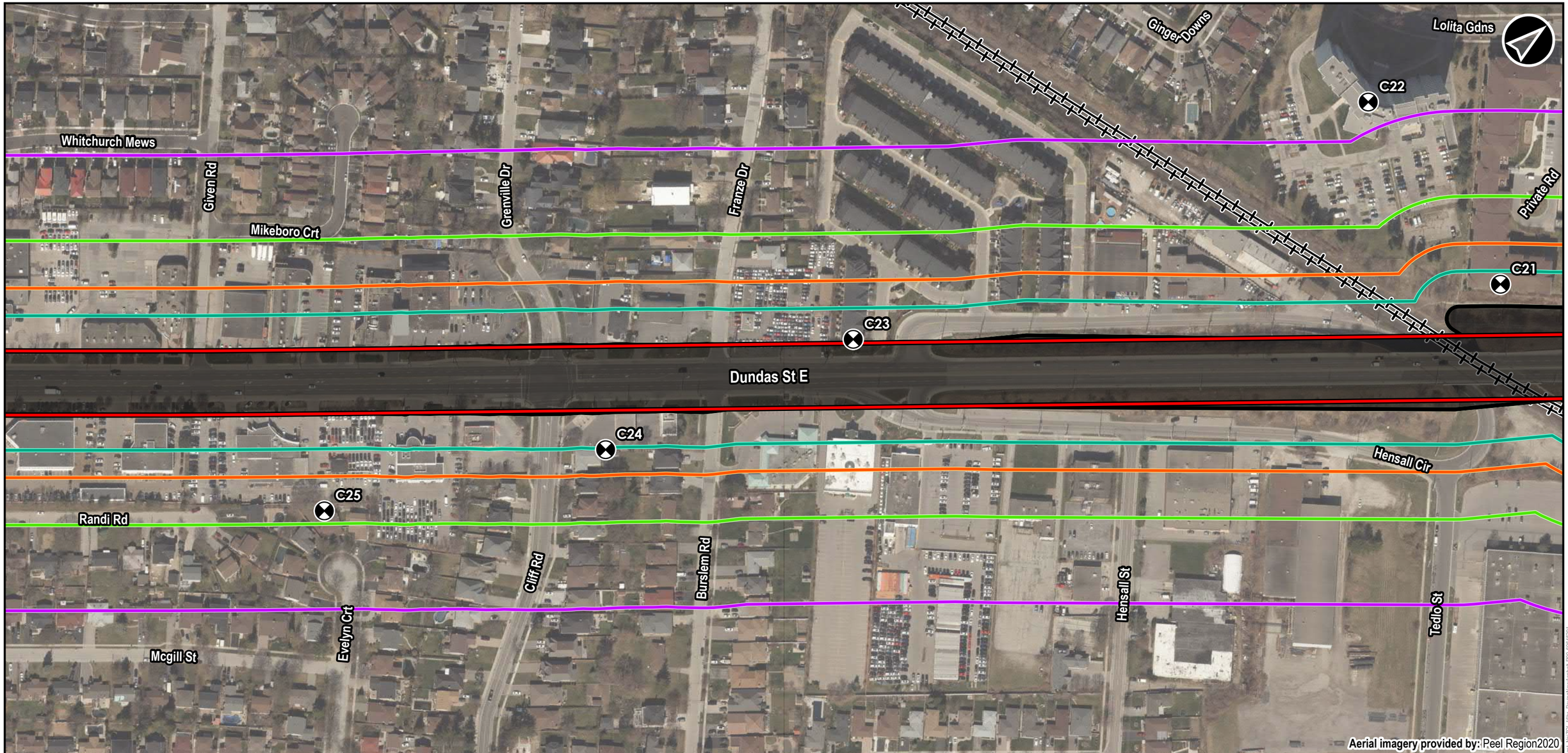
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 4-06**
P:60645291	Rev:00	



Legend

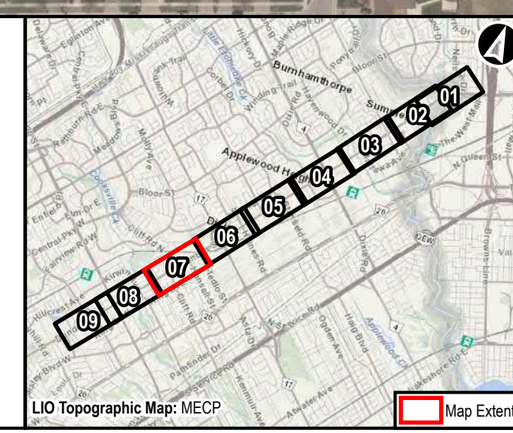
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

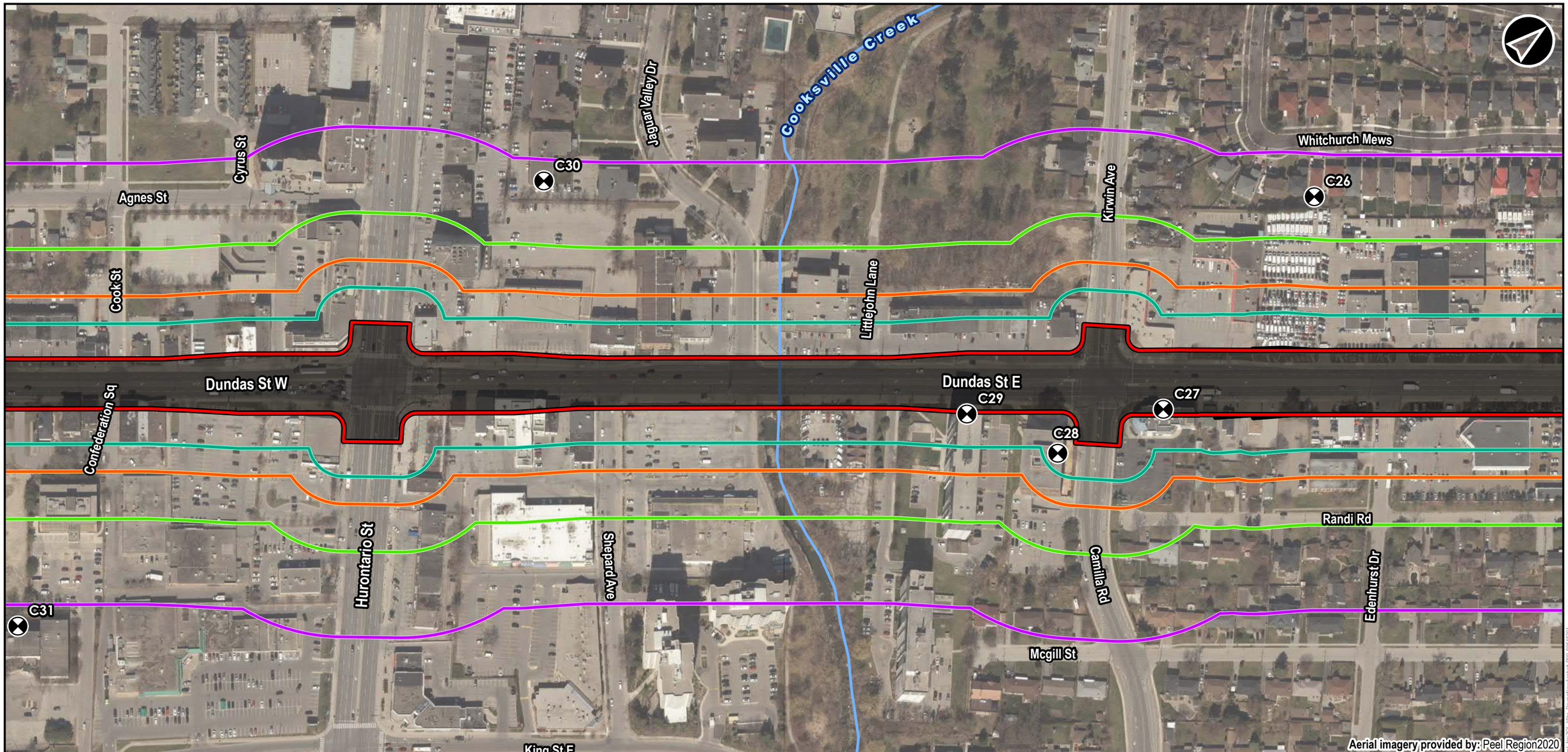
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 4-07**
P:60645291	Rev:00	



Legend

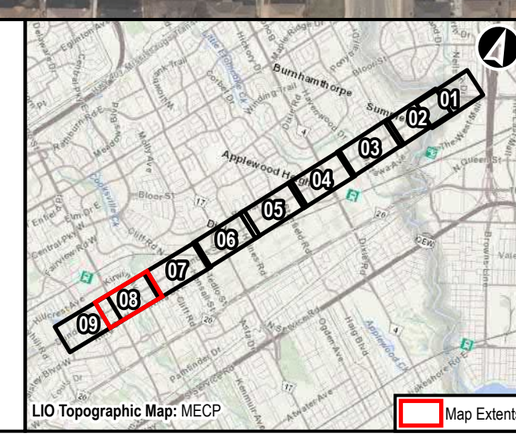
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

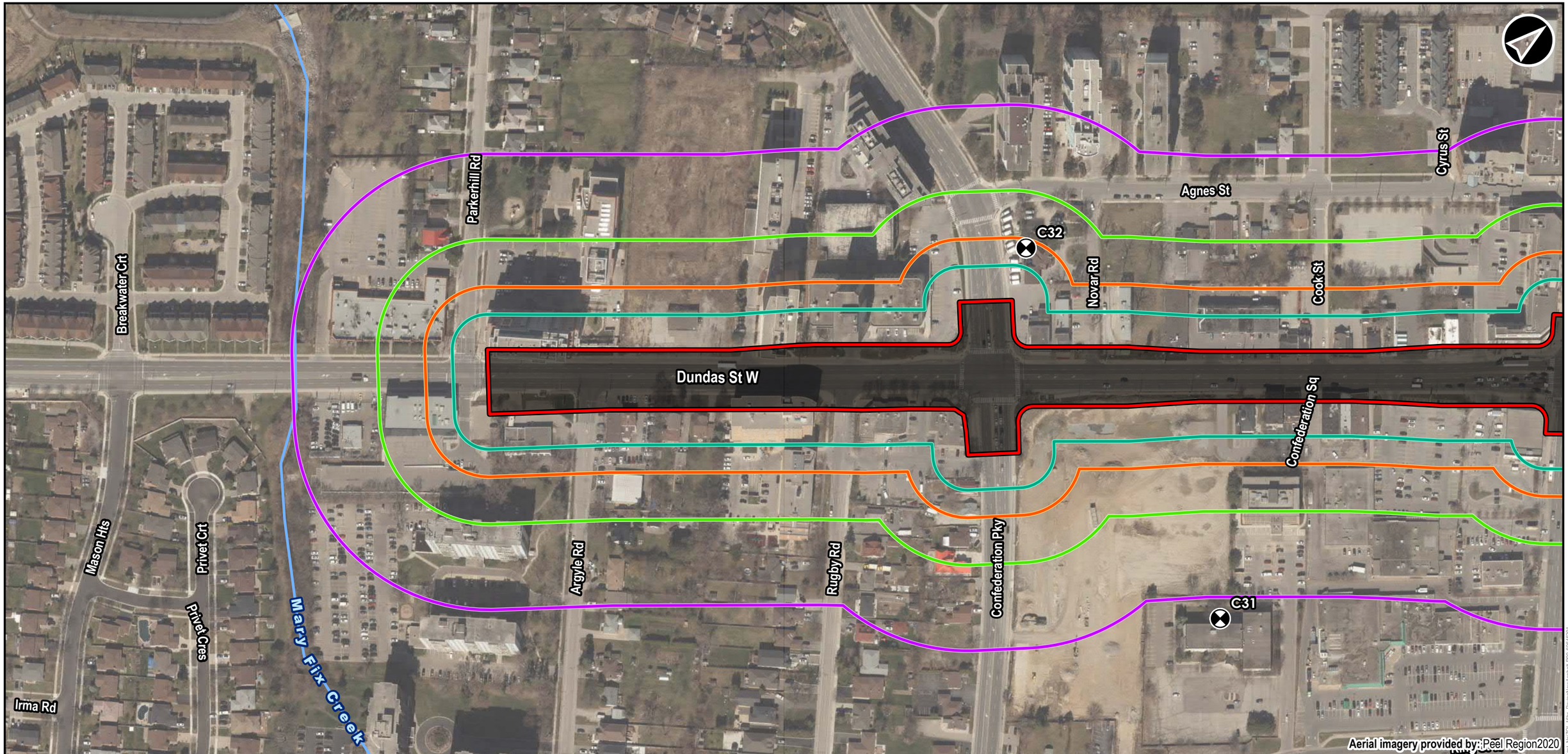
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 4-08**
P:60645291	Rev:00	



Legend

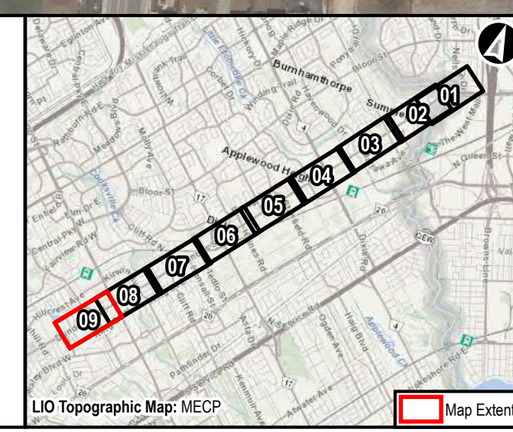
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 16hr

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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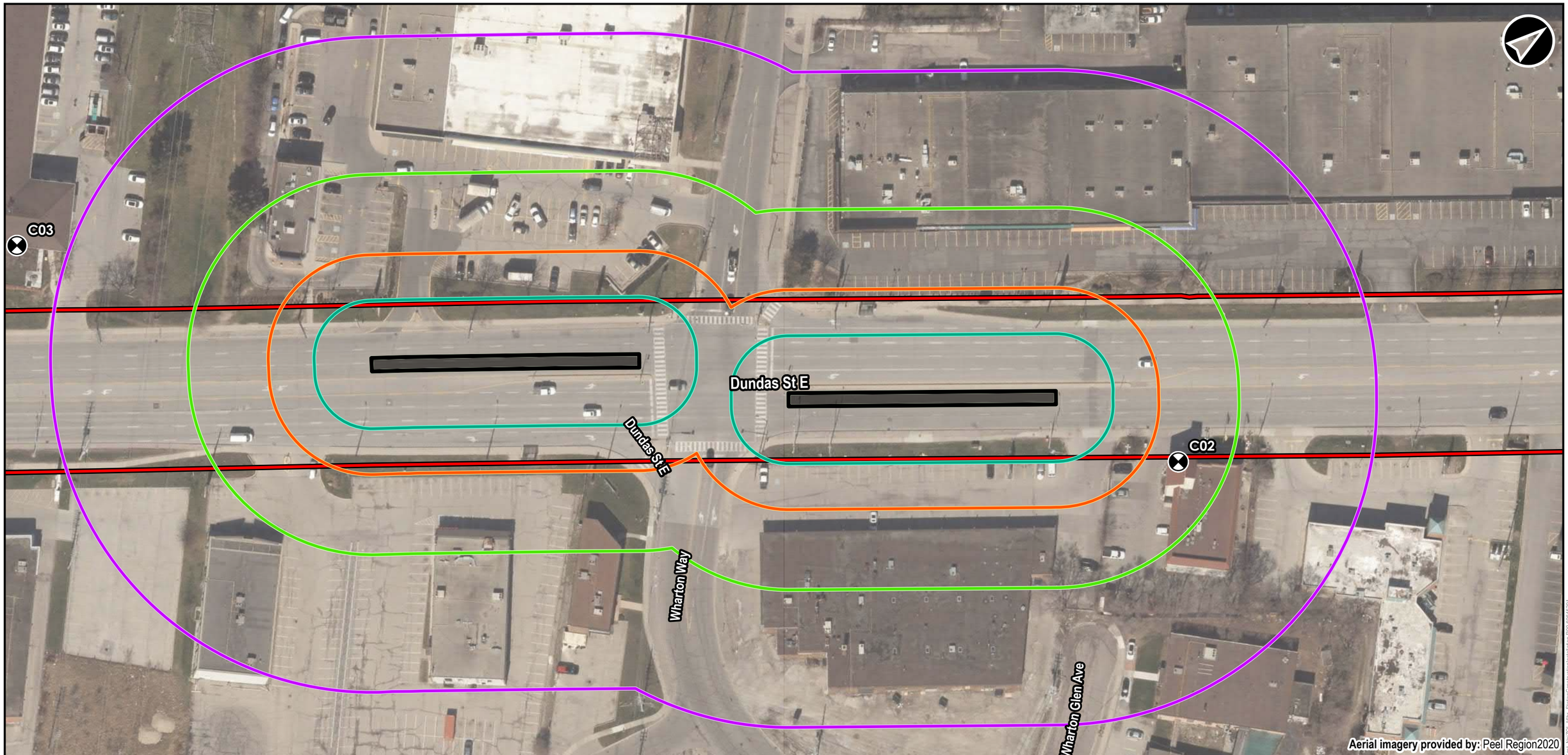
P:60645291	Rev:00	



Legend

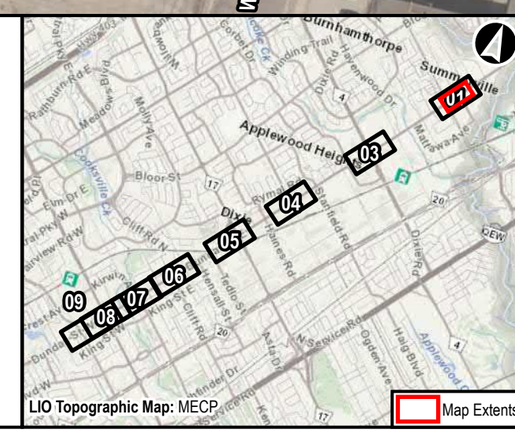
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

0 5 10 20 30 40 50 60 70 M

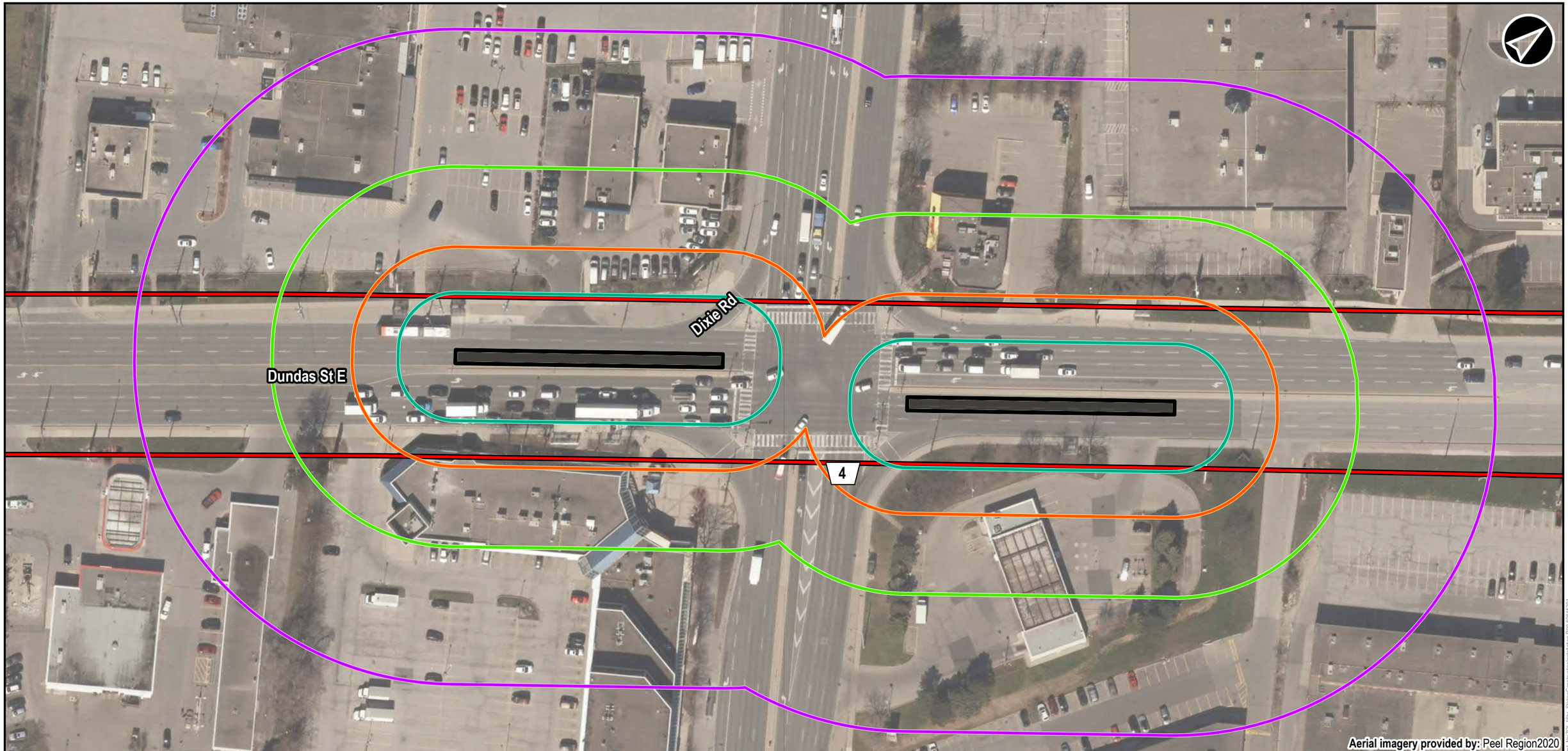
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000
P:60645291	Rev:00

Figure: 5-01



Legend

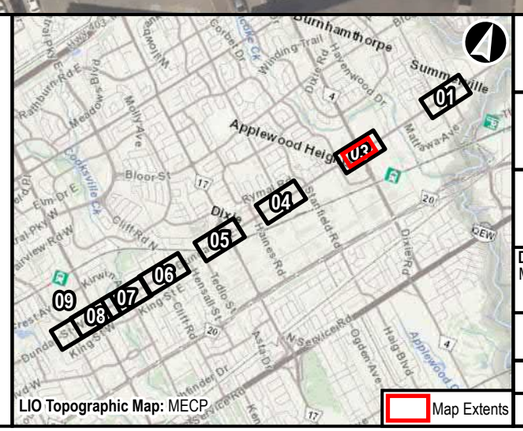
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

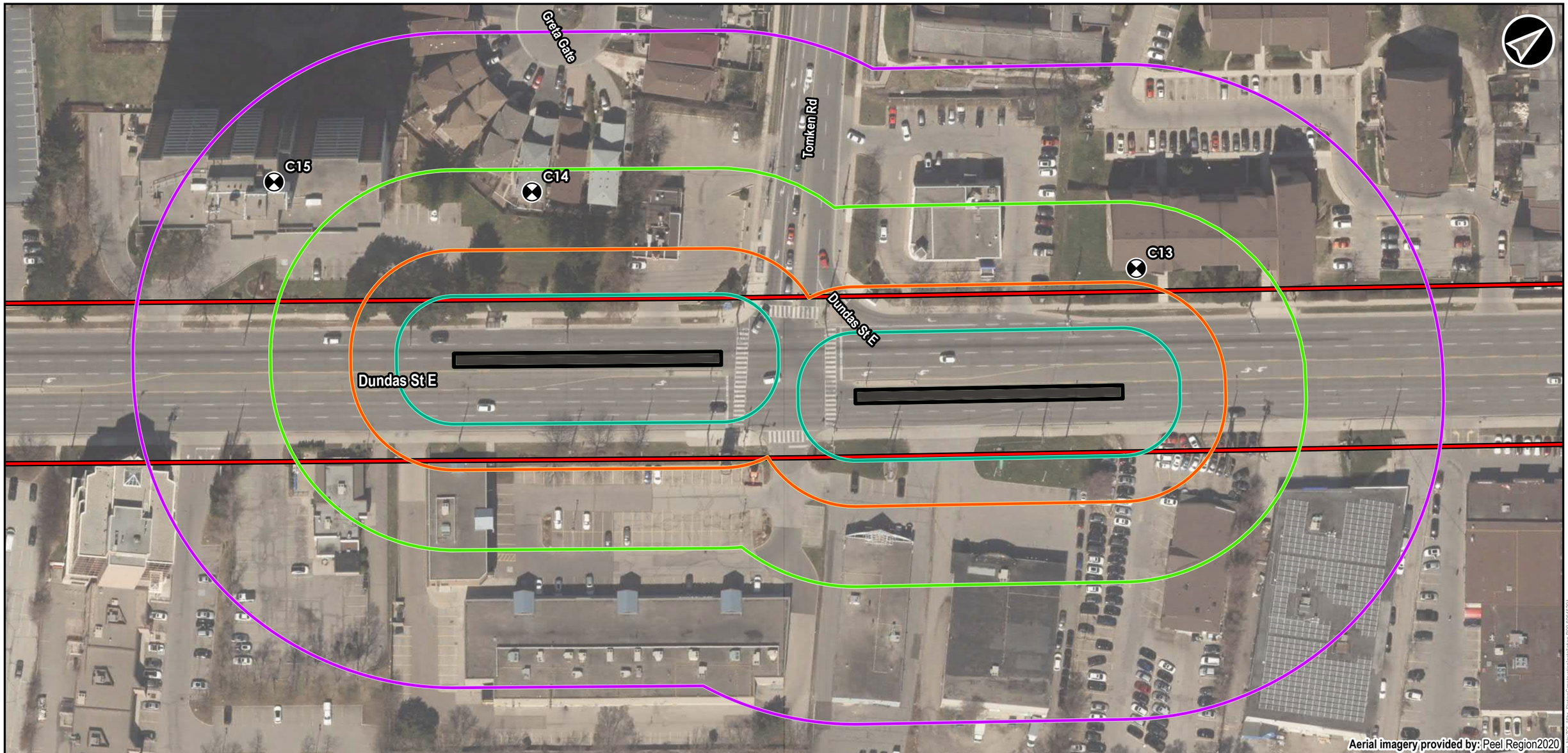
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 5-02**
P:60645291	Rev:00	



Legend

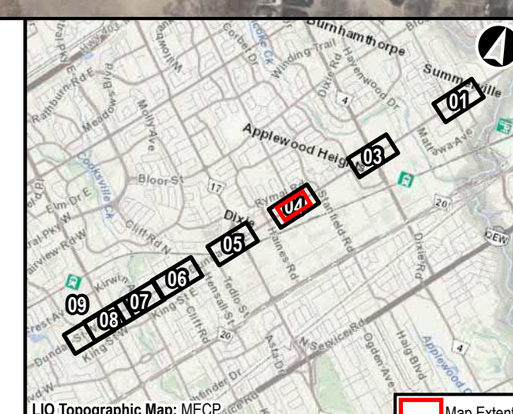
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

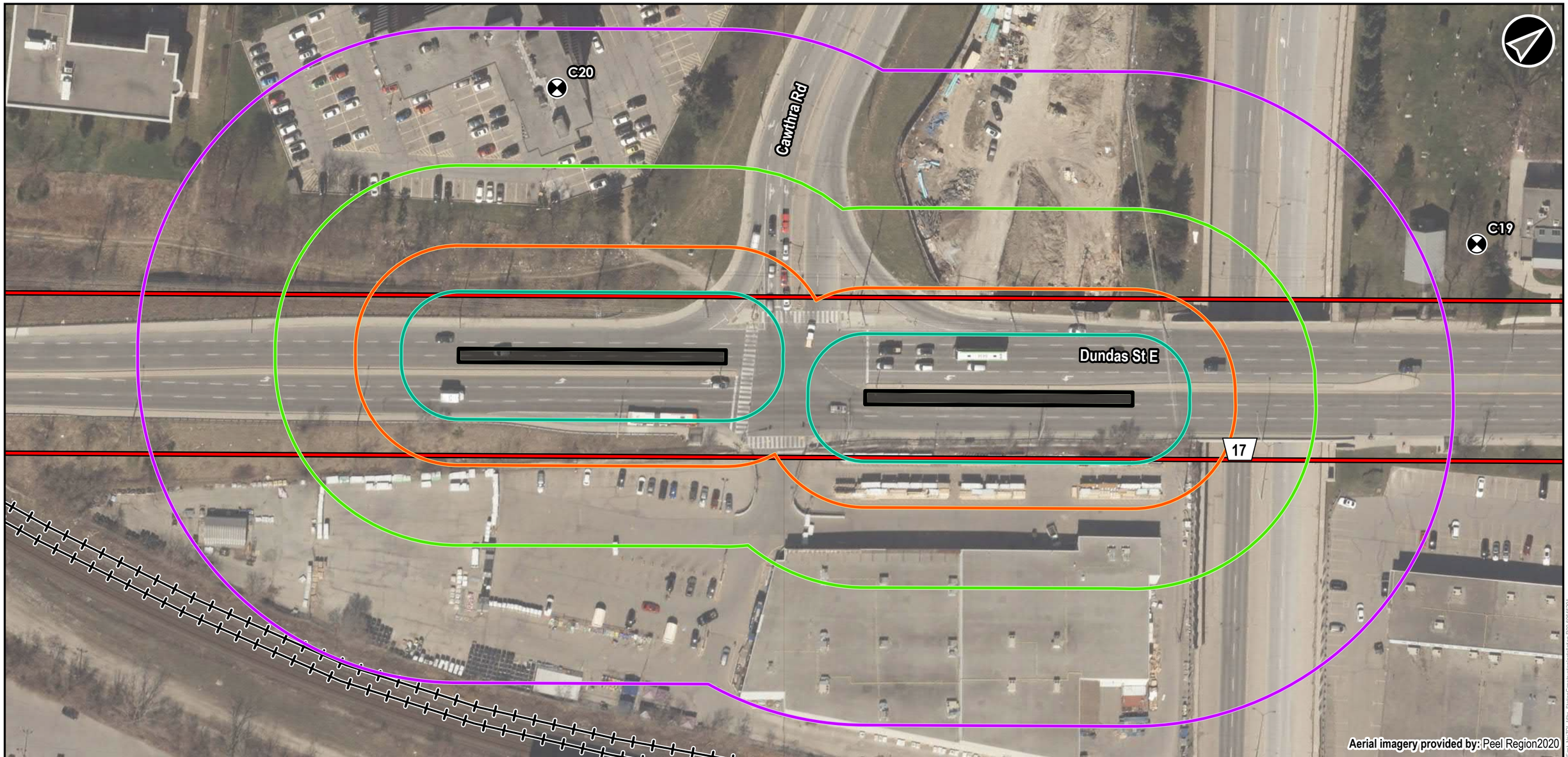
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 5-03**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway

LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

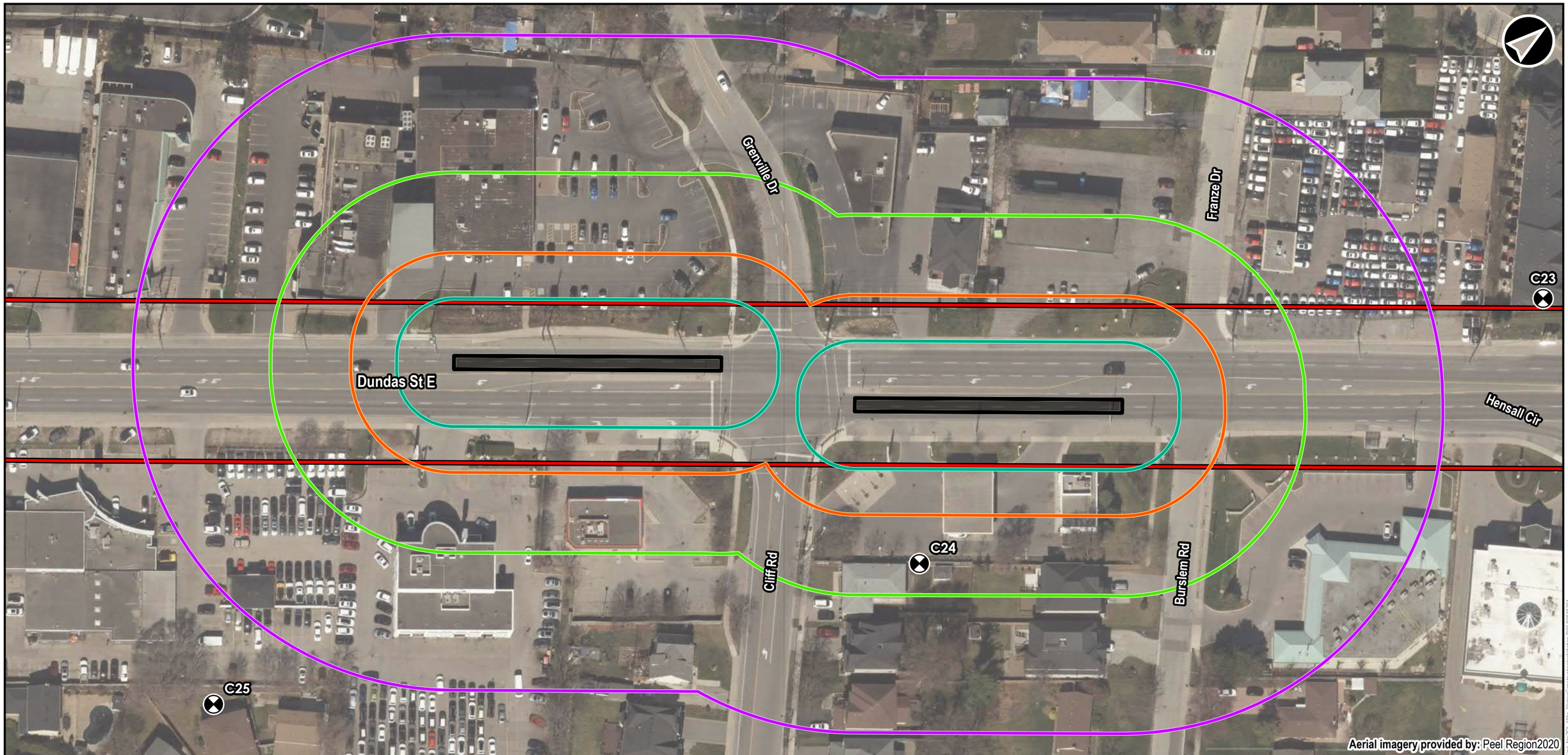
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 5-04**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

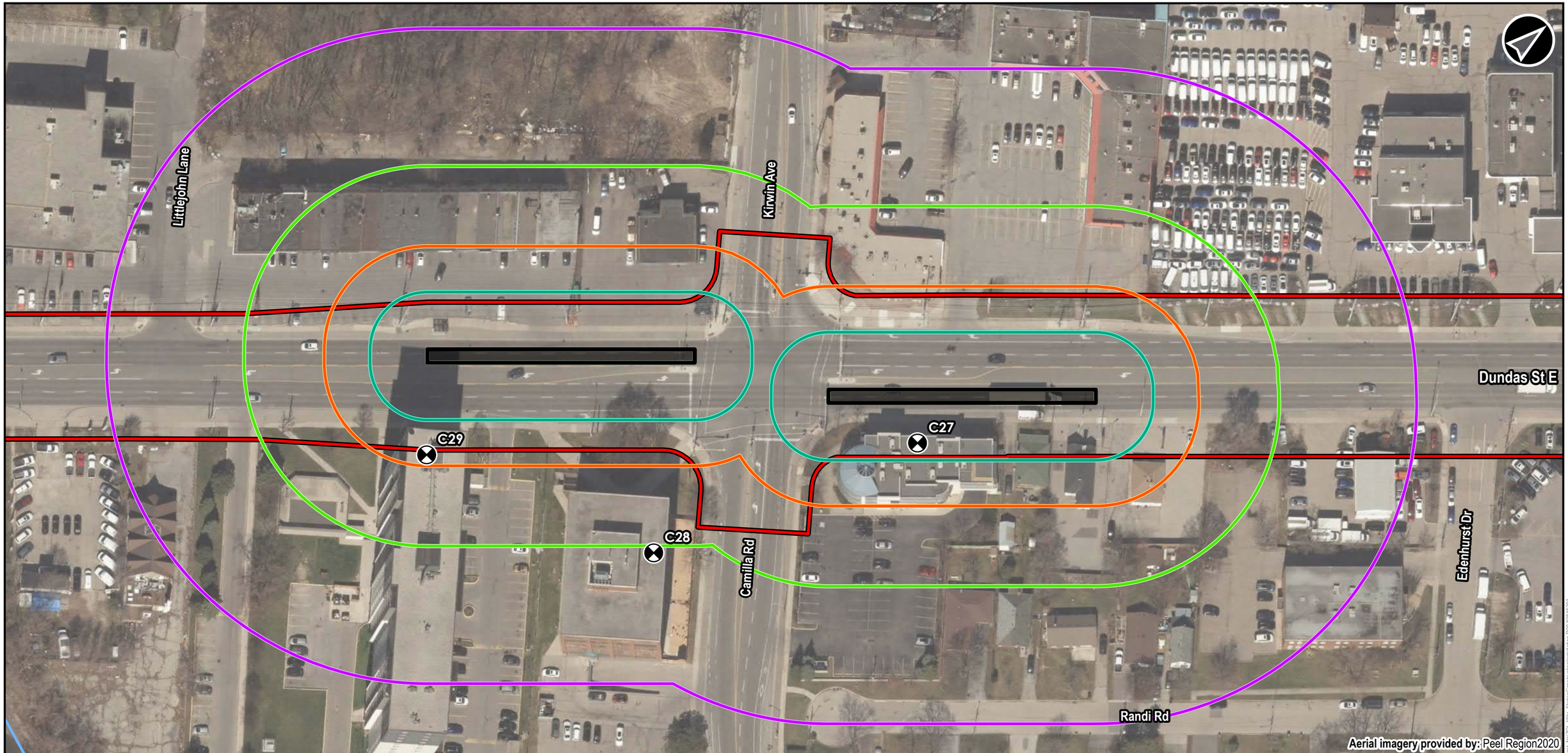
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 5-05**
P:60645291	Rev:00	



Legend

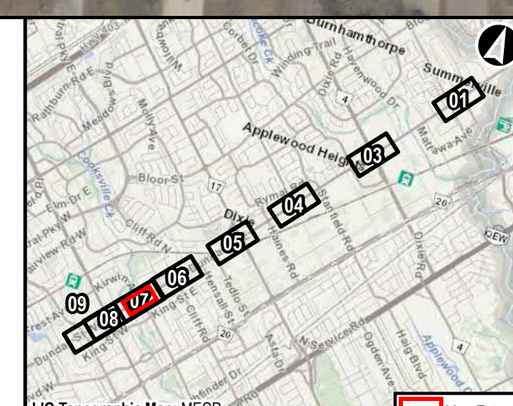
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

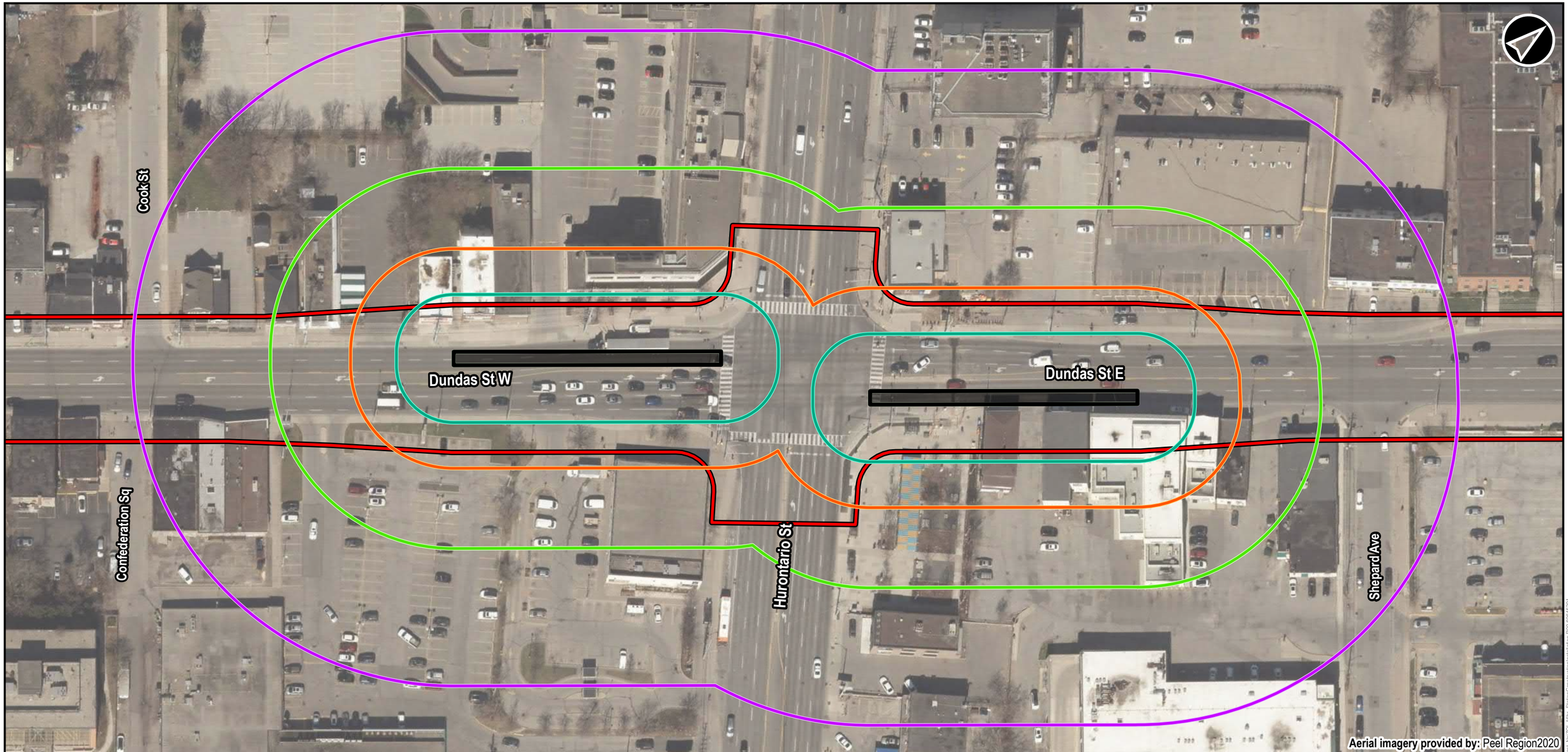
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 5-06**
P:60645291	Rev:00	



Legend

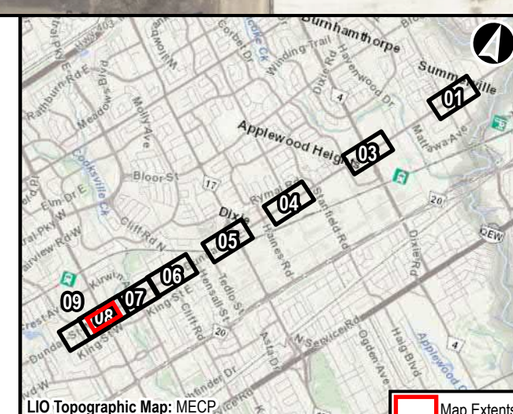
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

0 5 10 20 30 40 50 60 70 M

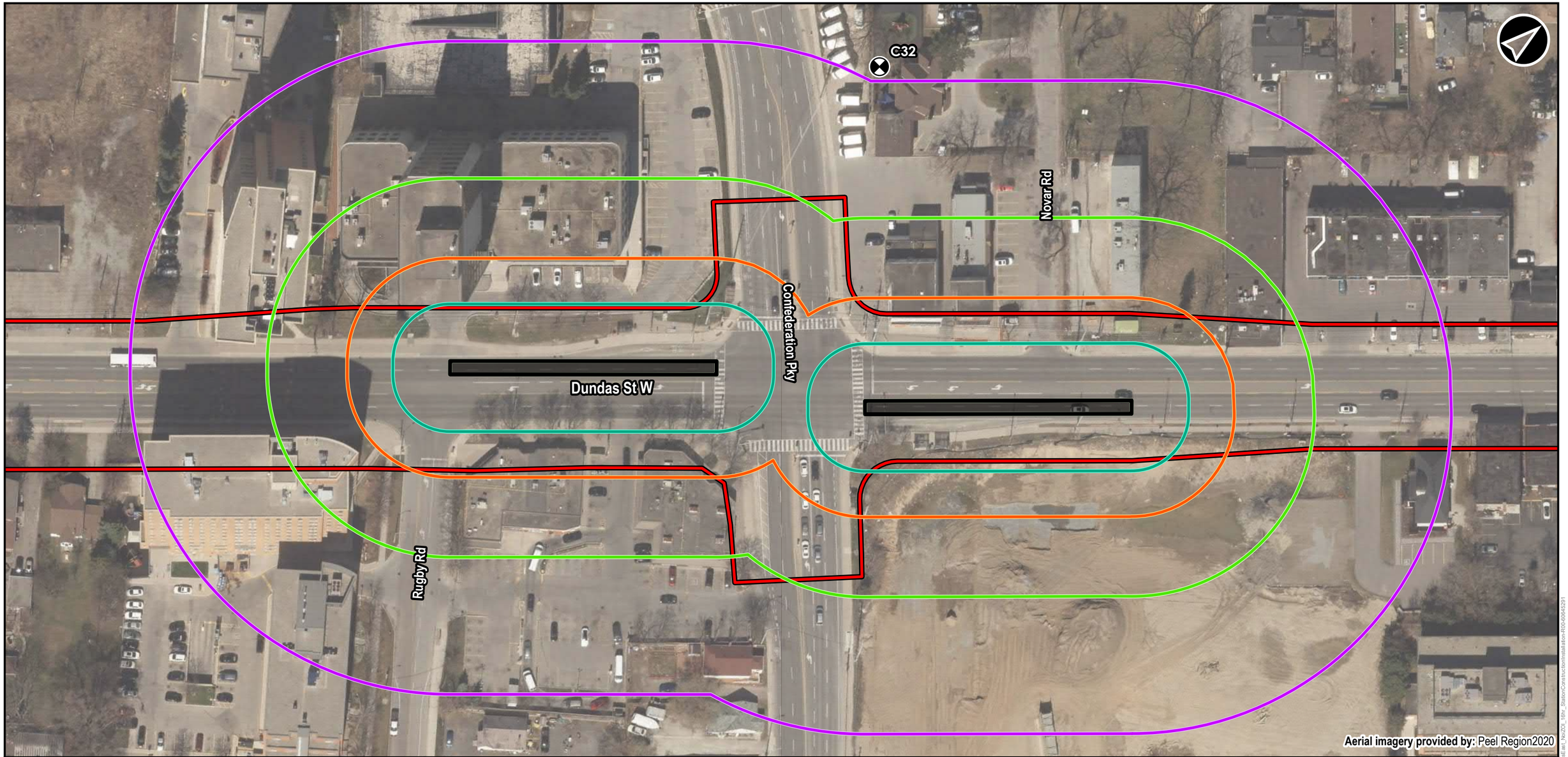
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000
P:60645291	Rev:00

Figure: 5-07



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq (16hr)

0 5 10 20 30 40 50 60 70 M

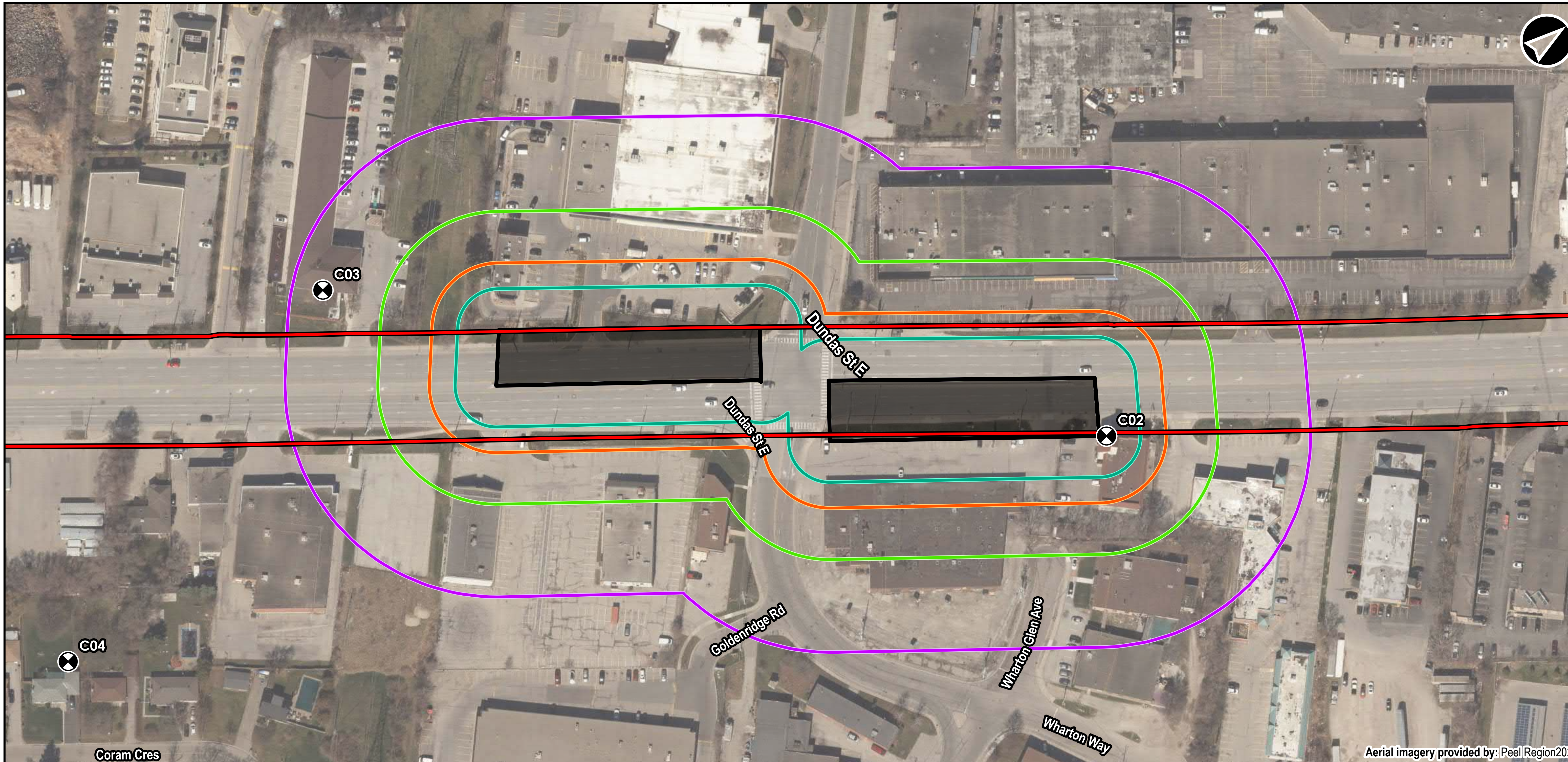
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000
P:60645291	Rev:00

Figure: 5-08



Legend

Receptor

Presumed Exisiting Right of Way

Proposed Bus Station Construction Limits

Zone of Influence

Residential Receptors

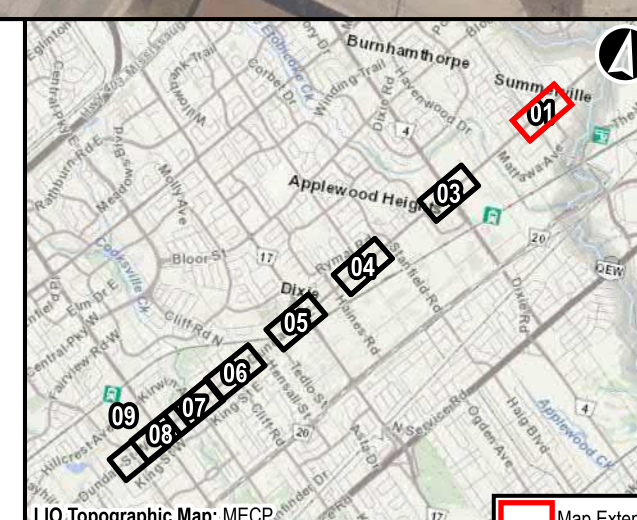
Institutional Receptors

Commercial Receptors

Industrial Receptors

Base Layers

Municipal Boundary



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

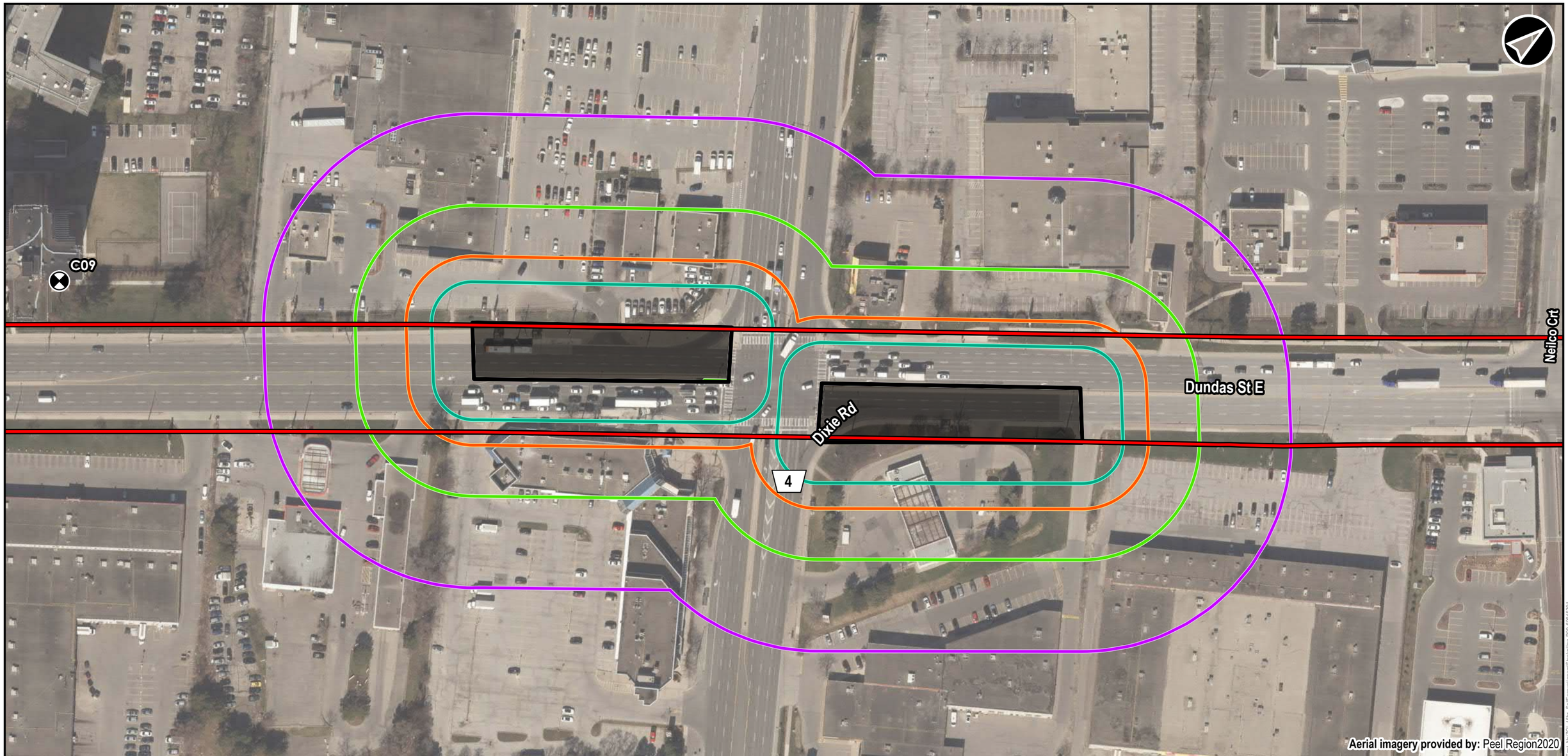
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX AECOM

Sep, 2021	1:1,500	Figure: 6-01
P:60645291	Rev:00	



Legend

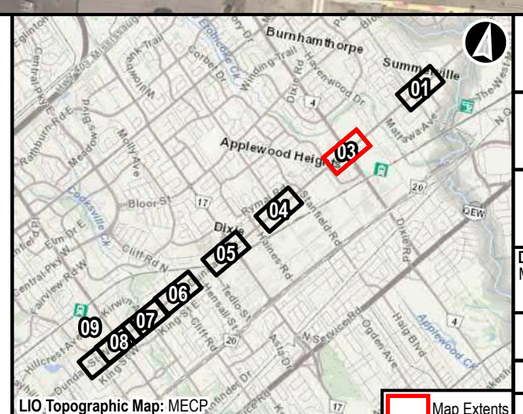
- Receptor
- Presumed Exisiting Right of Way
- Proposed Bus Station Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 6-02**
P:60645291	Rev:00	

Aerial imagery provided by: Peel Region2020

Legend

- Receptor
- Presumed Exisiting Right of Way
- Proposed Bus Station Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

0 5 10 20 30 40 50 60 70 80 90 100 110 M

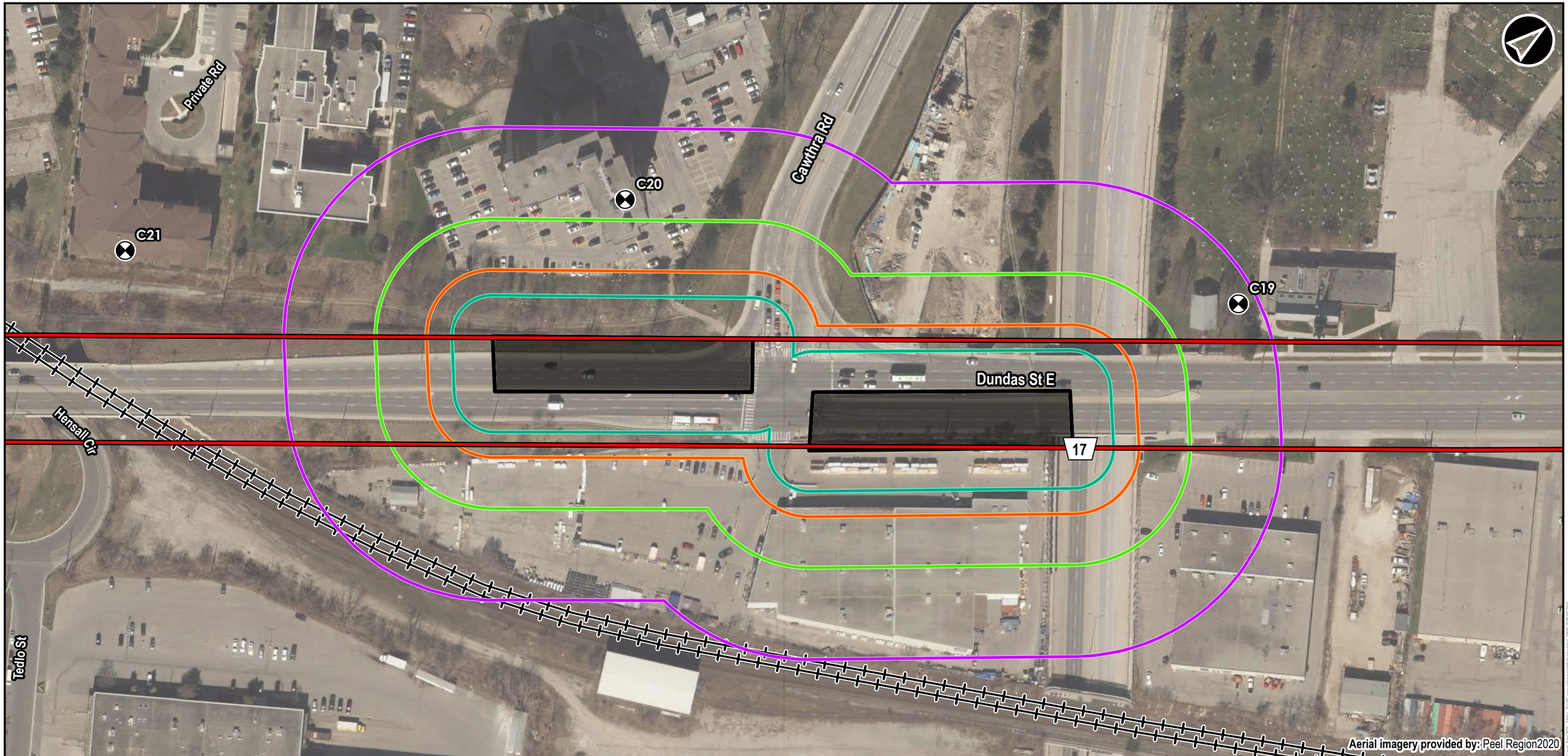
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500
P:60645291	Rev:00

Figure: 6-03



Legend

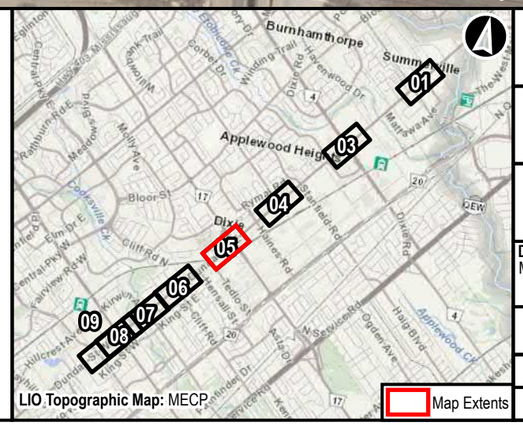
- Receptor
- Presumed Exisiting Right of Way
- Proposed Bus Station Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

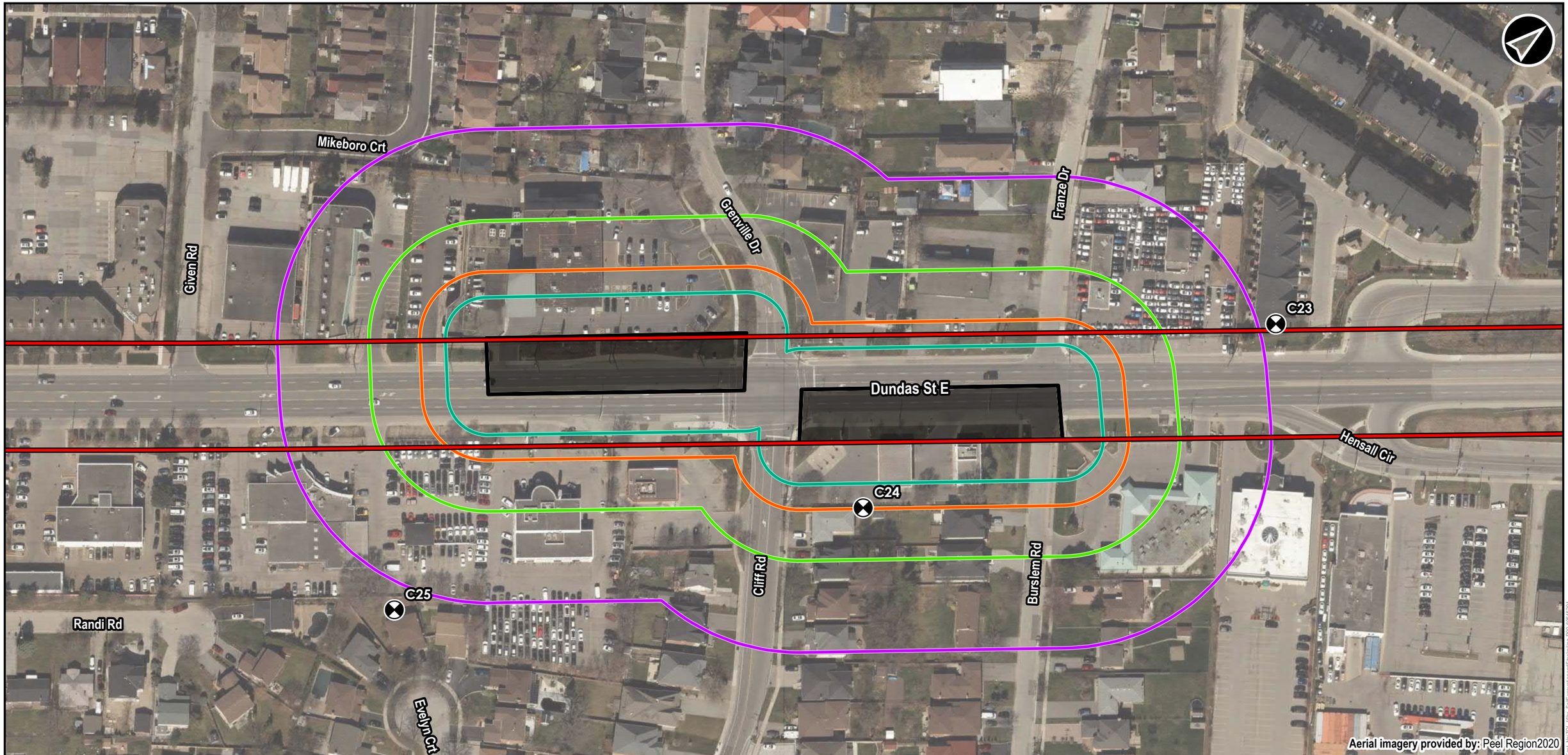
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 6-04**
P:60645291	Rev:00	



Legend

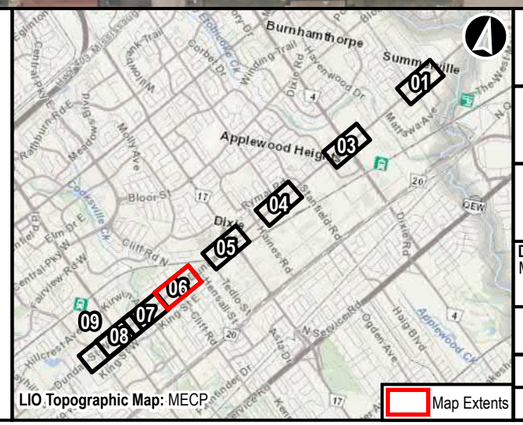
- Receptor
- Presumed Exisiting Right of Way
- Proposed Bus Station Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

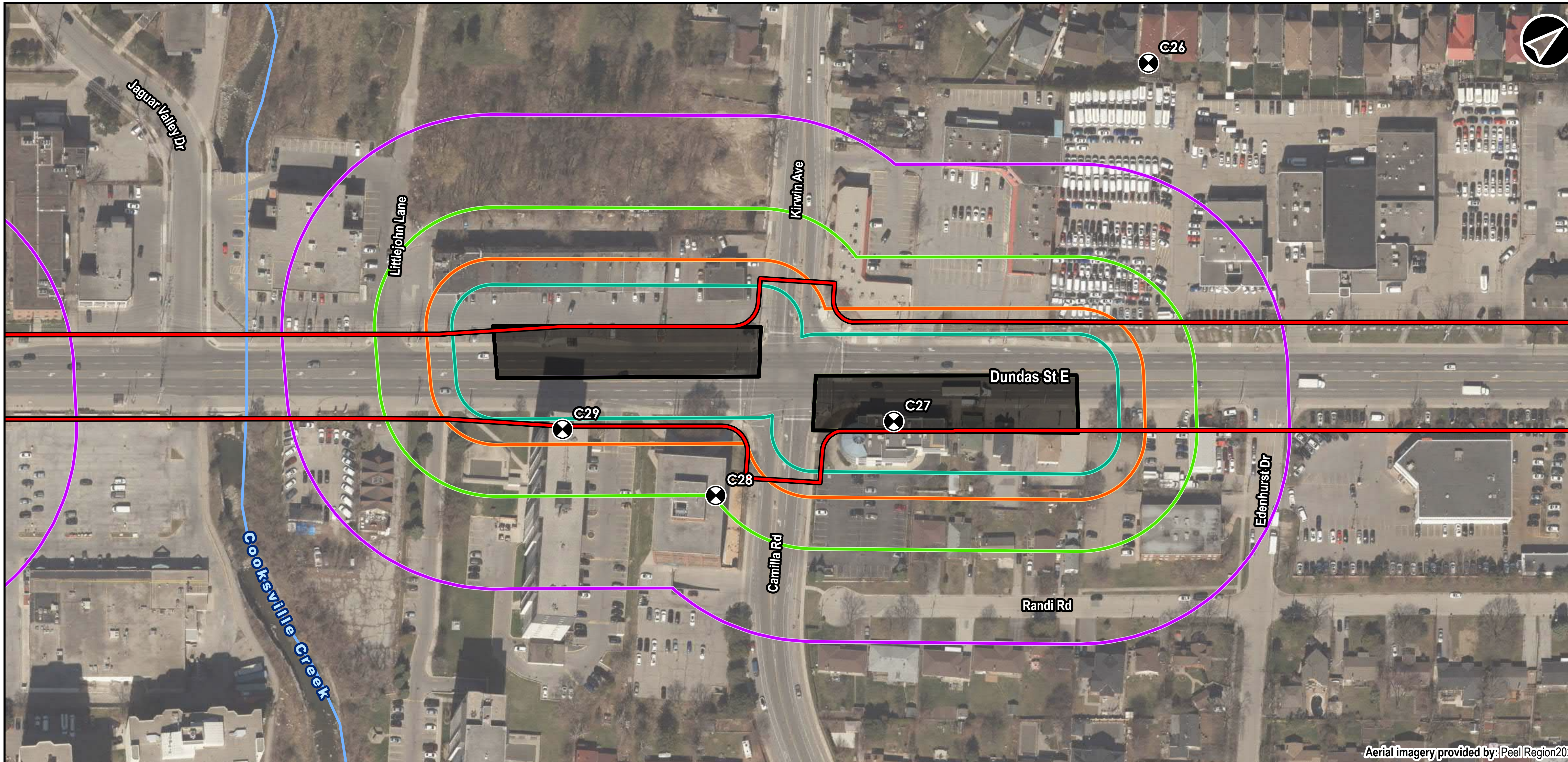
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 6-05**
P:60645291	Rev:00	



Legend

- Receptor
- Presumed Exisiting Right of Way
- Proposed Bus Station Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

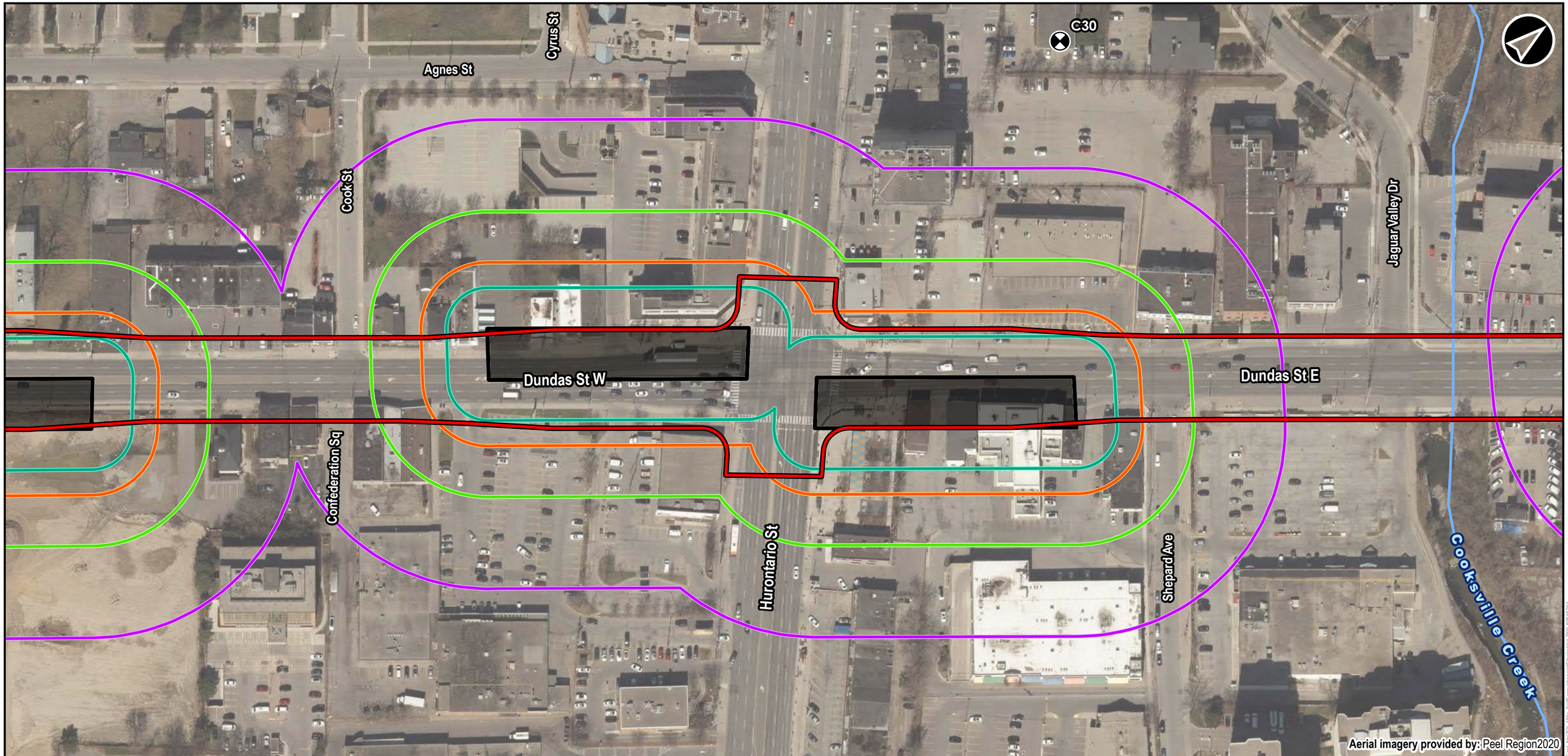
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	Figure: 6-06
P:60645291	Rev:00	



Legend

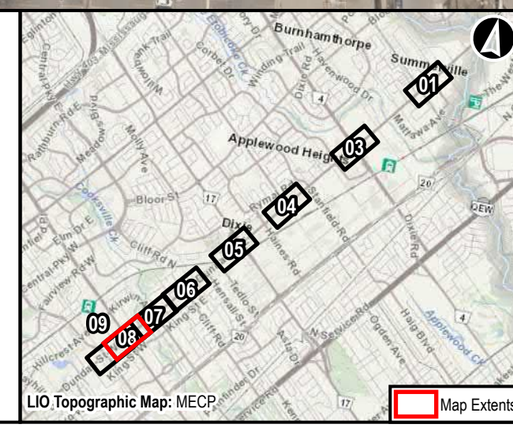
- Receptor
- Presumed Exisiting Right of Way
- Proposed Bus Station Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

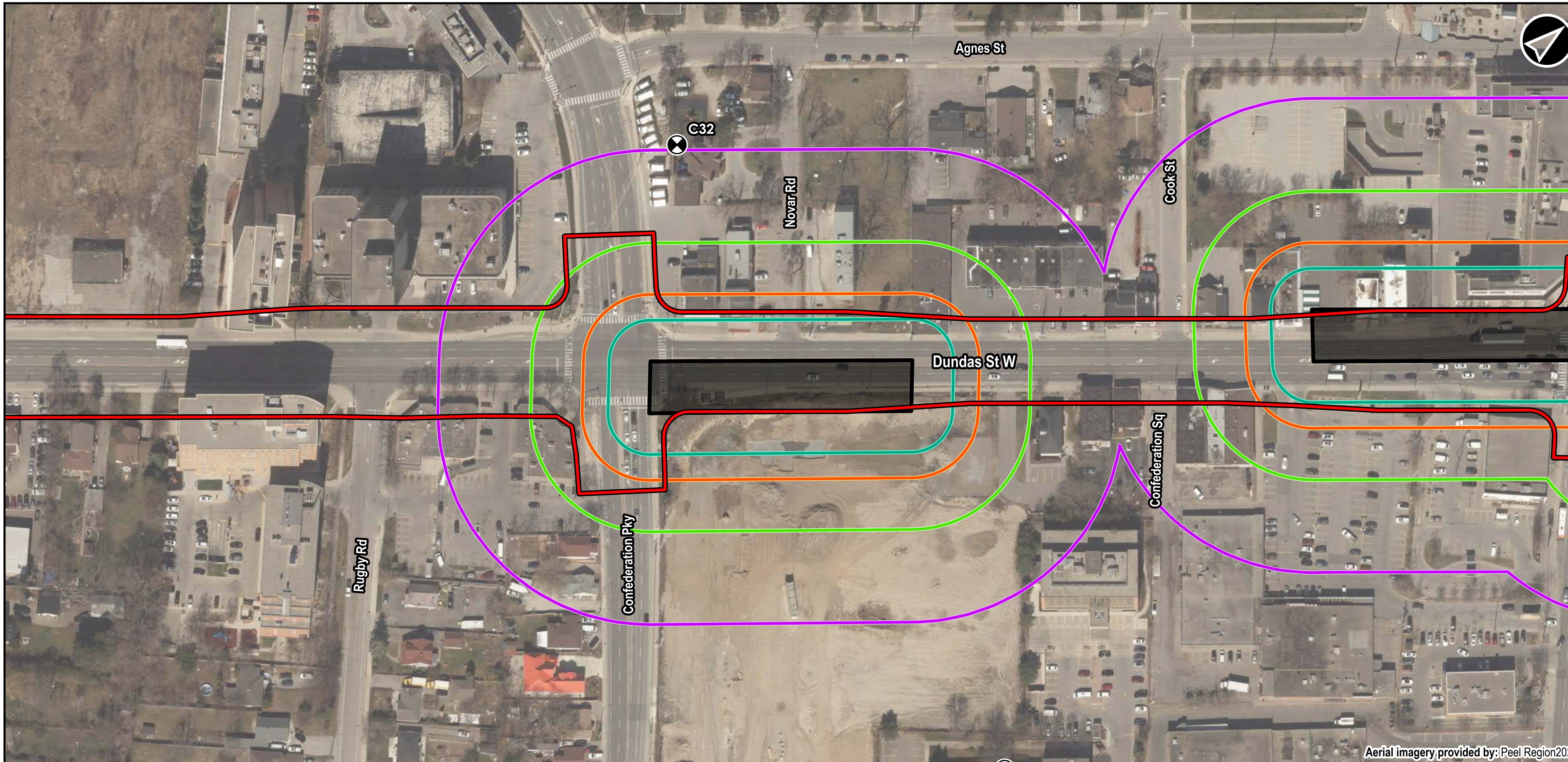
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 6-07**
P:60645291	Rev:00	



Legend

- Receptor
- Presumed Exisiting Right of Way
- Proposed Bus Station Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq (16hr)

0 5 10 20 30 40 50 60 70 80 90 100 110 M

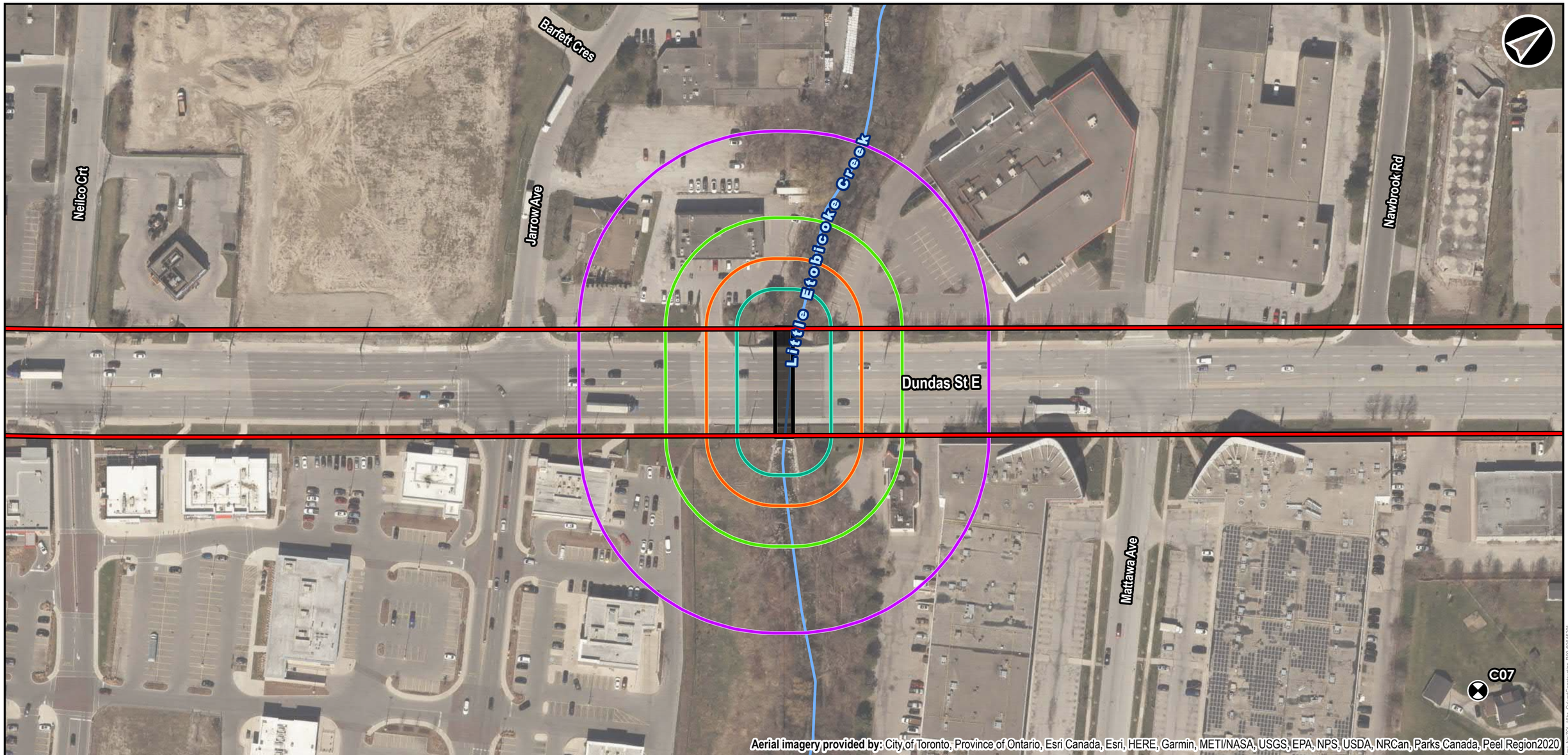
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500
P:60645291	Rev:00

Figure: 6-08



Legend

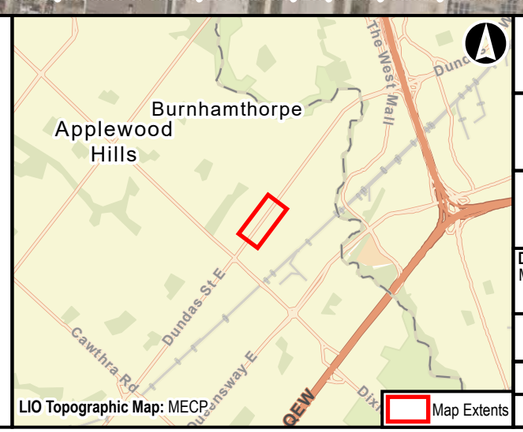
- Receptor
- Proposed Bridge Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Culvert
Construction Noise Zone of Influence Leq 16hr

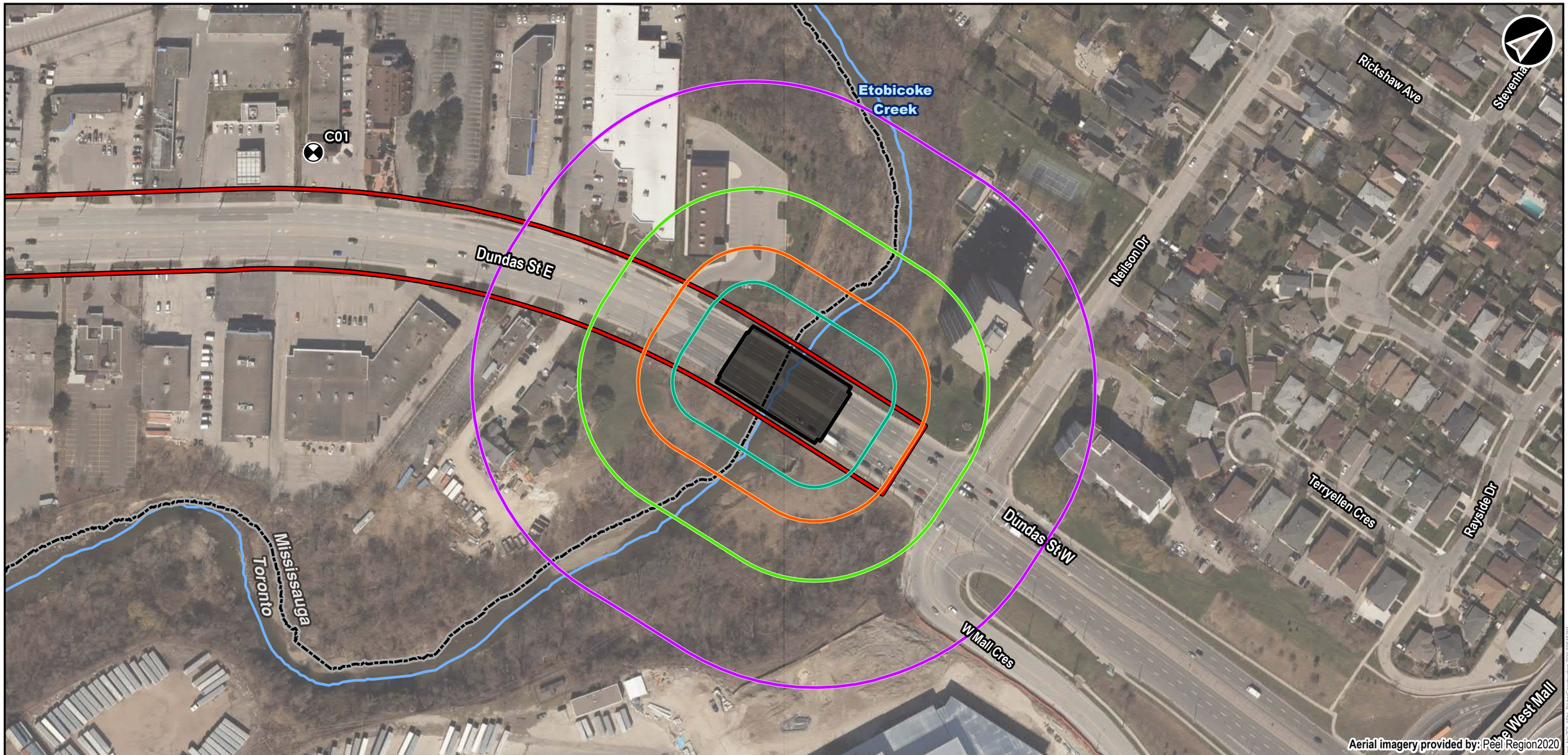
0 10 20 40 60 80 100 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 7**
P:60645291	Rev:00	



Legend

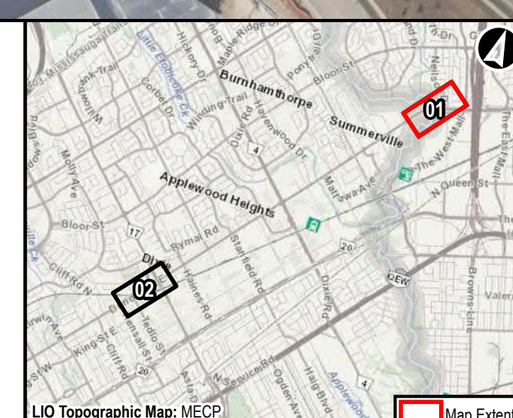
- Receptor
- Presumed Exisiting Right of Way
- Proposed Bridge Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Bridge
Construction Noise Zone of Influence Leq 16hr

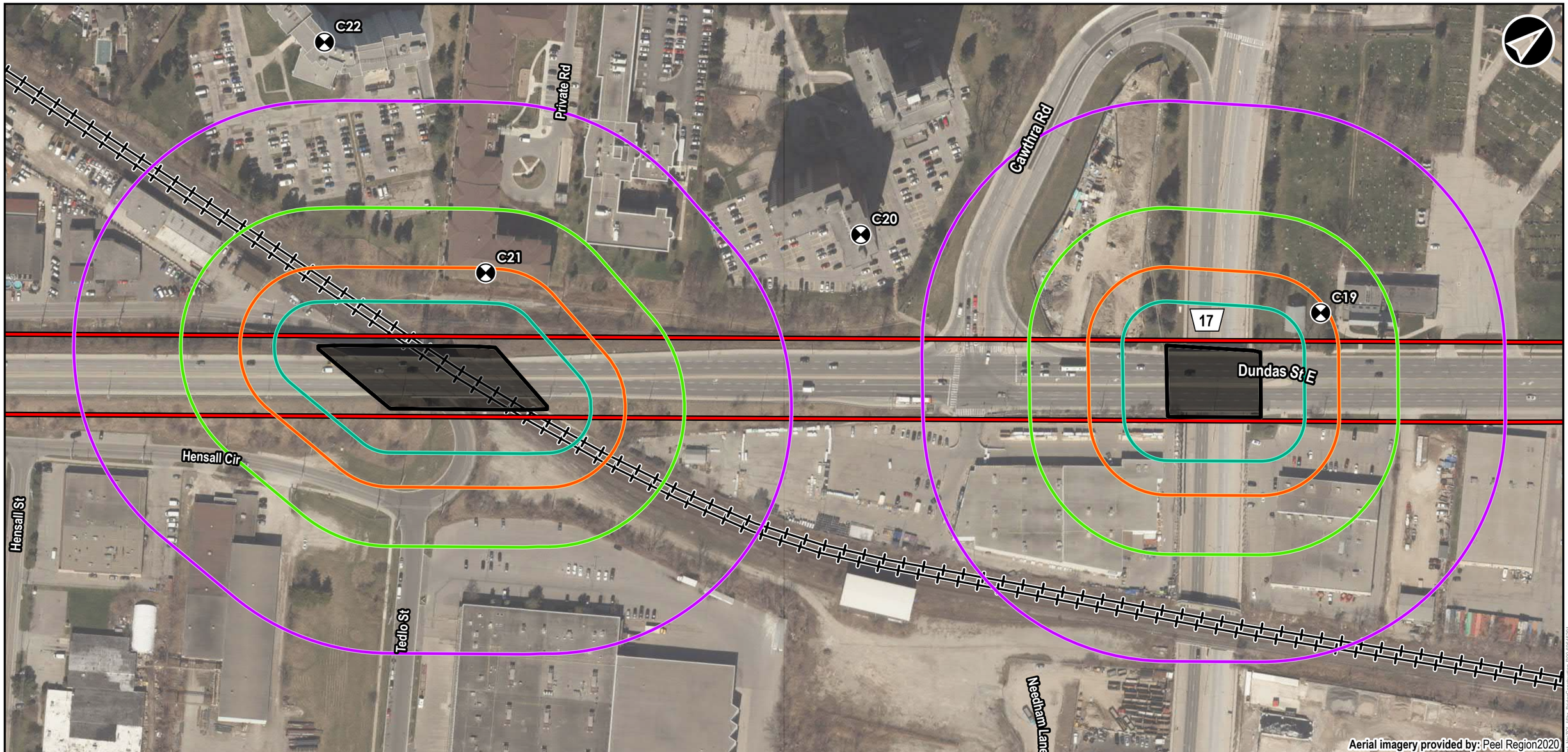
0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 8-01**
P:60645291	Rev:00	



Legend

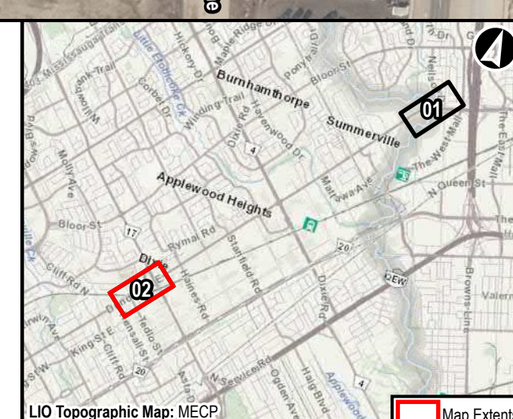
- Receptor
- Presumed Exisiting Right of Way
- Proposed Bridge Construction Limits

Zone of Influence

- Residential Receptors
- Institutional Receptors
- Commercial Receptors
- Industrial Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Bridge
Construction Noise Zone of Influence Leq 16hr

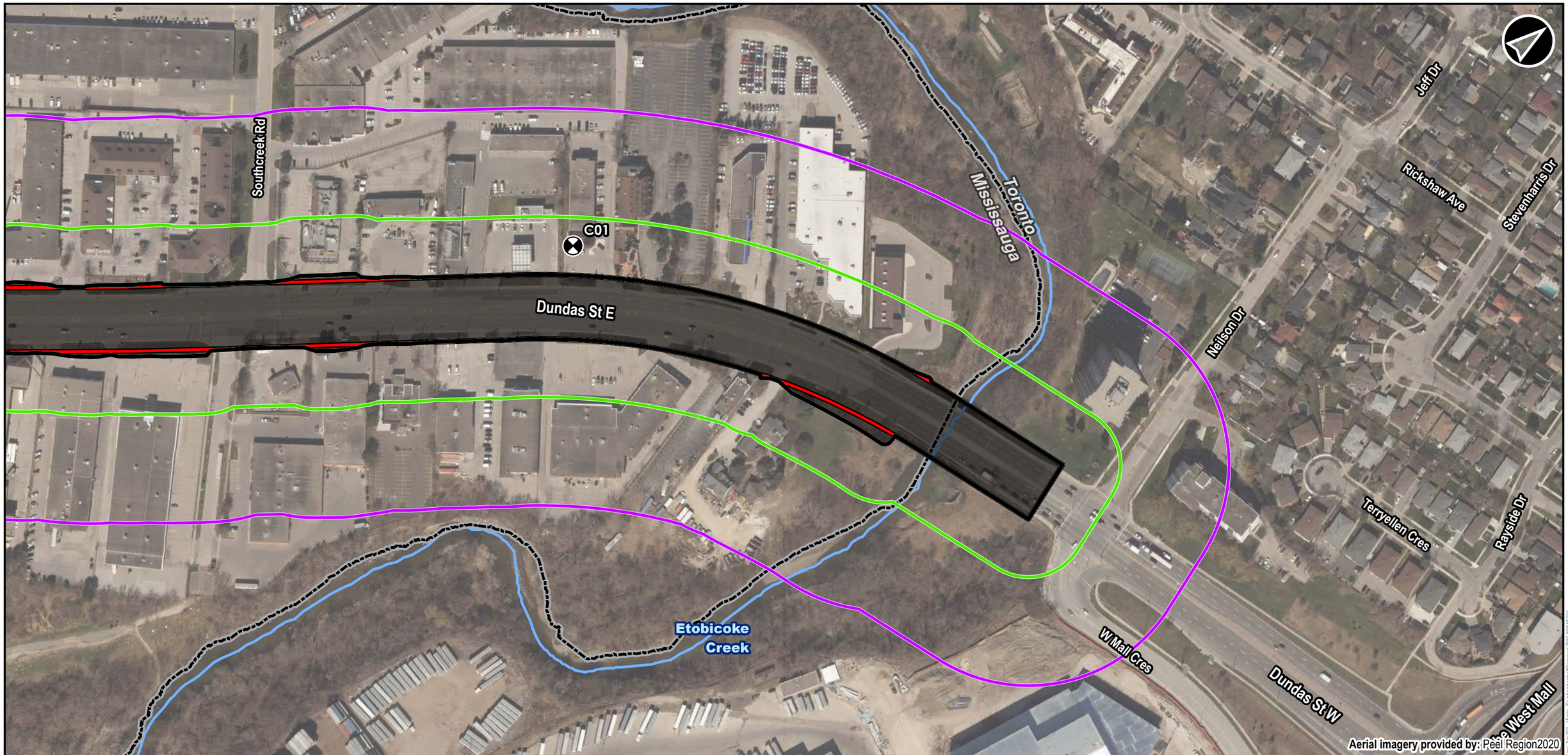
0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 8-02**
P:60645291	Rev:00	



Legend

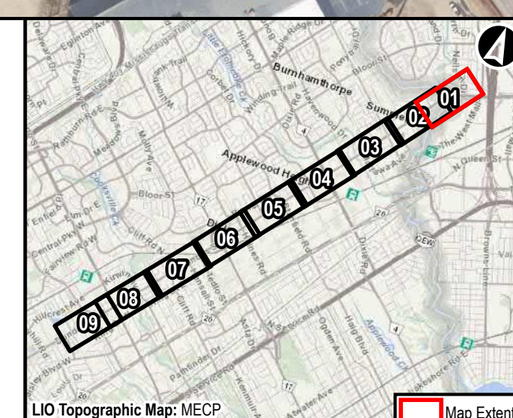
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

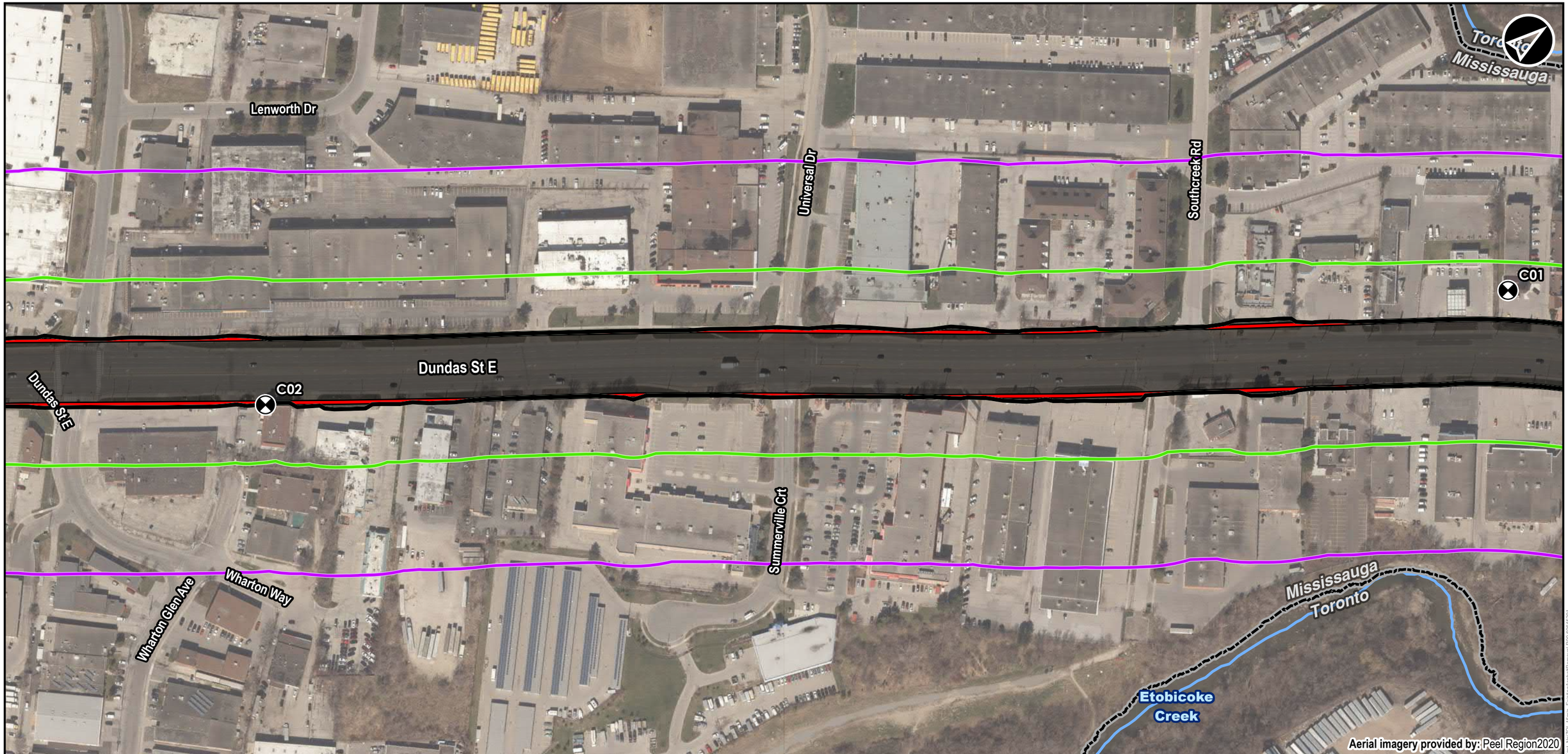
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-01**
P:60645291	Rev:00	



Legend

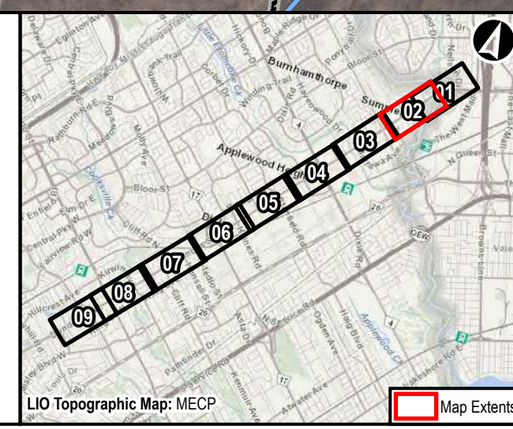
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

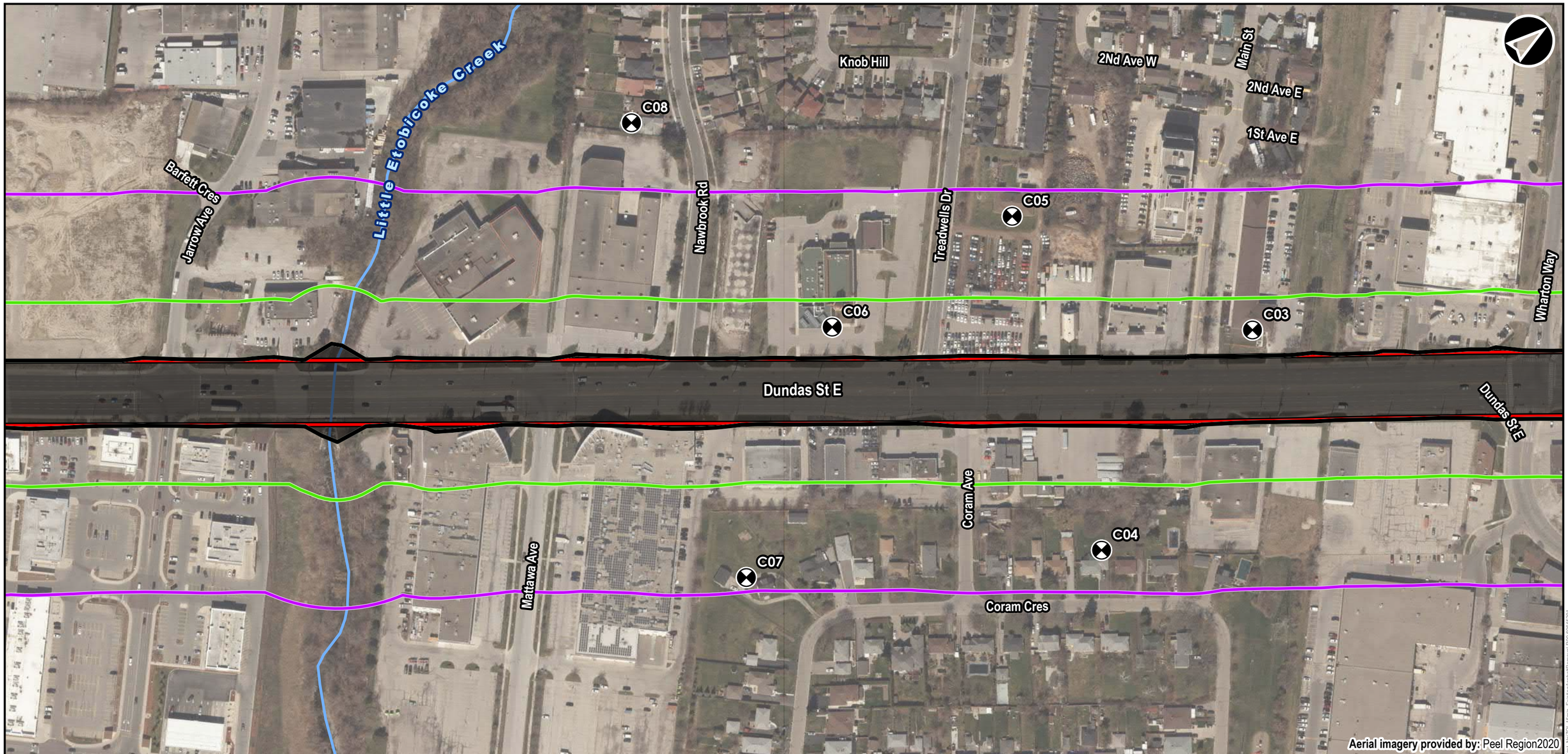
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-02**
P:60645291	Rev:00	



Legend

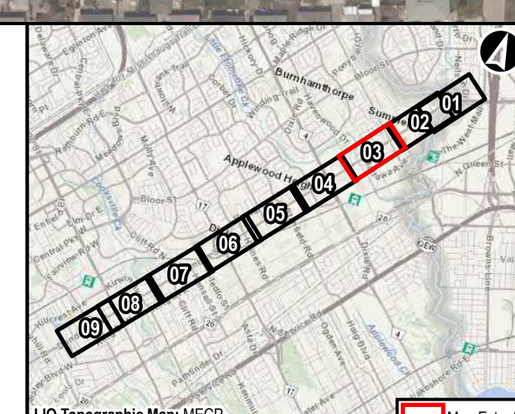
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

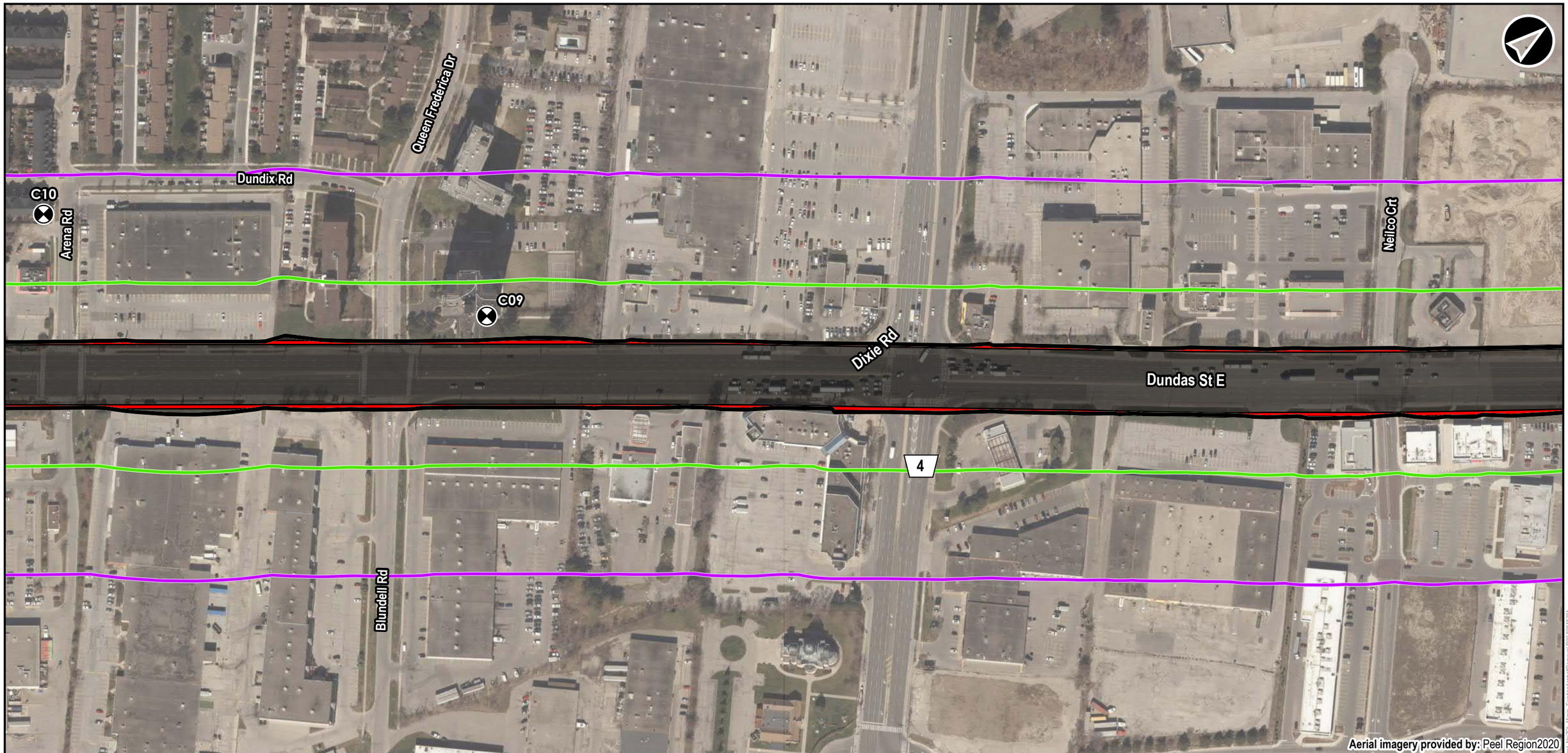
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-03**
P:60645291	Rev:00	



Legend

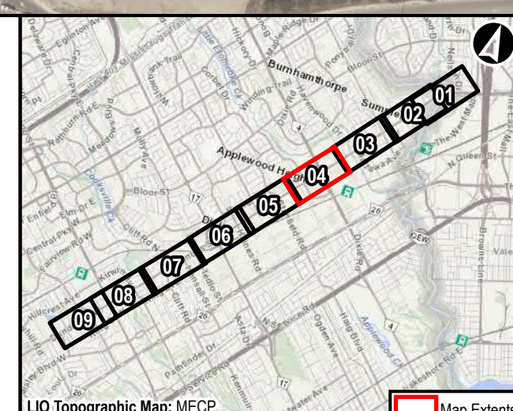
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

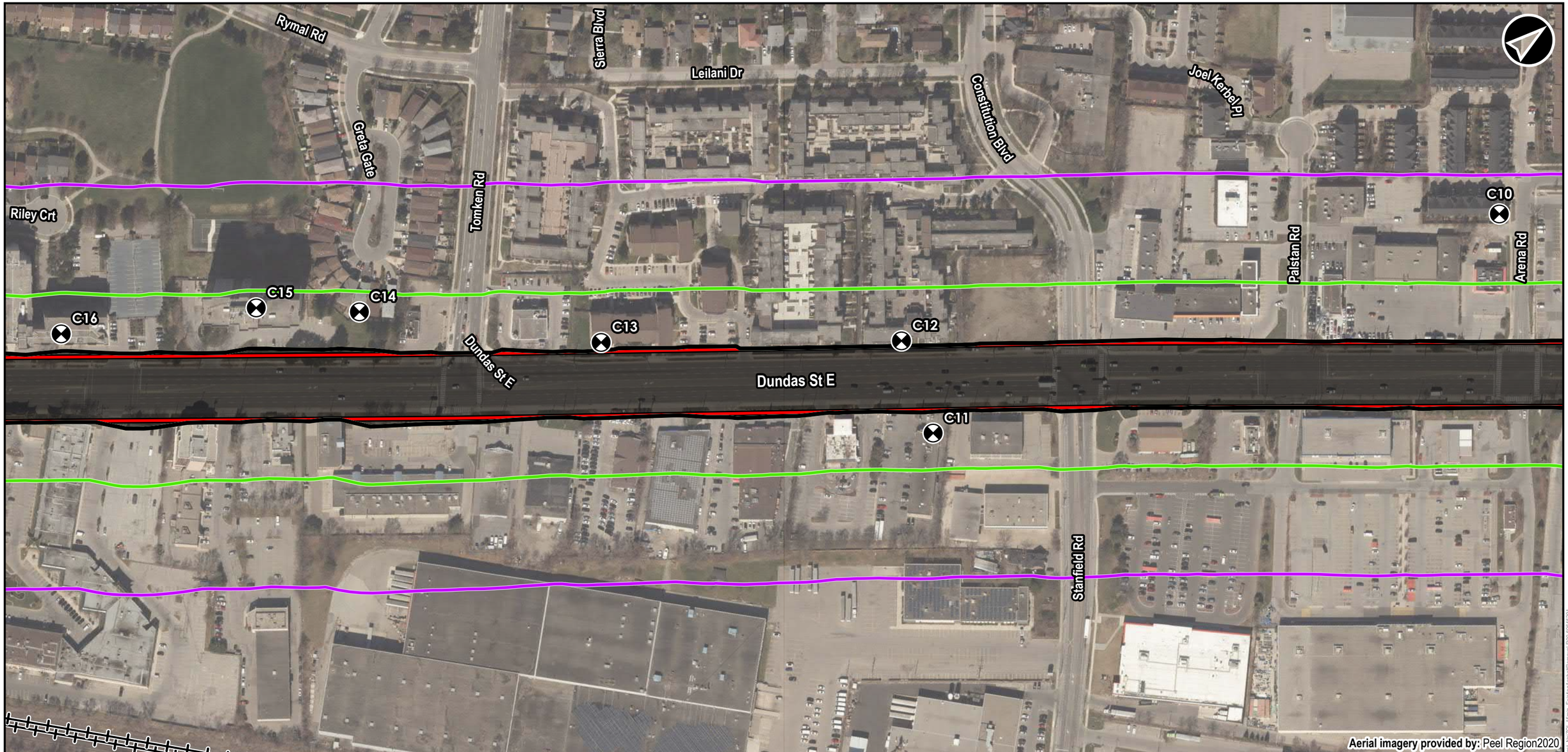
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-04**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Railway

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

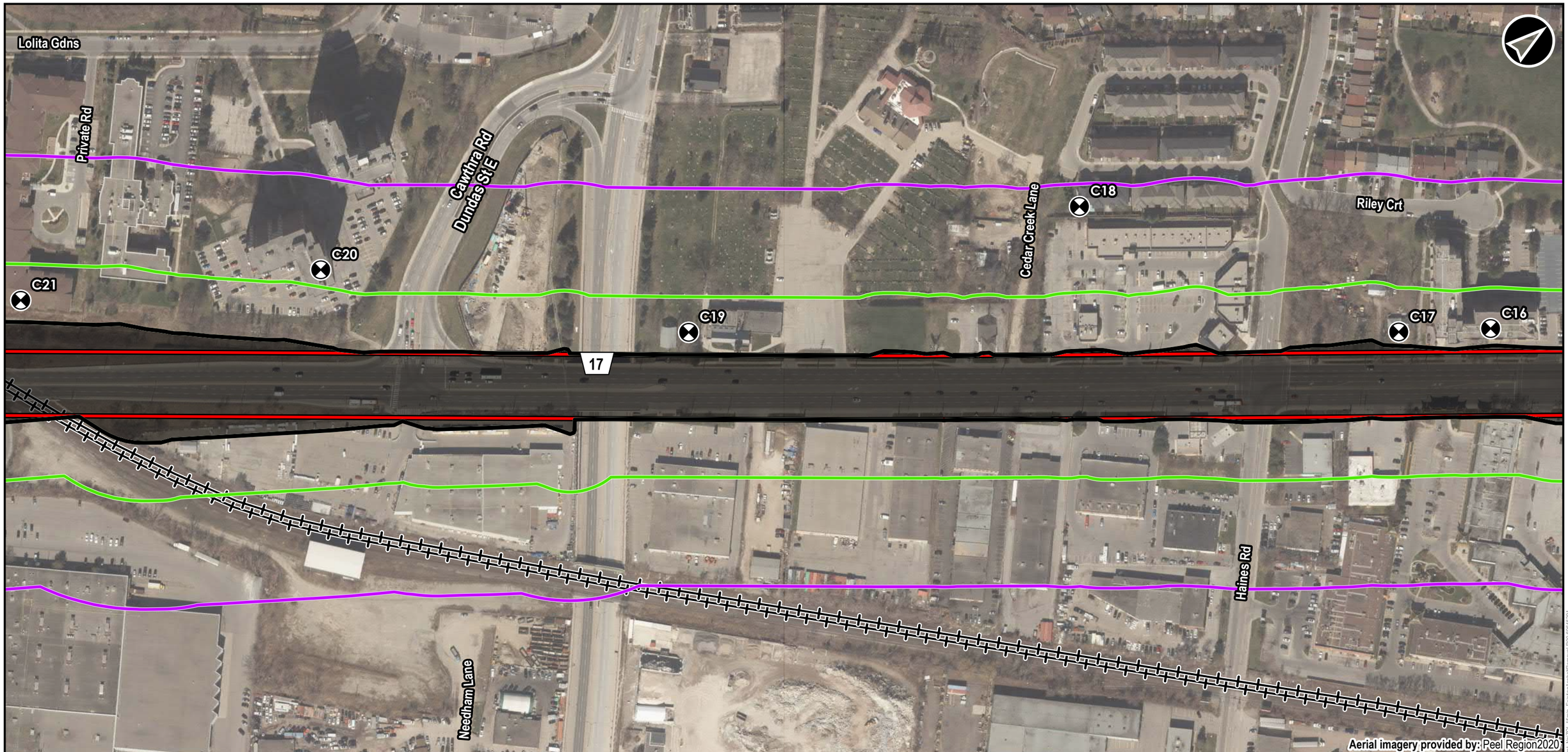
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-05**
P:60645291	Rev:00	



Legend

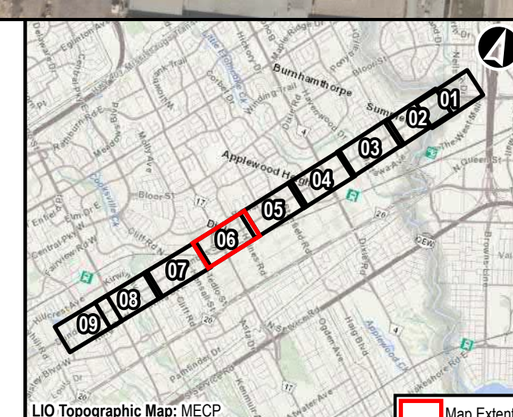
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

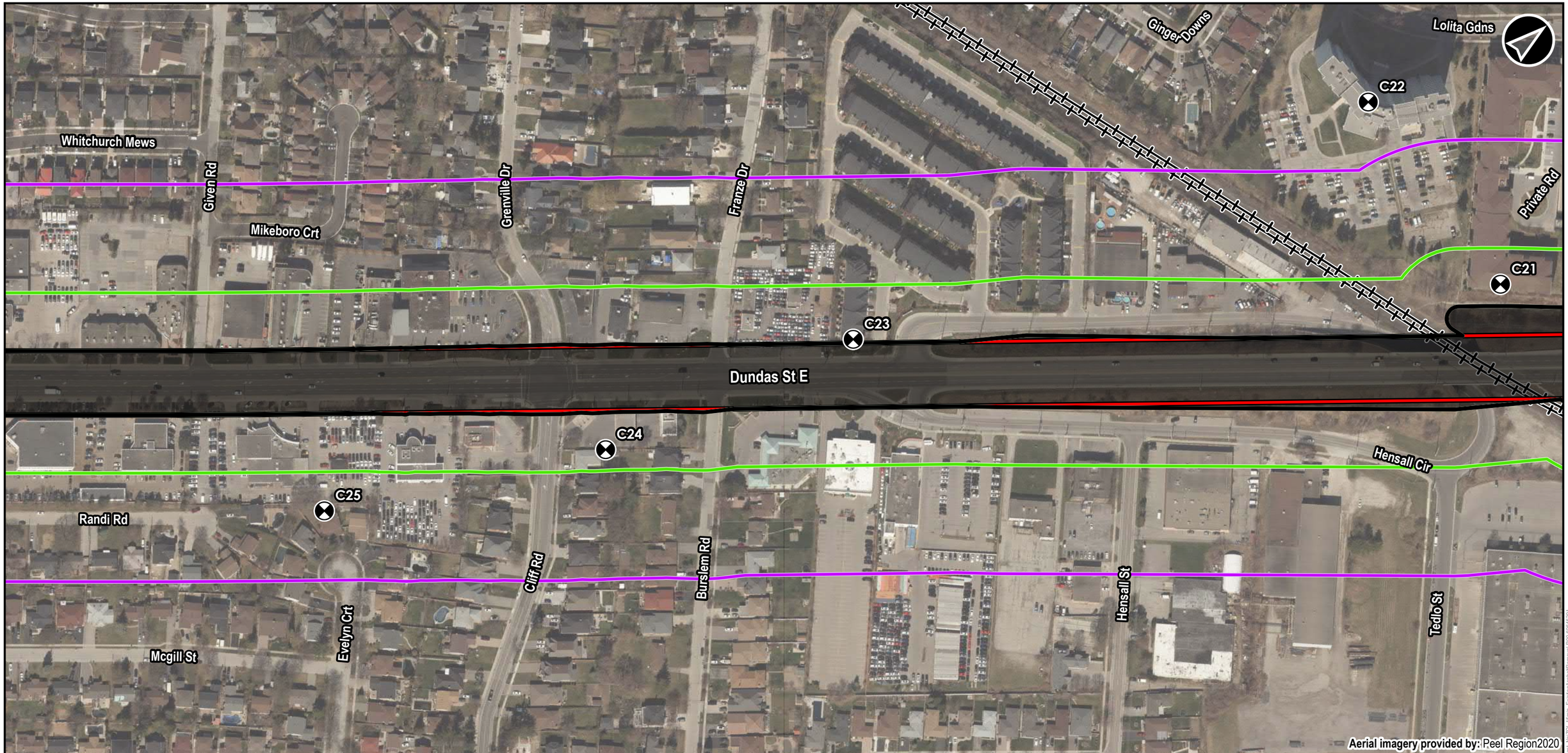
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-06**
P:60645291	Rev:00	



Legend

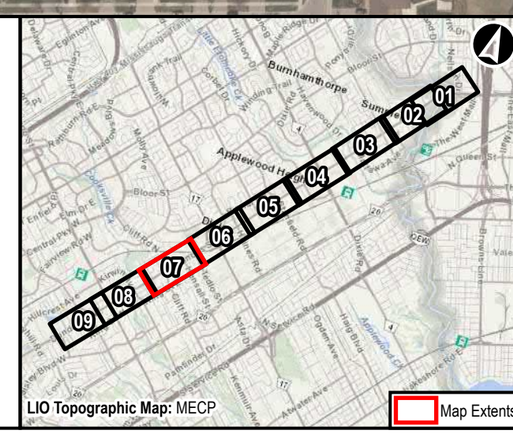
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

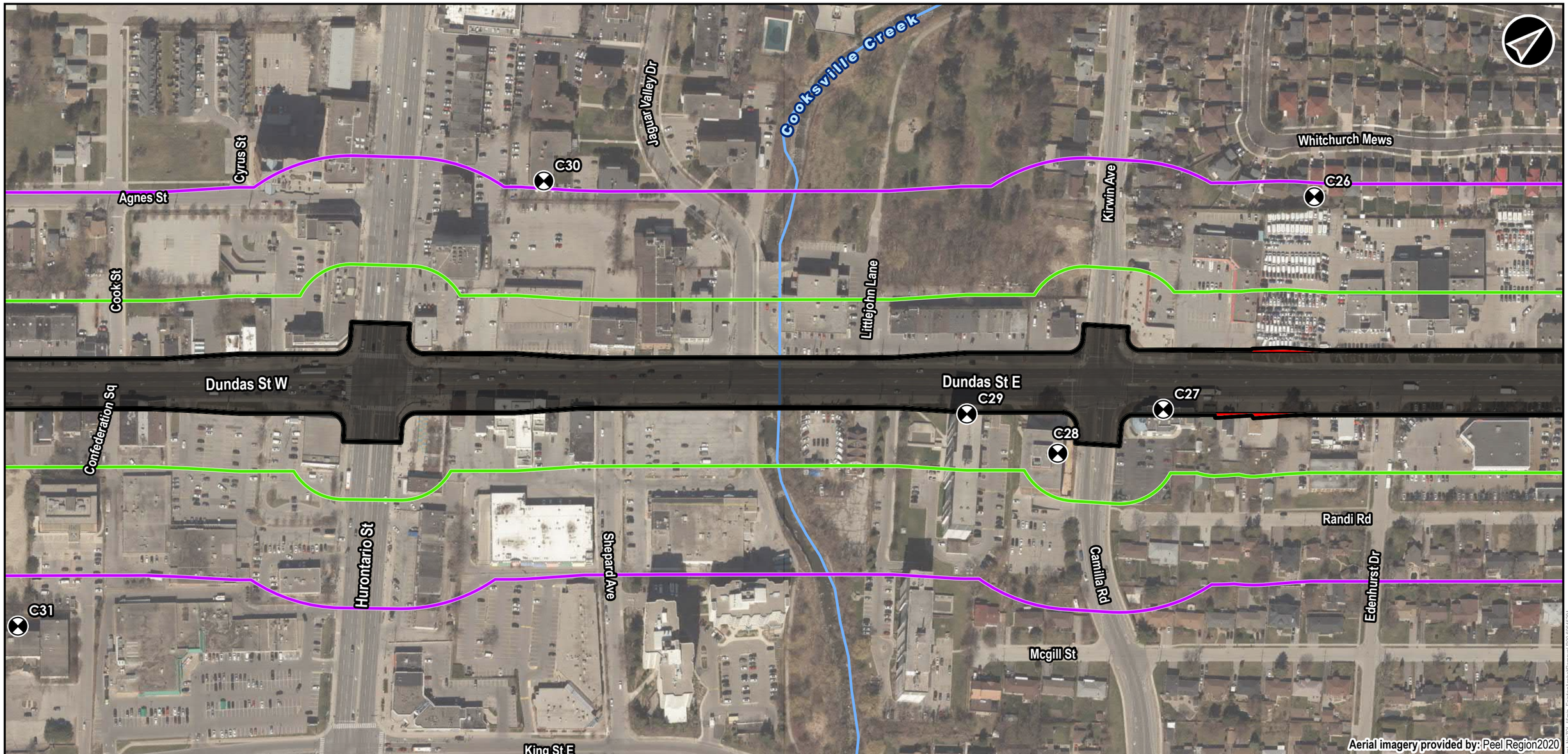
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-07**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

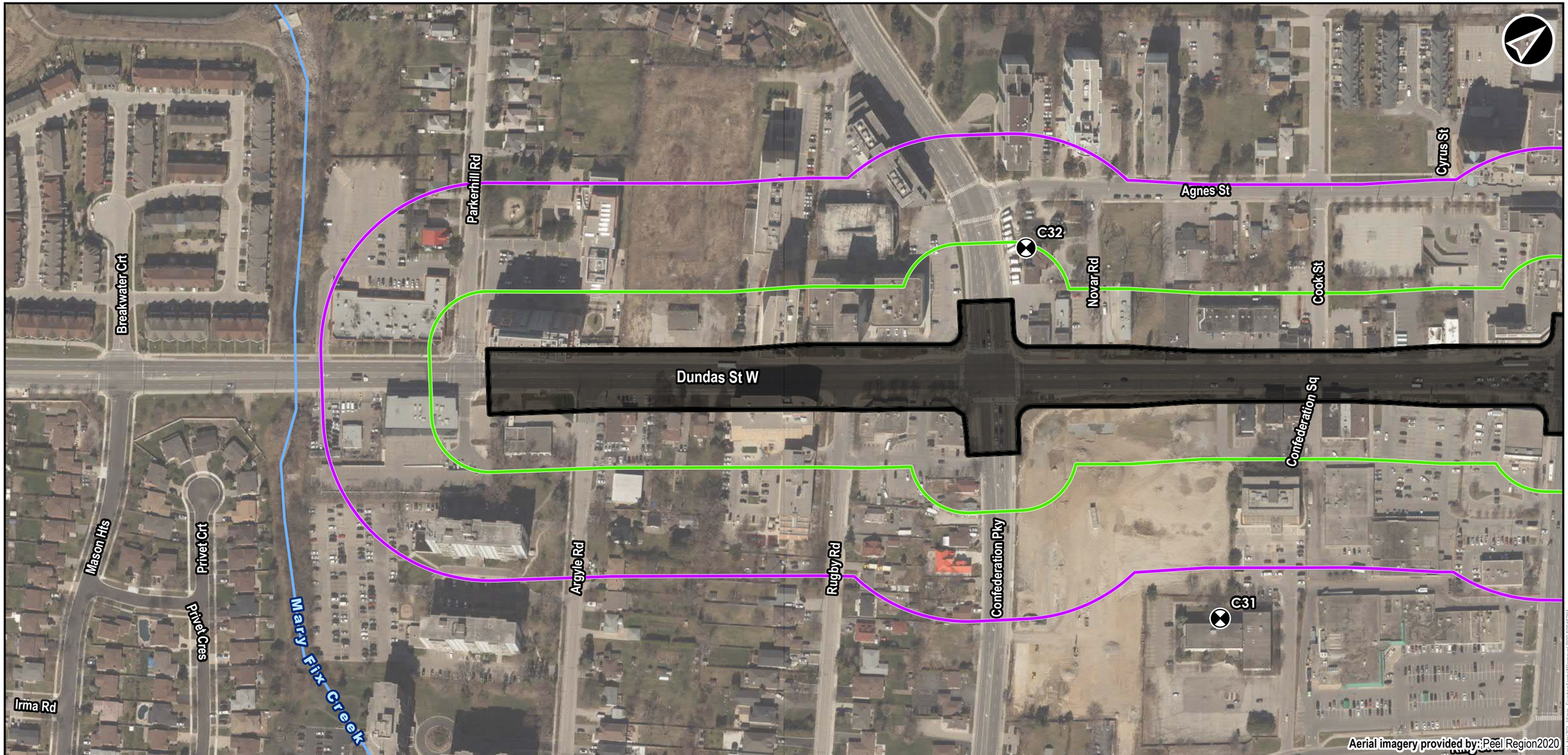
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-08**
P:60645291	Rev:00	



Legend

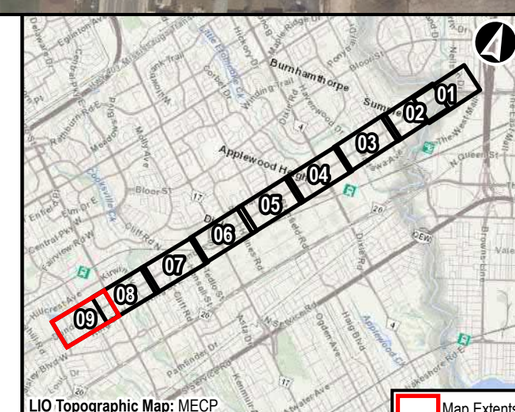
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Leq 15min

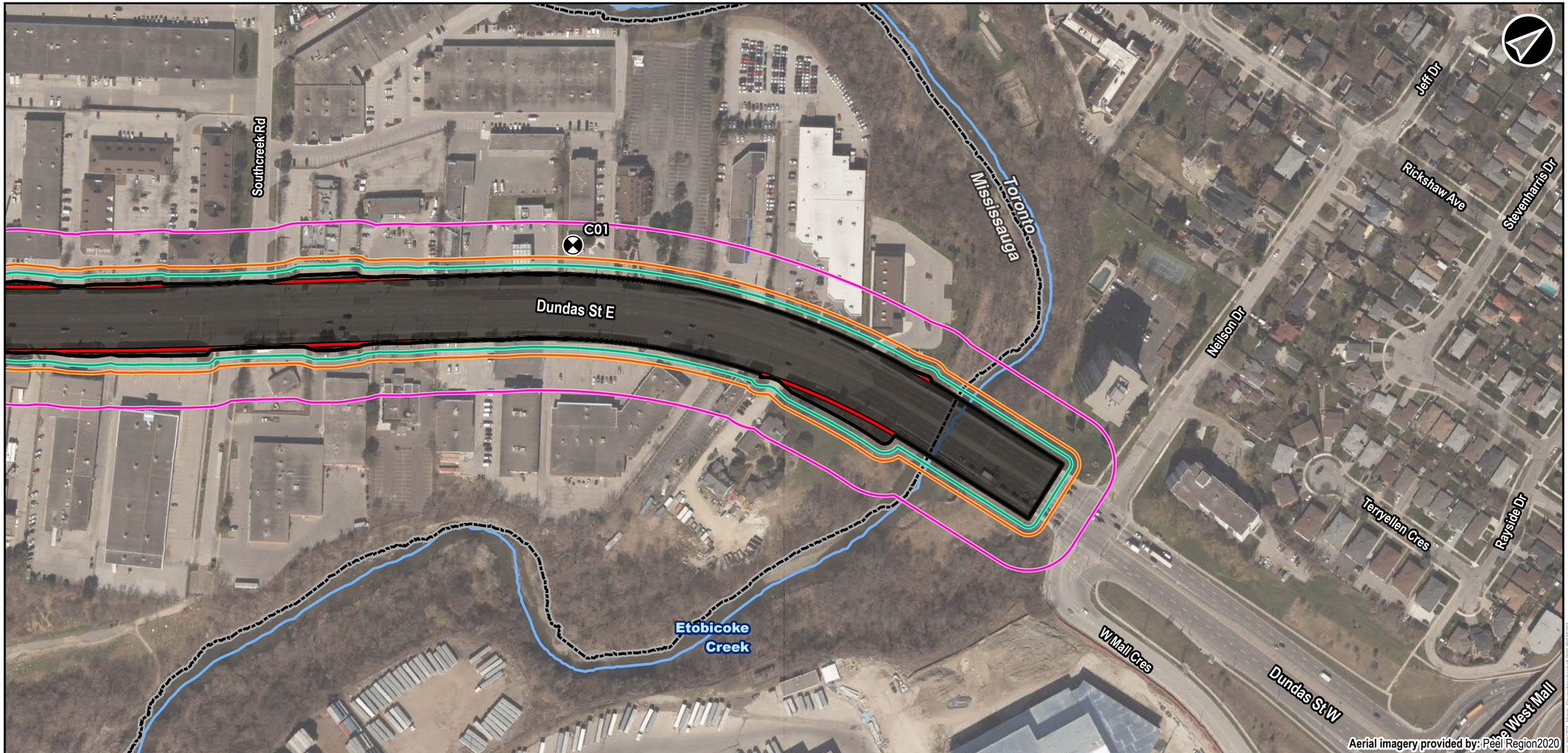
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 9-09**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

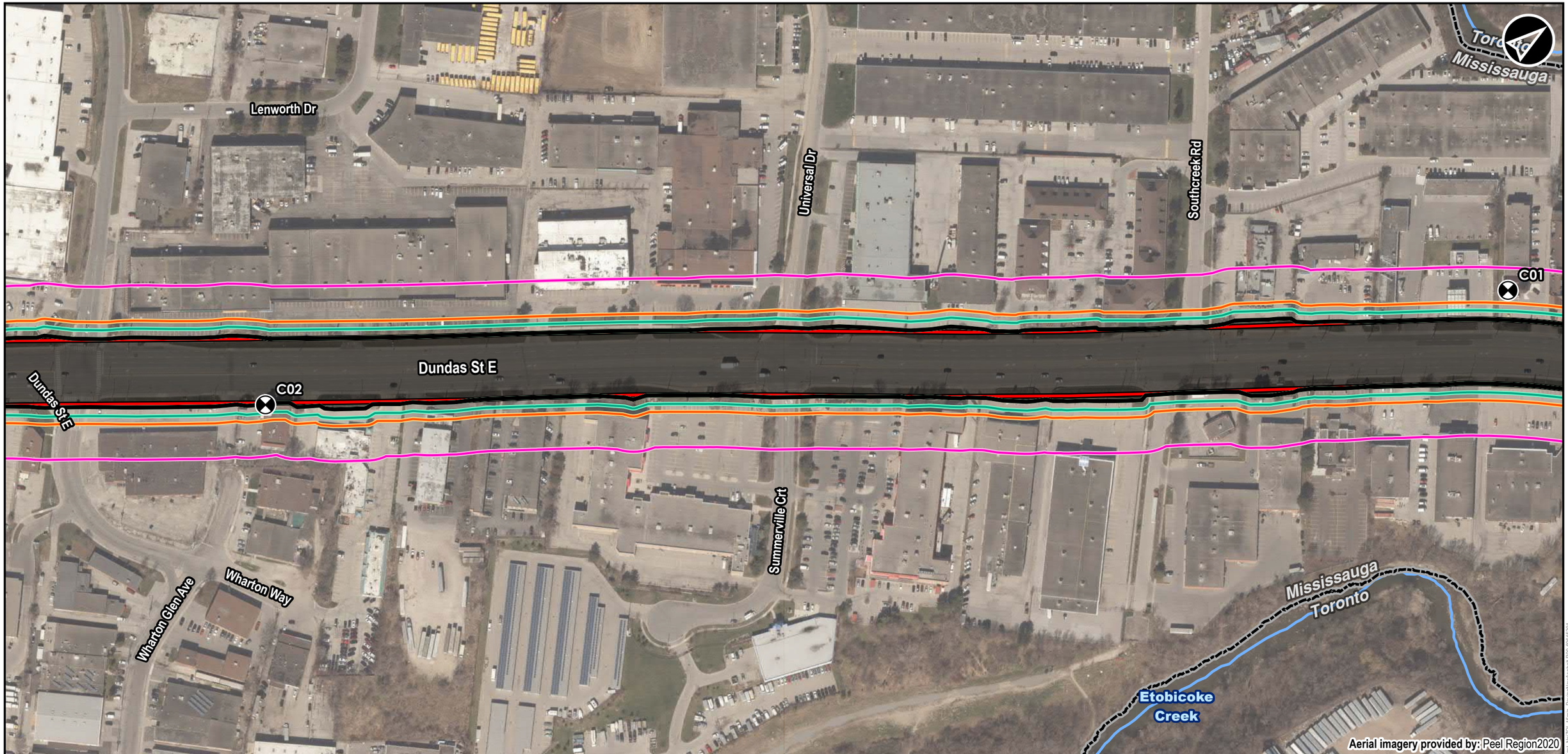
0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500
P:60645291	Rev:00

Figure: 10-01



Legend

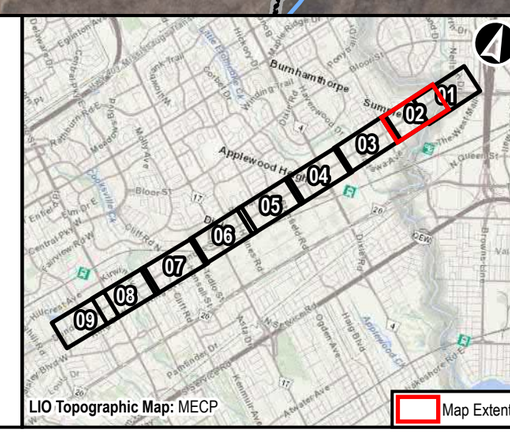
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

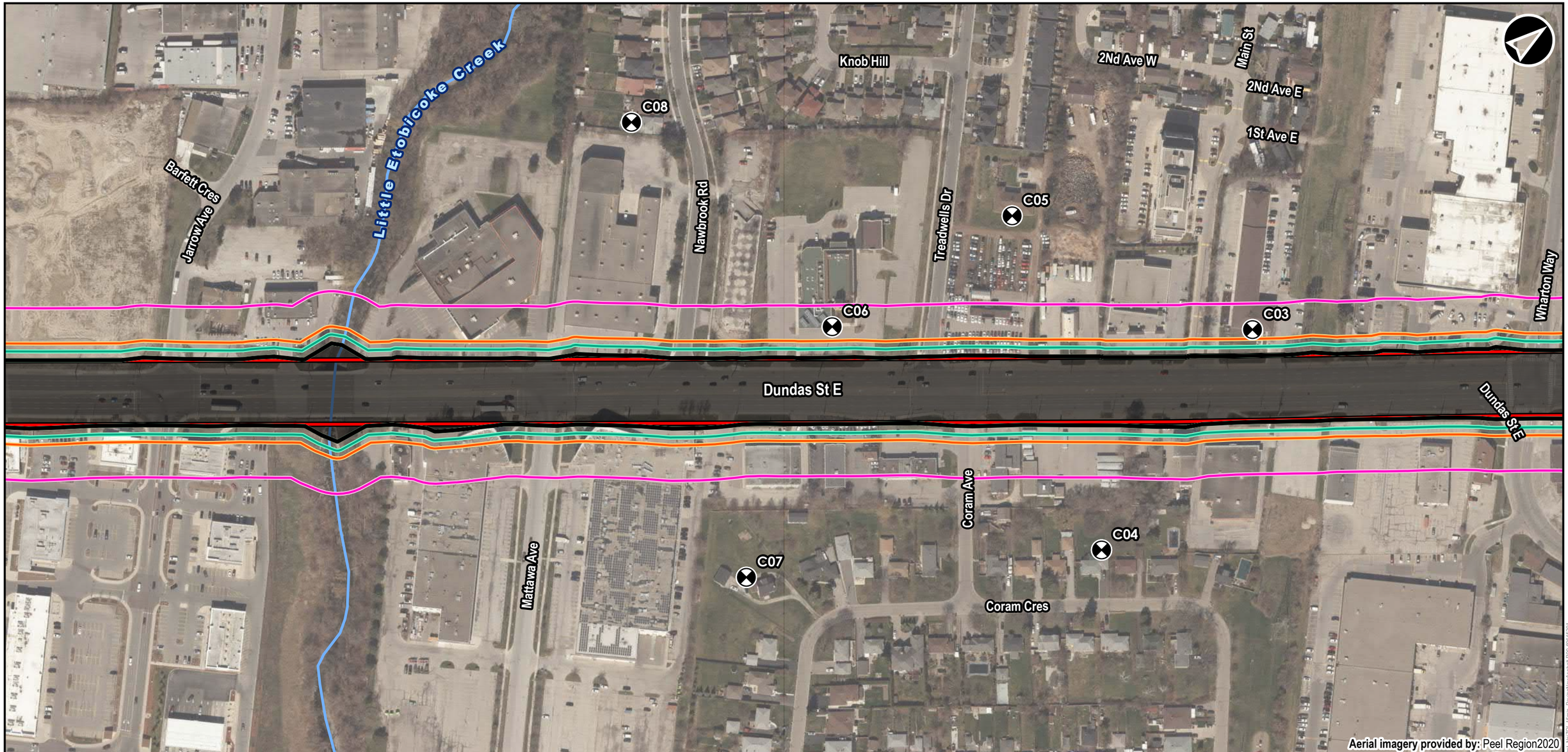
Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 10-02**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

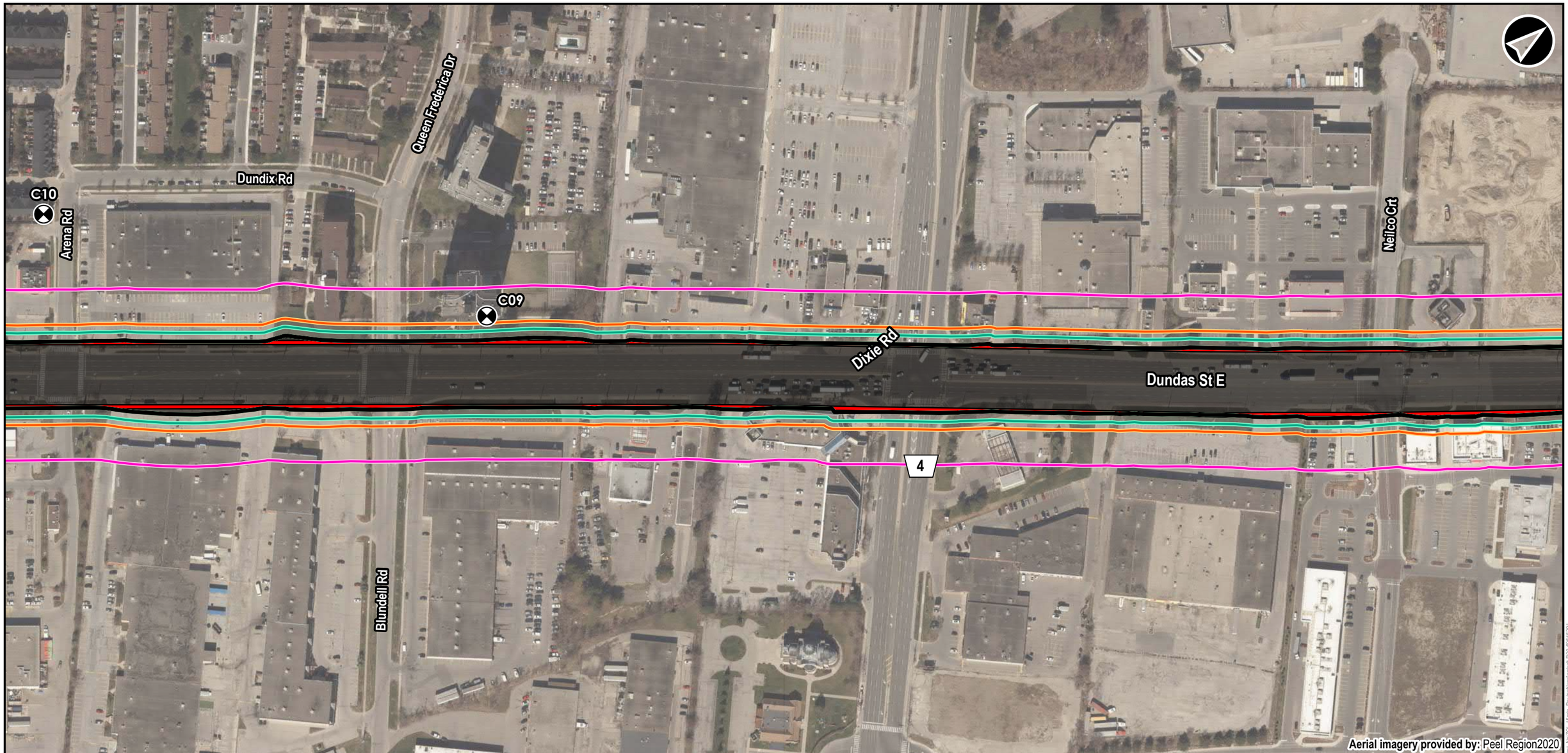
Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 10-03**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

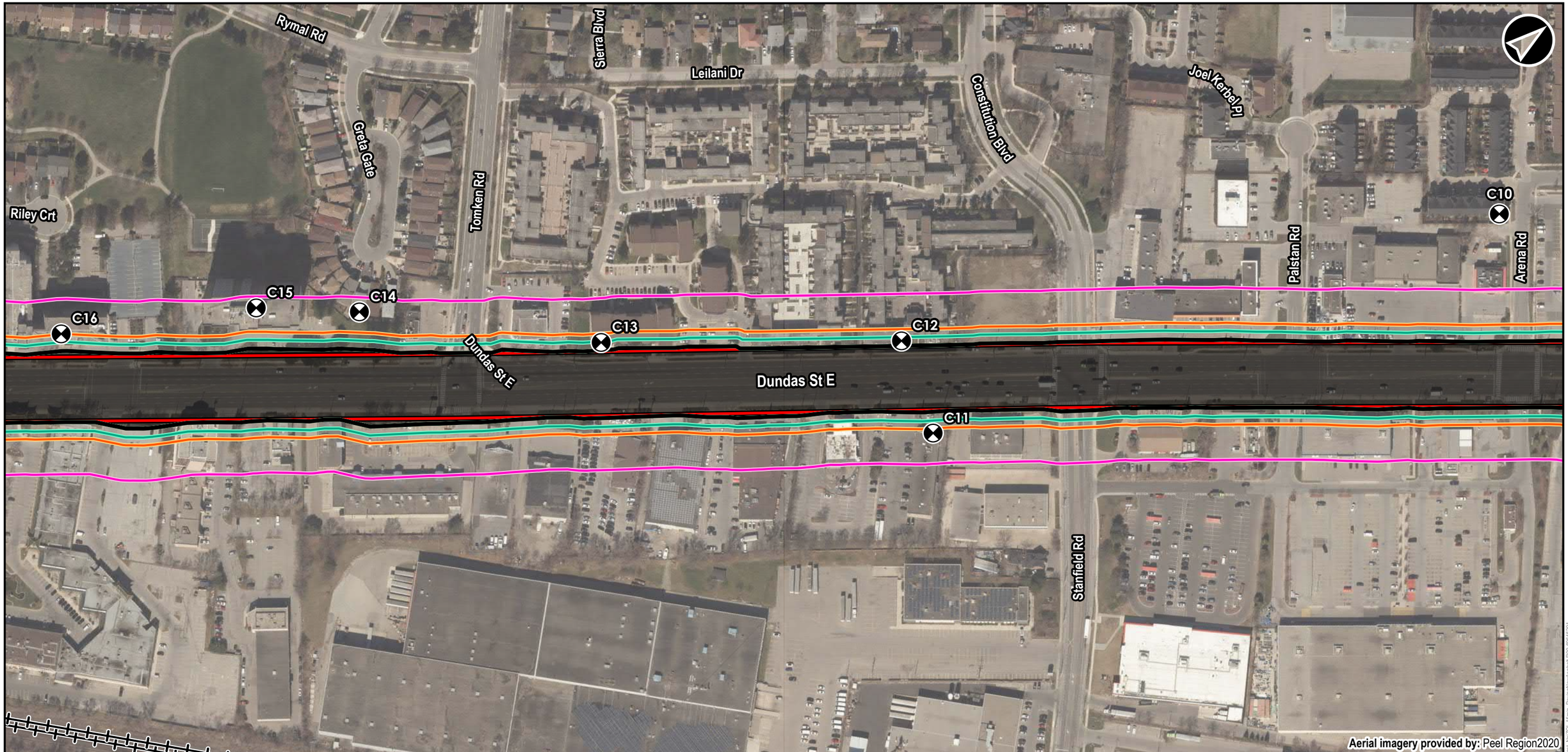
Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 10-04**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

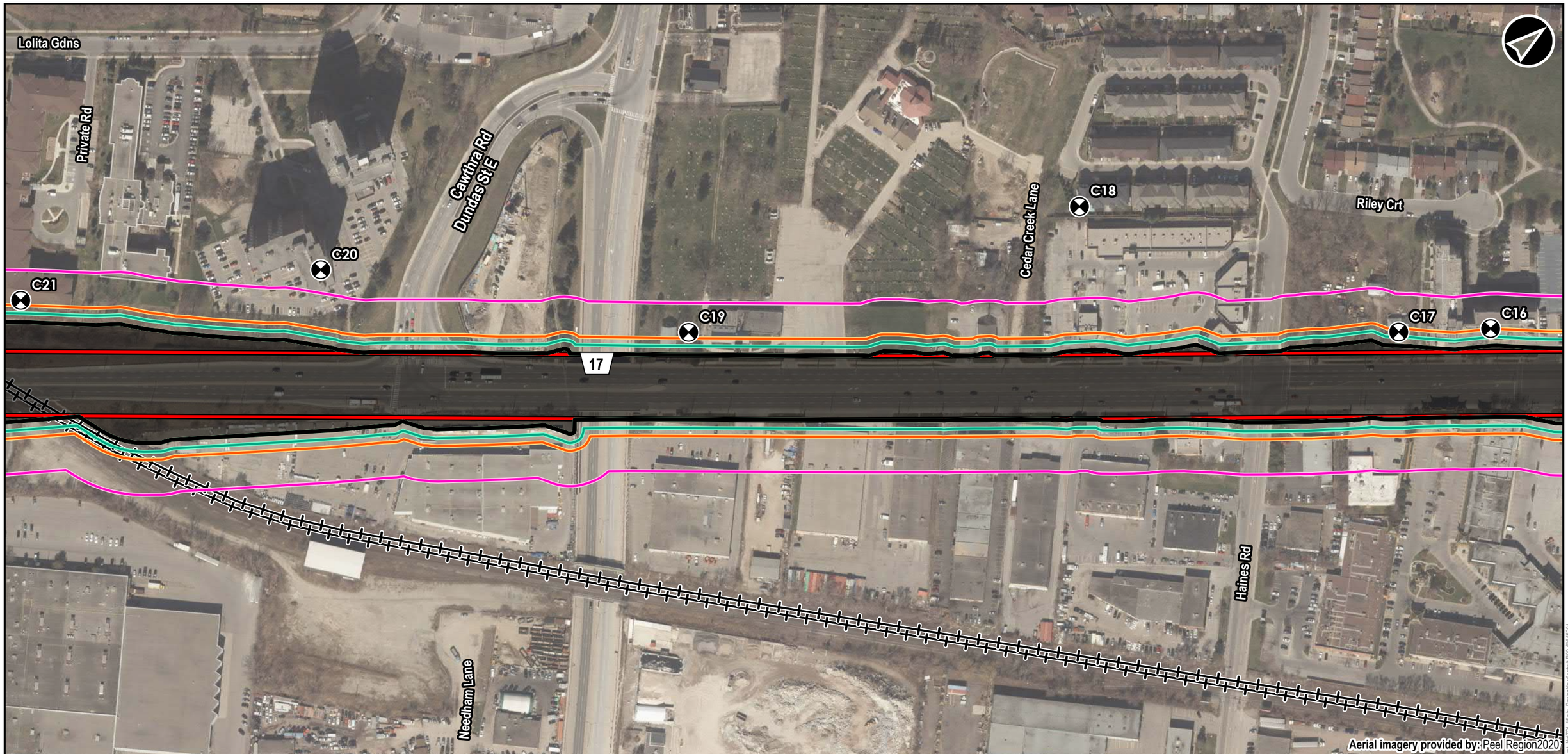
Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 10-05**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

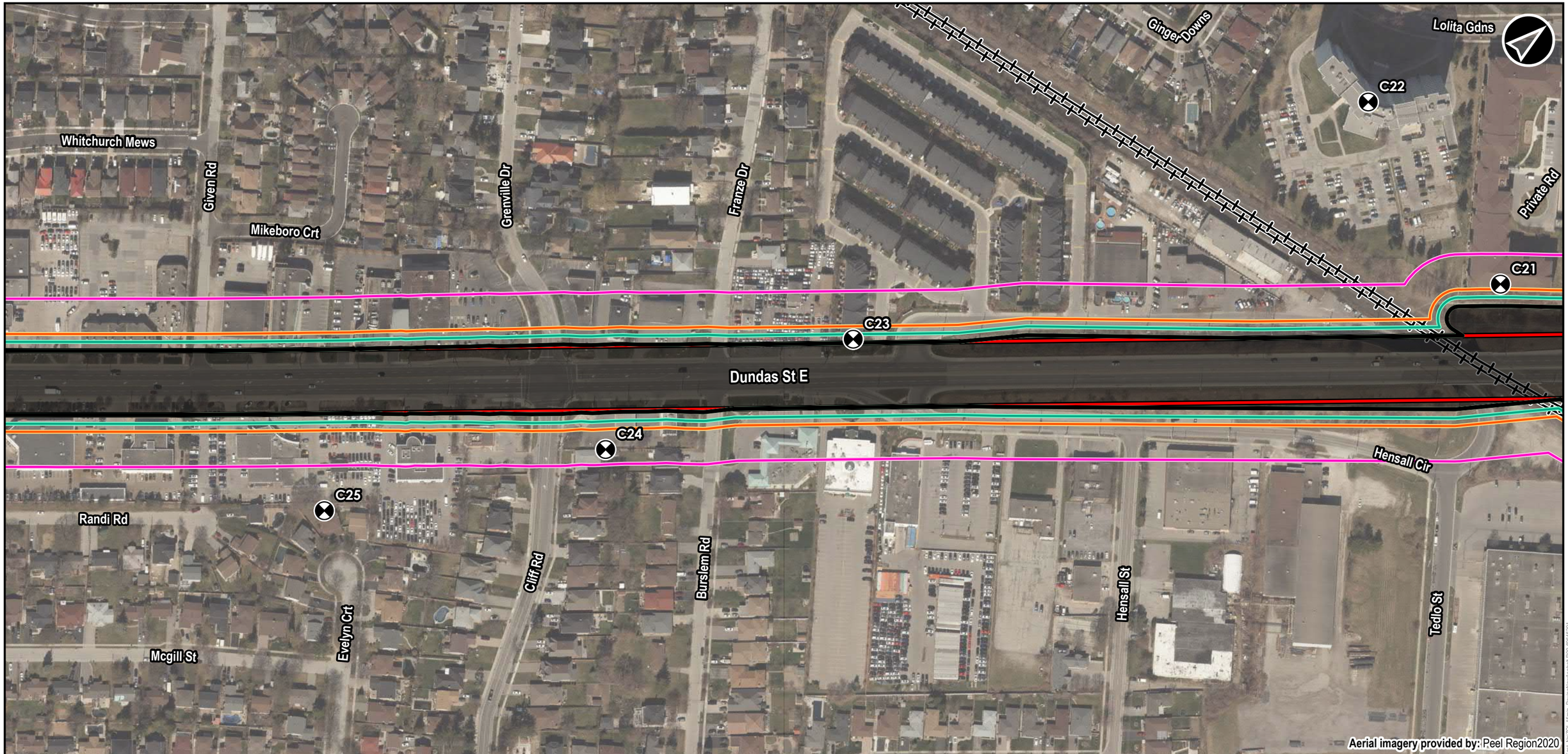
Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 10-06**
P:60645291	Rev:00	



Legend

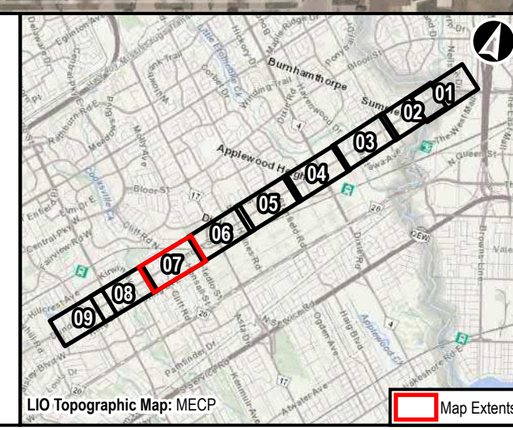
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 10-07**
P:60645291	Rev:00	

Aerial imagery provided by: Peel Region2020

Legend

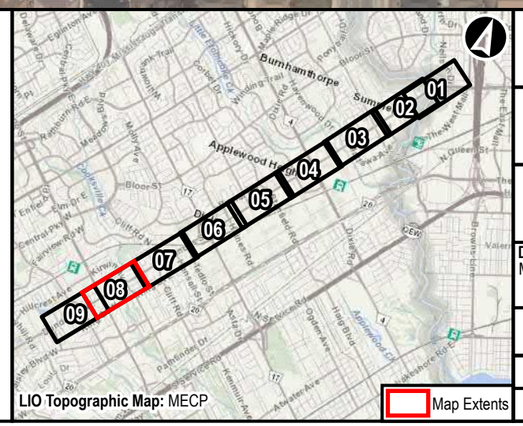
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

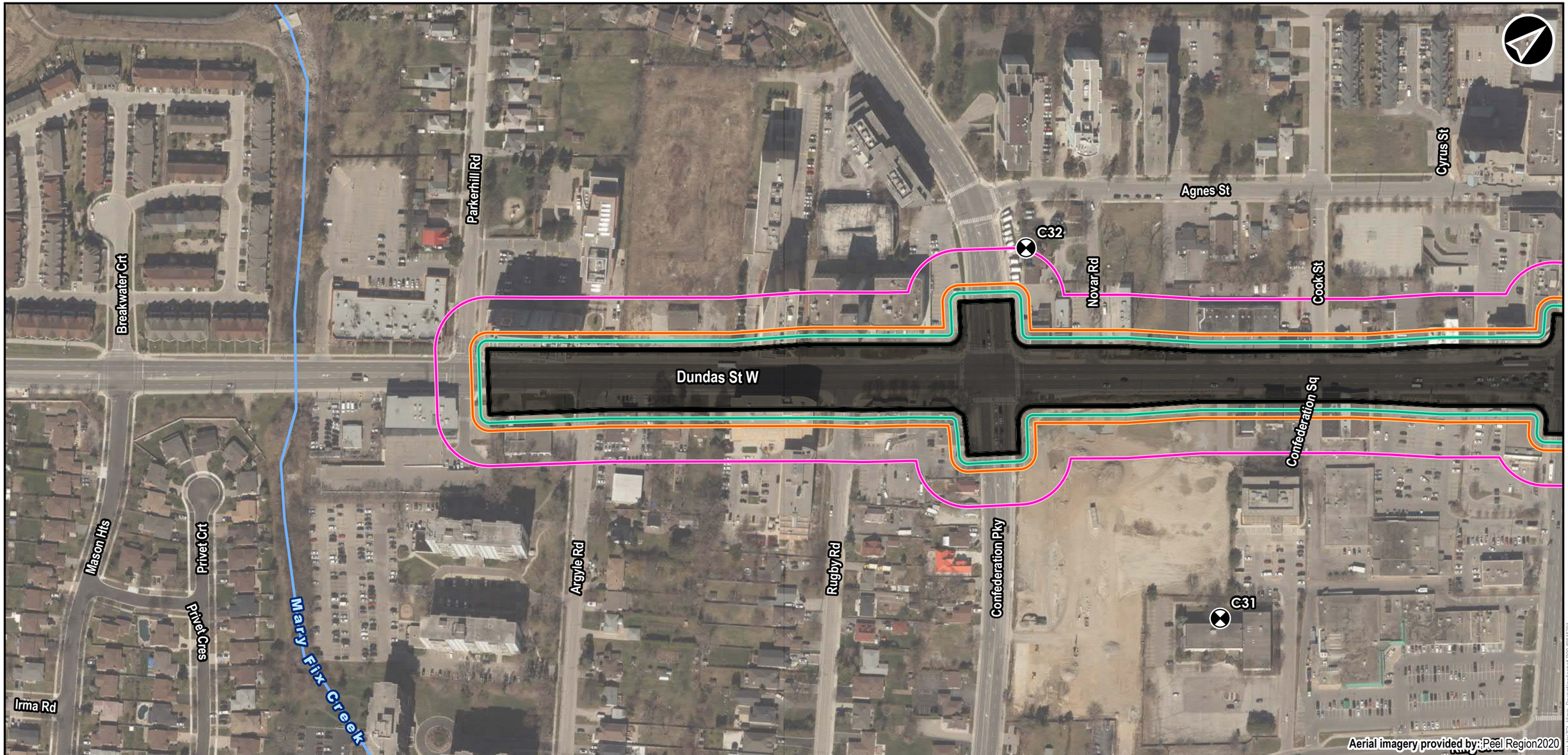
0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500
P:60645291	Rev:00

Figure: 10-08



Legend

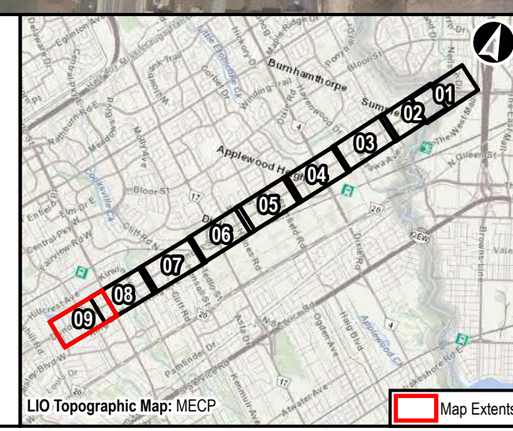
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

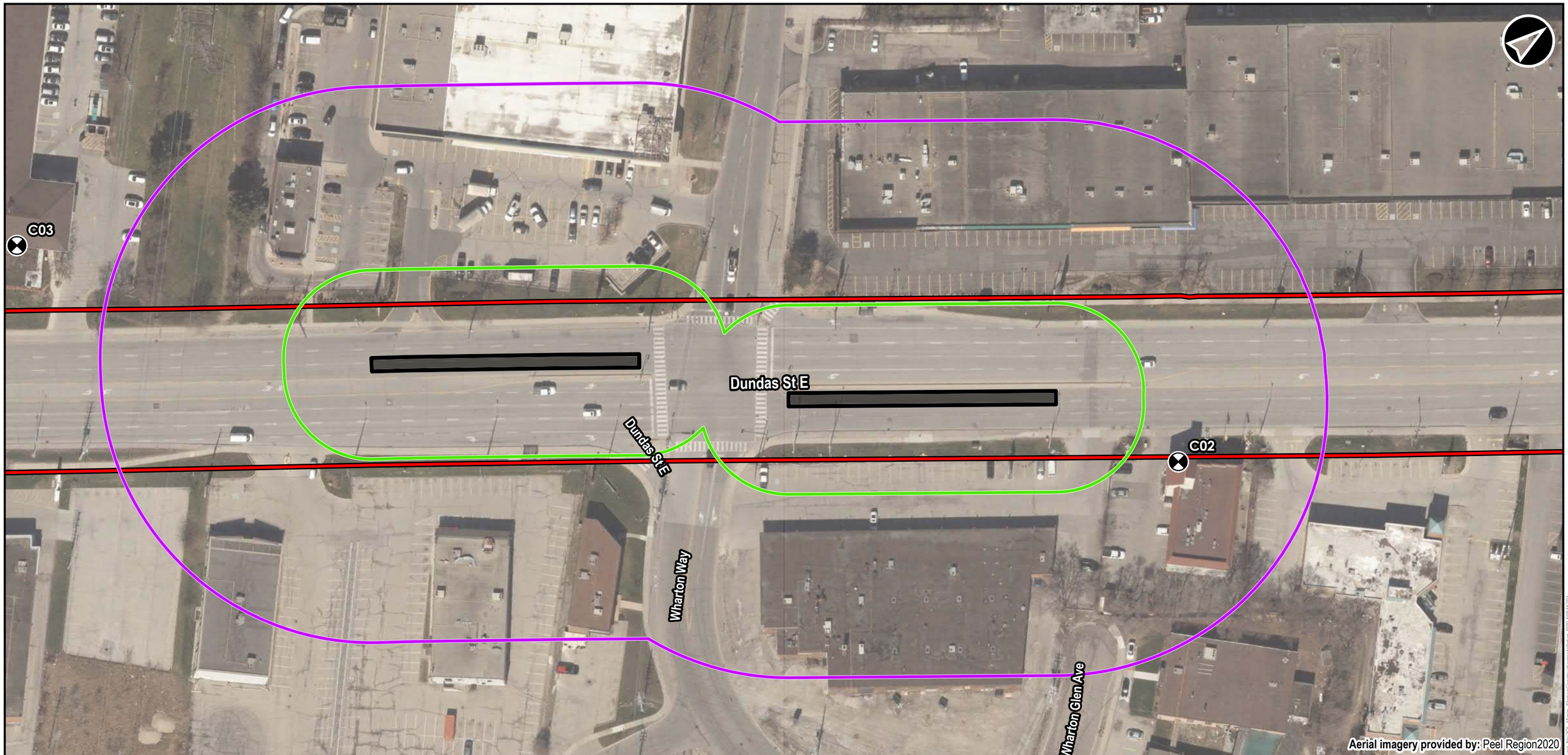
Paving New Asphalt
Construction Noise Zone of Influence Leq 15min

0 20 40 80 120 160 M

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 10-09**
P:60645291	Rev:00	



Legend

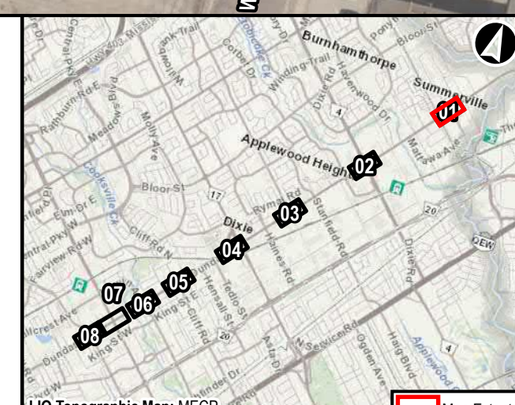
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

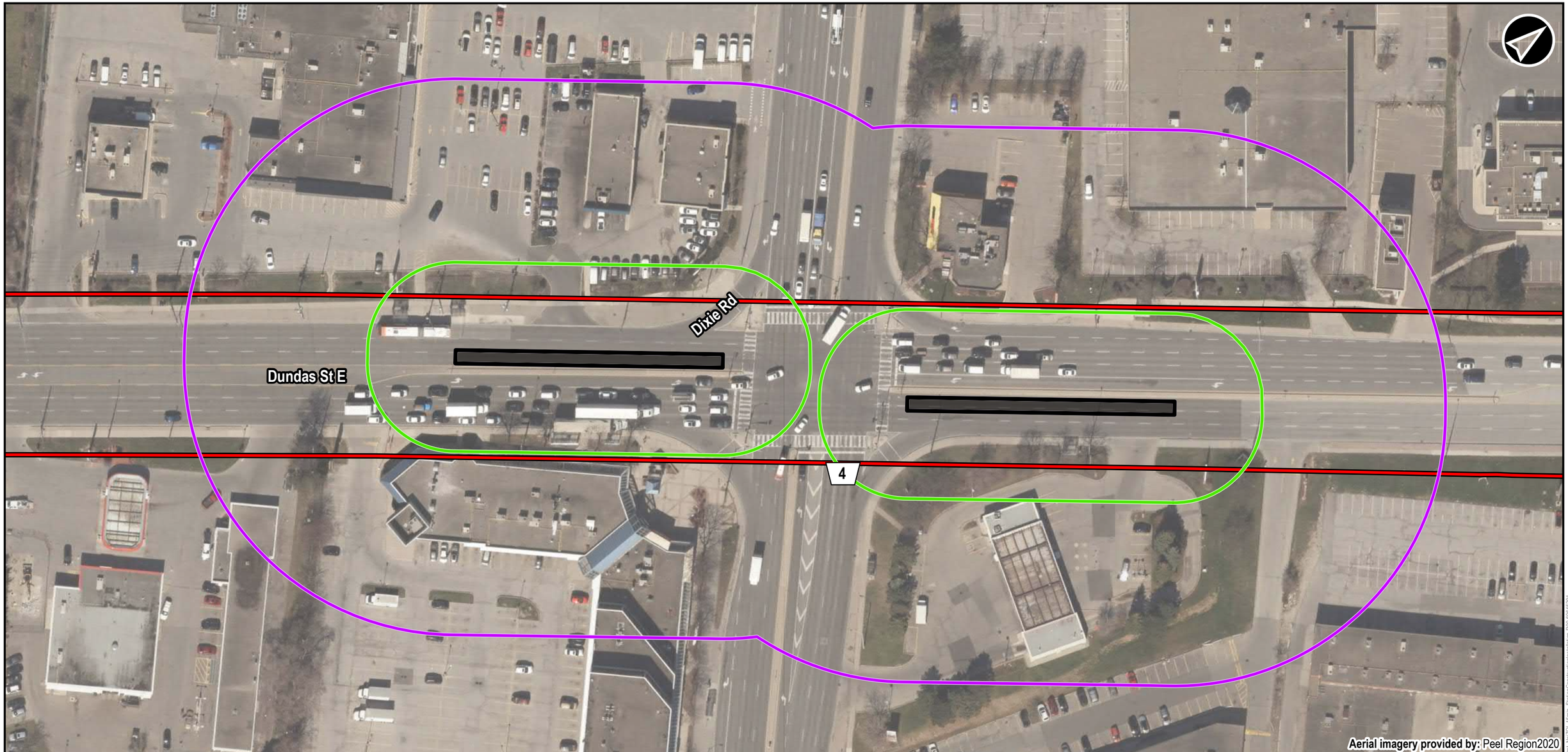
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 11-01**
P:60645291	Rev:00	



Legend

Proposed Bus Station Construction Limits

Presumed Exisiting Right of Way

Zone of Influence

Residential Receptors

Institutional Receptors

Base Layers

Municipal Boundary

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

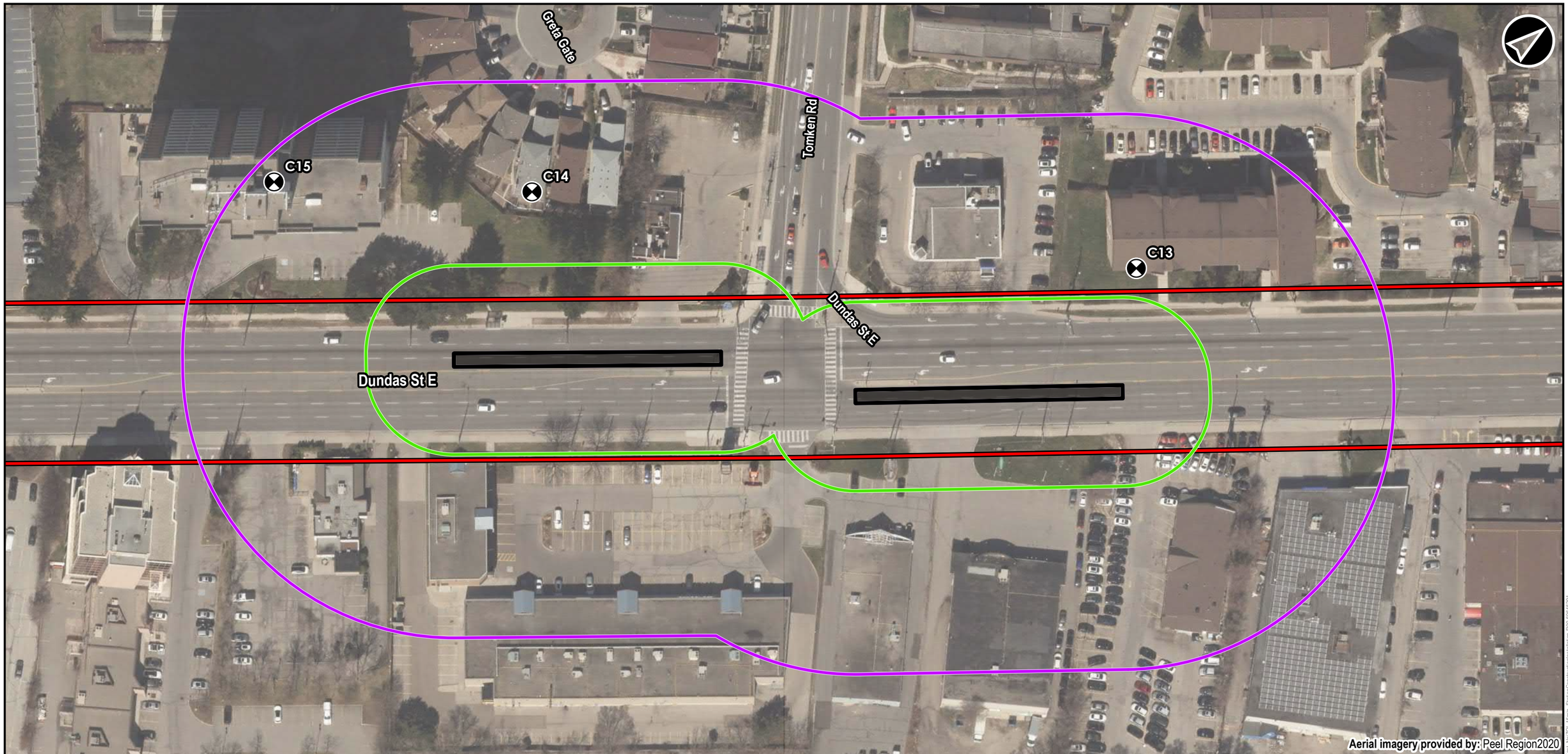
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 11-02**
P:60645291	Rev:00	



Legend

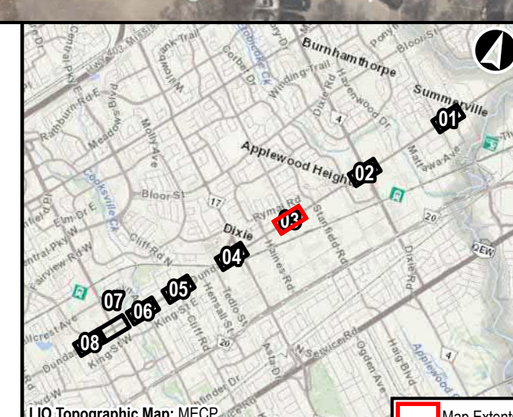
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

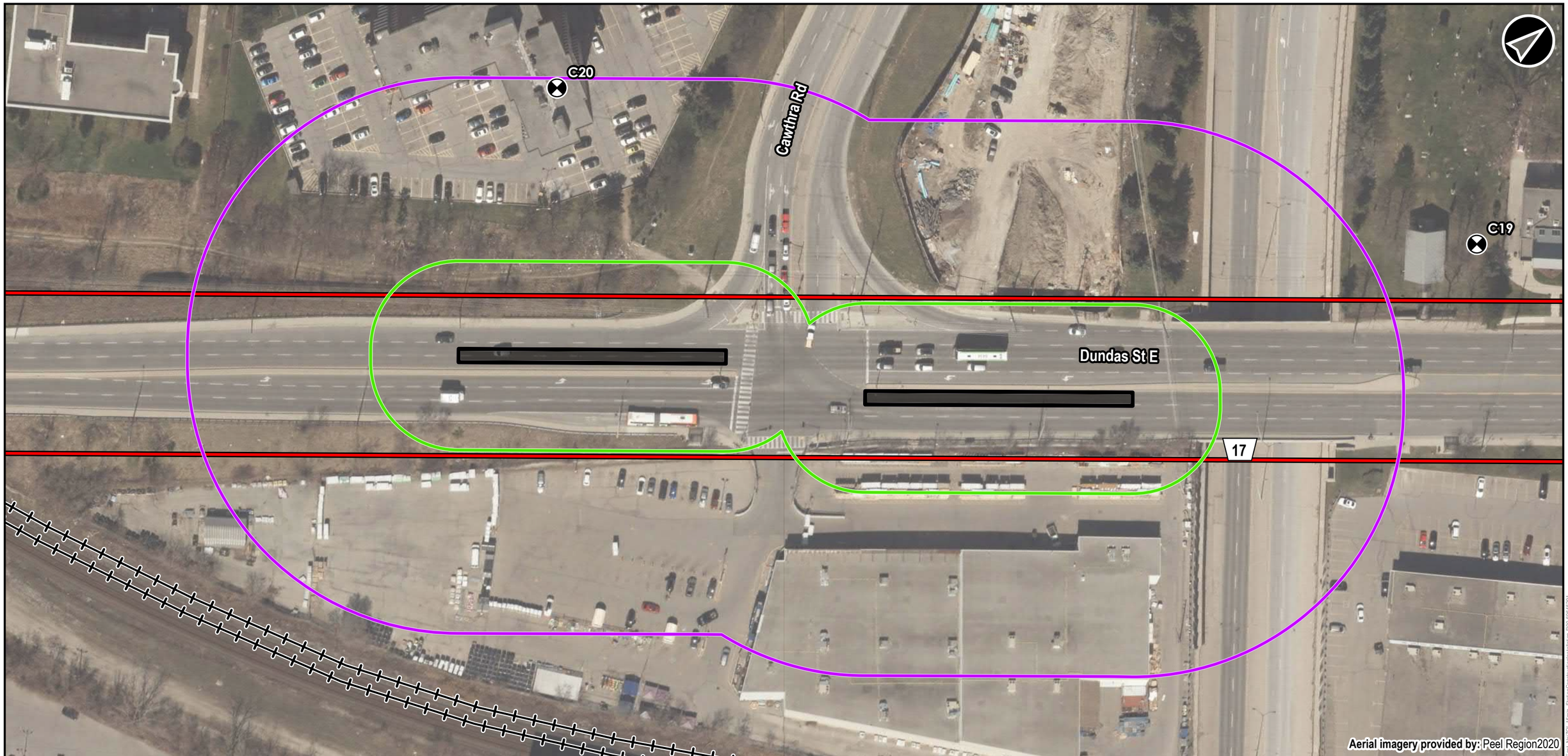
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 11-03**
P:60645291	Rev:00	



Legend

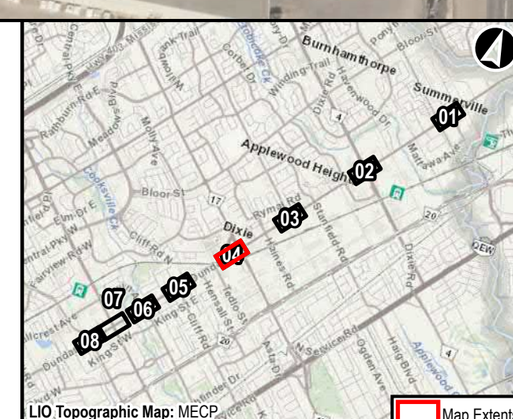
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

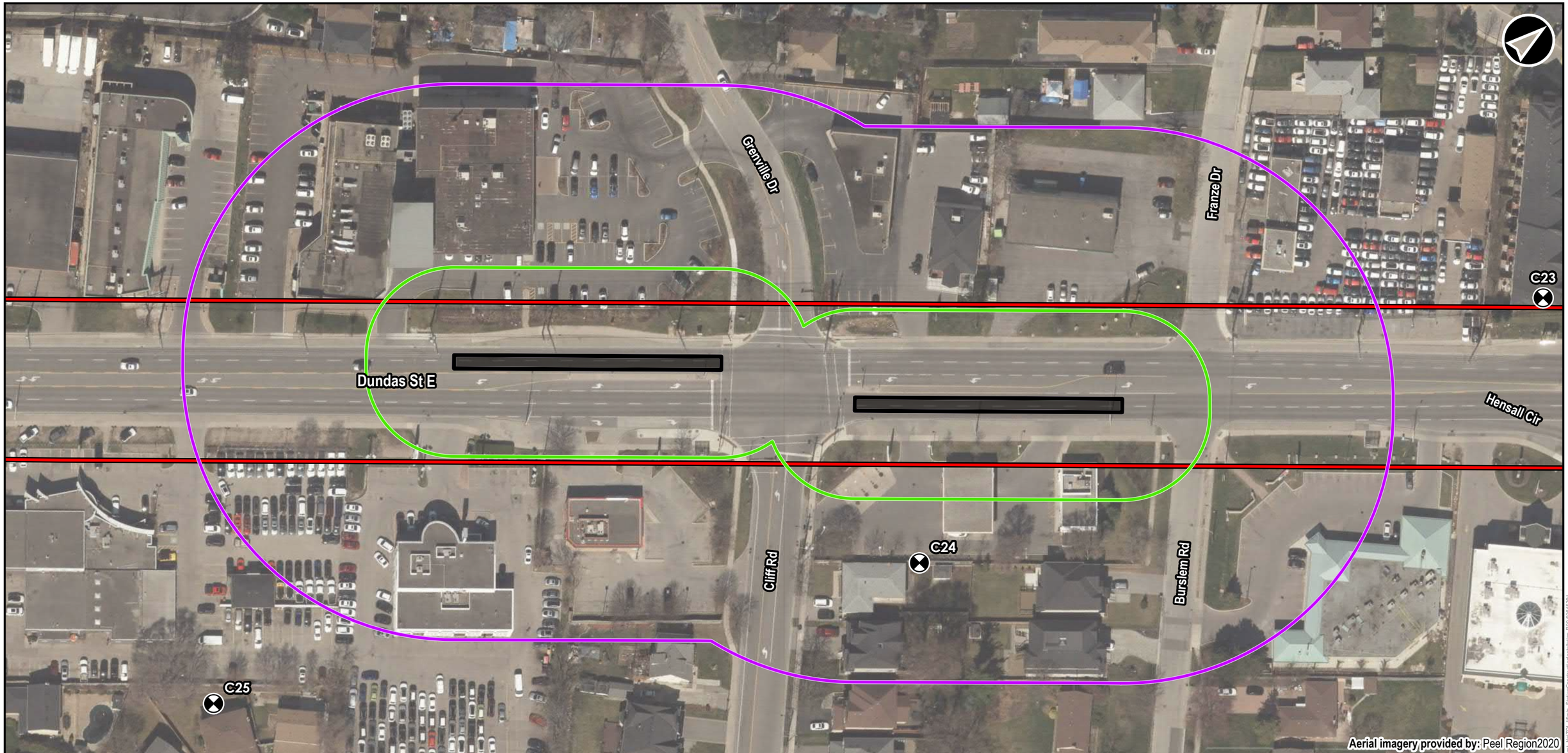
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 11-04**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

0 5 10 20 30 40 50 60 70 M

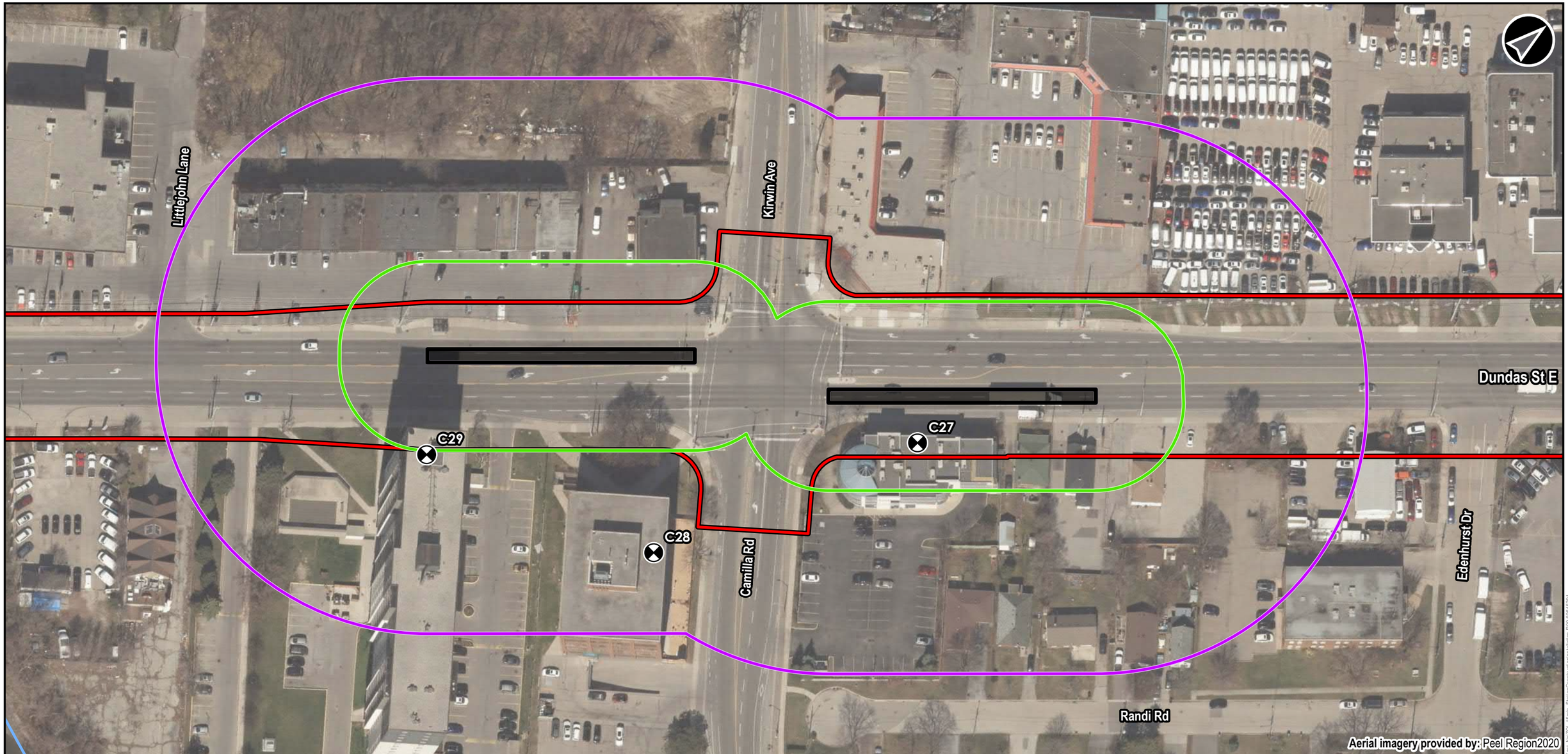
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000
P:60645291	Rev:00

Figure: 11-05



Legend

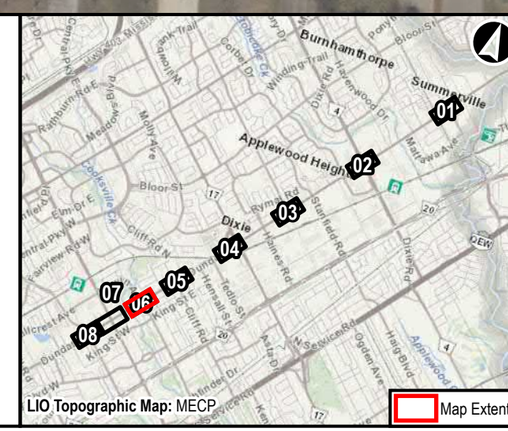
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

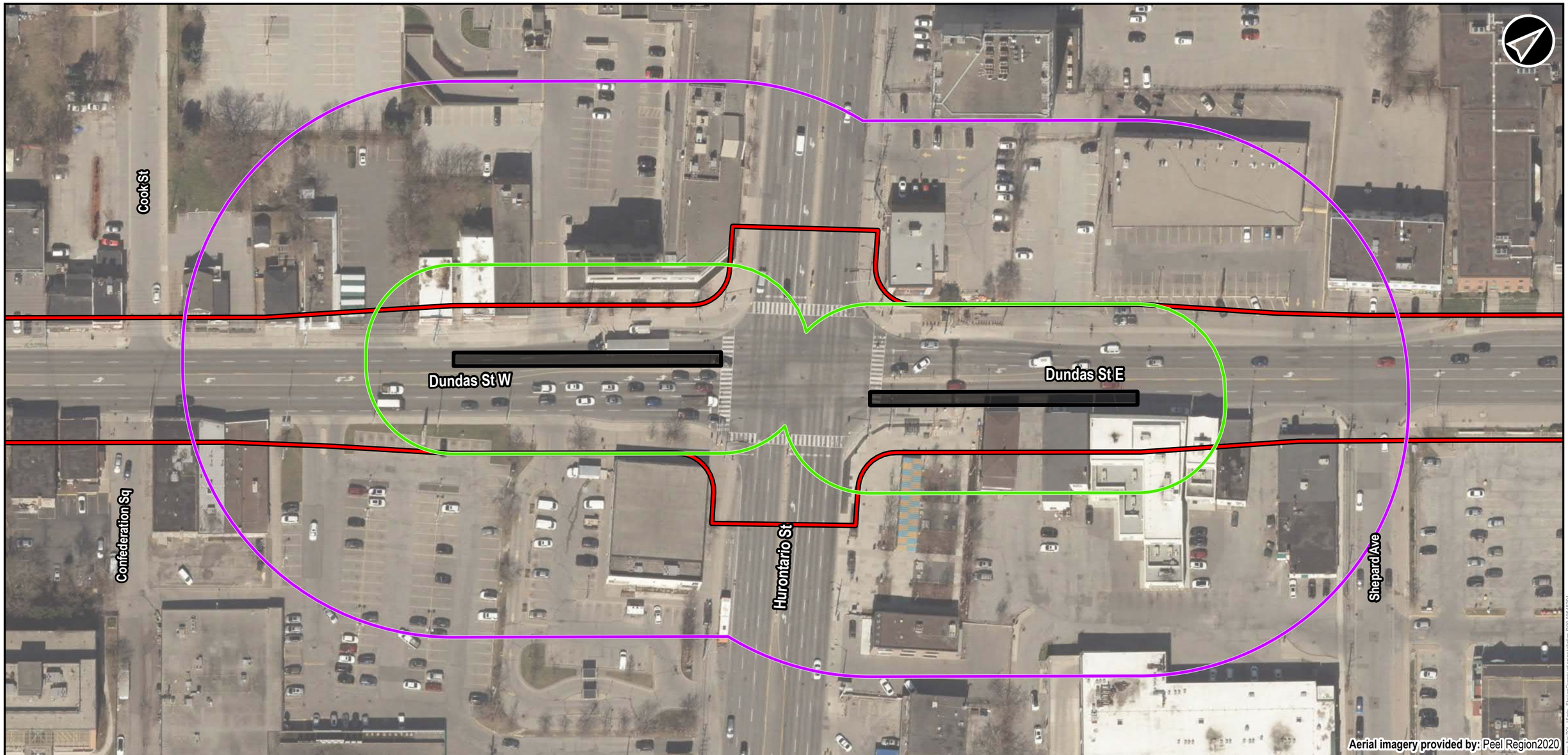
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 11-06**
P:60645291	Rev:00	



Legend

Proposed Bus Station Construction Limits

Presumed Exisiting Right of Way

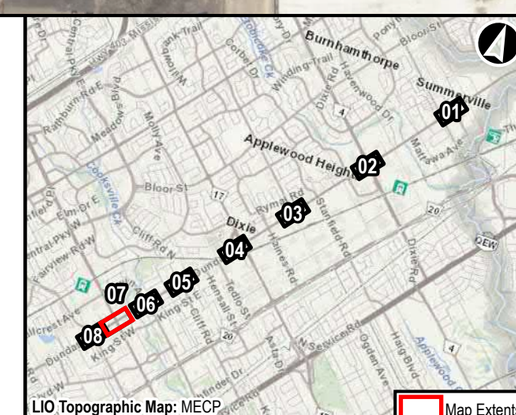
Zone of Influence

Residential Receptors

Institutional Receptors

Base Layers

Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

0 5 10 20 30 40 50 60 70 M

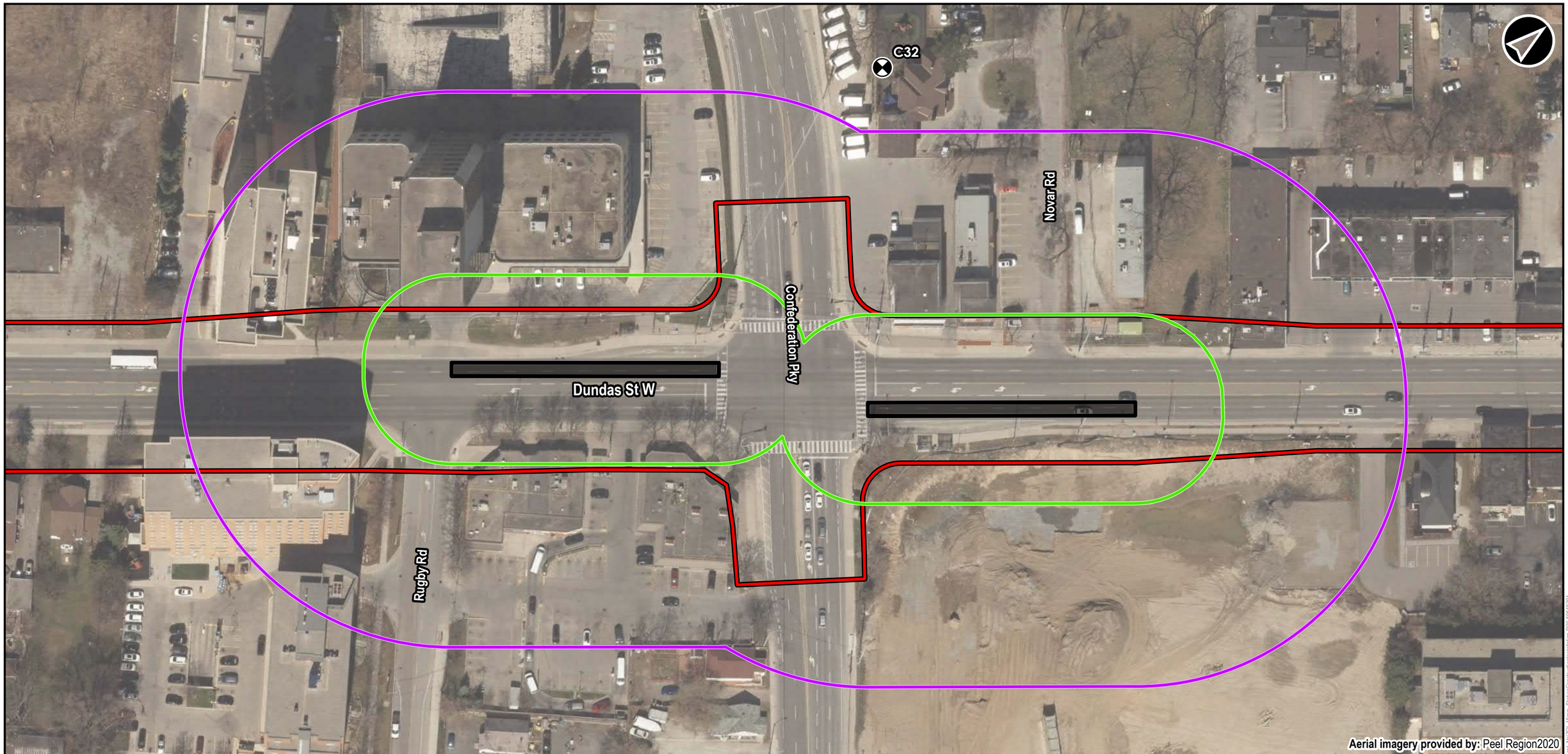
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000
P:60645291	Rev:00

Figure: 11-07



Legend

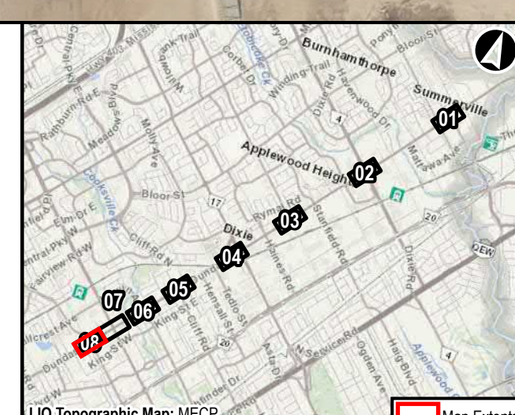
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Leq 15min

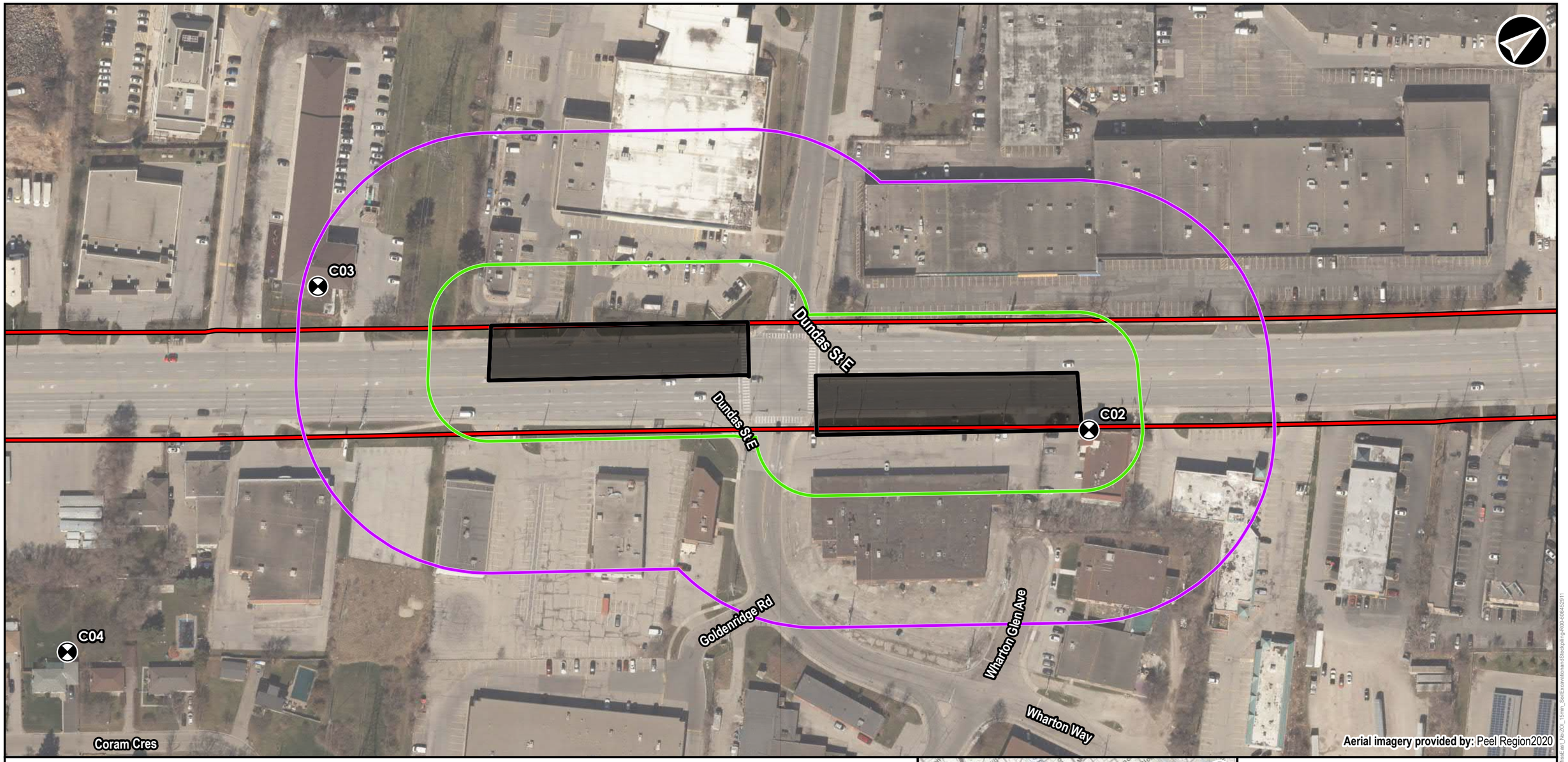
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 11-08**
P:60645291	Rev:00	



Legend

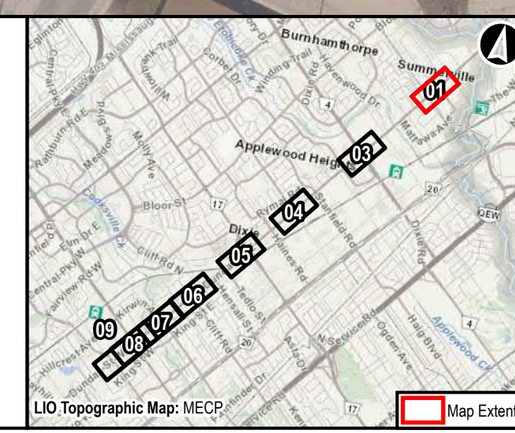
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

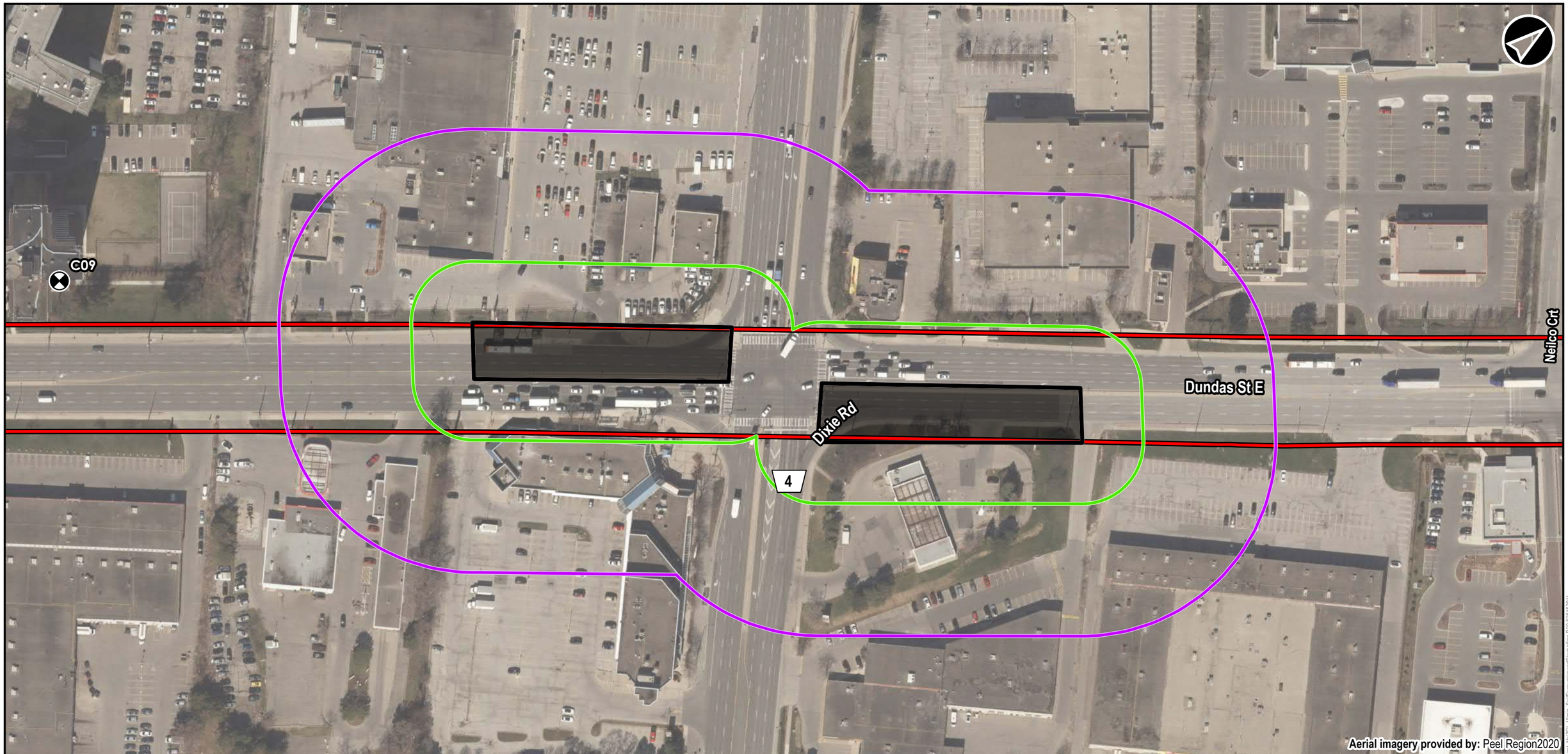
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 12-01**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

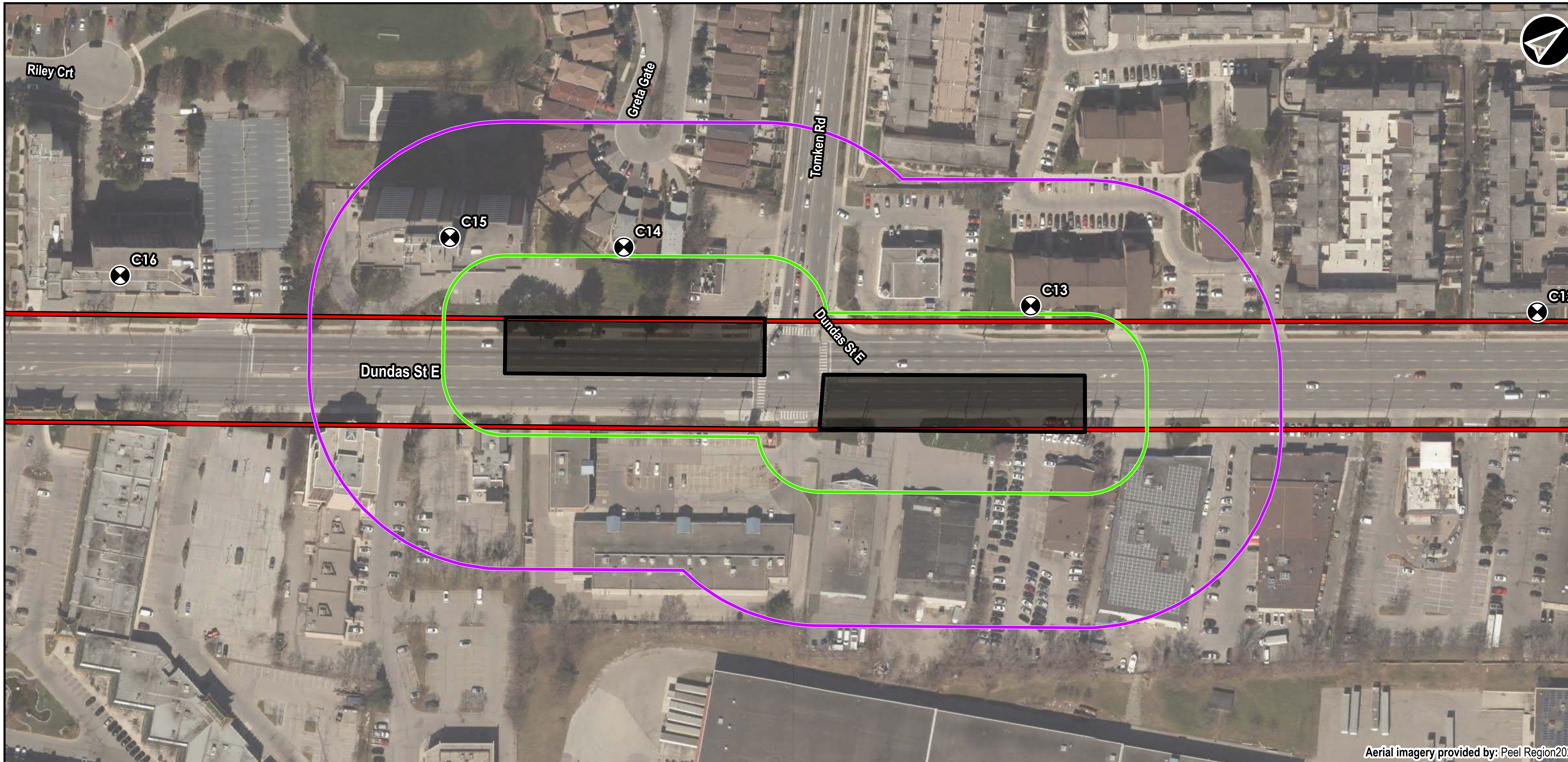
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 12-02**
P:60645291	Rev:00	



Legend

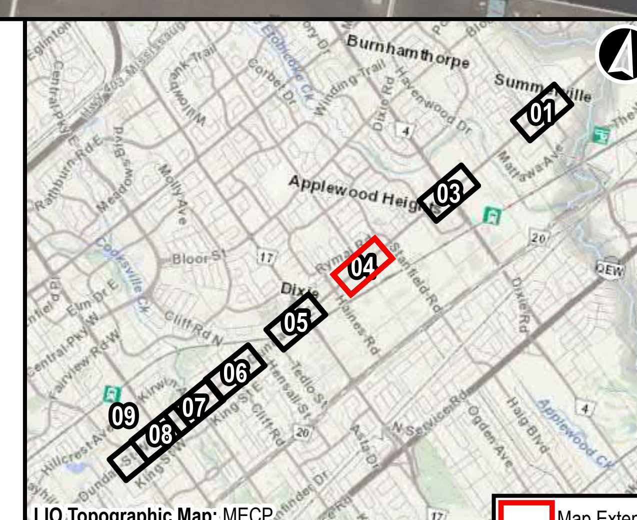
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

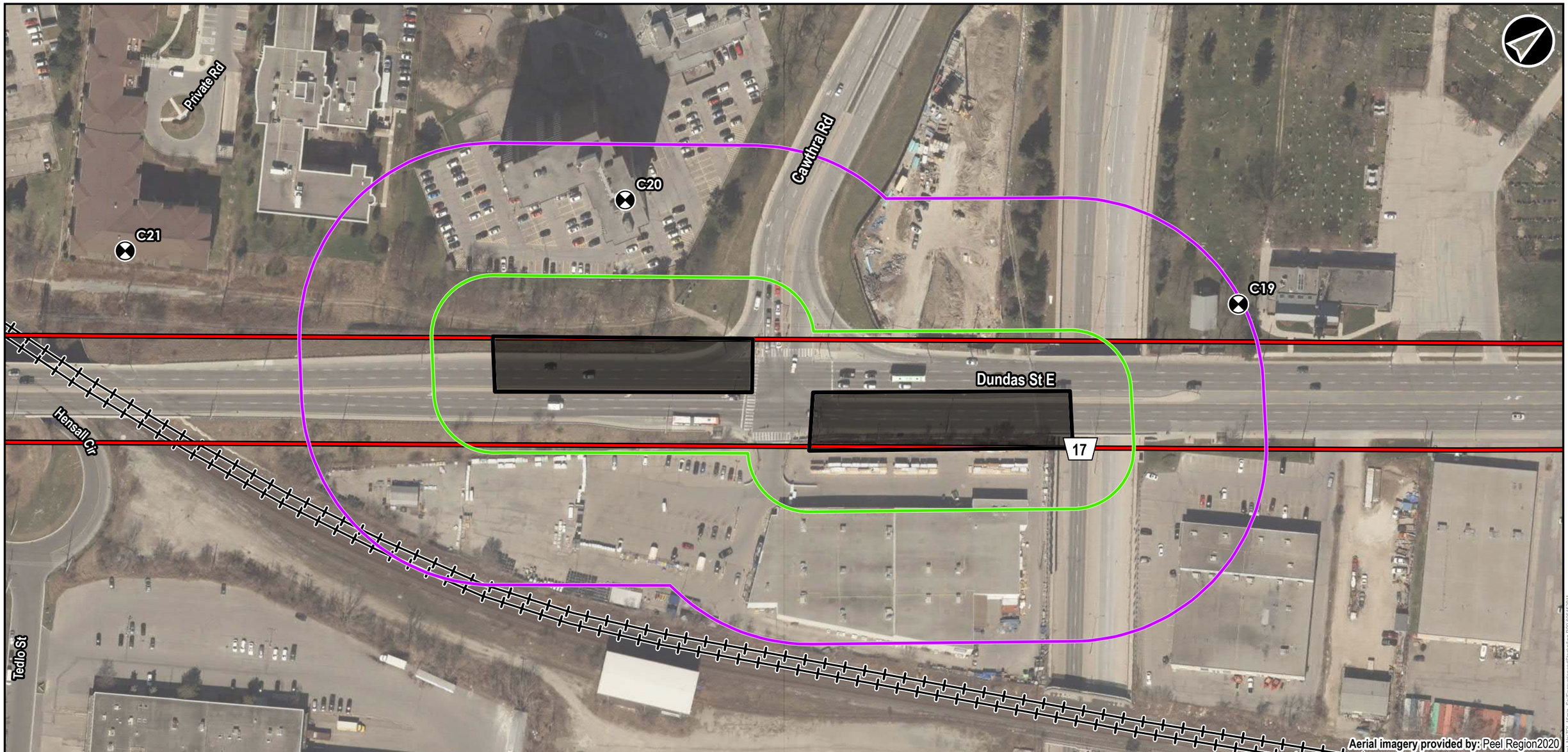
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX AECOM

Sep, 2021	1:1,500	Figure: 12-03
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Railway

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

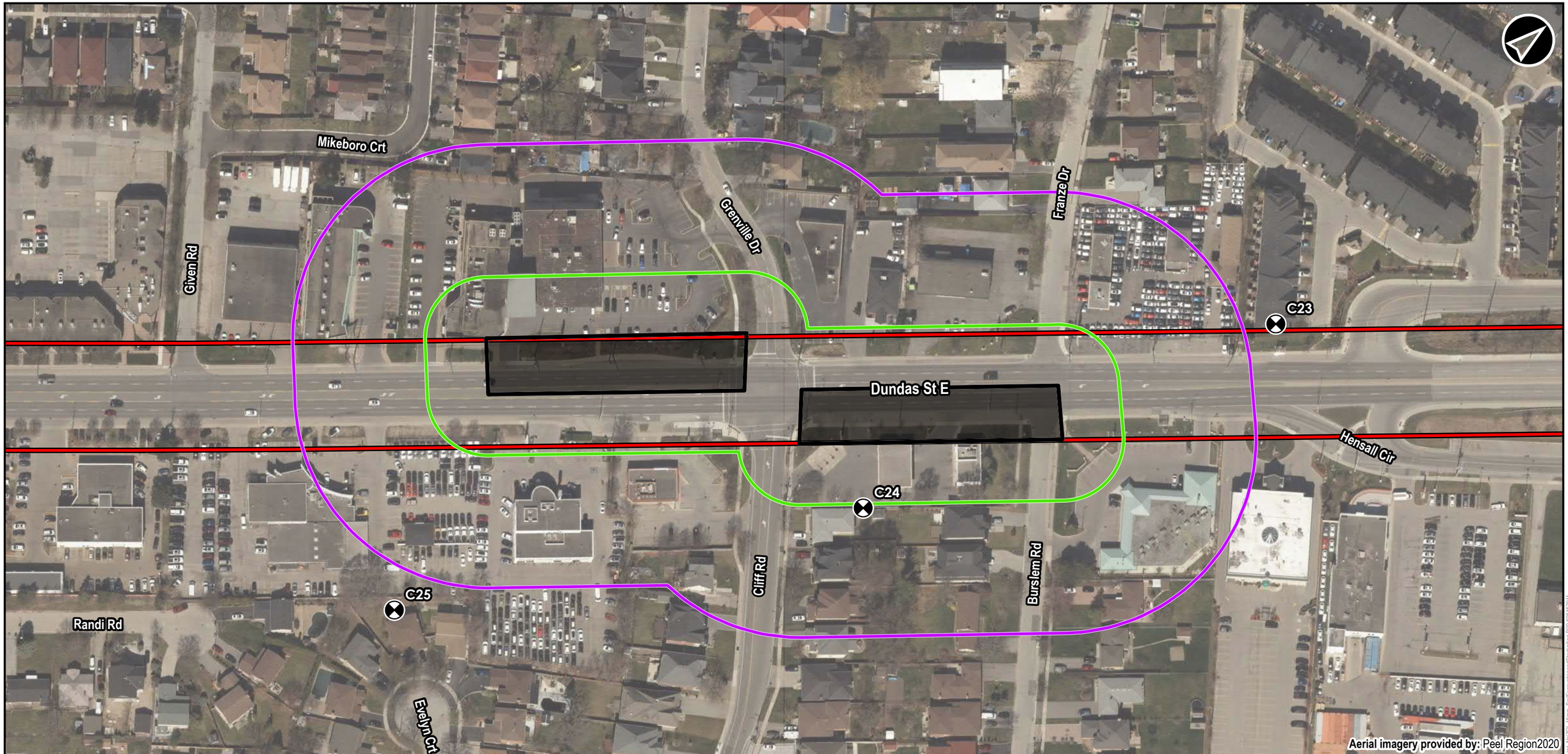
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 12-04**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

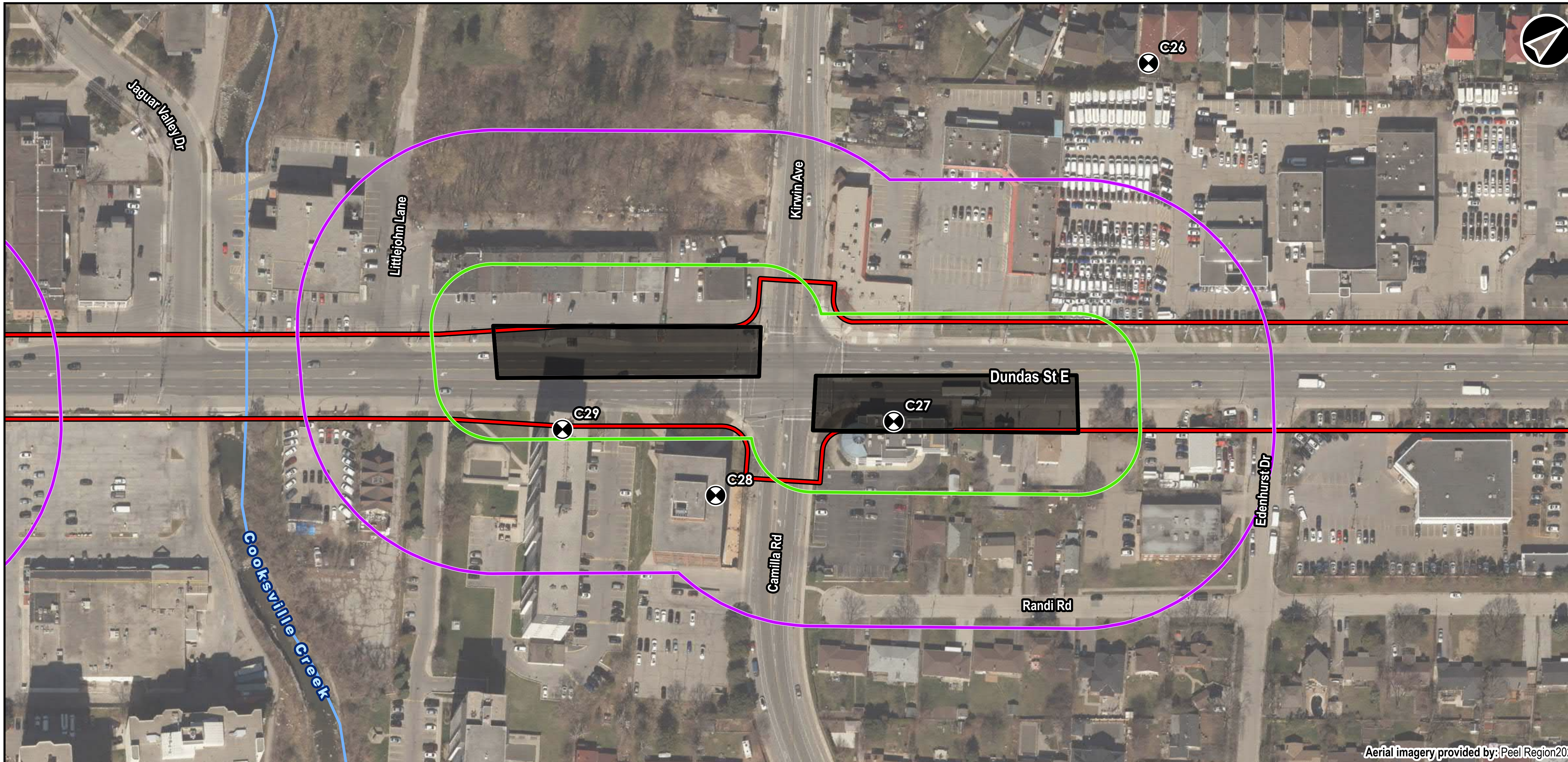
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 12-05**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	Figure: 12-06
P:60645291	Rev:00	

Aerial imagery provided by: Peel Region2020

Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

0 5 10 20 30 40 50 60 70 80 90 100 110 M

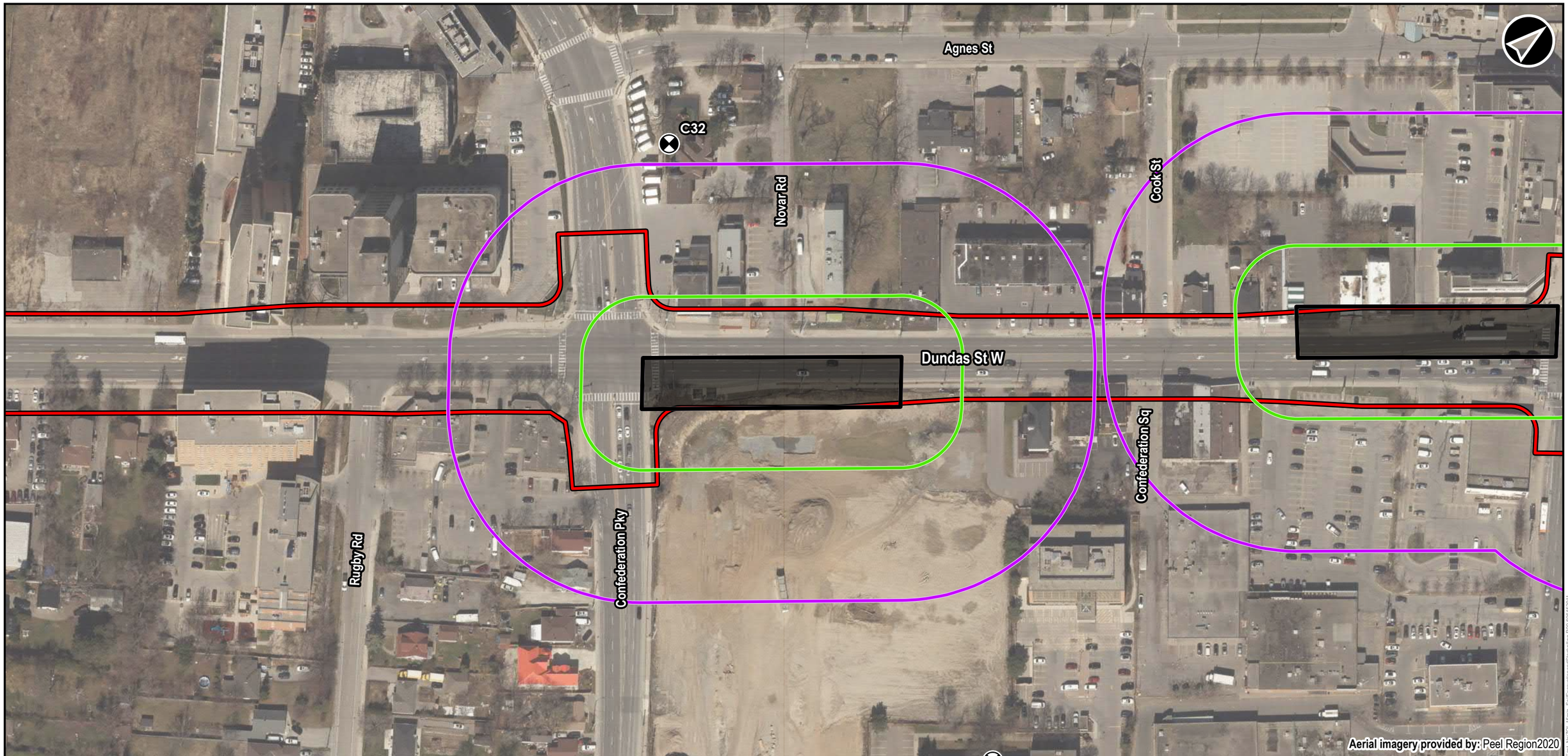
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500
P:60645291	Rev:00

Figure: 12-07



Legend

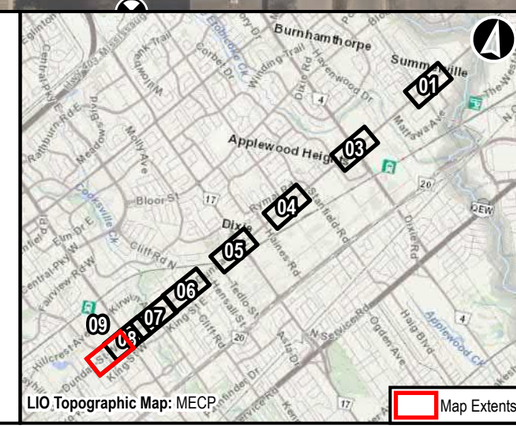
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Leq 15min

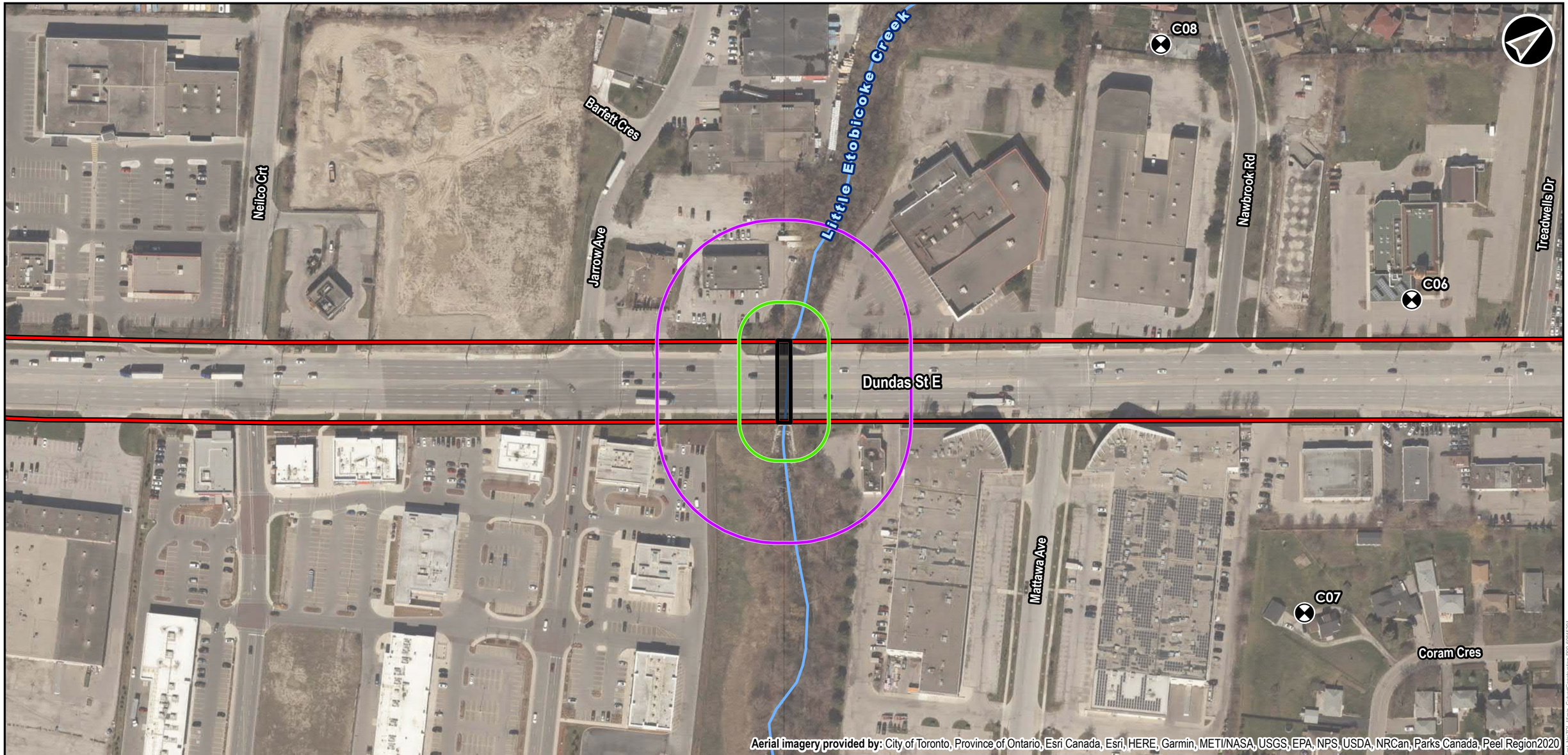
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 12-08**
P:60645291	Rev:00	



Legend

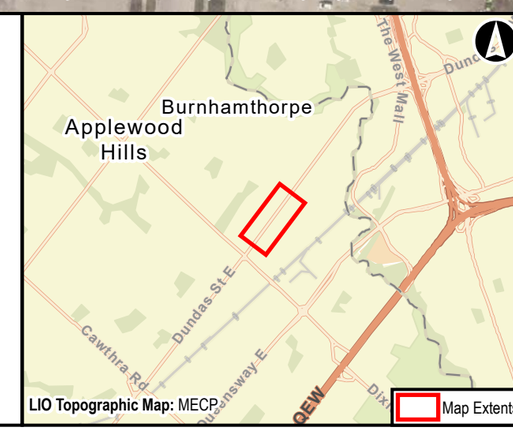
- Receptor
- Proposed Culvert Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Residential Receptors
- Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Culvert
Construction Noise Zone of Influence Leq 15min

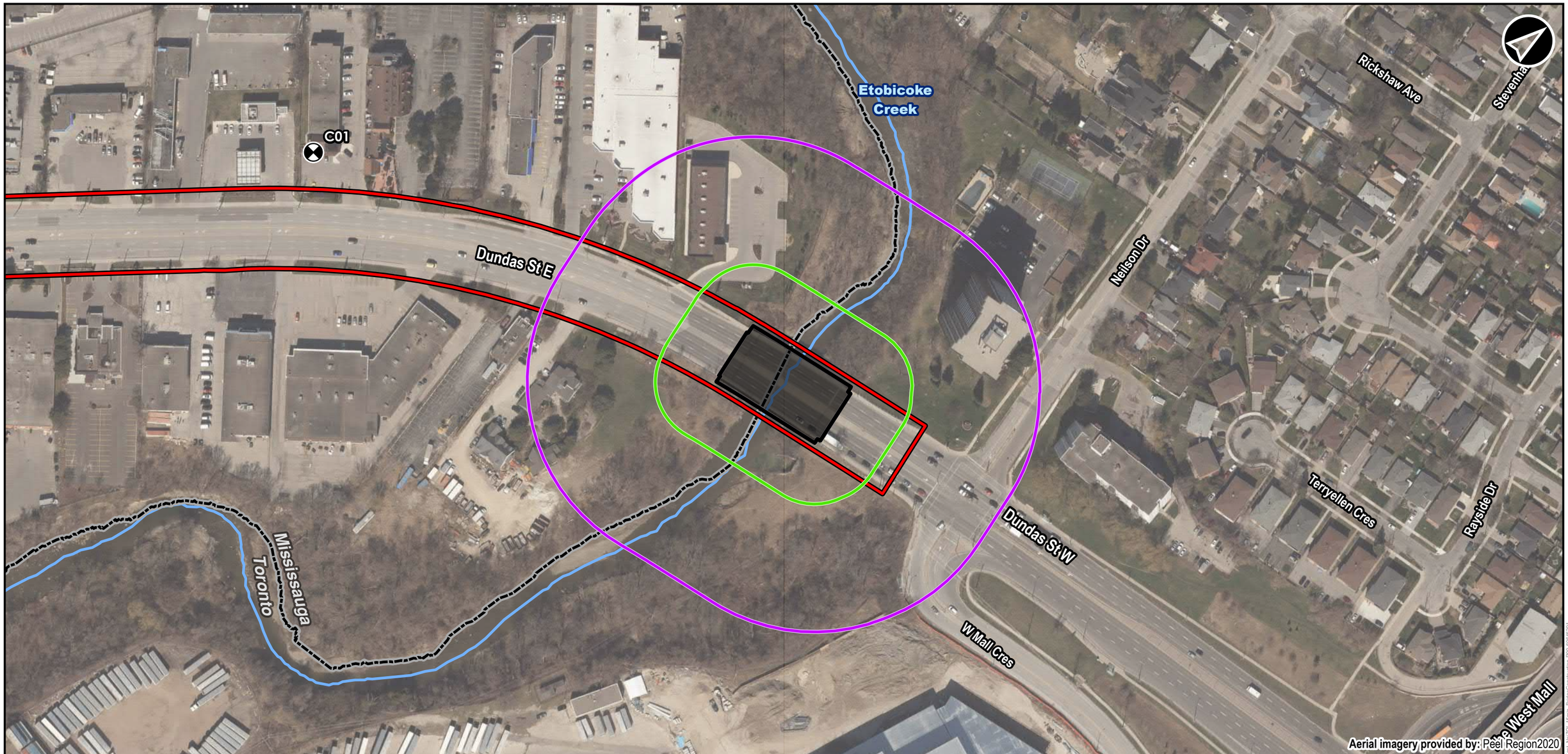
0 10 20 40 60 80 100 120 140 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 13**
P:60645291	Rev:00	

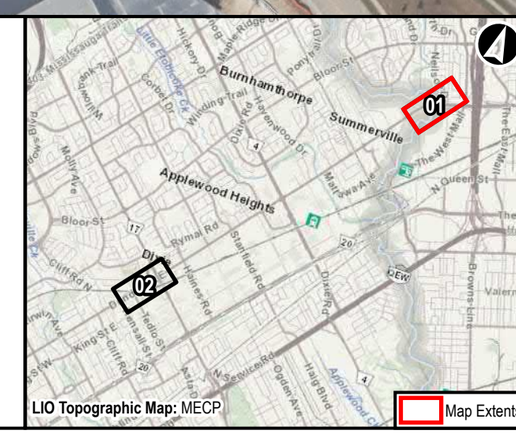


Legend

- Receptor
- Proposed Bridge Construction Limits
- Presumed Exisiting Right of Way

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Bridge
Construction Noise Zone of Influence Leq 15min

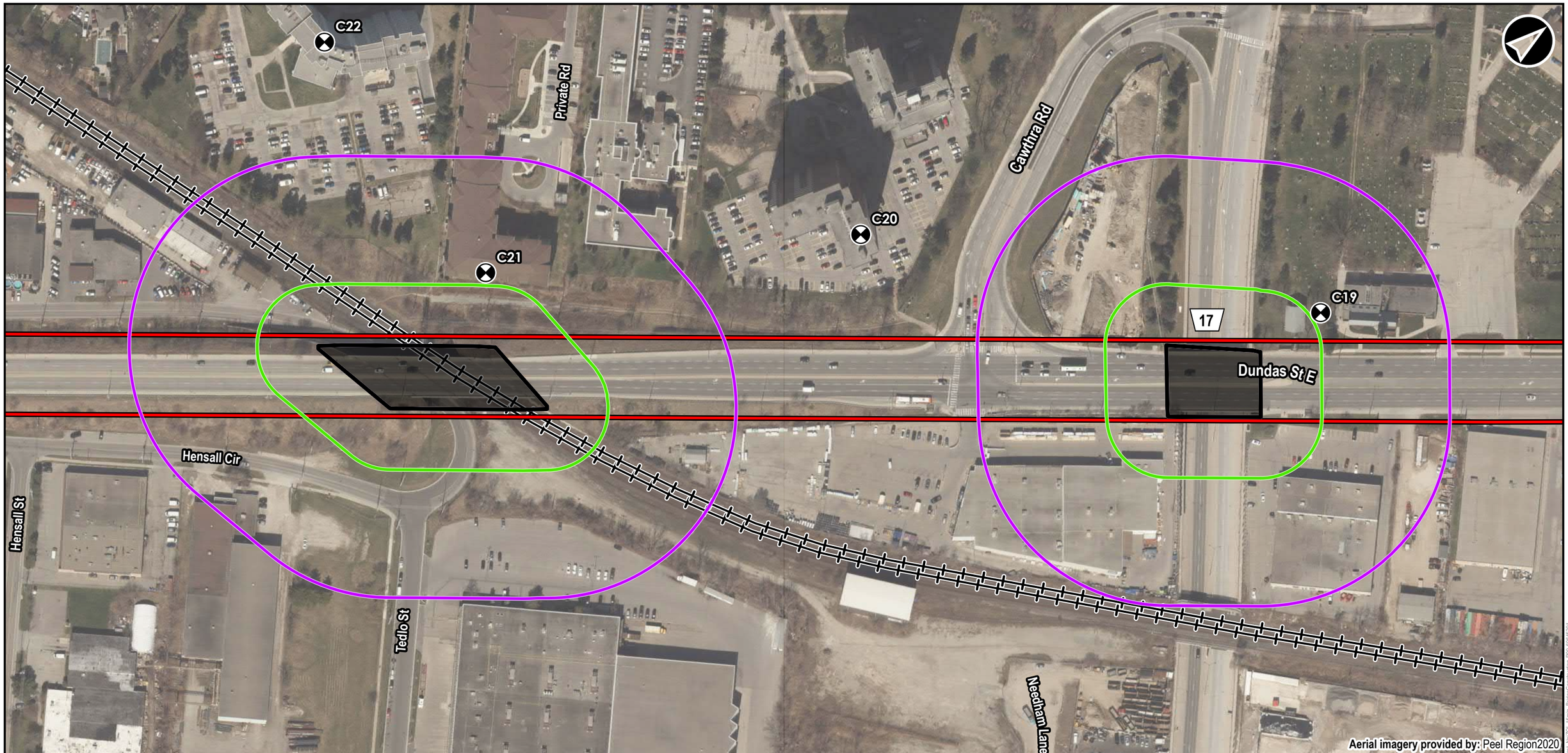
0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 14-01**
P:60645291	Rev:00	

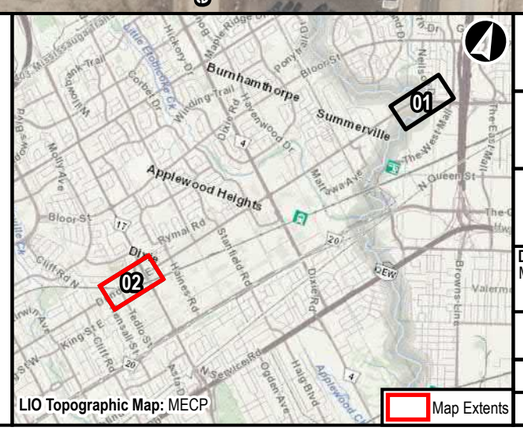


Legend

- Receptor
- Proposed Bridge Construction Limits
- Presumed Exisiting Right of Way

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Bridge
Construction Noise Zone of Influence Leq 15min

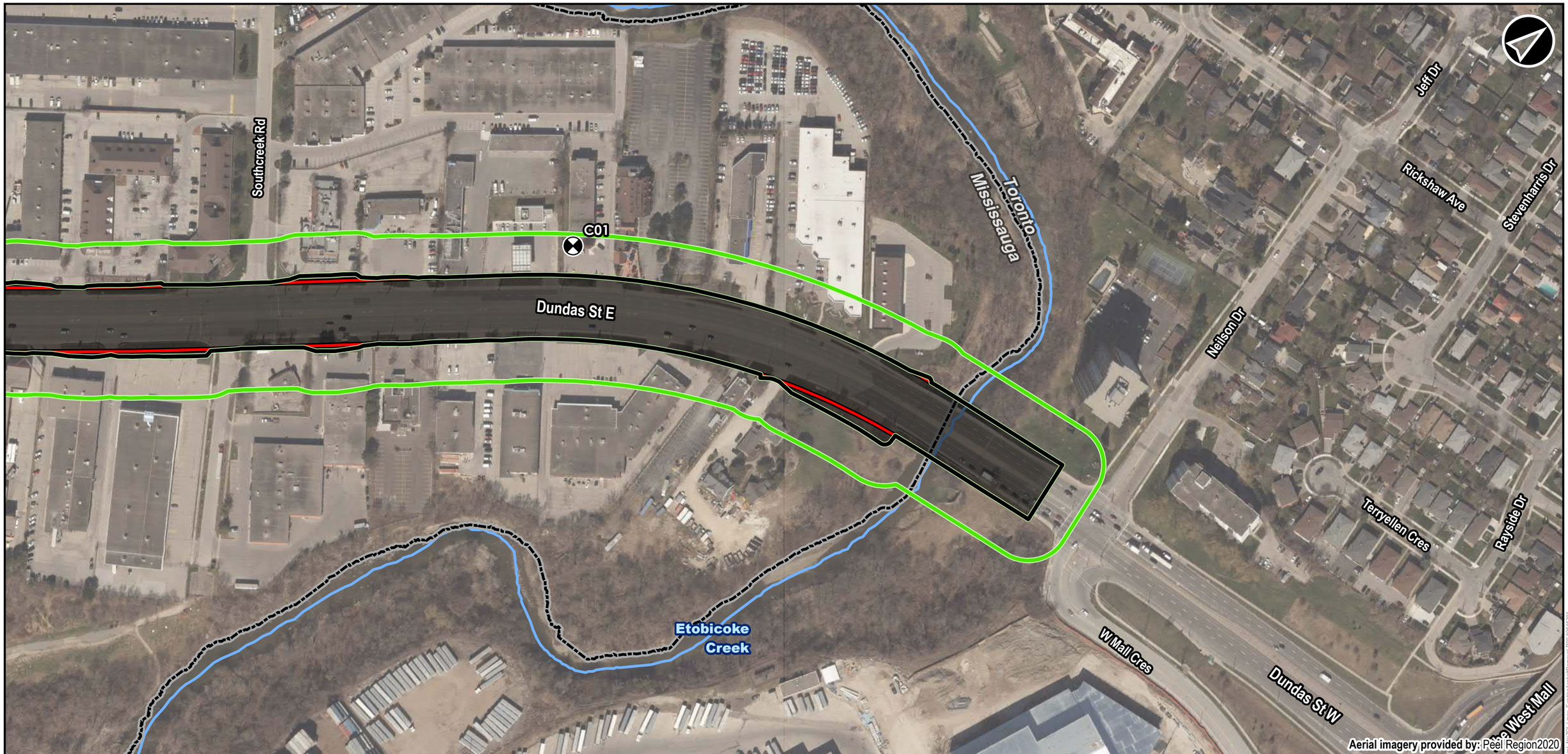
0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 14-02**
P:60645291	Rev:00	

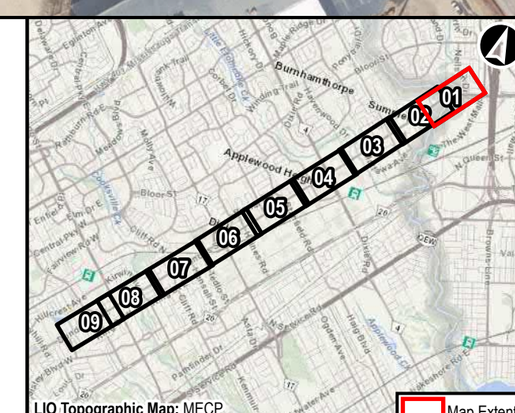


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

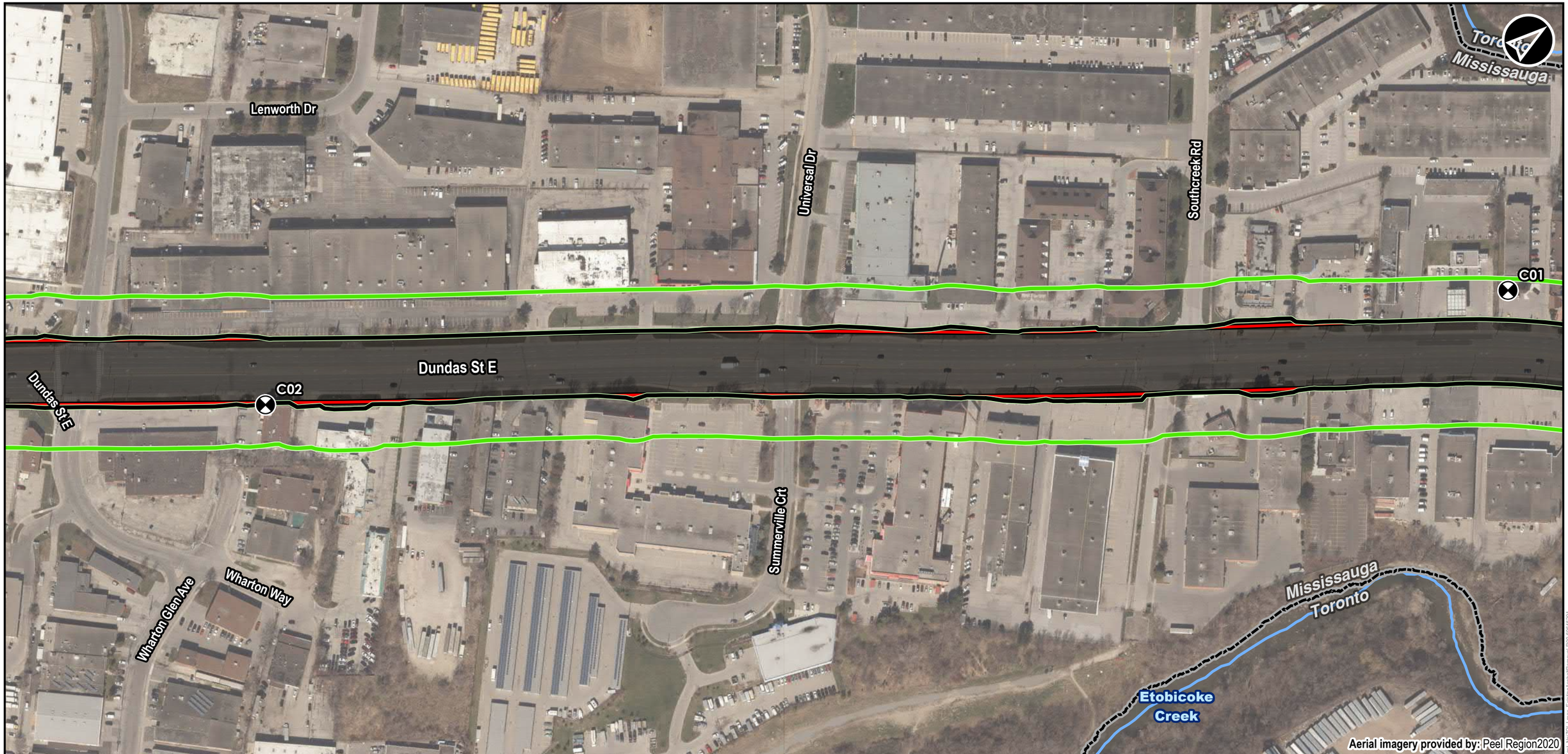
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-01**
P:60645291	Rev:00	

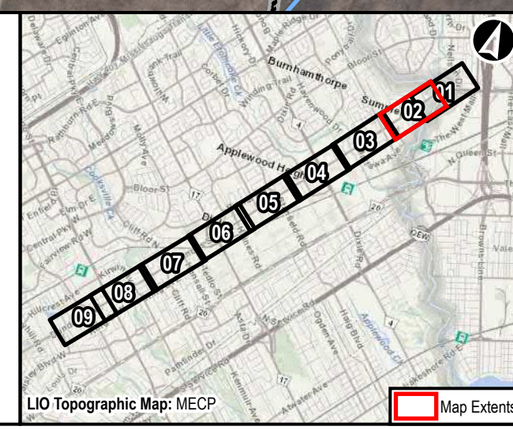


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

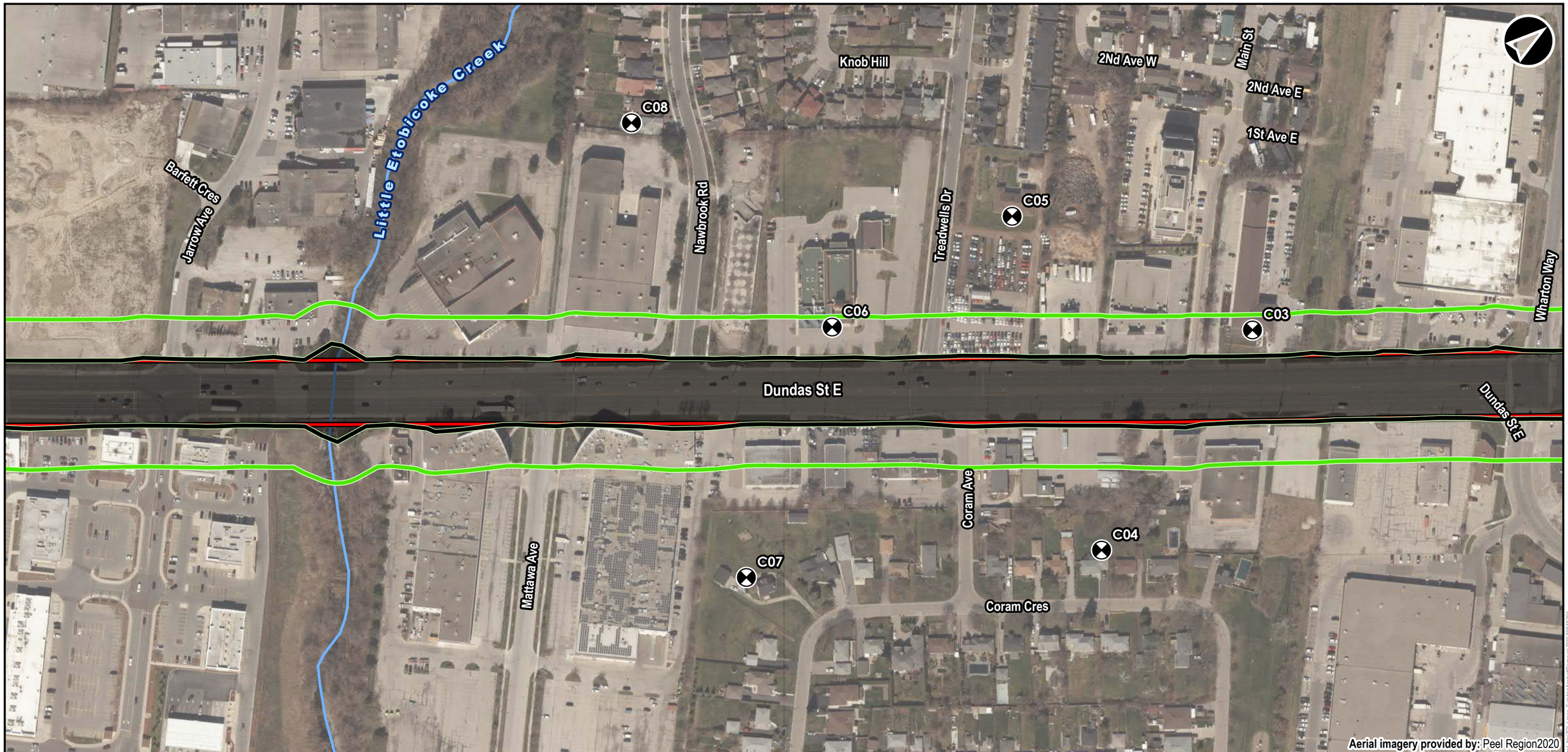
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-02**
P:60645291	Rev:00	

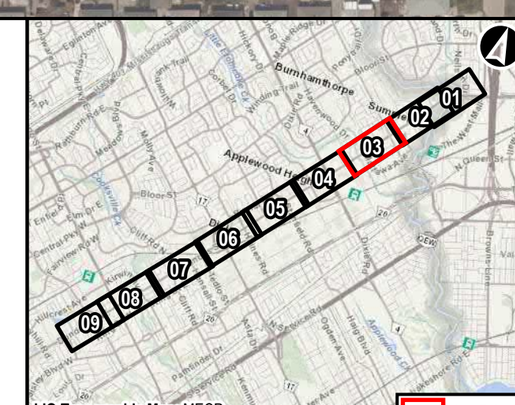


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

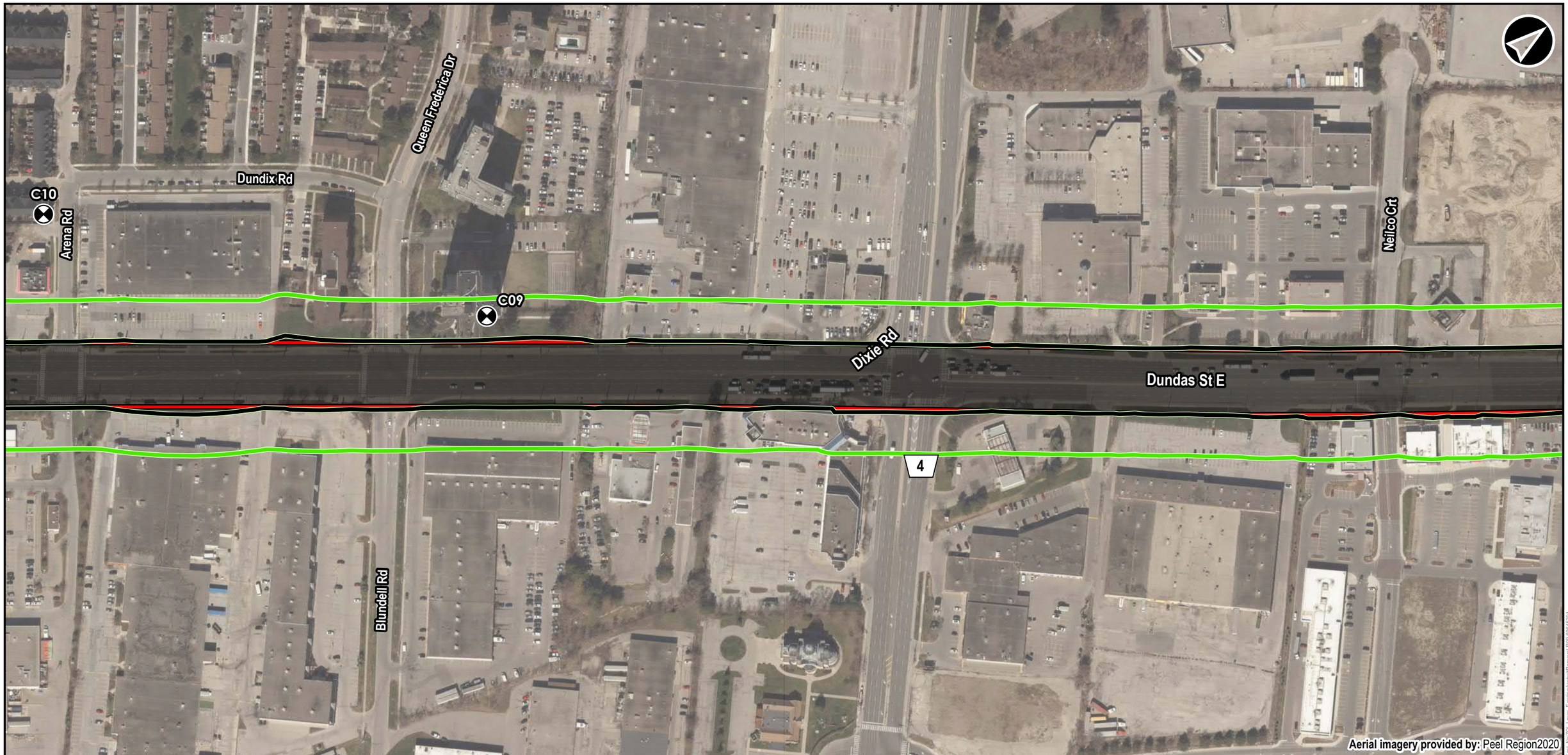
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-03**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

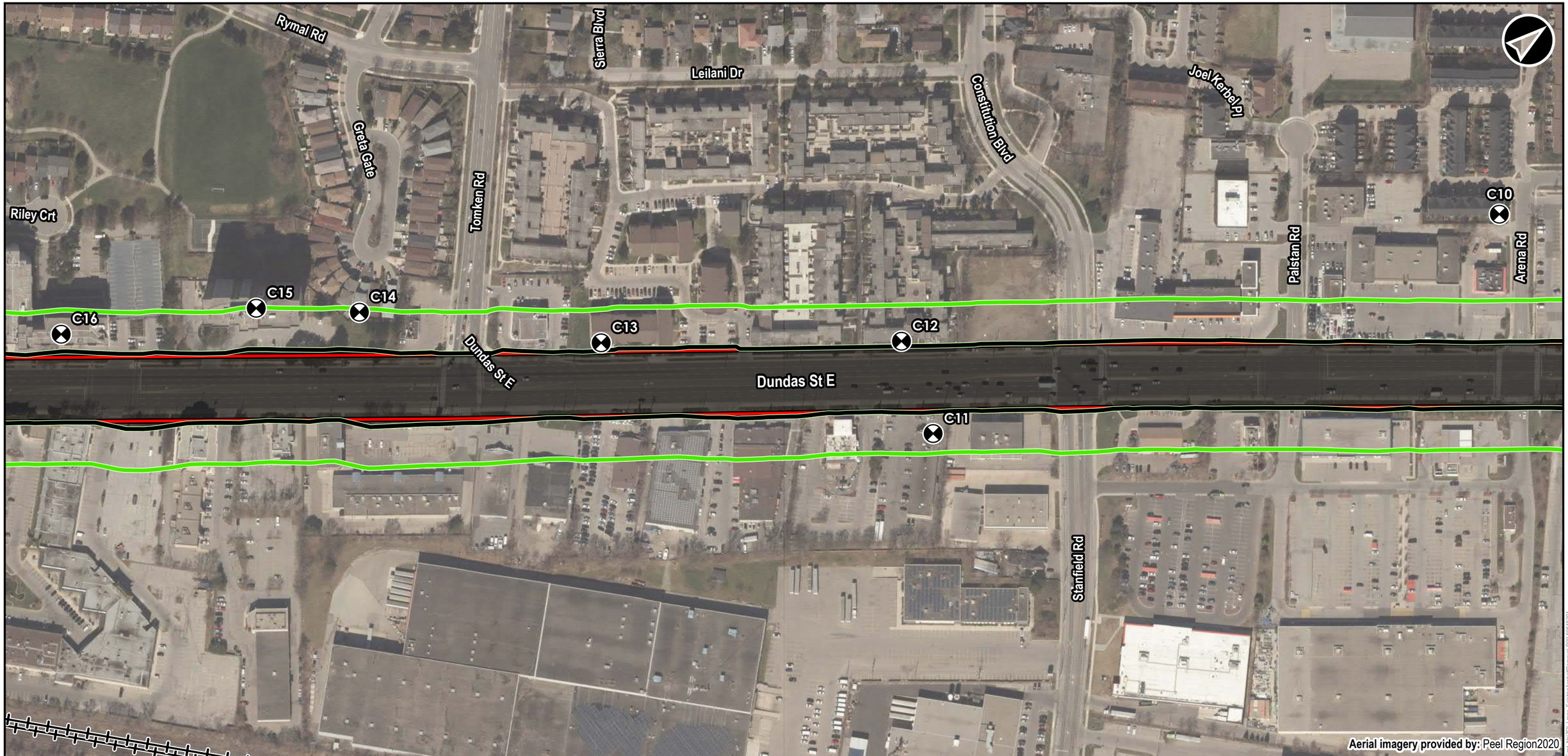
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-04**
P:60645291	Rev:00	

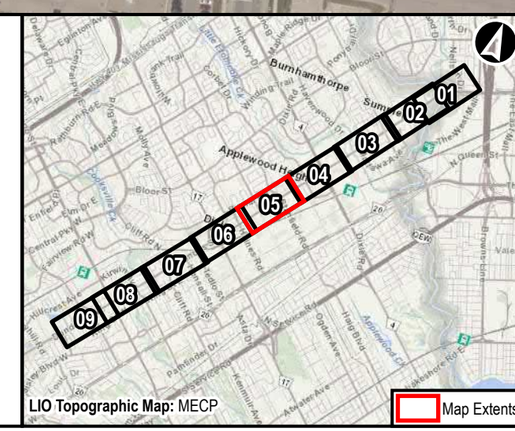


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

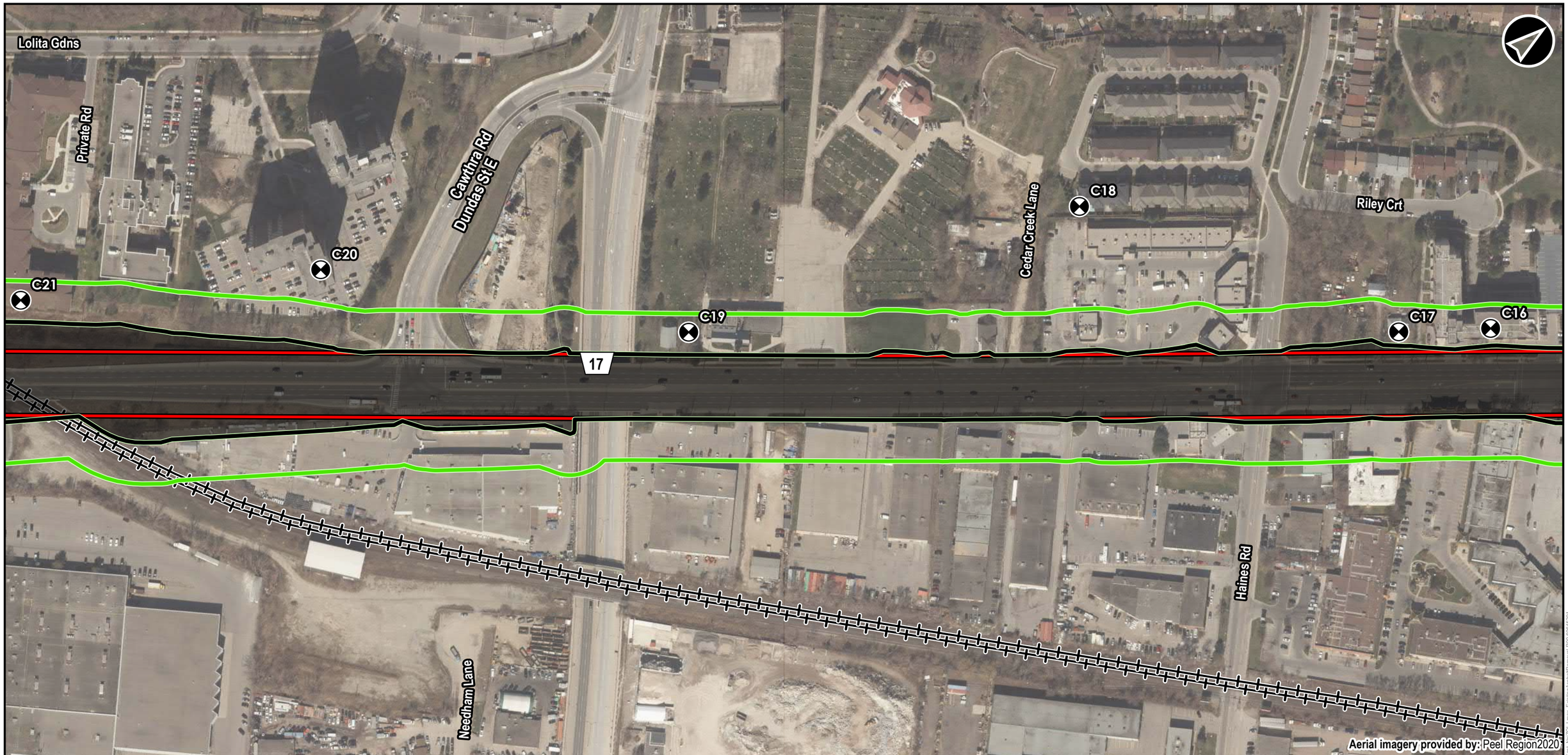
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-05**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

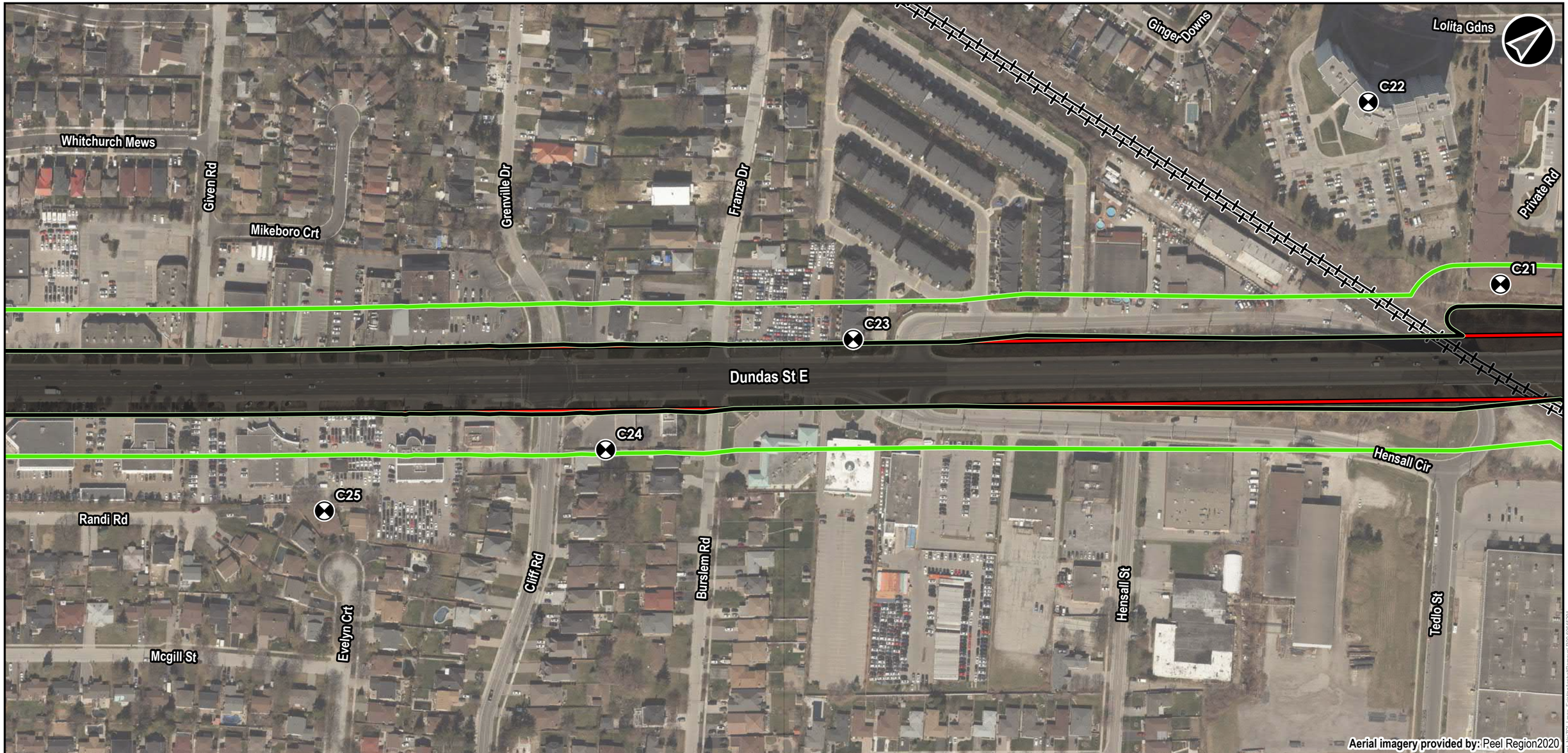
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-06**
P:60645291	Rev:00	

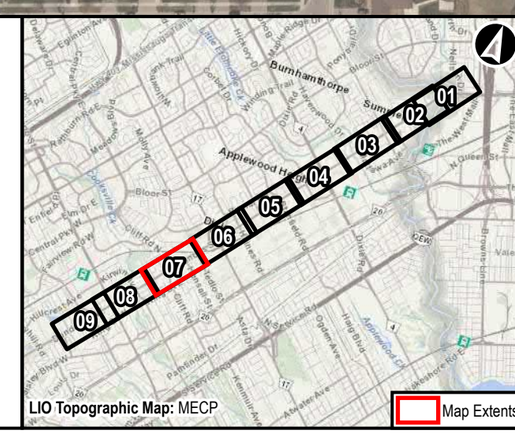


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

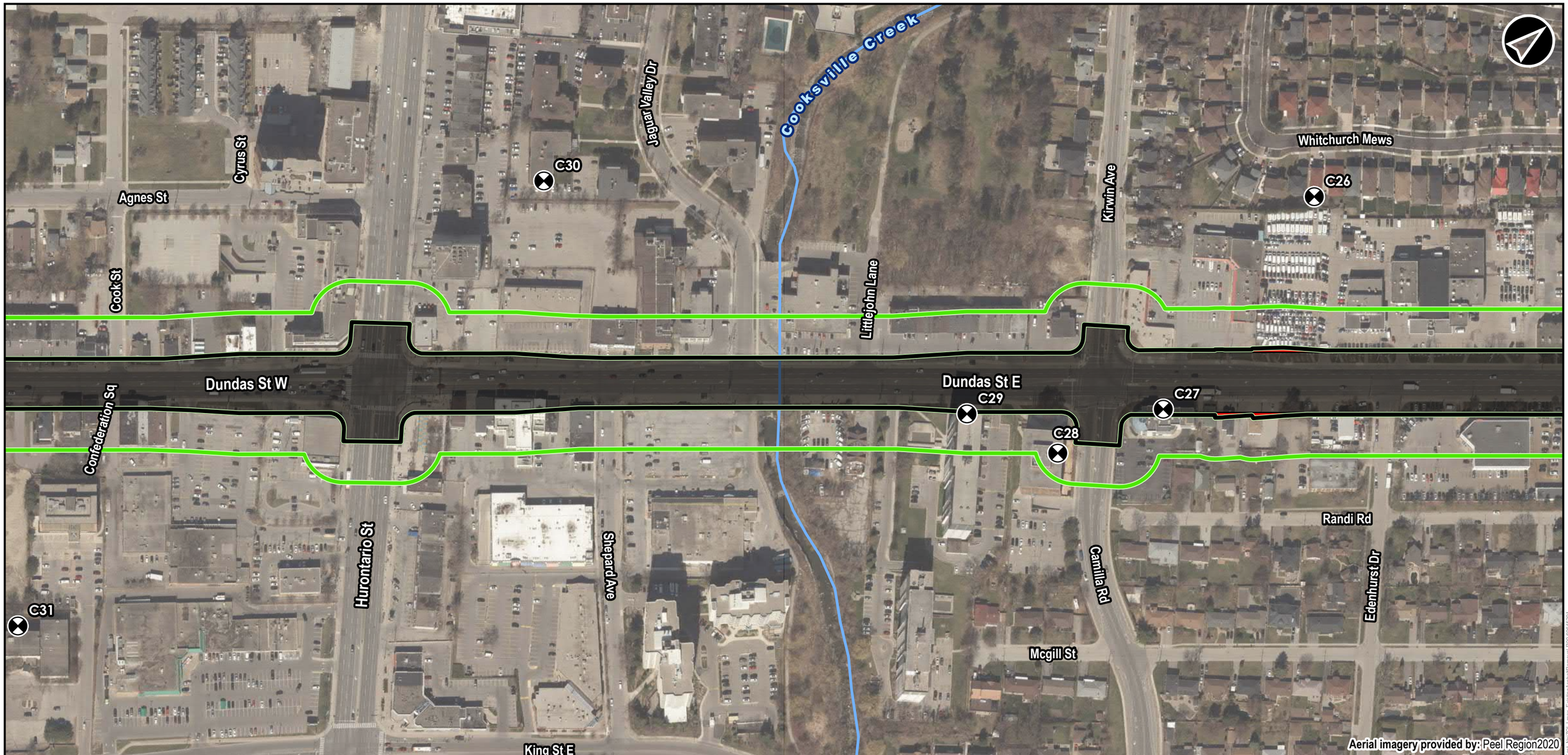
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-07**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500
P:60645291	Rev:00

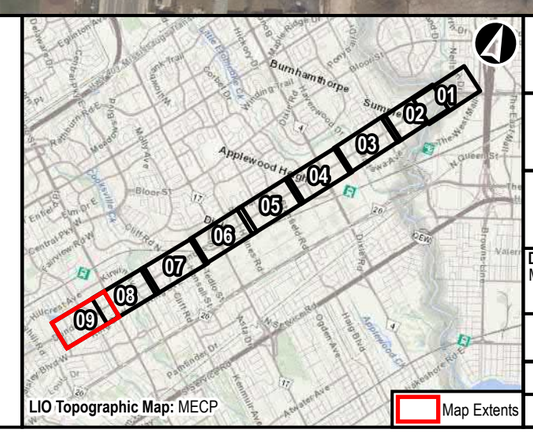
Figure: 15-08

Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Noise Zone of Influence Lmax

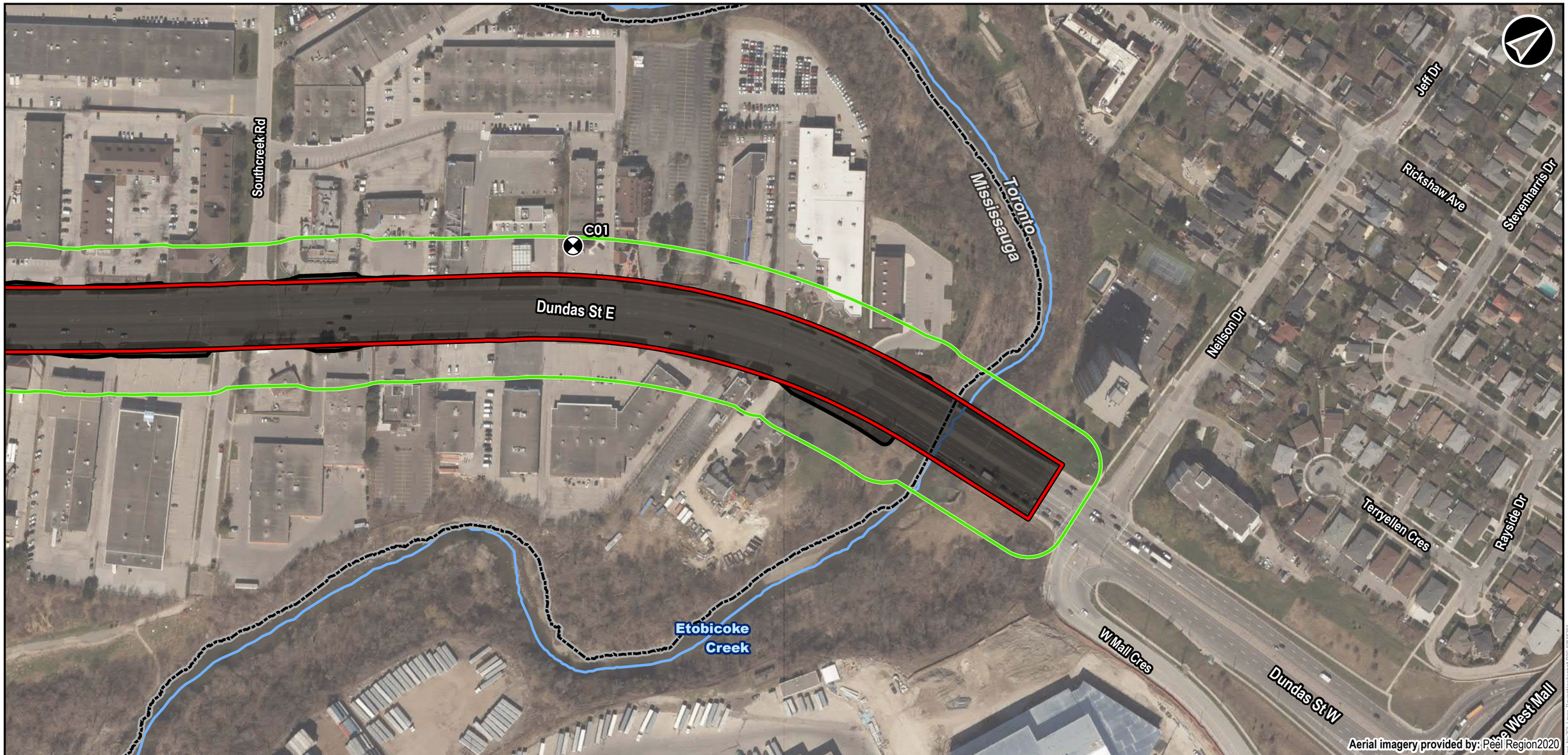
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 15-09**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

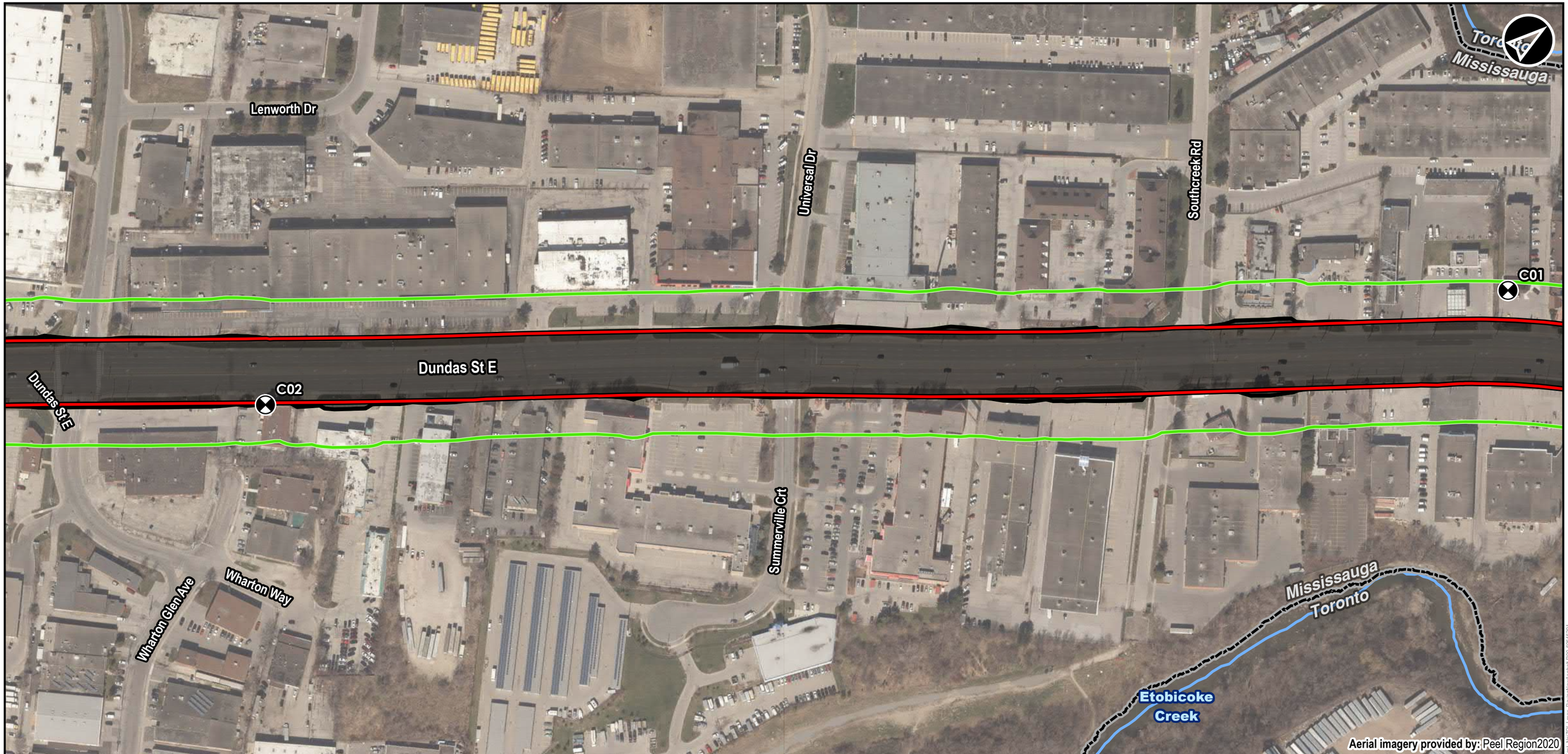
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-01**
P:60645291	Rev:00	

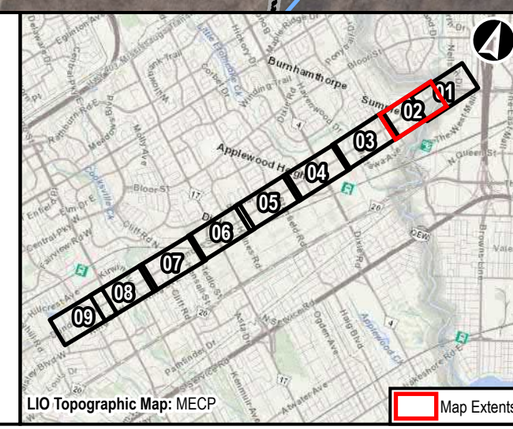


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

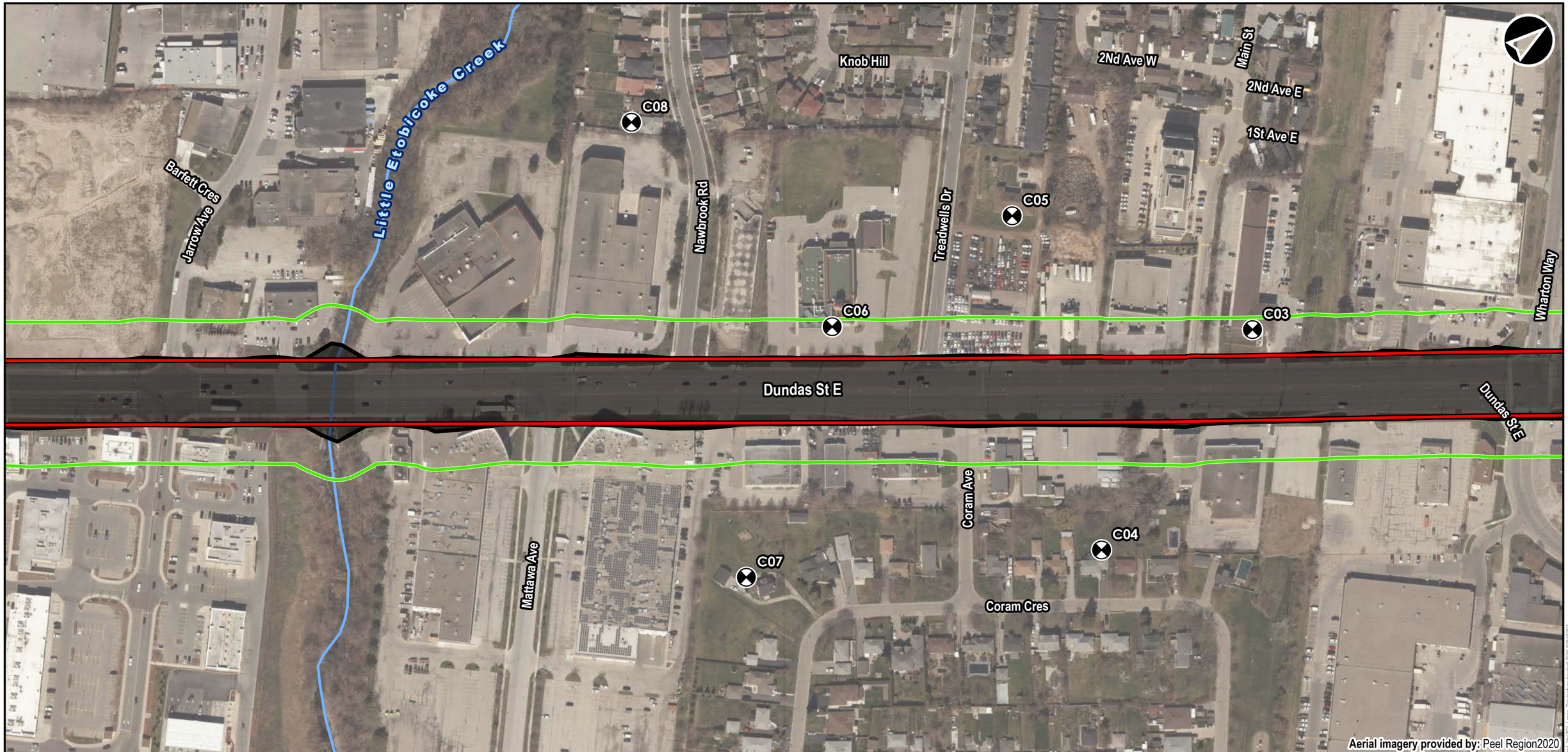
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-02**
P:60645291	Rev:00	

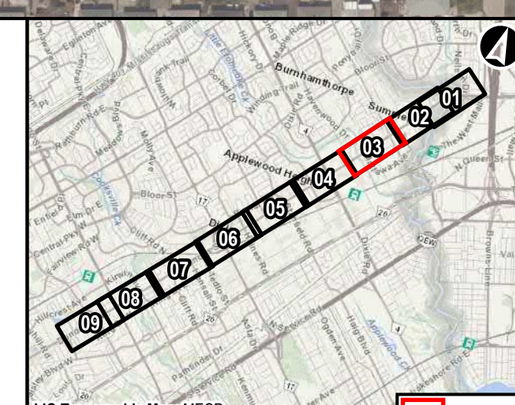


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

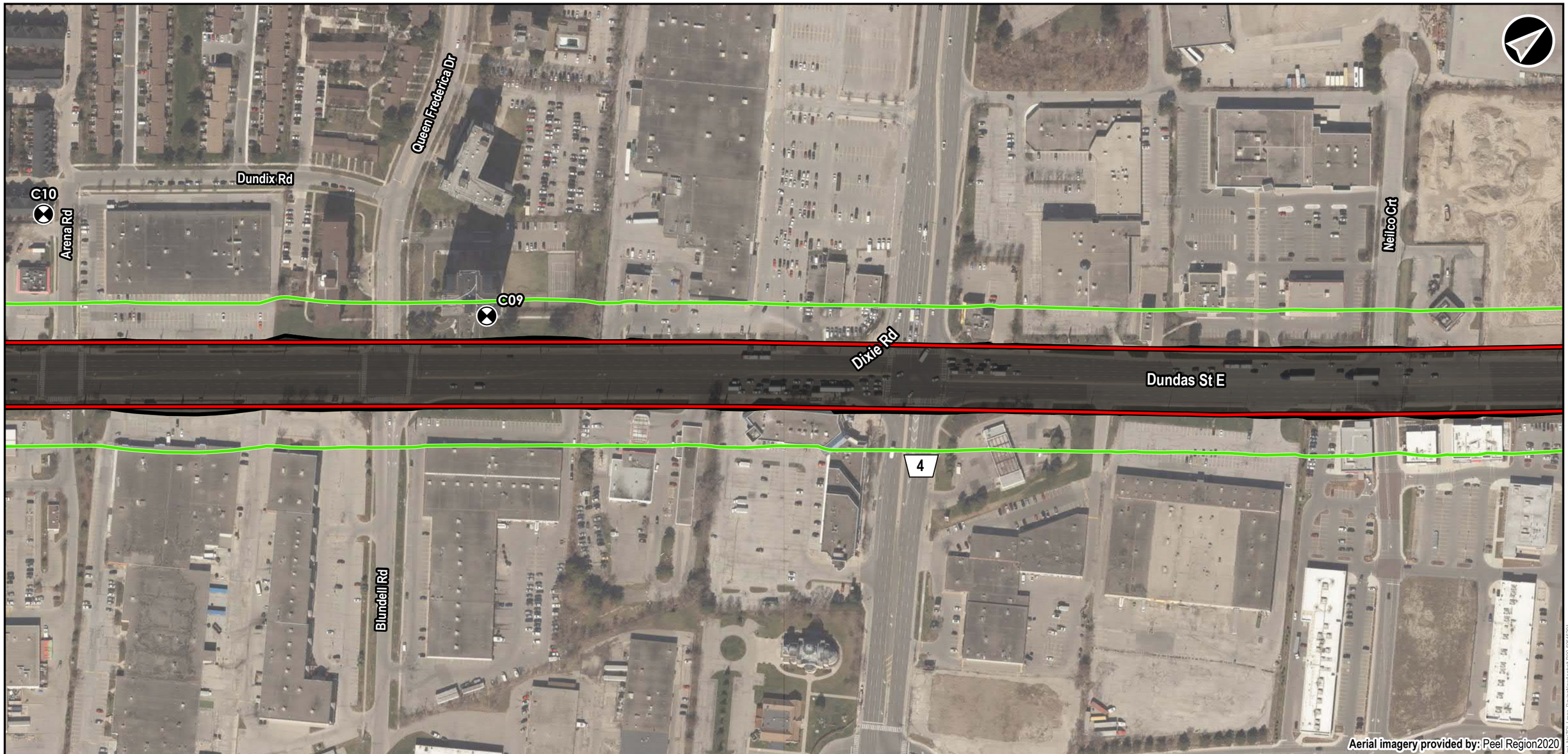
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-03**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

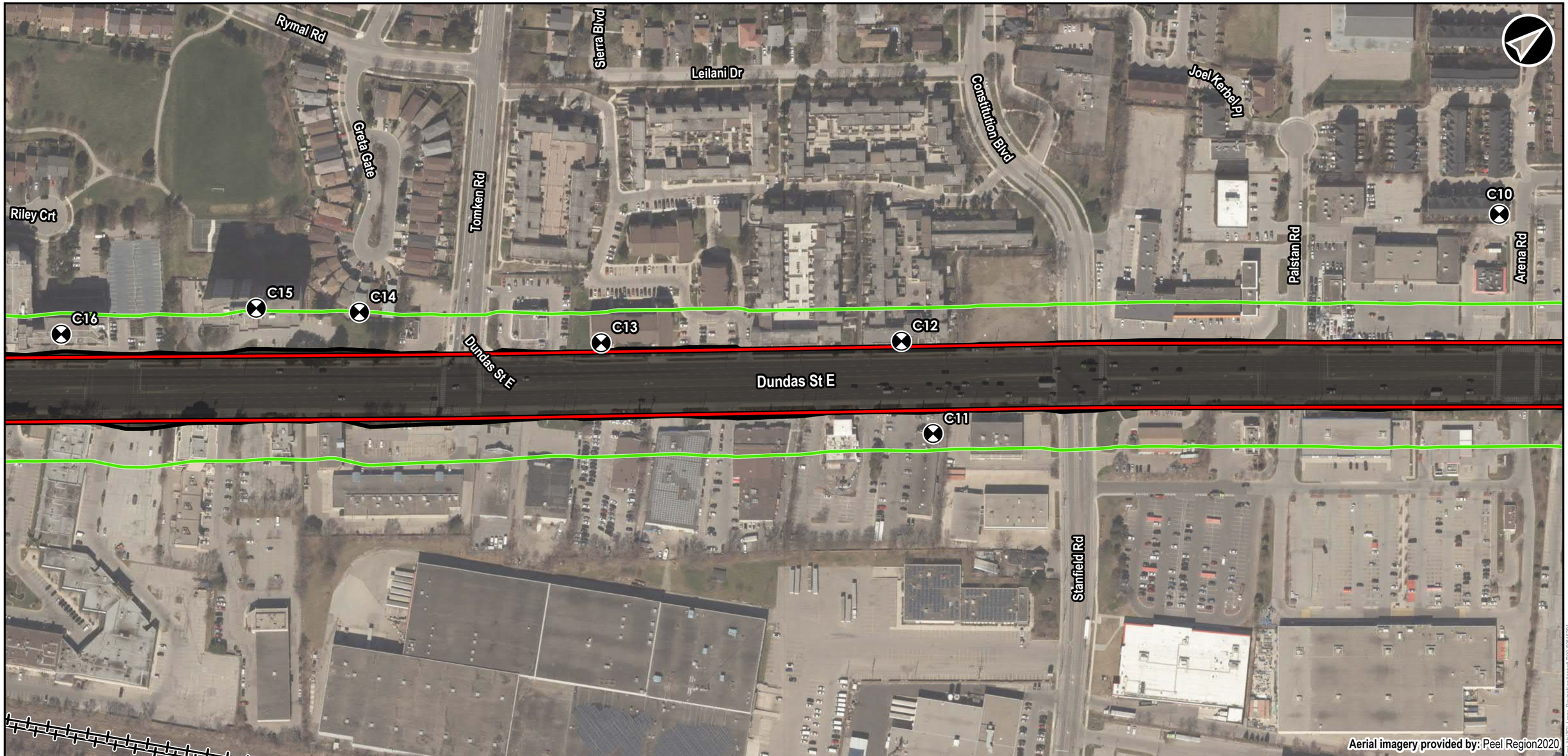
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-04**
P:60645291	Rev:00	

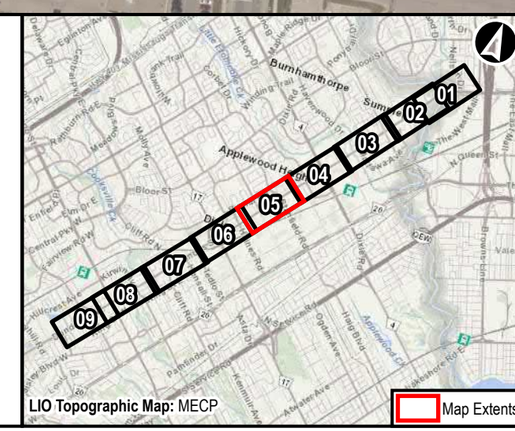


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

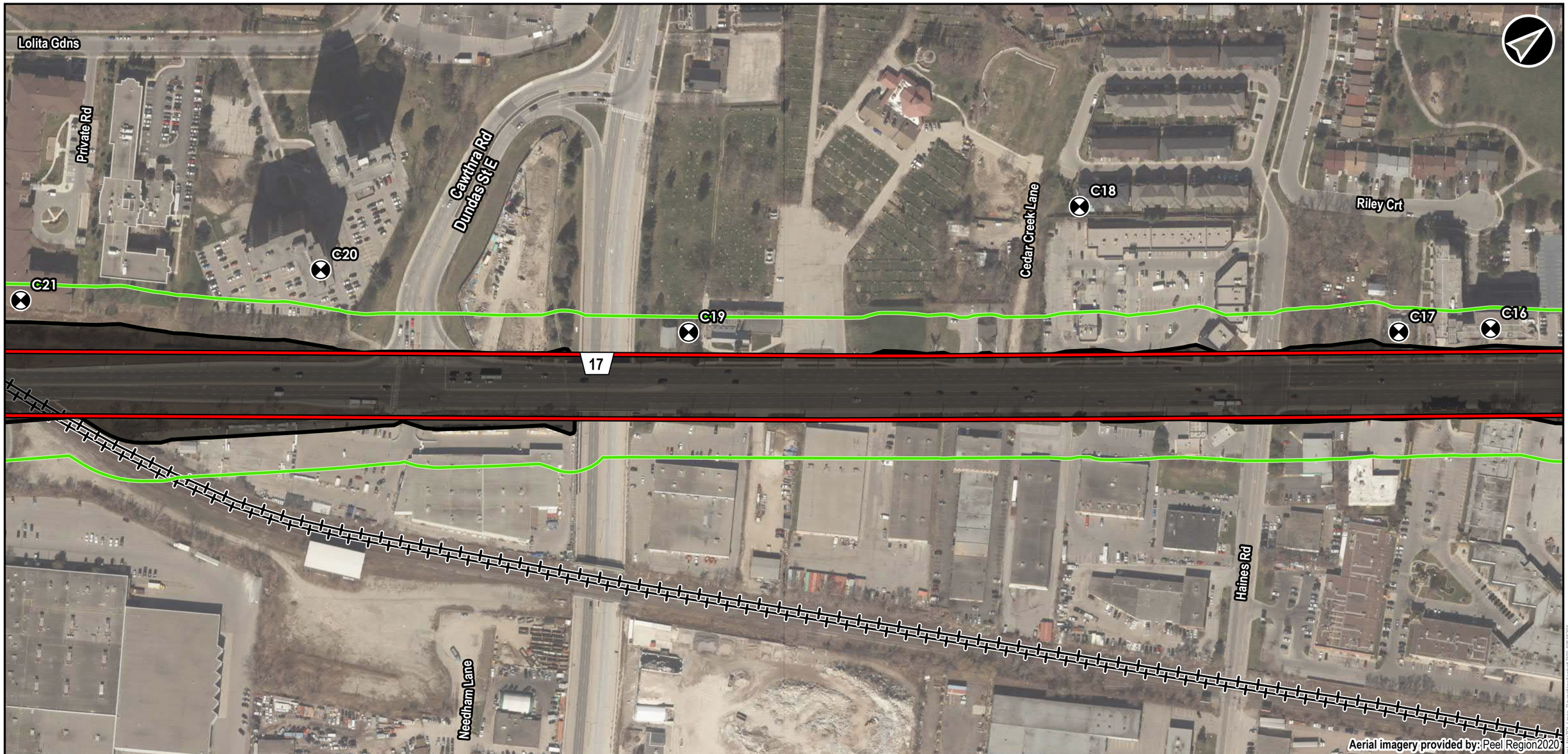
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-05**
P:60645291	Rev:00	

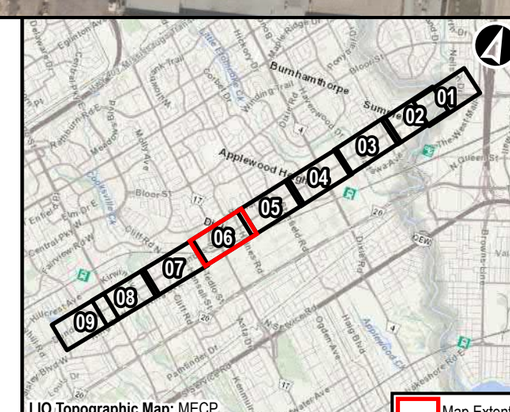


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

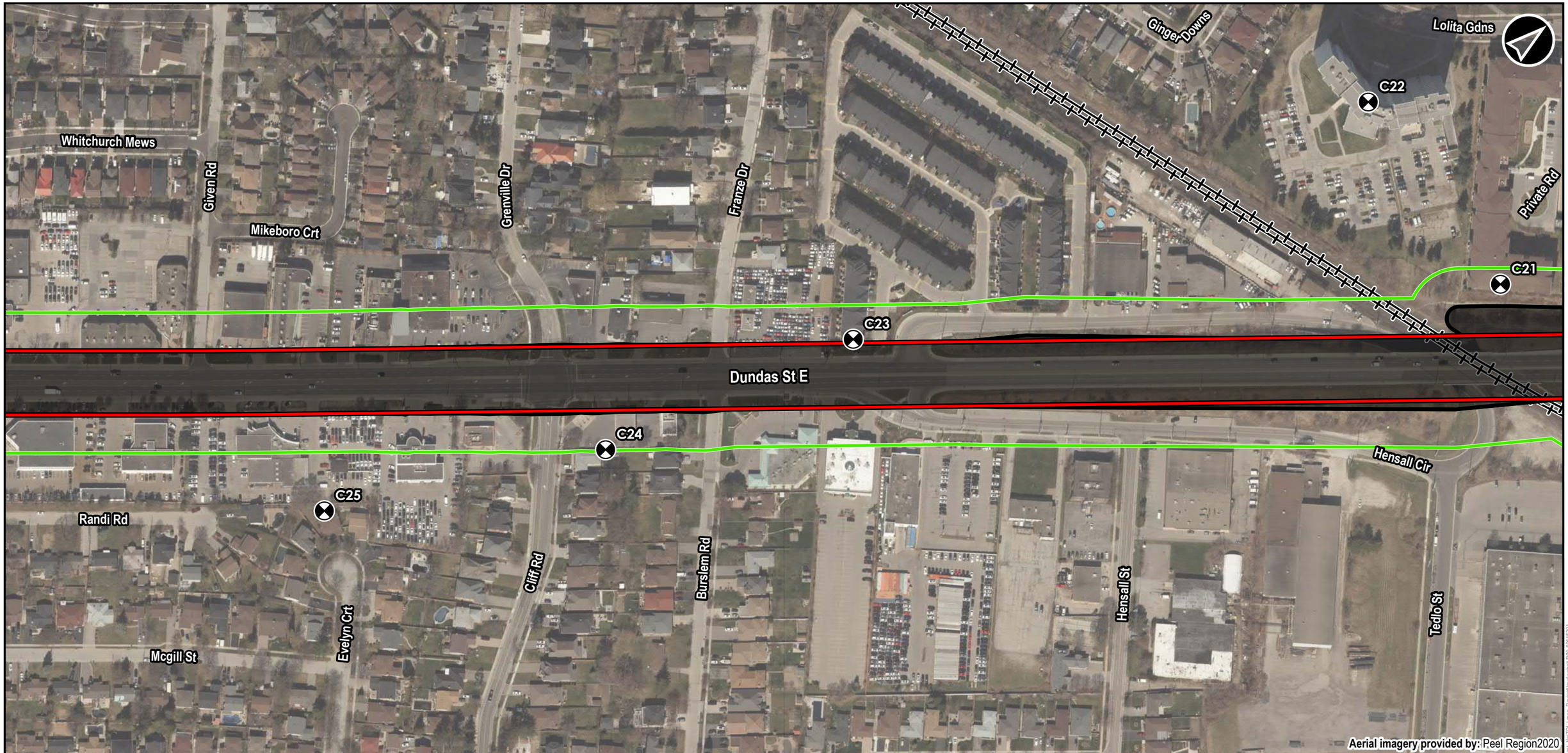
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-06**
P:60645291	Rev:00	

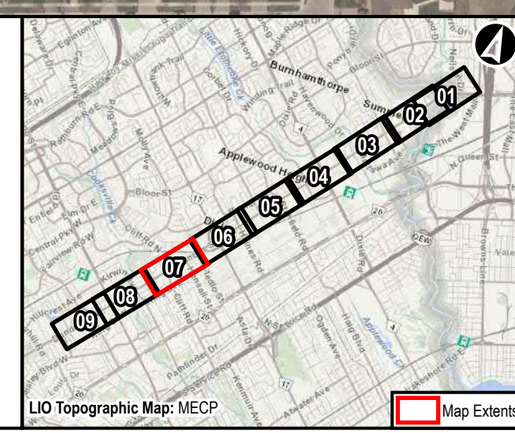


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-07**
P:60645291	Rev:00	

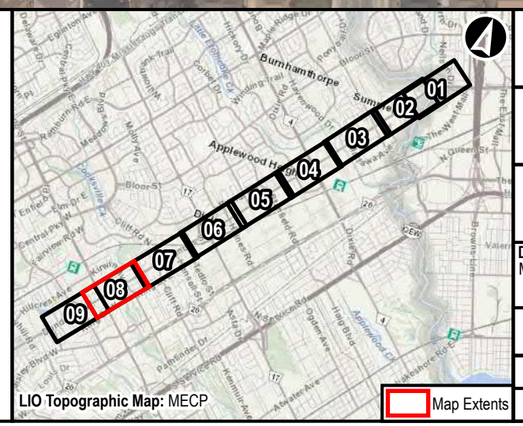
Aerial imagery provided by: Peel Region2020

Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

0 20 40 80 120 160 M

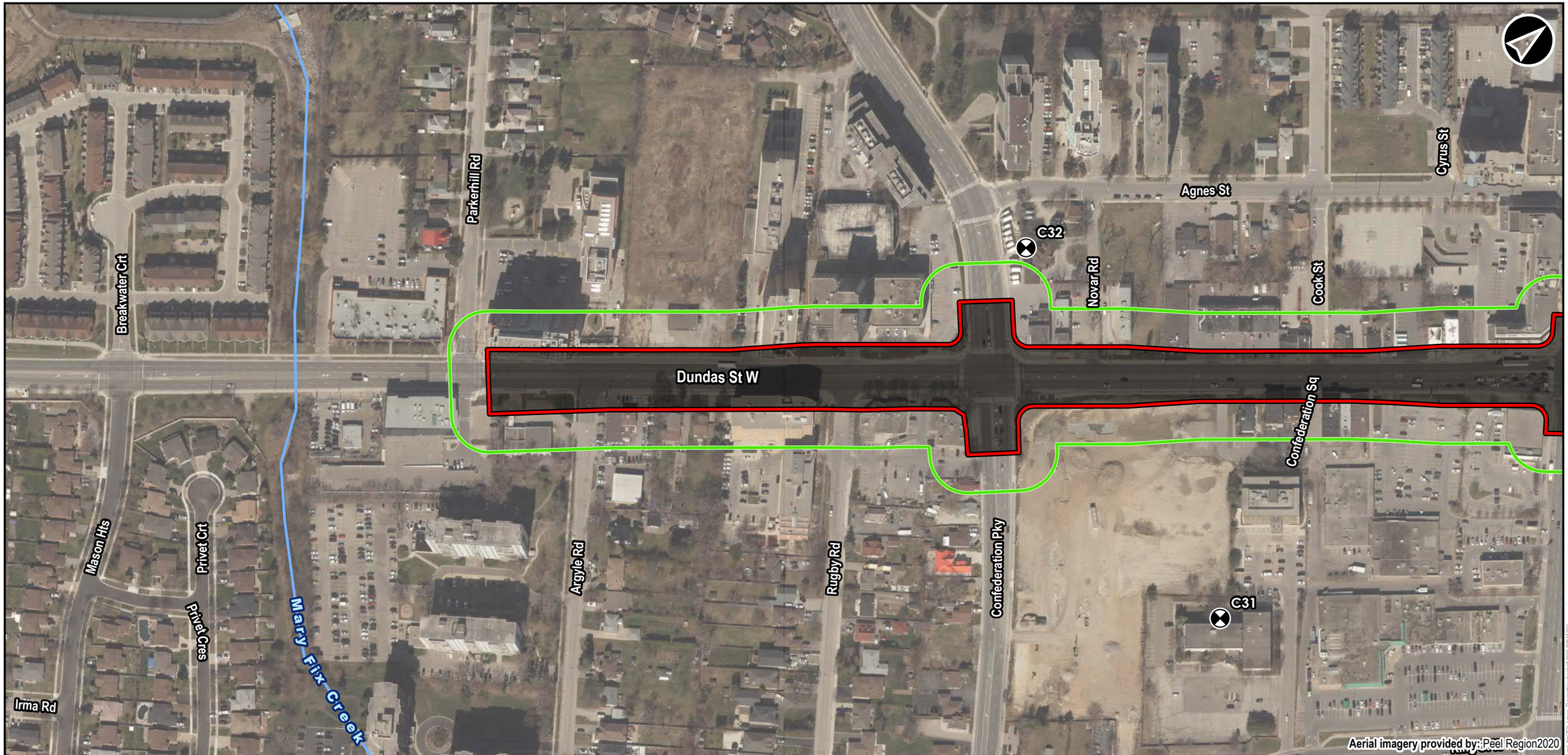
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500
P:60645291	Rev:00

Figure: 16-08

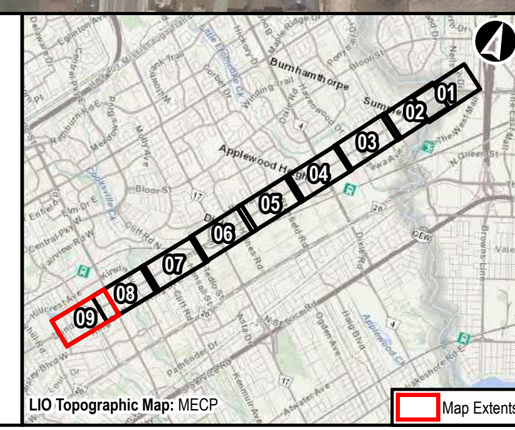


Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Noise Zone of Influence Lmax

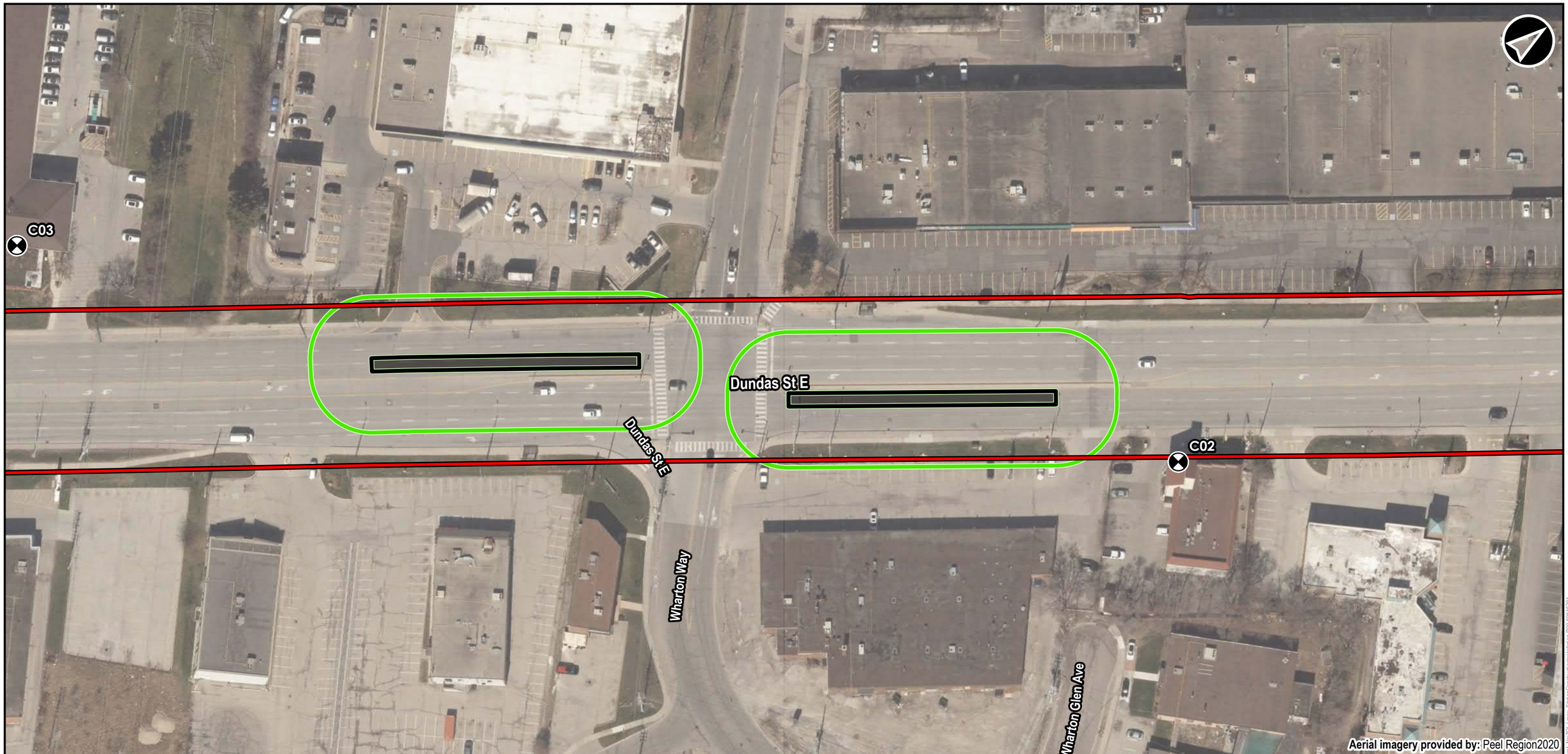
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,500	**Figure: 16-09**
P:60645291	Rev:00	

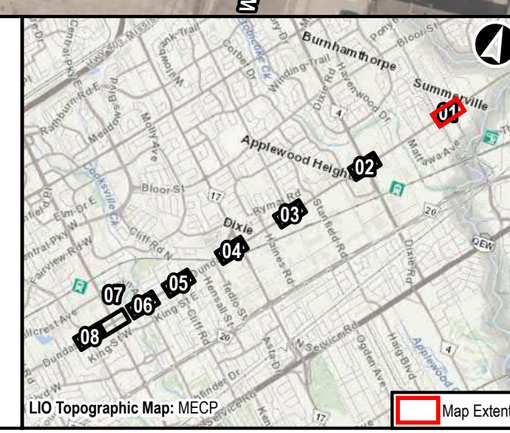


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

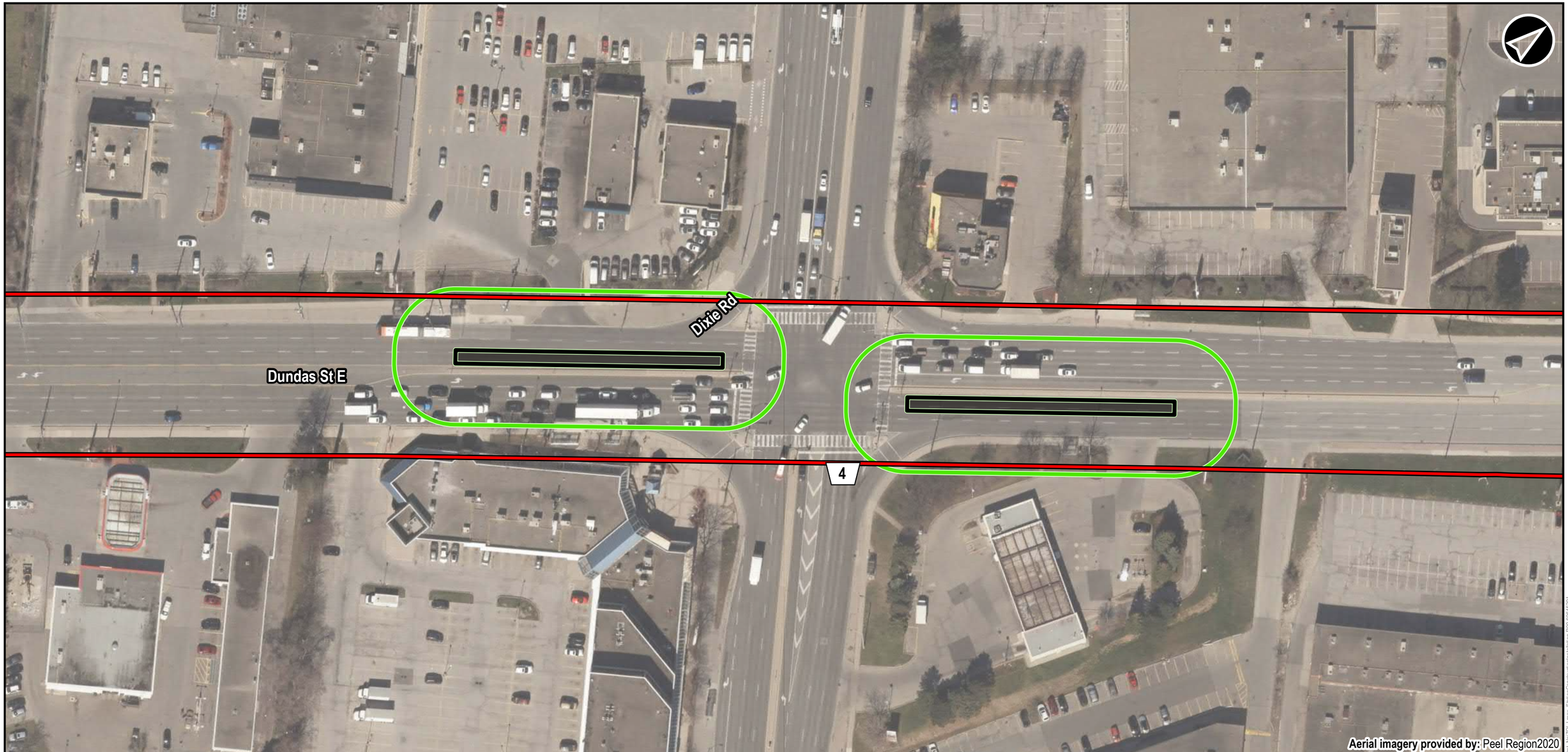
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-01**
P:60645291	Rev:00	



Legend

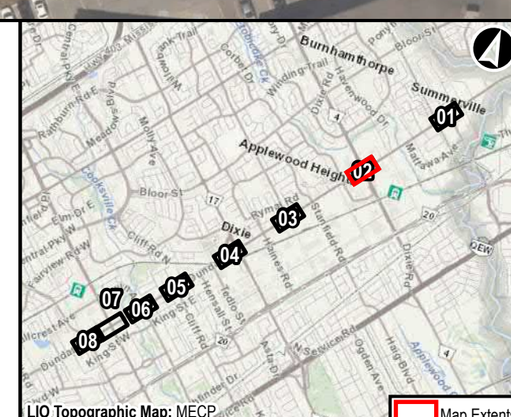
Proposed Bus Station Construction Limits

Presumed Exisiting Right of Way

Residential and Institutional Receptors

Base Layers

Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

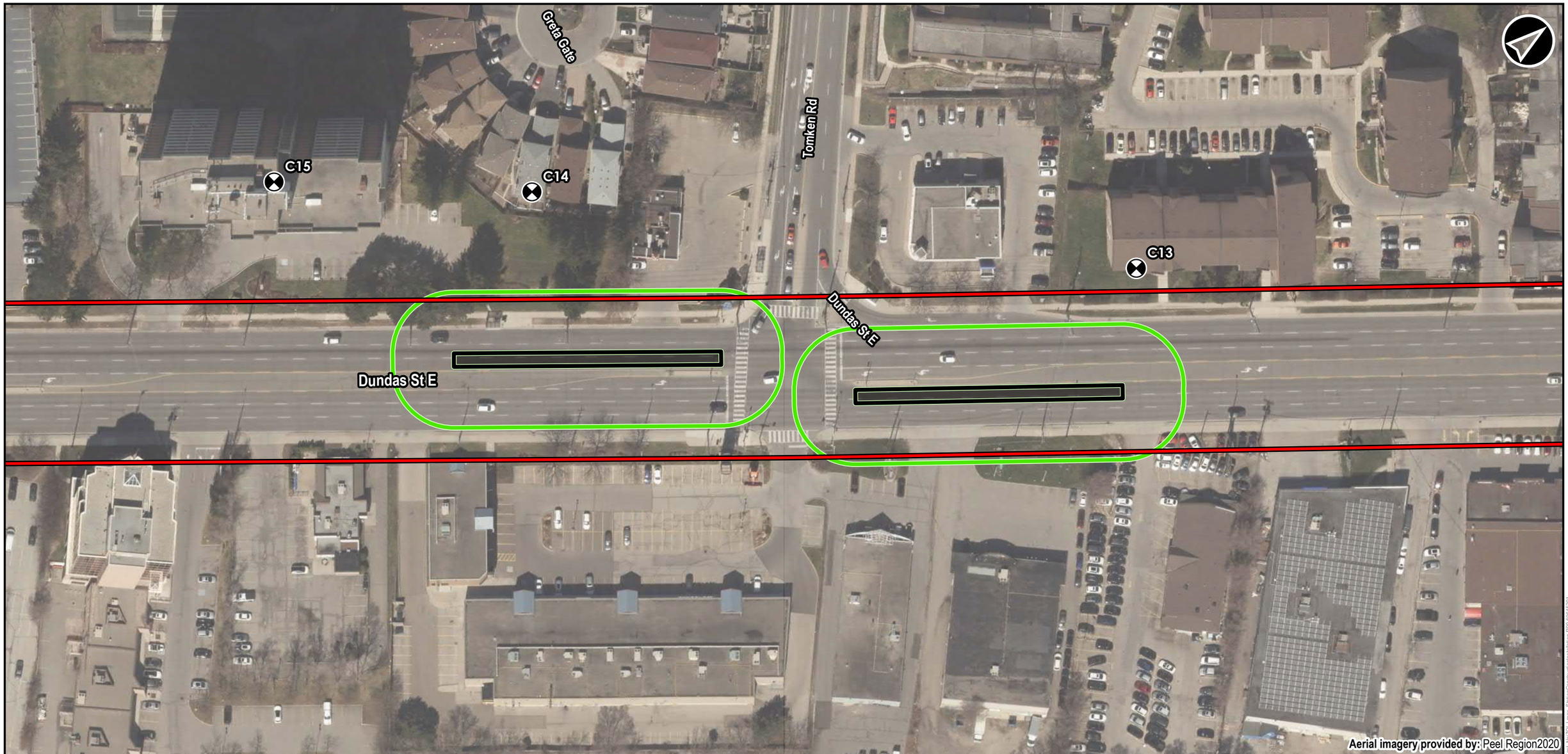
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-02**
P:60645291	Rev:00	

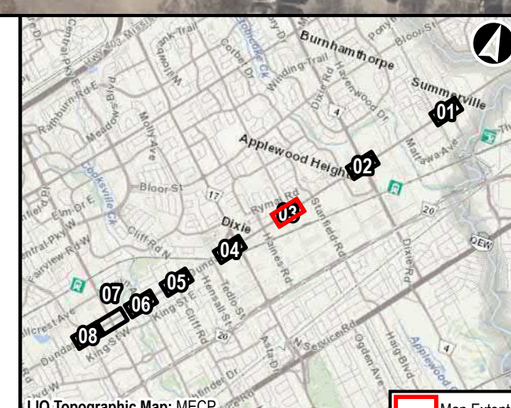


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

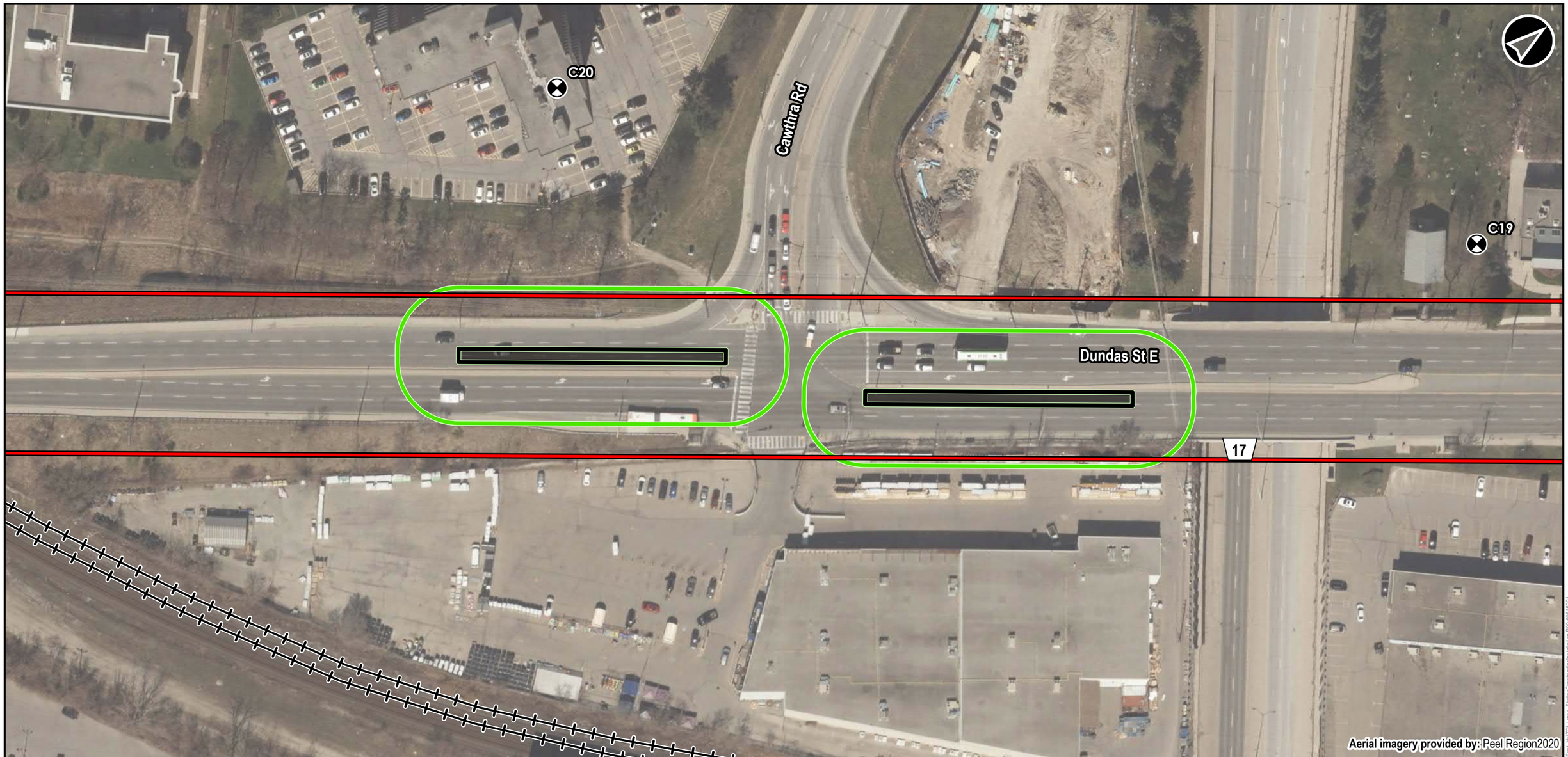
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-03**
P:60645291	Rev:00	

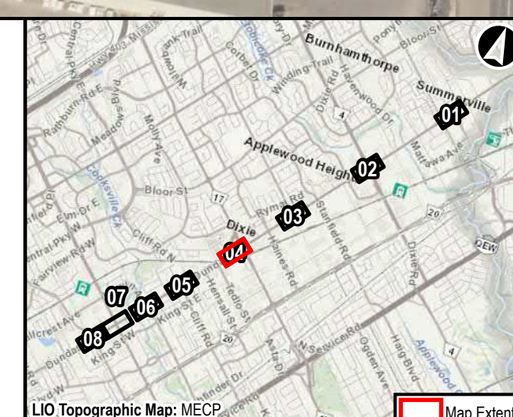


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

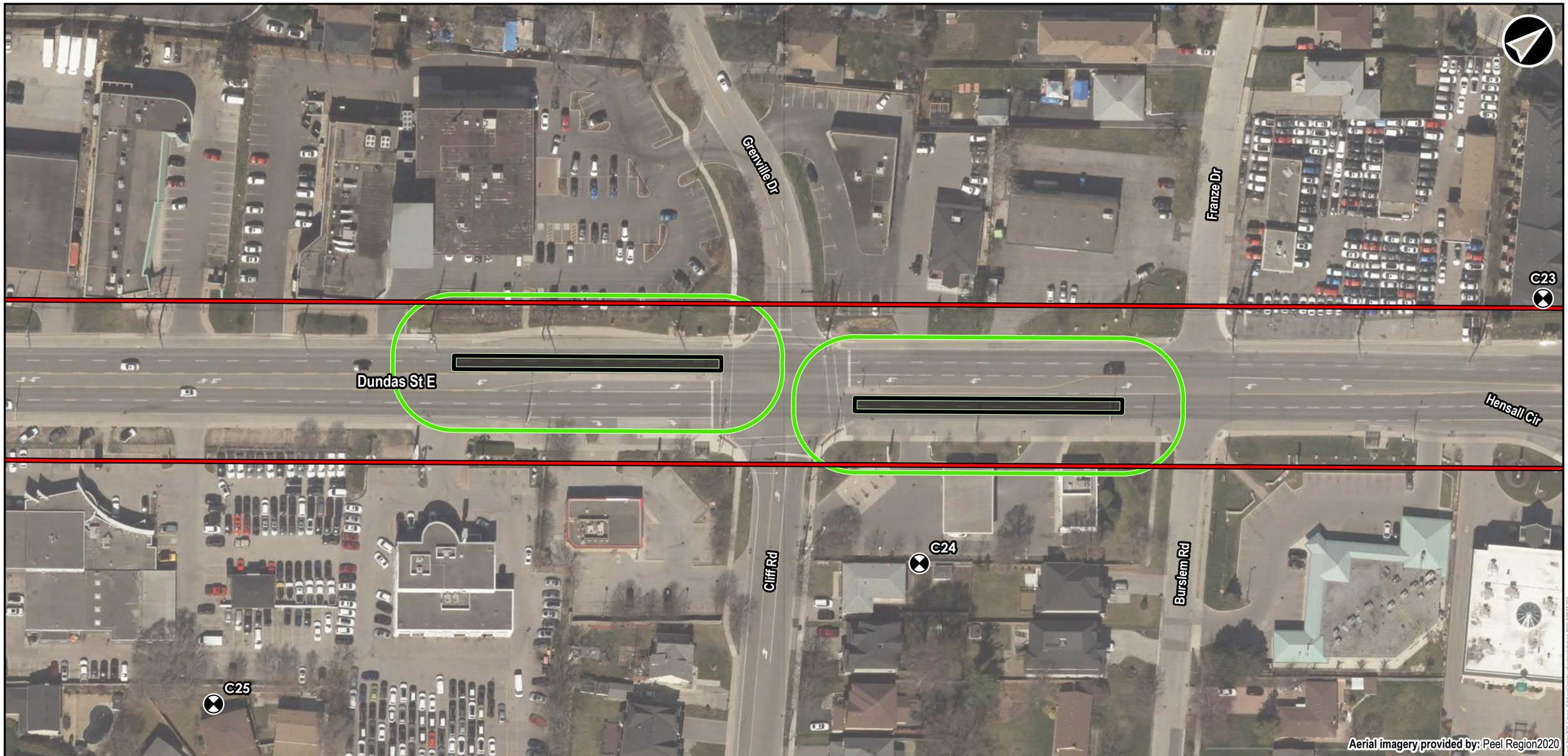
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-04**
P:60645291	Rev:00	

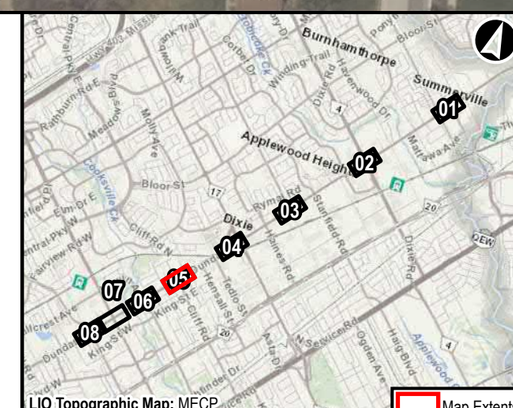


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

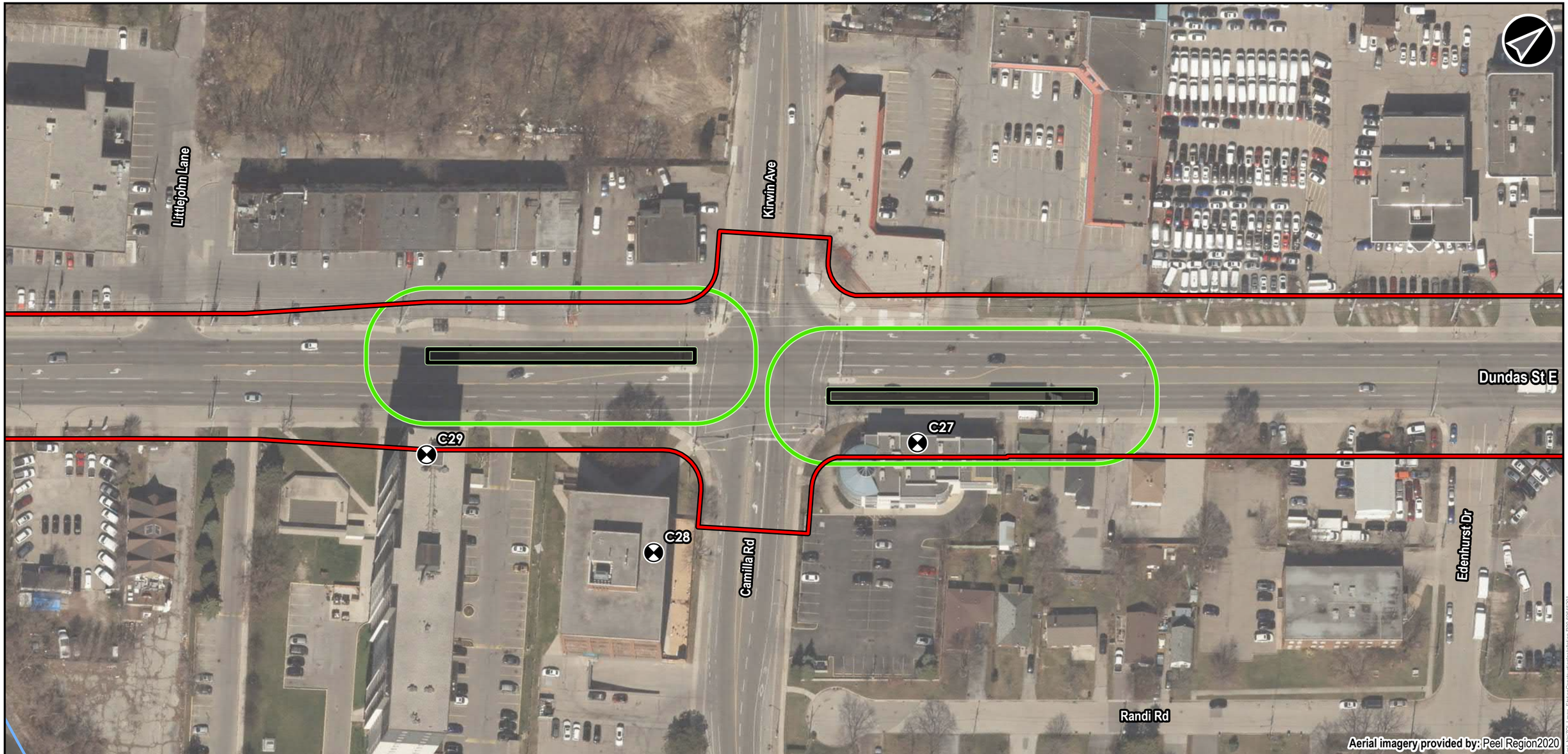
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-05**
P:60645291	Rev:00	

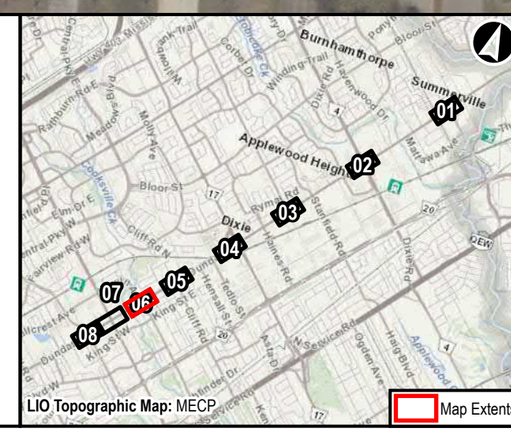


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

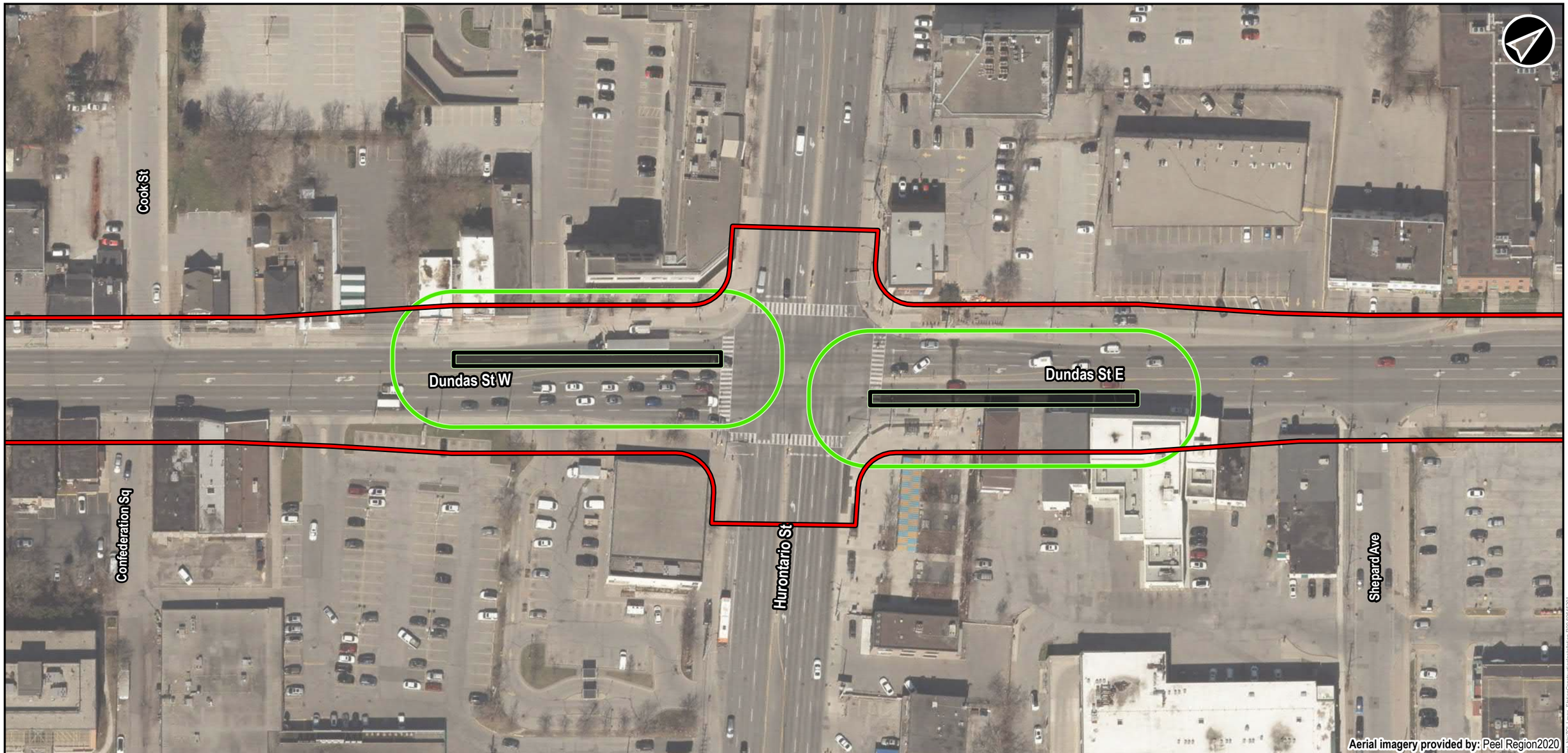
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-06**
P:60645291	Rev:00	



Legend

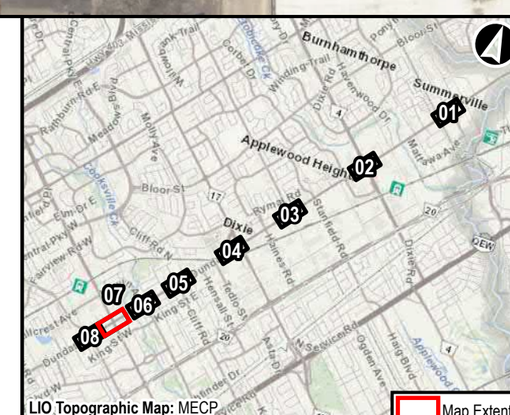
Proposed Bus Station Construction Limits

Presumed Exisiting Right of Way

Residential and Institutional Receptors

Base Layers

Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

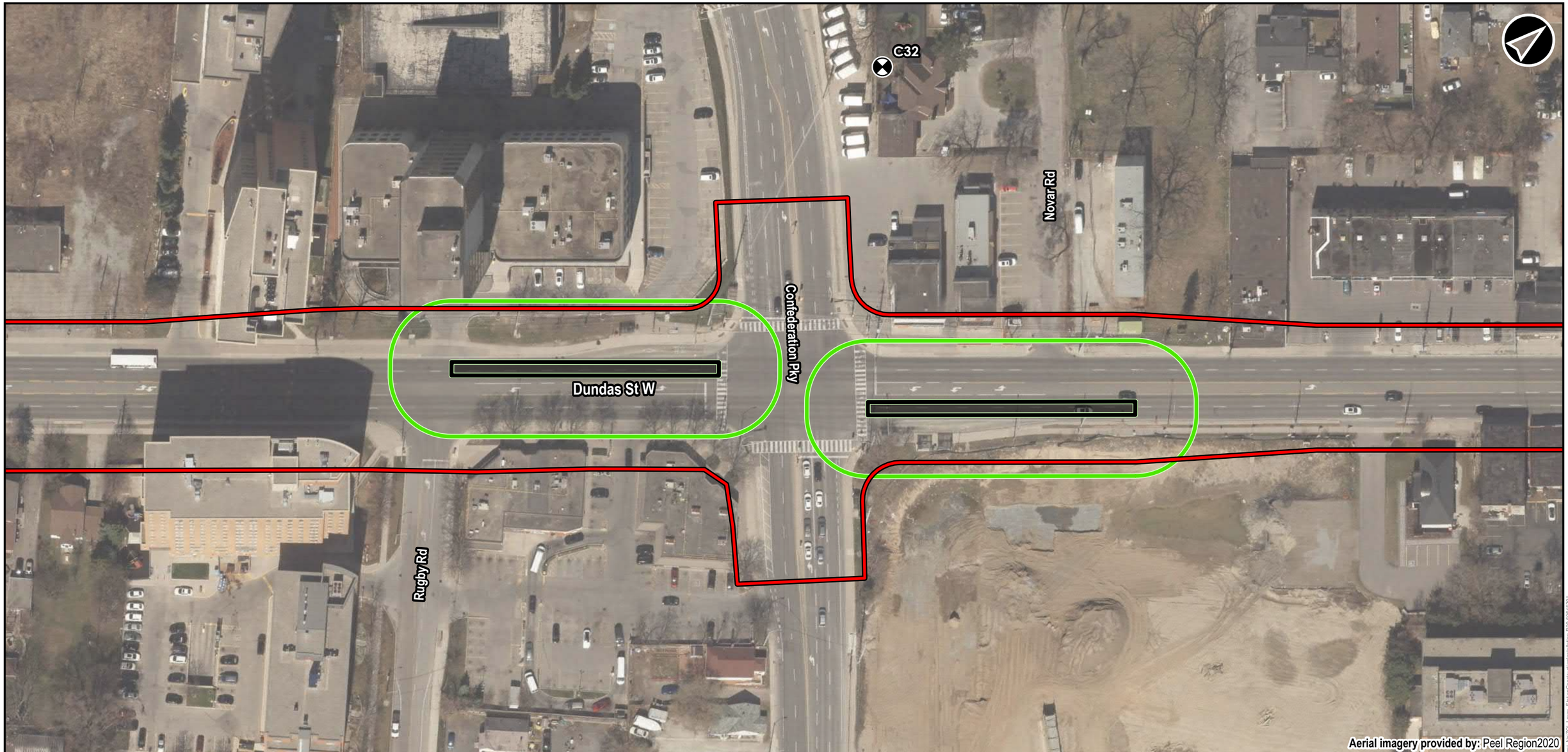
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-07**
P:60645291	Rev:00	

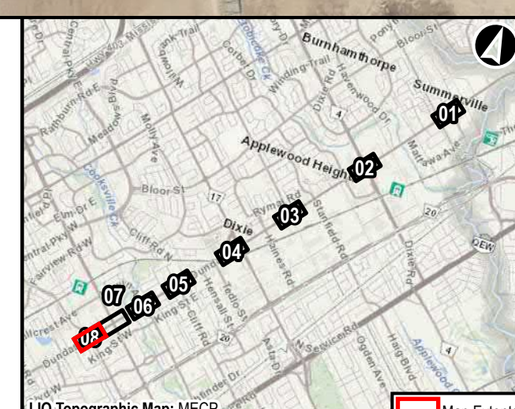


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Noise Zone of Influence Lmax

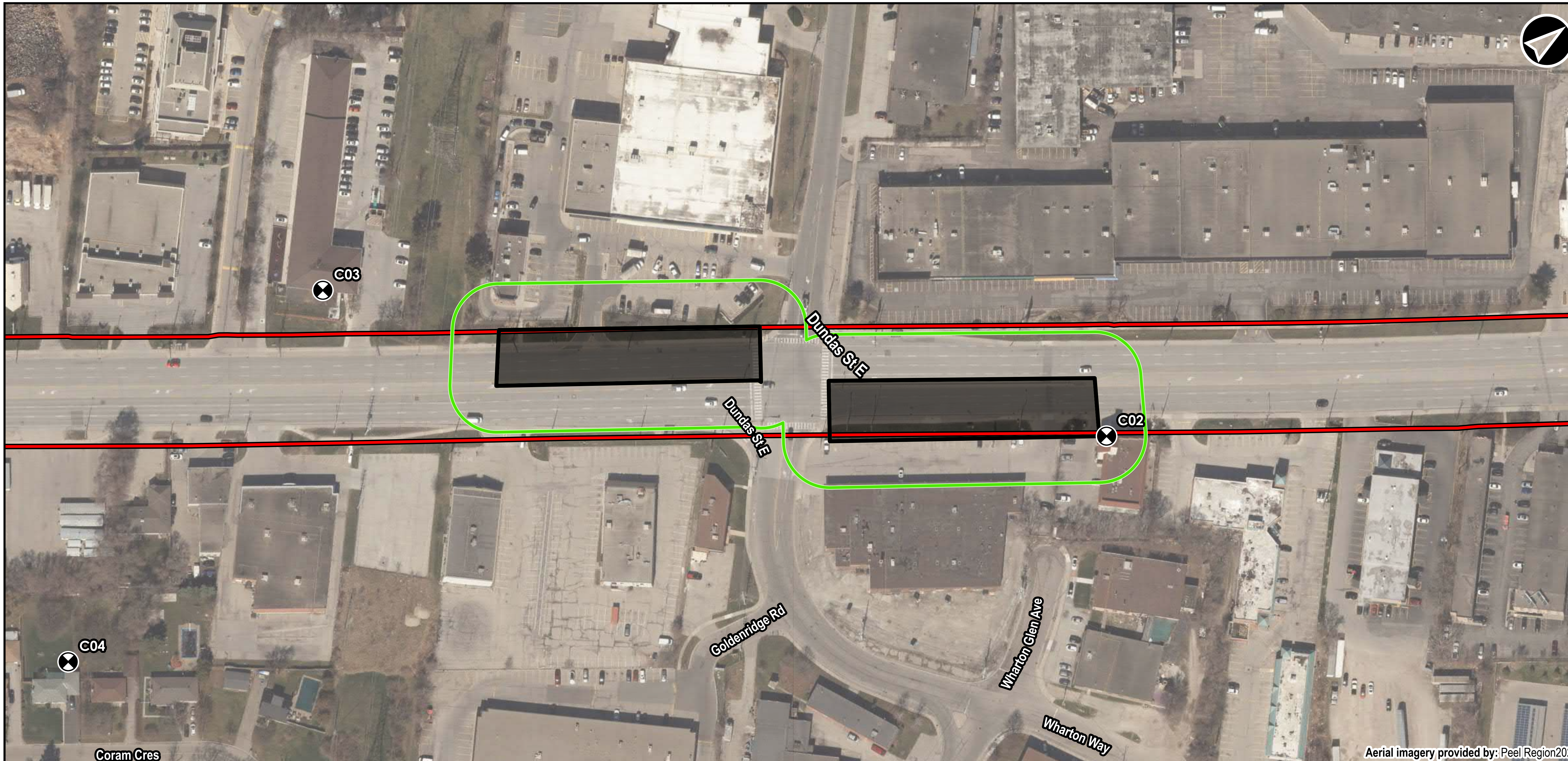
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,000	**Figure: 17-08**
P:60645291	Rev:00	



Legend

Receptor

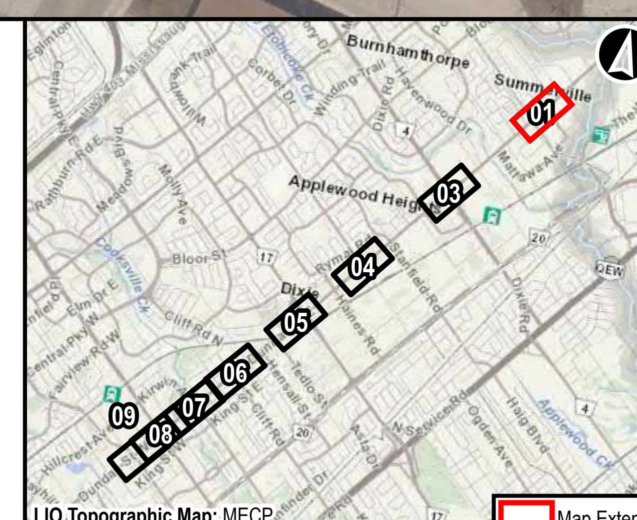
Proposed Bus Station Construction Limits

Presumed Exisiting Right of Way

Residential and Institutional Receptors

Base Layers

Municipal Boundary



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

0 5 10 20 30 40 50 60 70 80 90 100 110 M

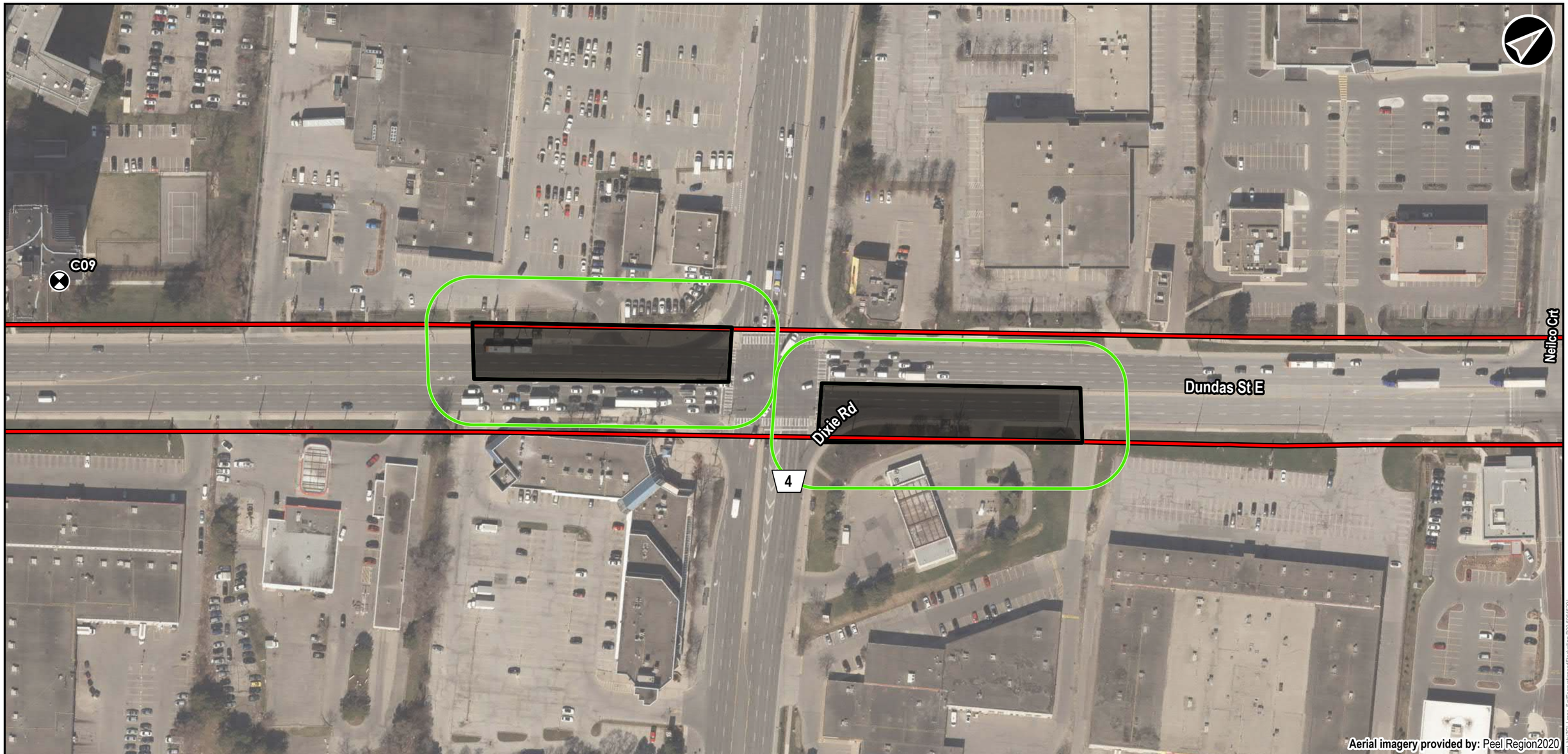
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX

AECOM

Sep, 2021	1:1,500	**Figure: 18-01**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

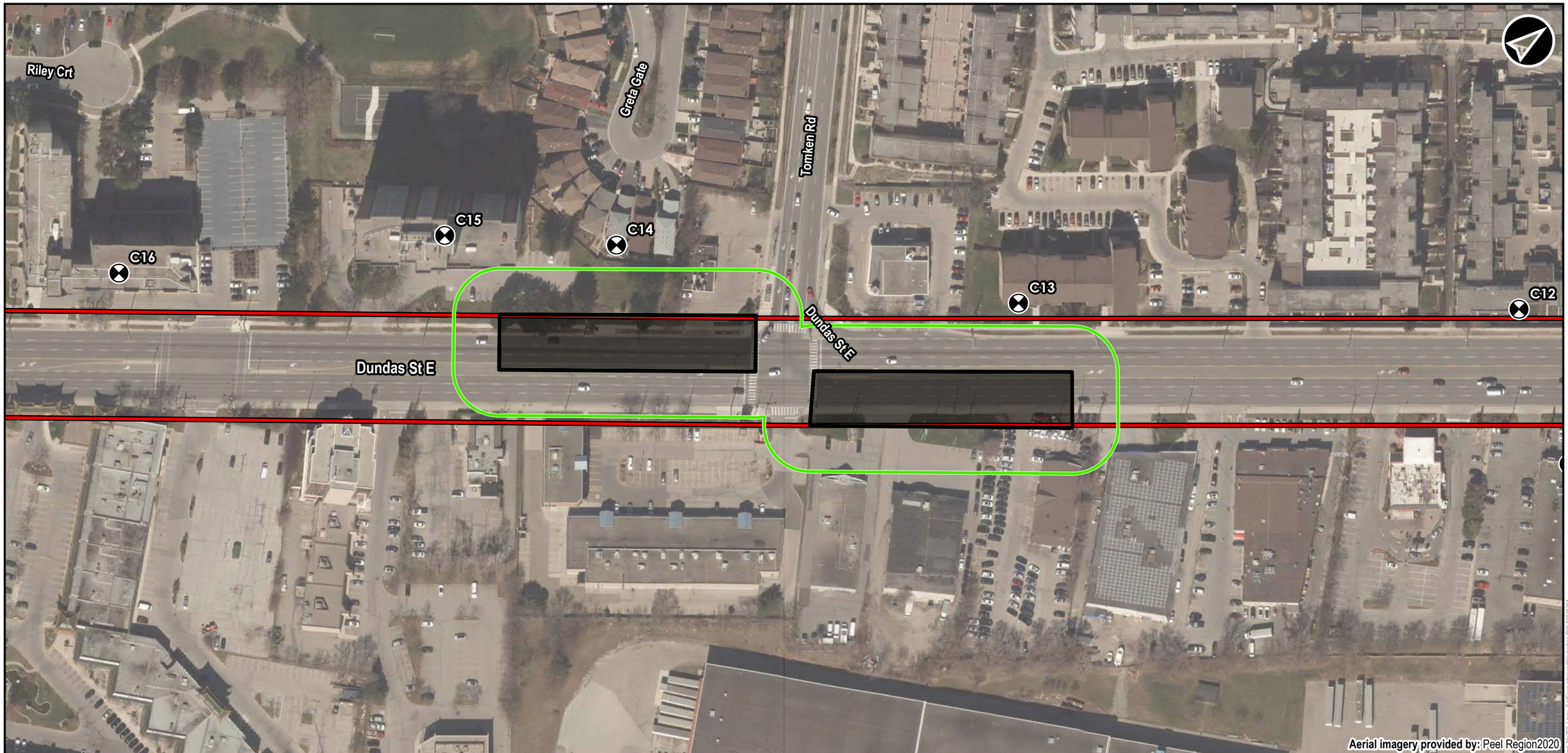
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 18-02**
P:60645291	Rev:00	

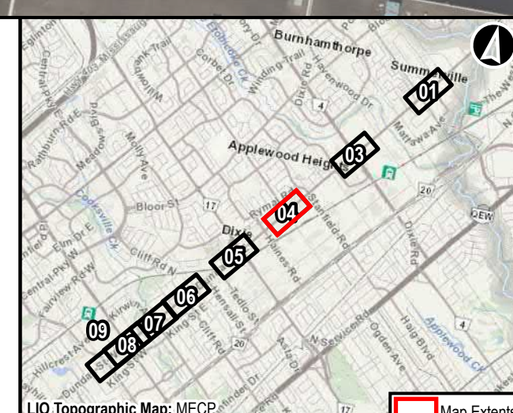


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

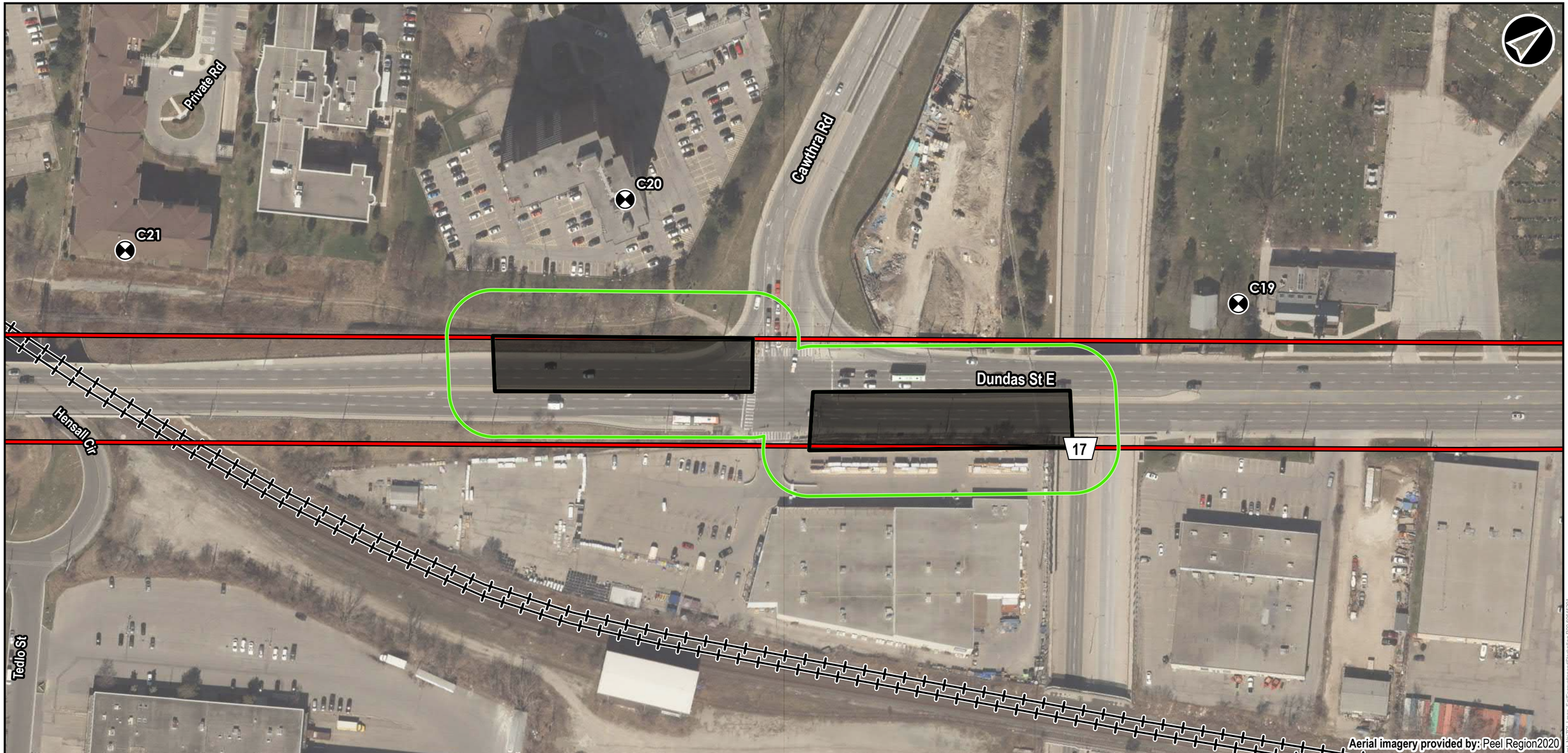
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 18-03**
P:60645291	Rev:00	

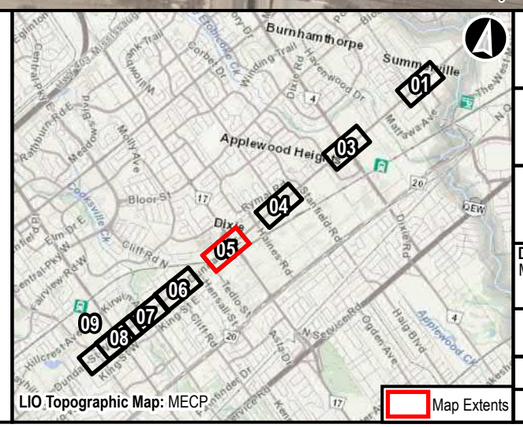


Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

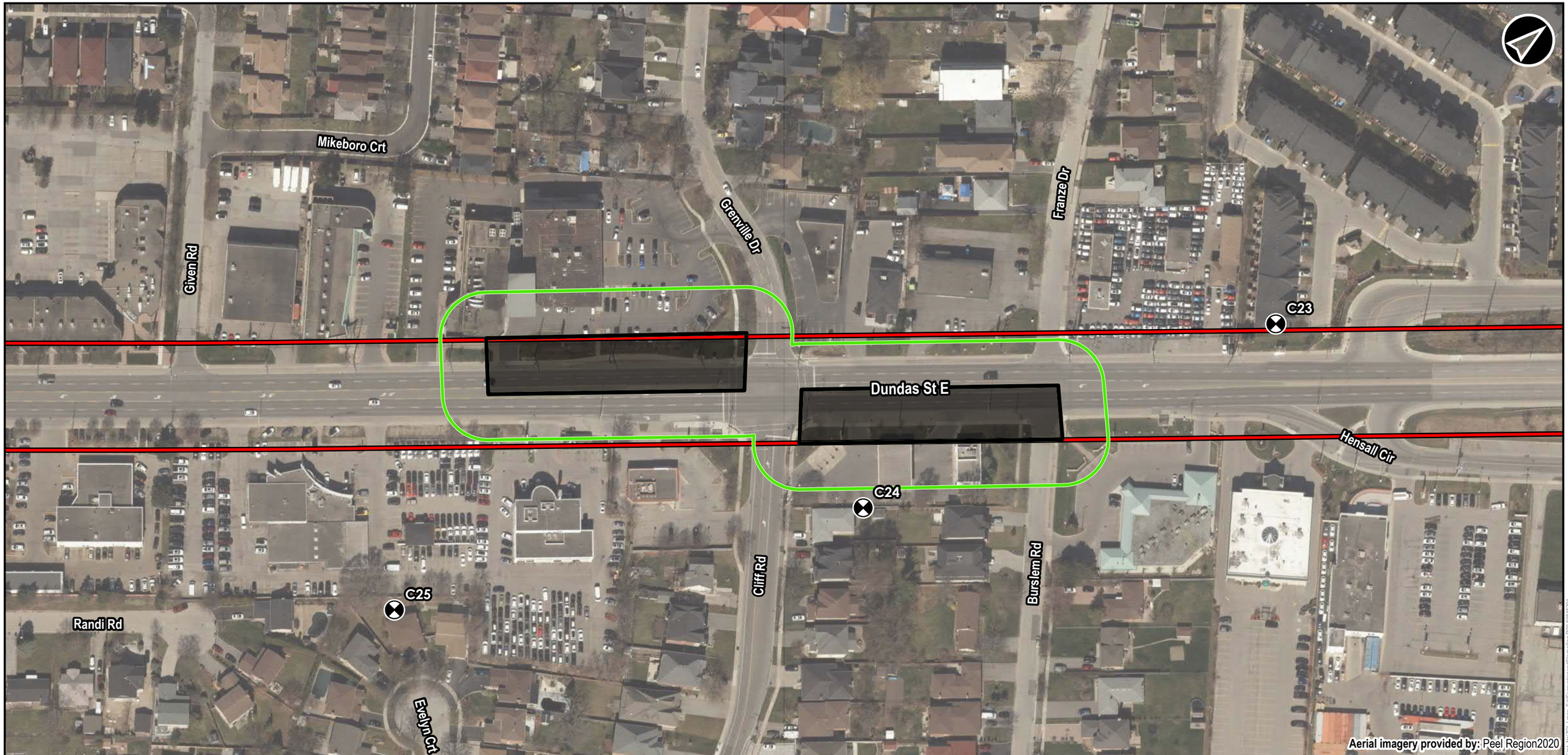
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 18-04**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

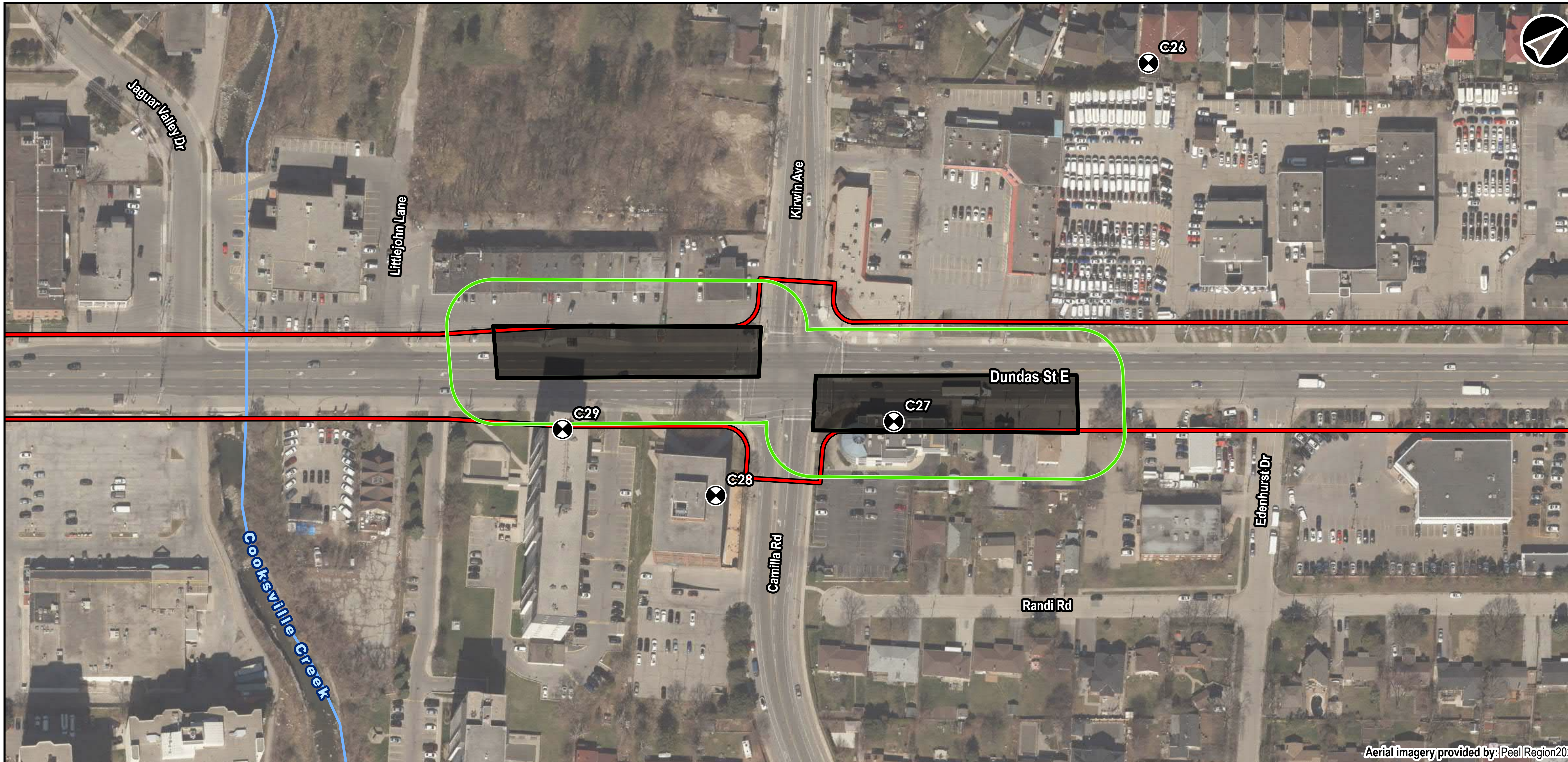
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	**Figure: 18-05**
P:60645291	Rev:00	



Legend

Receptor

Proposed Bus Station Construction Limits

Presumed Exisiting Right of Way

Residential and Institutional Receptors

Base Layers

Municipal Boundary

Watercourse

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500	Figure: 18-06
P:60645291	Rev:00	

Aerial imagery provided by: Peel Region2020

Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

0 5 10 20 30 40 50 60 70 80 90 100 110 M

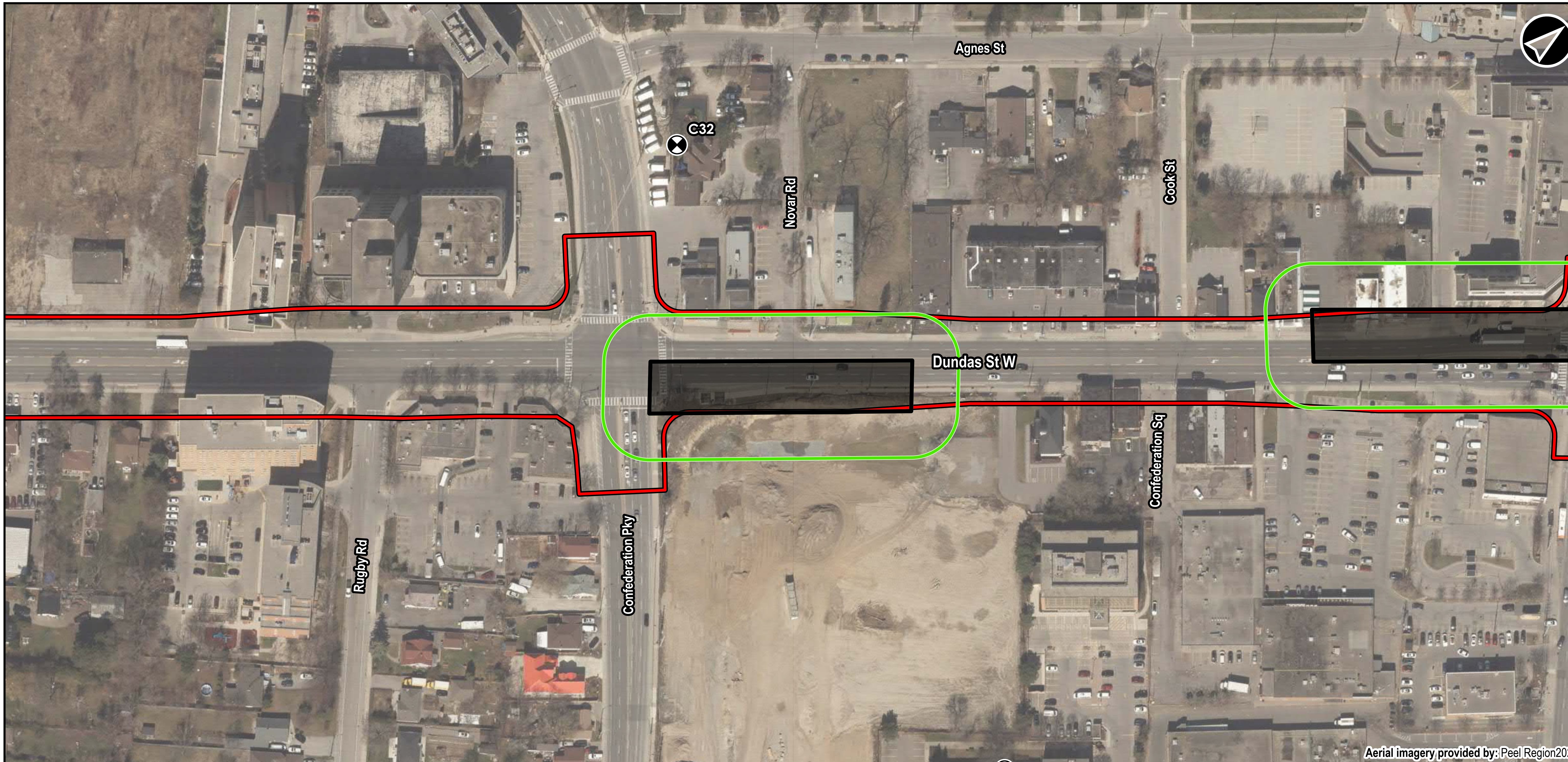
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500
P:60645291	Rev:00

Figure: 18-07



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Noise Zone of Influence Lmax

0 5 10 20 30 40 50 60 70 80 90 100 110 M

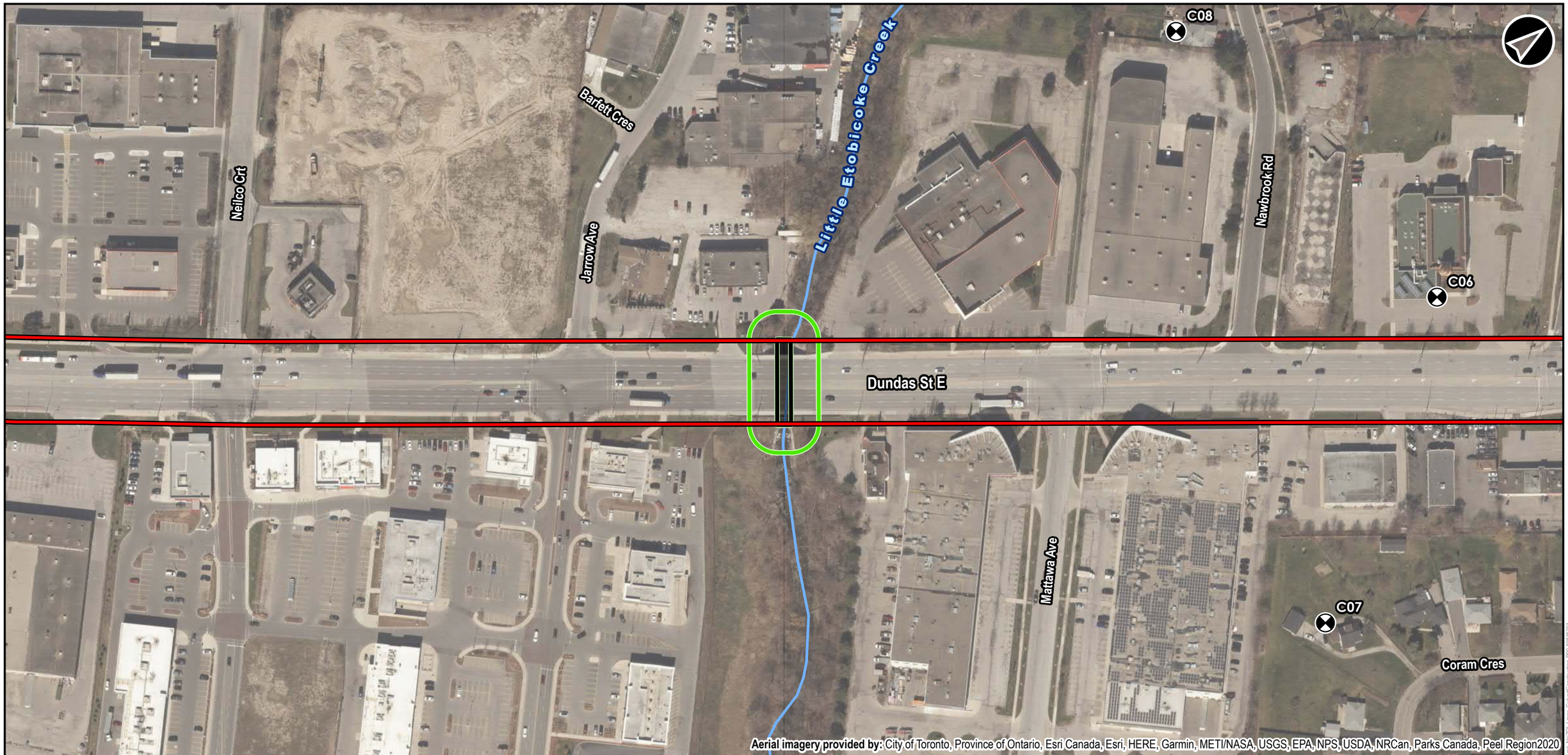
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,500
P:60645291	Rev:00

Figure: 18-08

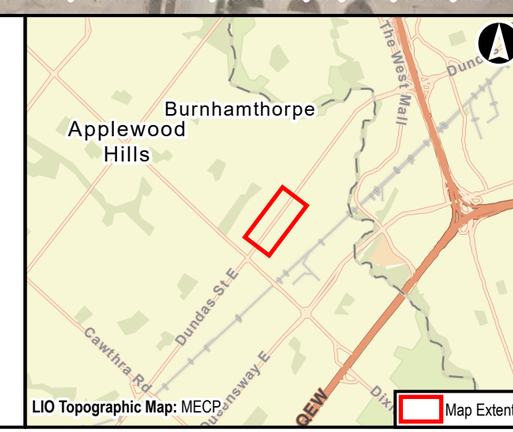


Legend

- Receptor
- Proposed Culvert Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Culvert
Construction Noise Zone of Influence Lmax

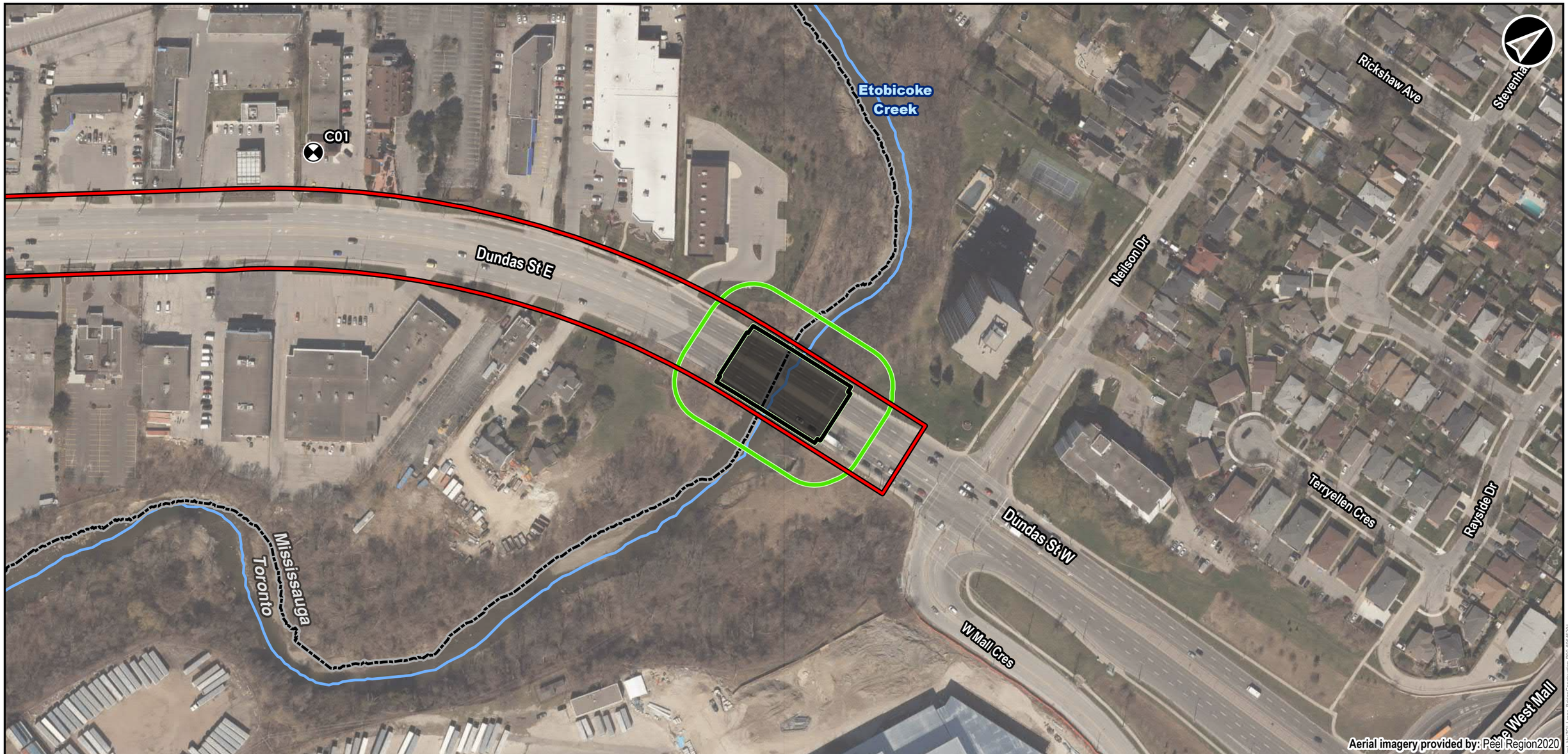
0 10 20 40 60 80 100 120 140 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:1,923	**Figure: 19**
P:60645291	Rev:00	

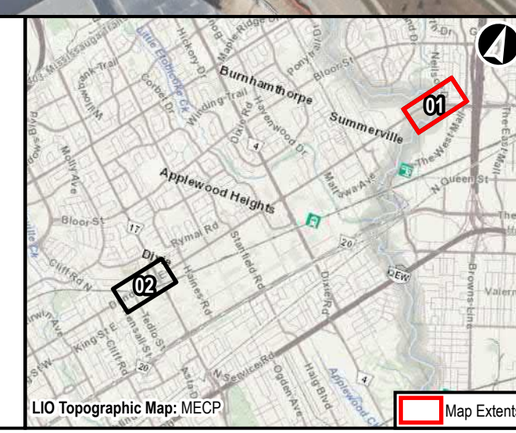


Legend

- Receptor
- Proposed Bridge Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Bridge
Construction Noise Zone of Influence Lmax

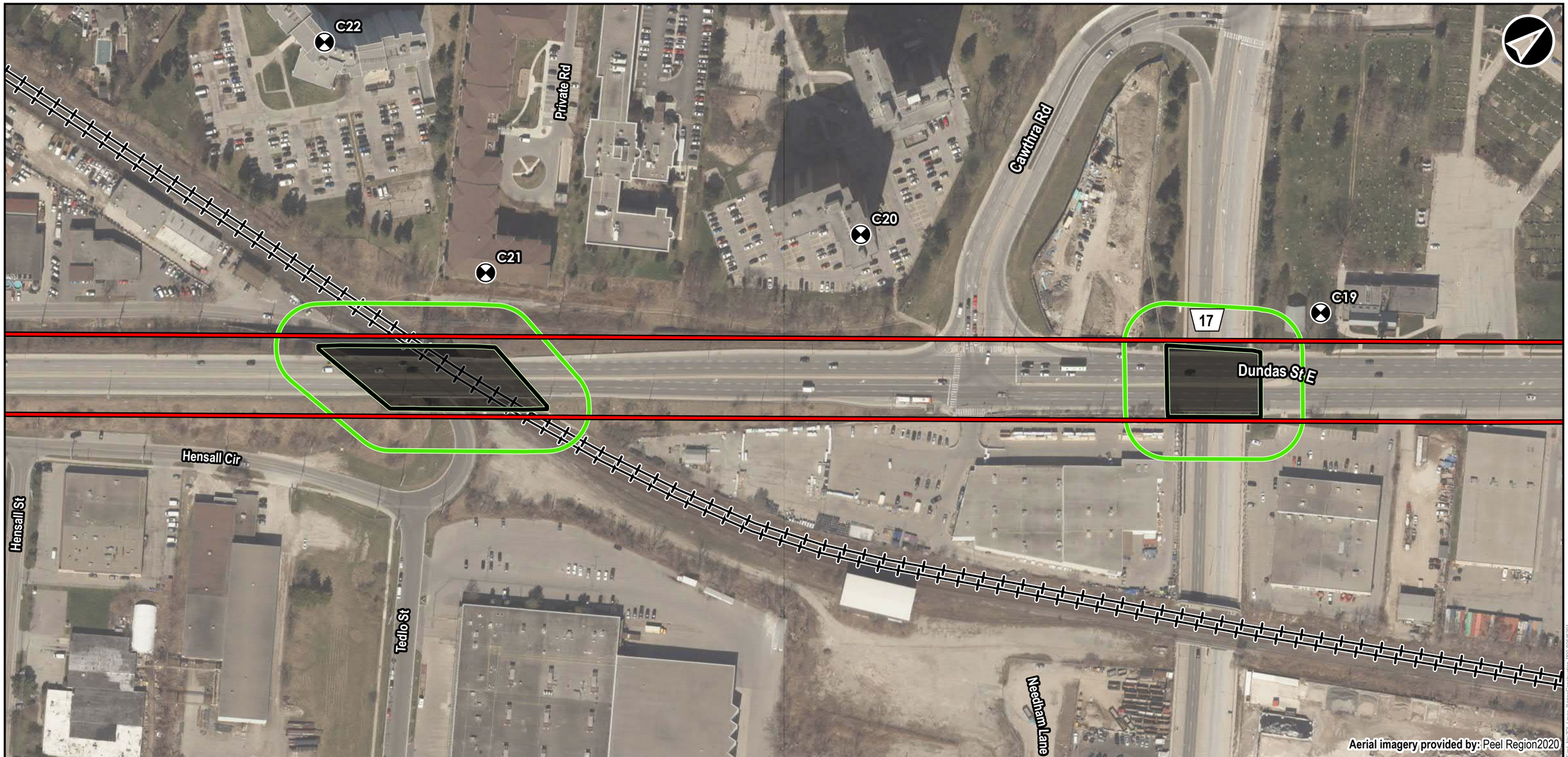
0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 20-01**
P:60645291	Rev:00	

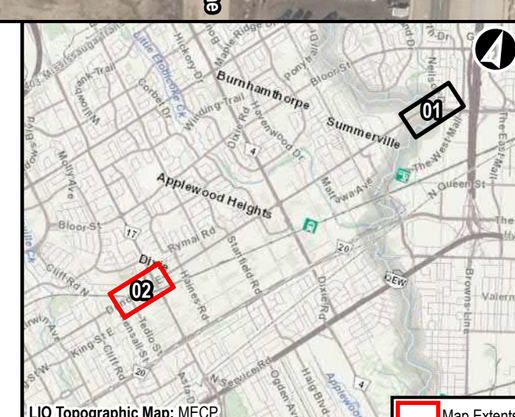


Legend

- Receptor
- Proposed Bridge Construction Limits
- Presumed Exisiting Right of Way
- Residential and Institutional Receptors

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Bridge
Construction Noise Zone of Influence Lmax

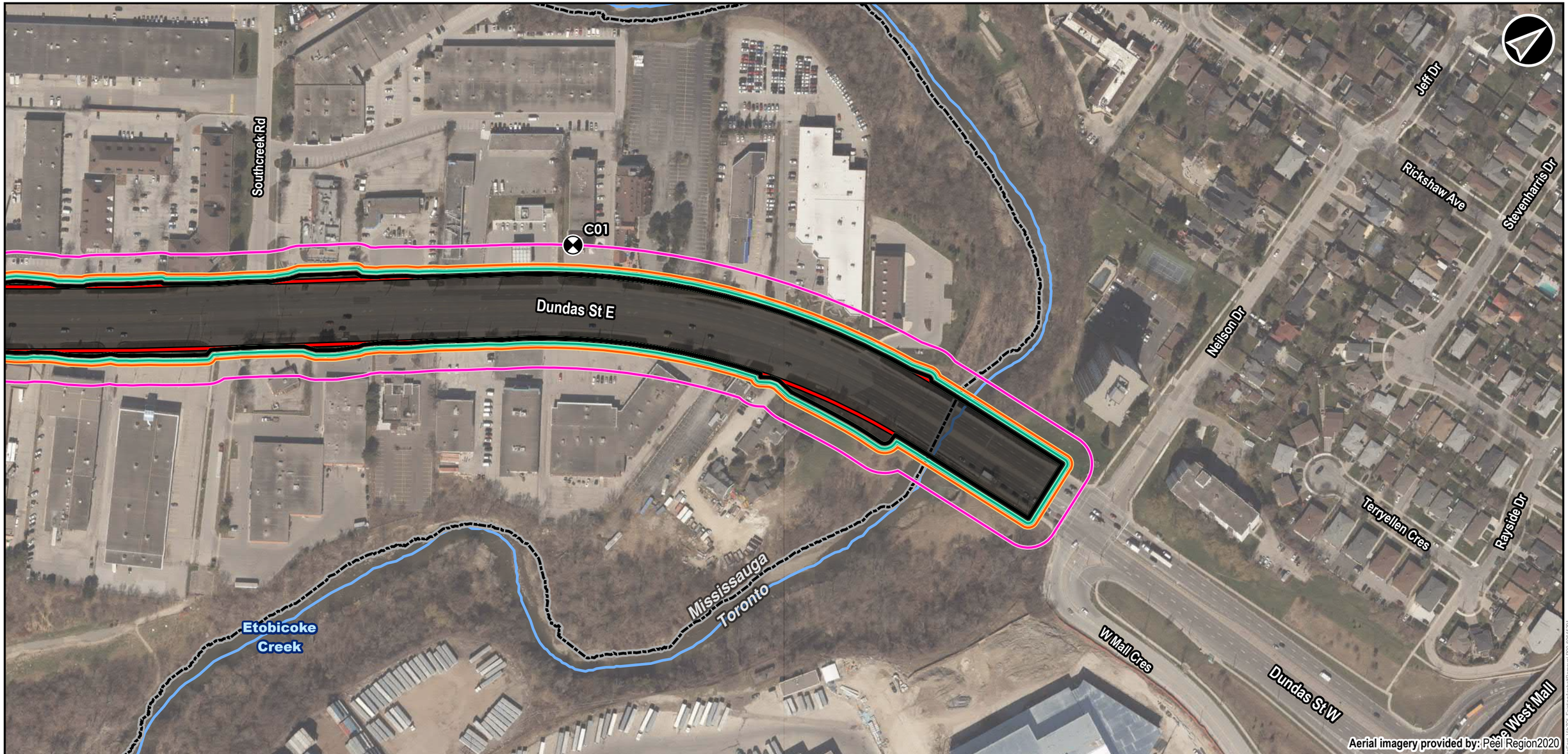
0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 20-02**
P:60645291	Rev:00	



Legend

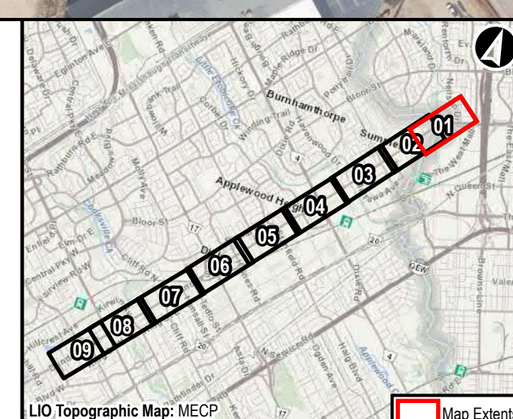
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

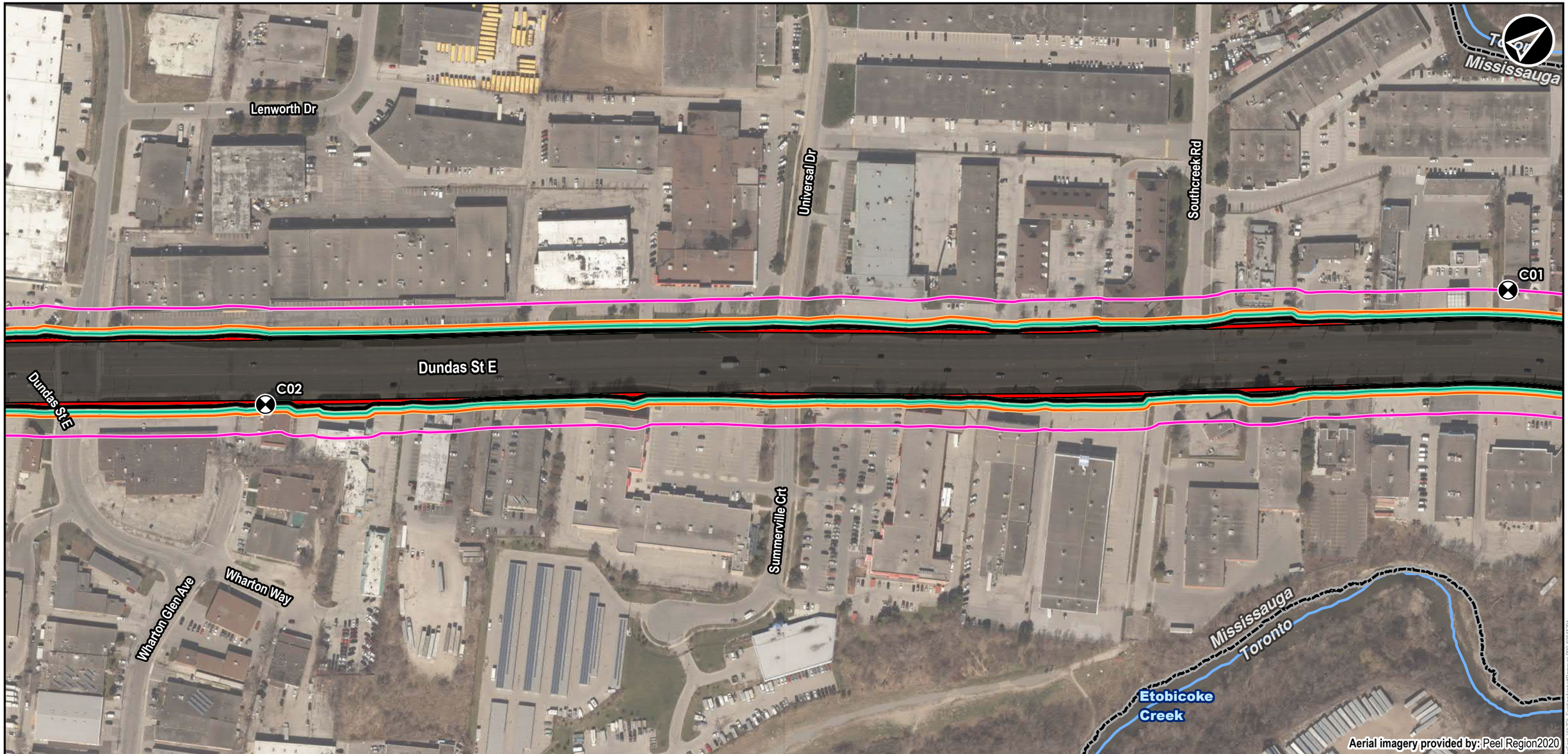
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-01**
P:60645291	Rev:00	



Legend

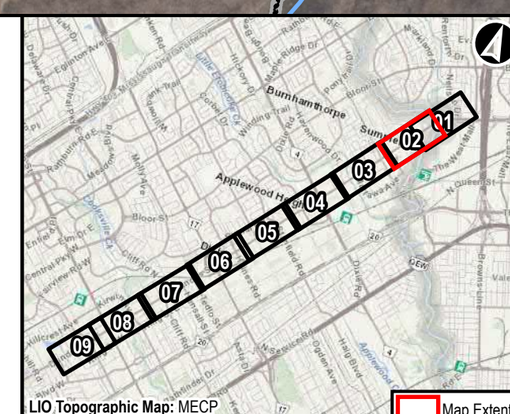
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

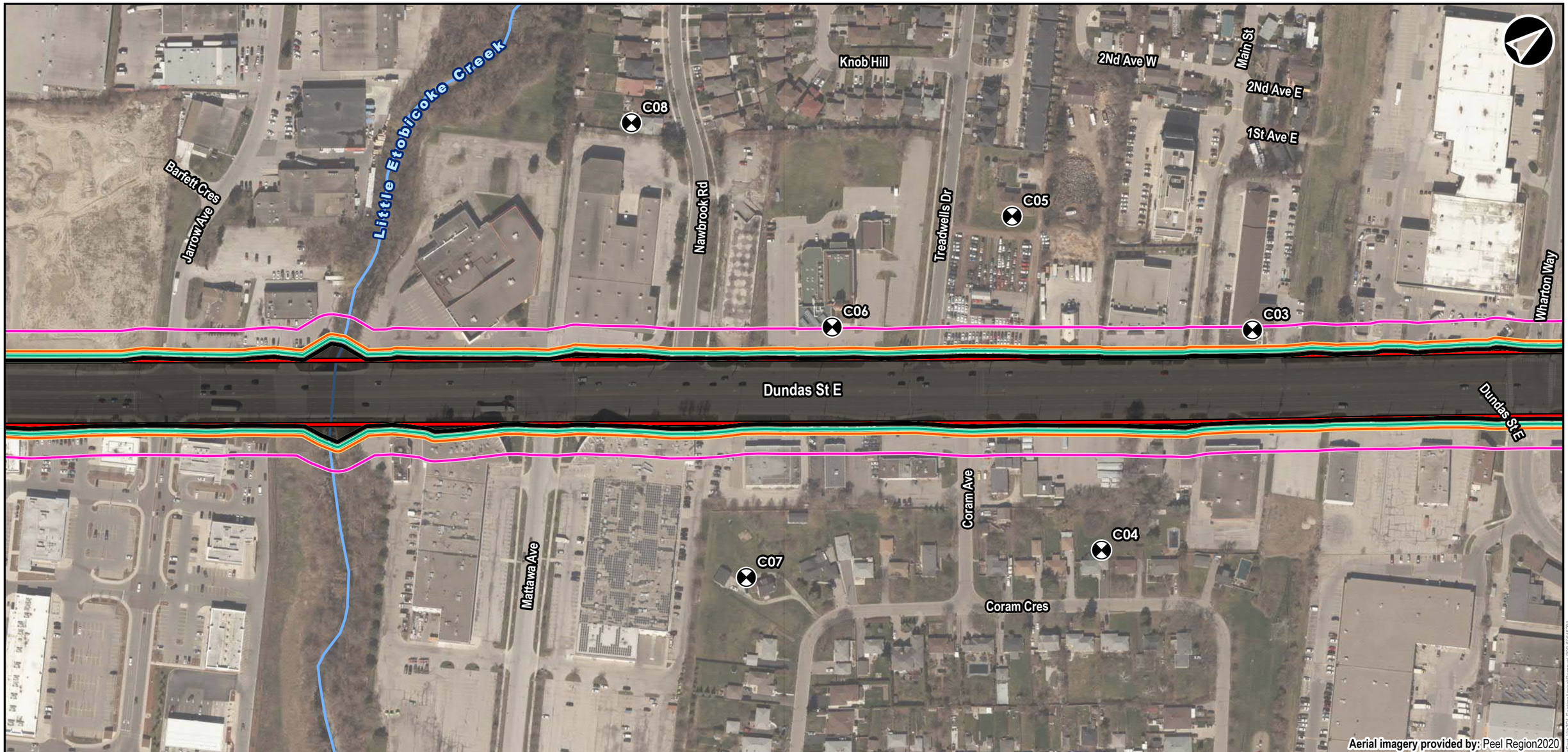
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-02**
P:60645291	Rev:00	



Legend

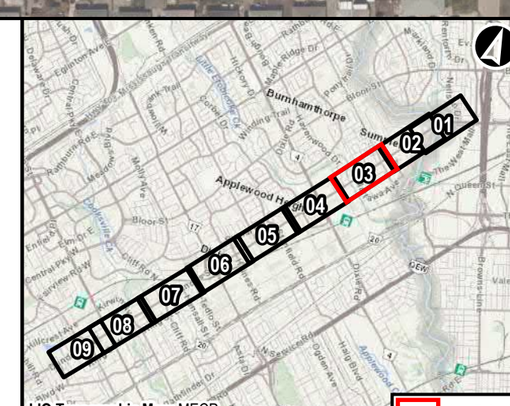
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

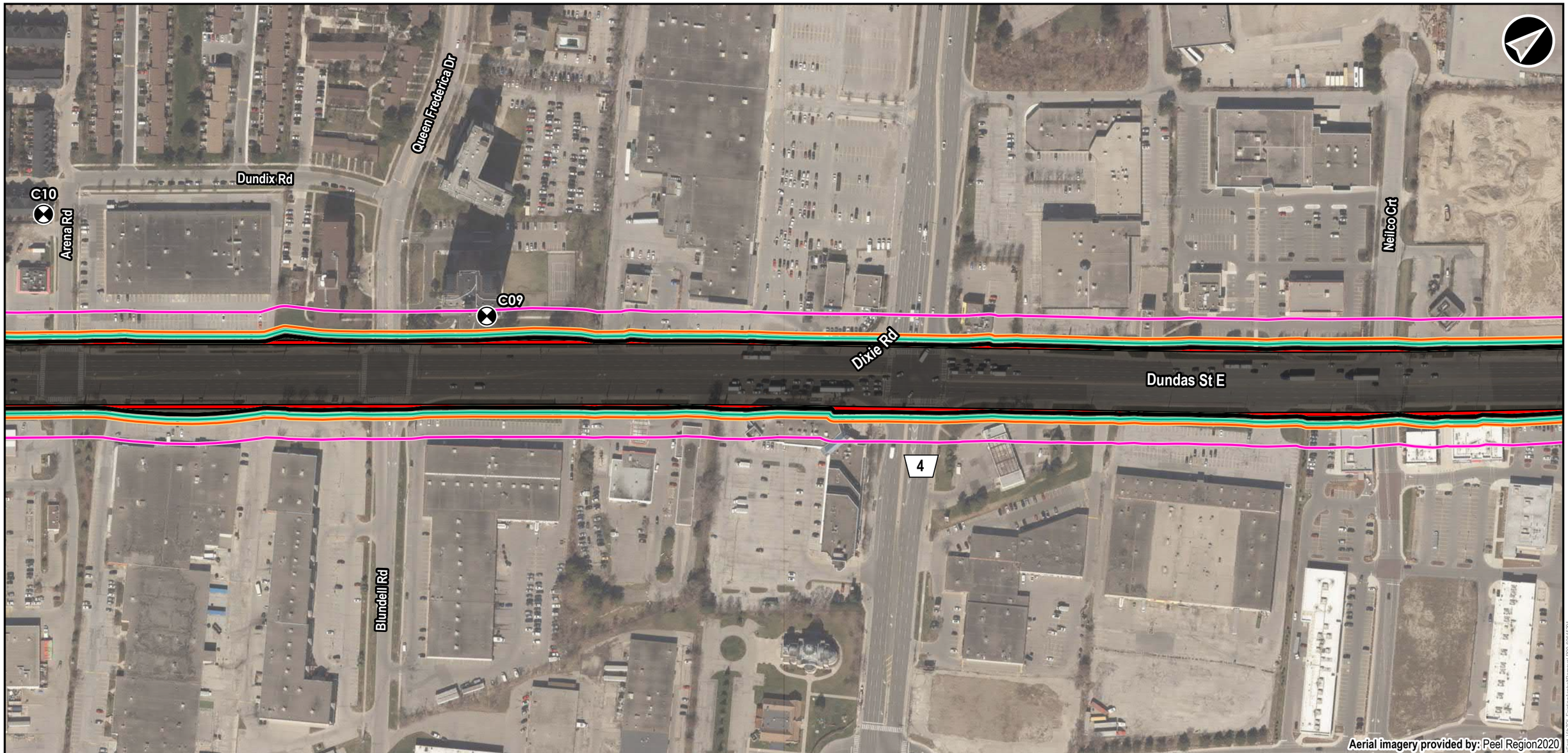
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-03**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

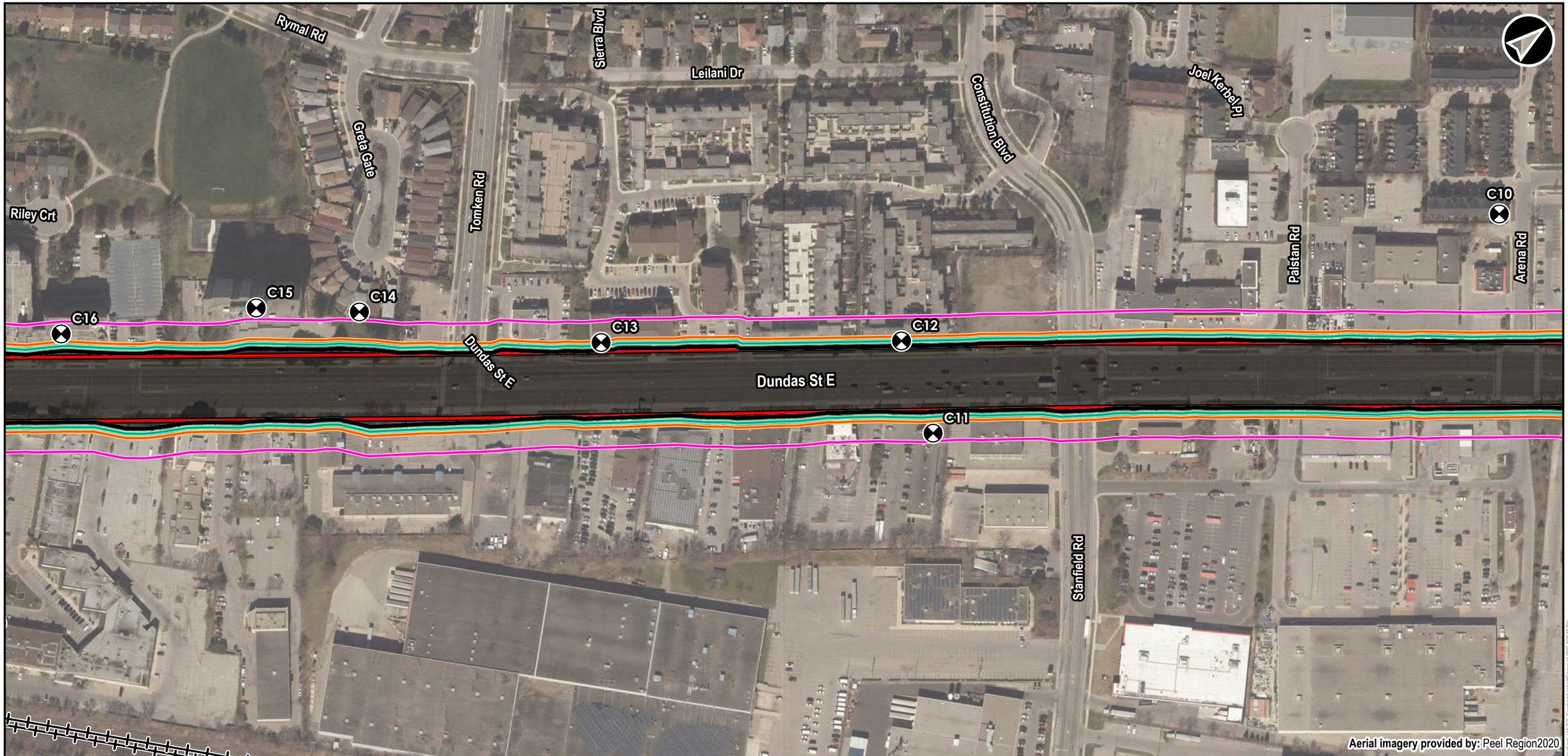
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-04**
P:60645291	Rev:00	



Legend

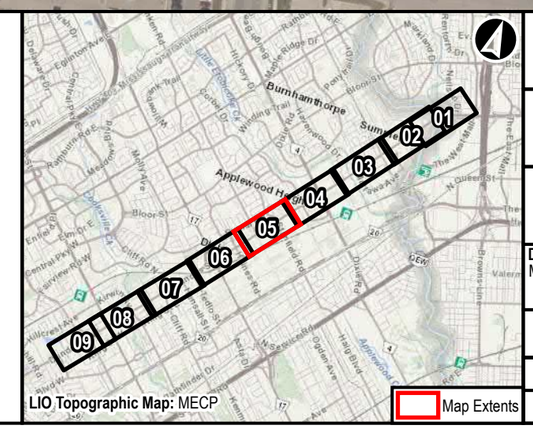
- Receptor
- Heritage Property Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

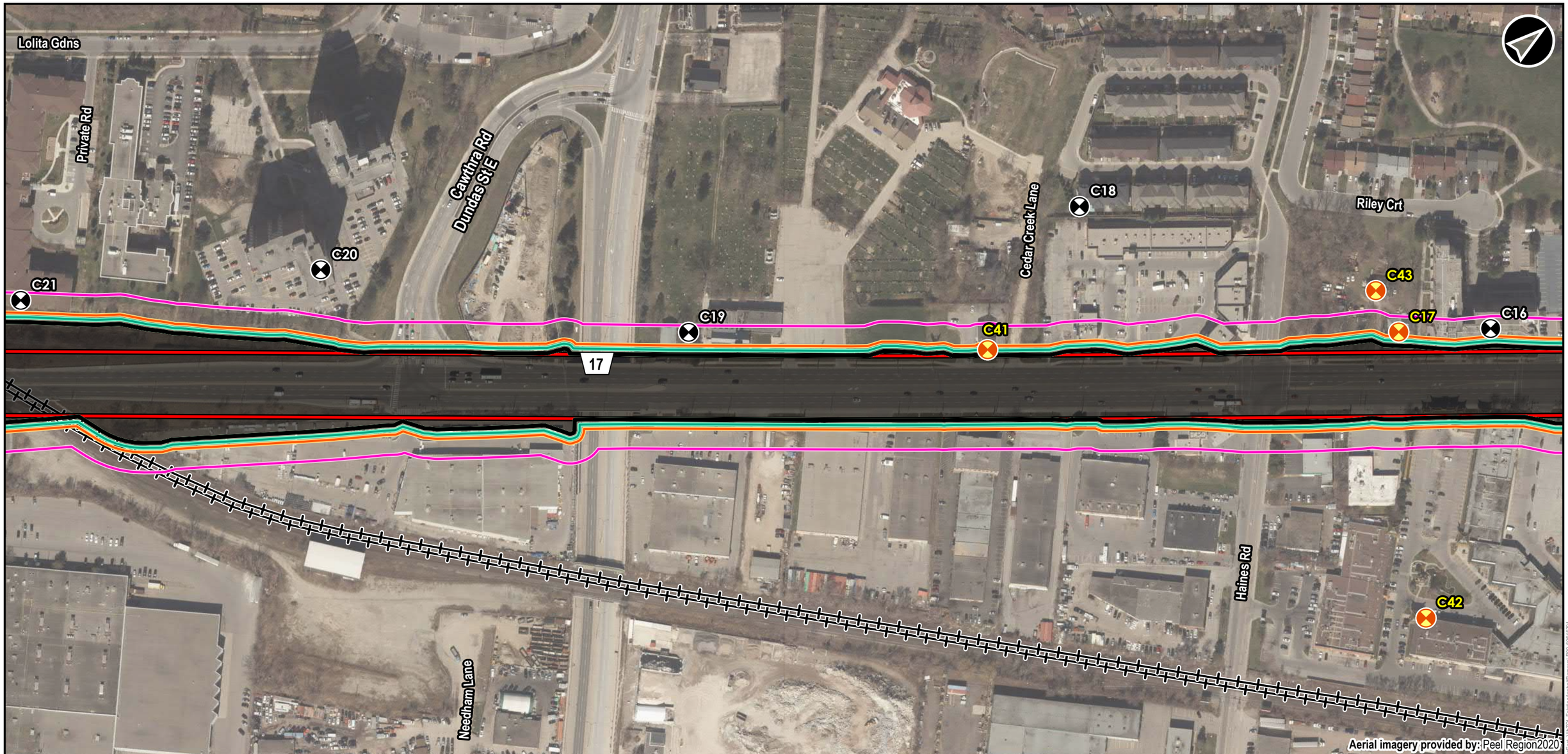
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-05**
P:60645291	Rev:00	



Legend

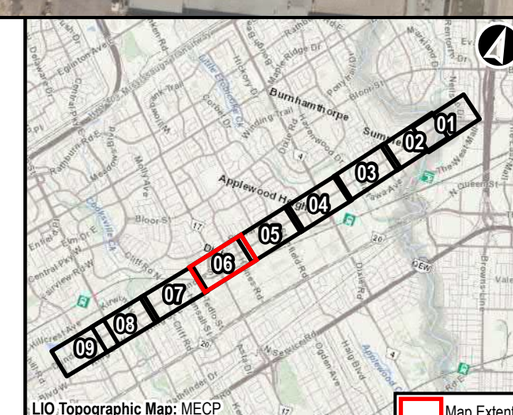
- Receptor
- Heritage Property Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

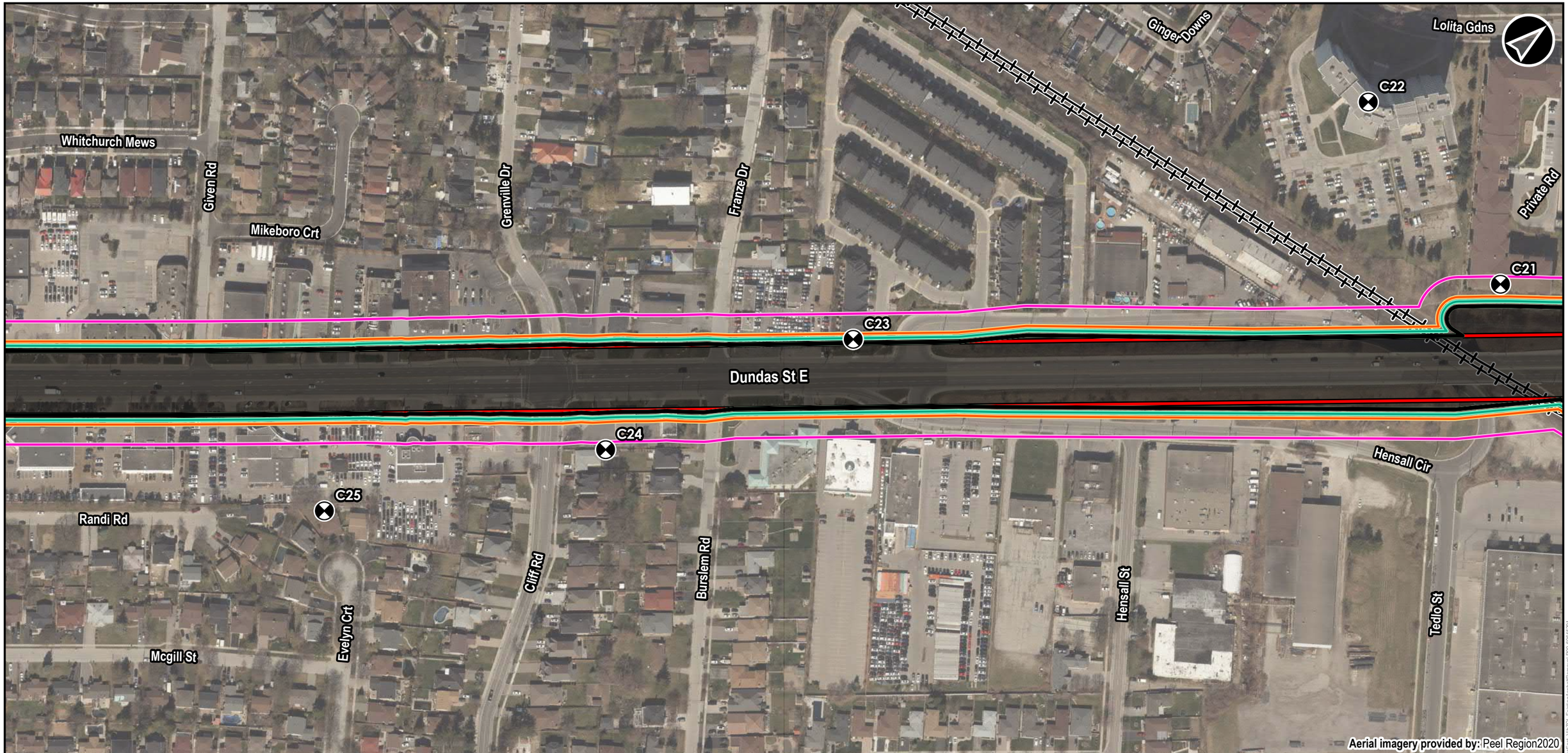
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-06**
P:60645291	Rev:00	



Legend

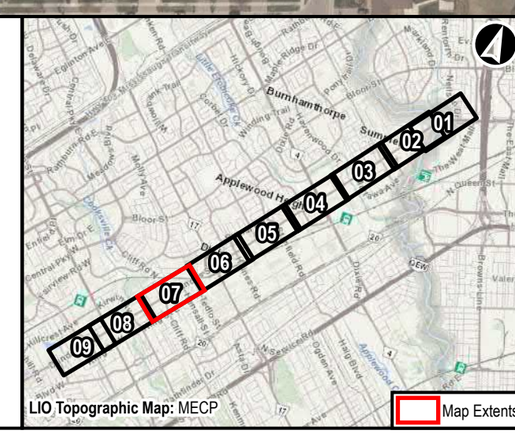
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

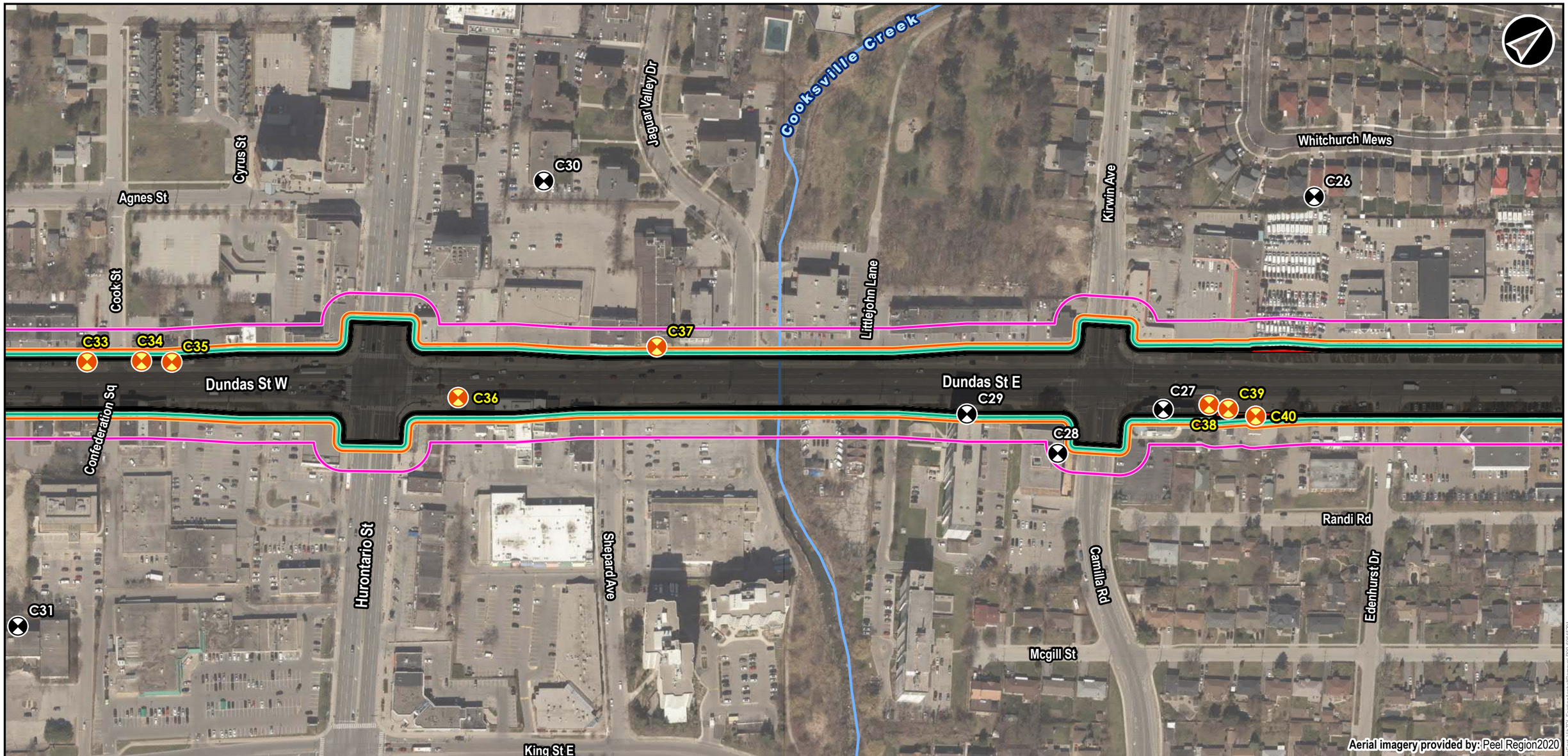
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-07**
P:60645291	Rev:00	



Legend

- Receptor
- Heritage Property Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

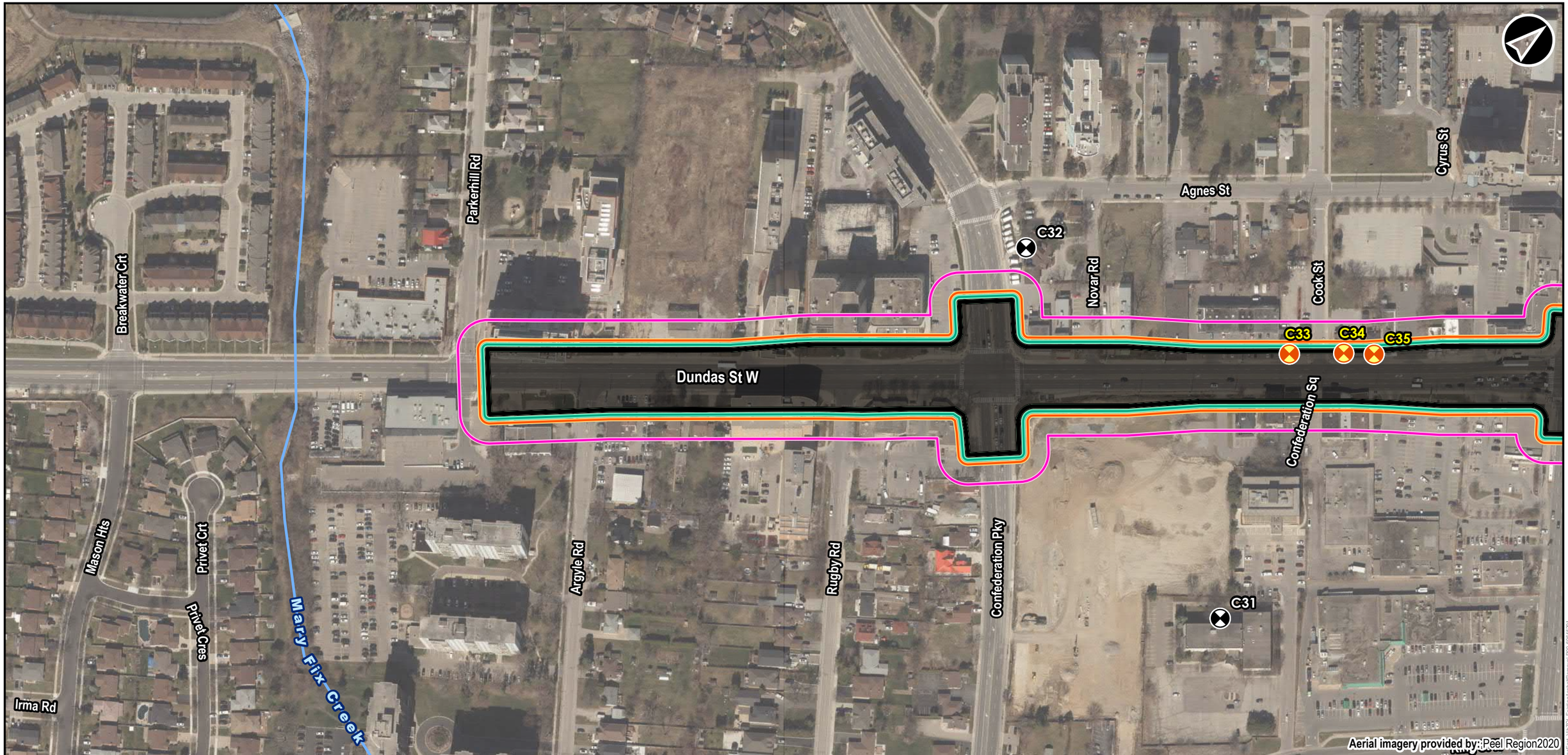
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-08**
P:60645291	Rev:00	



Legend

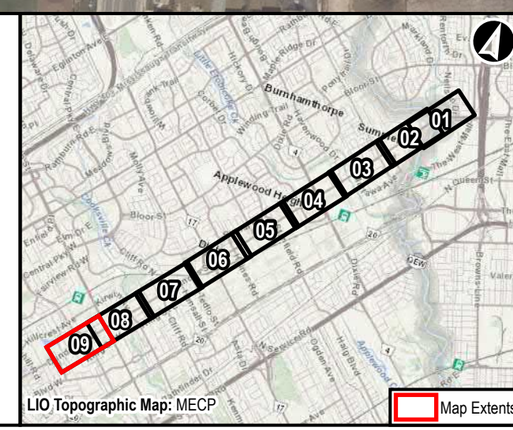
- Receptor
- Heritage Property Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Existing Asphalt Removal
Construction Vibration Zone of Influence

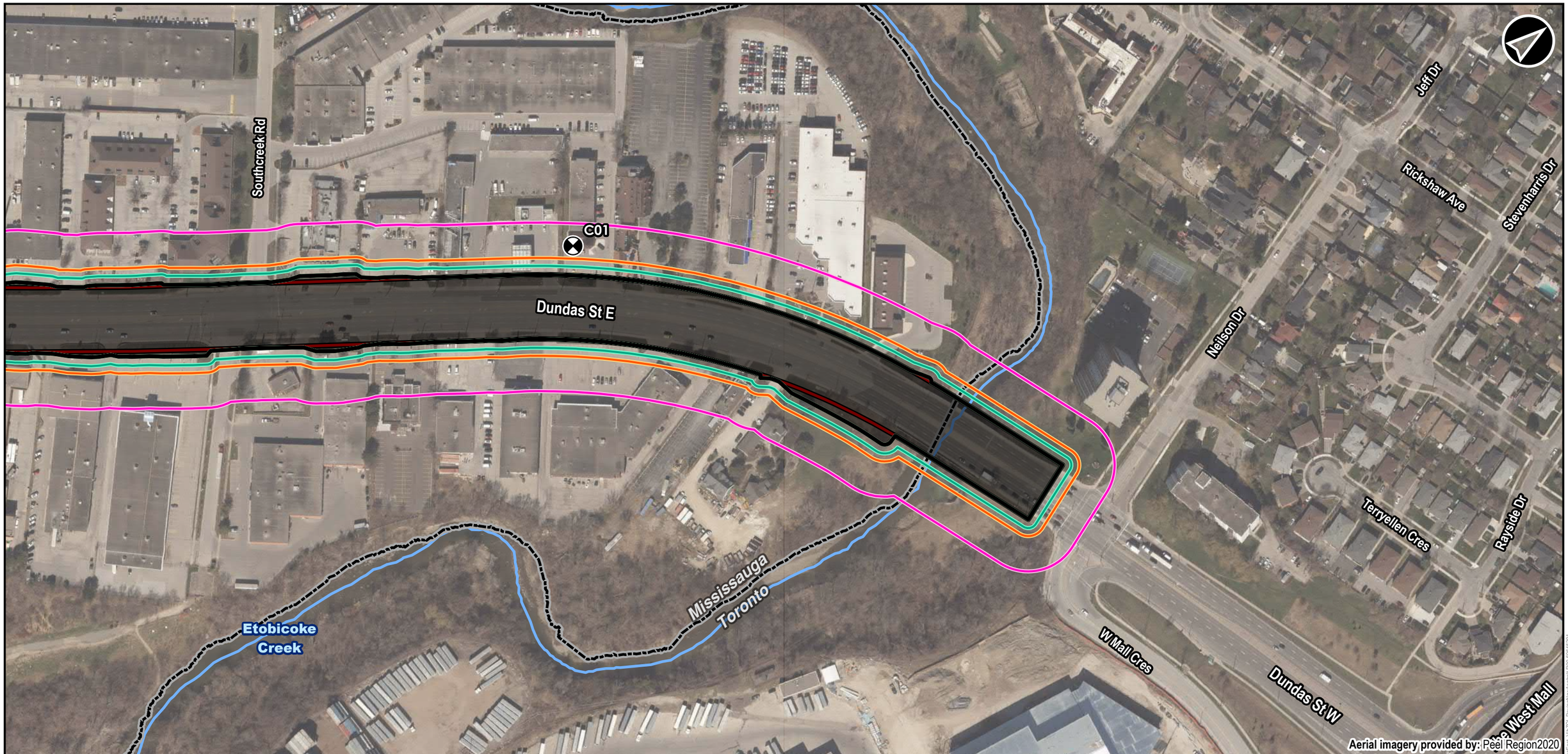
0 10 20 40 60 80 100 120 140 160 180 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 21-09**
P:60645291	Rev:00	



Legend

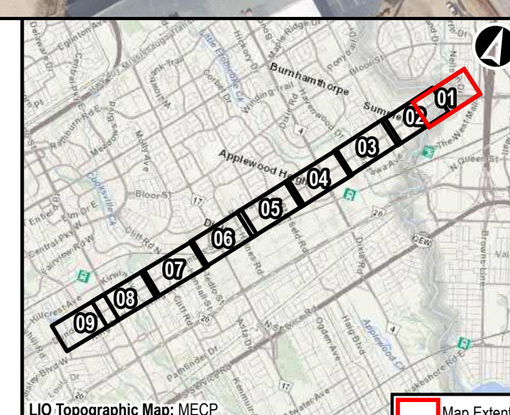
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

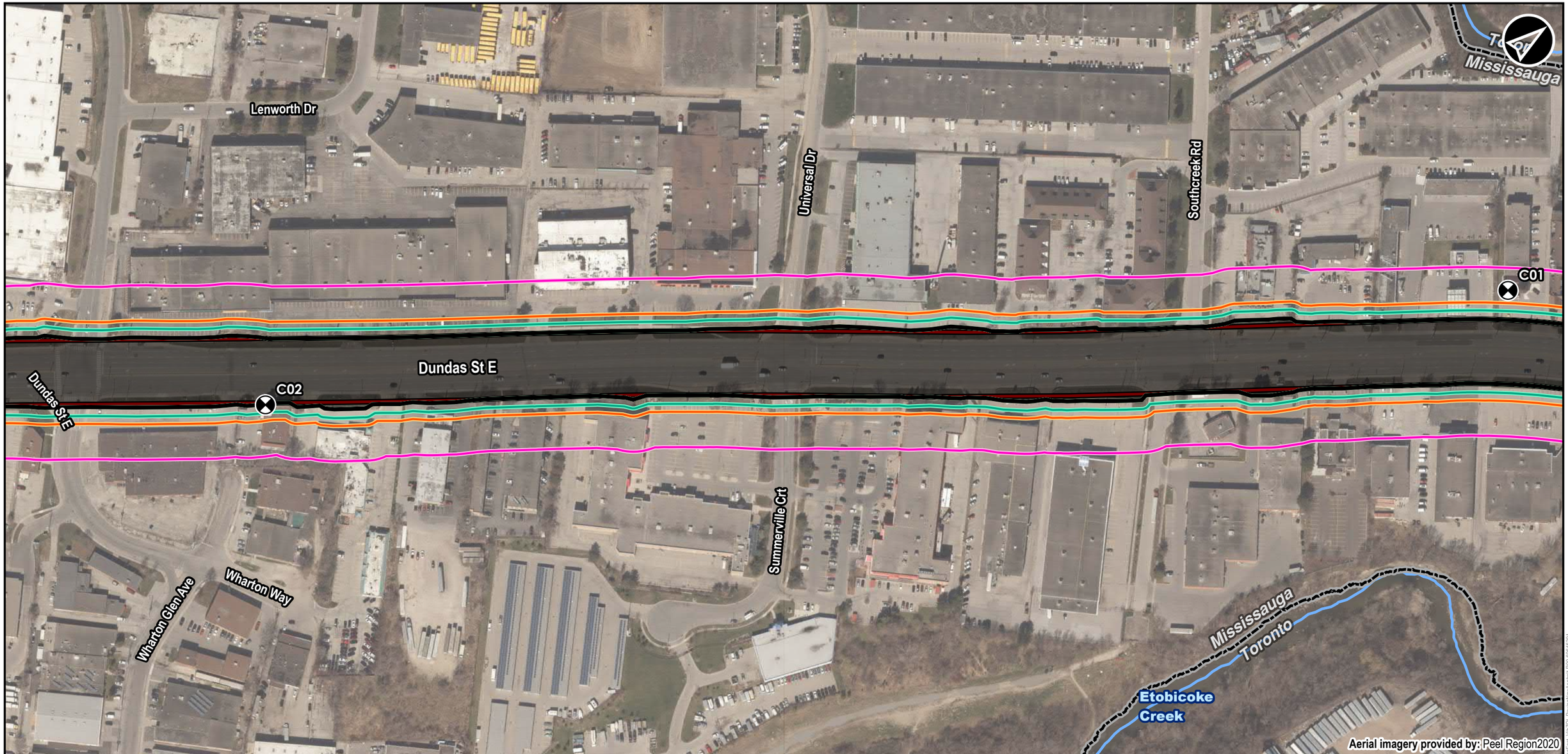
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 22-01**
P:60645291	Rev:00	



Legend

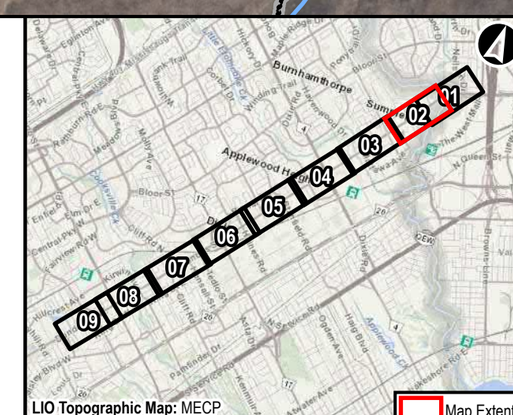
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

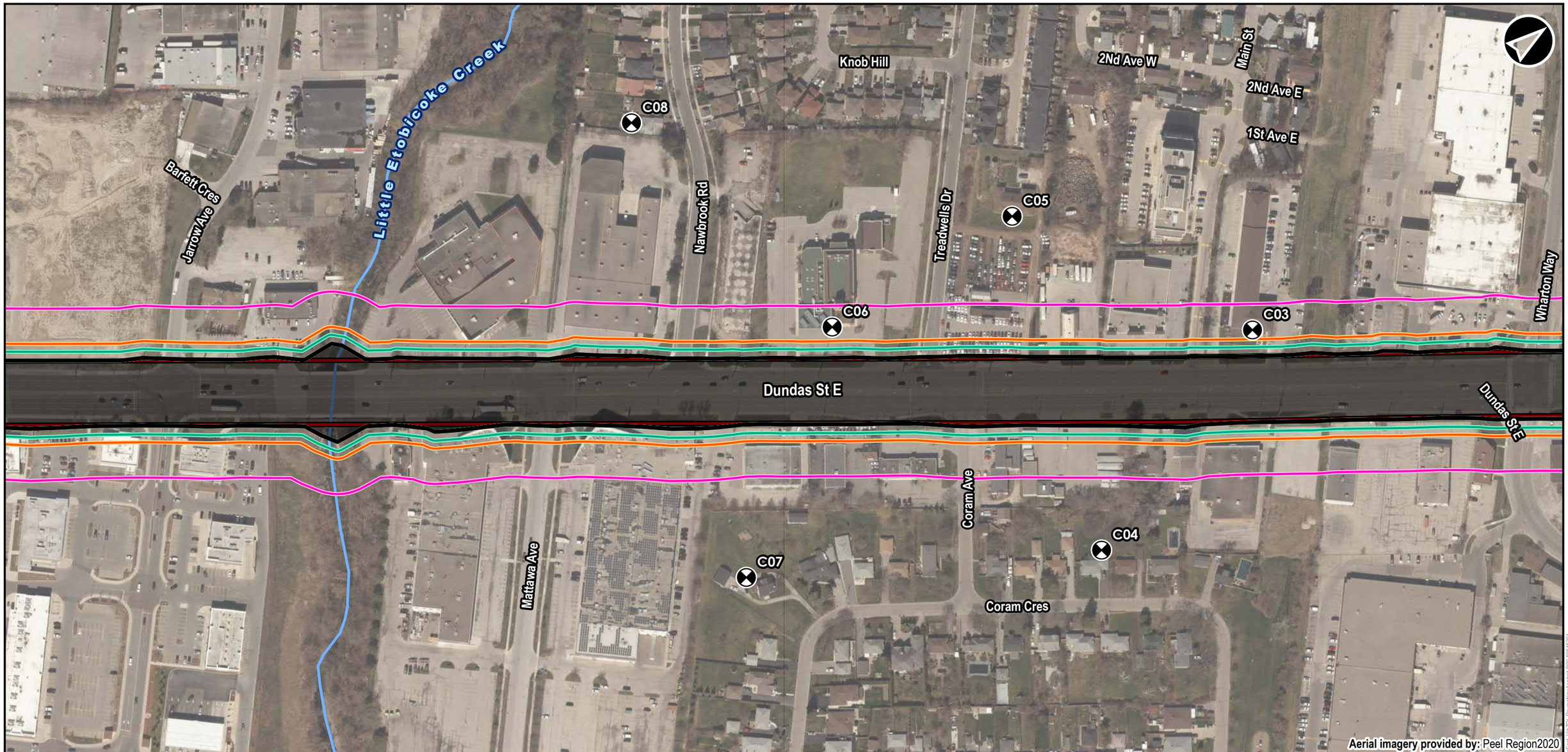
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 22-02**
P:60645291	Rev:00	



Legend

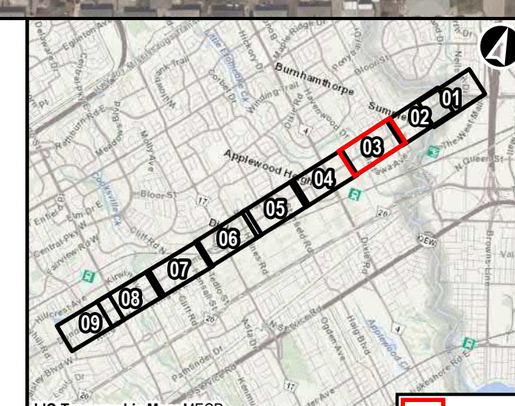
- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

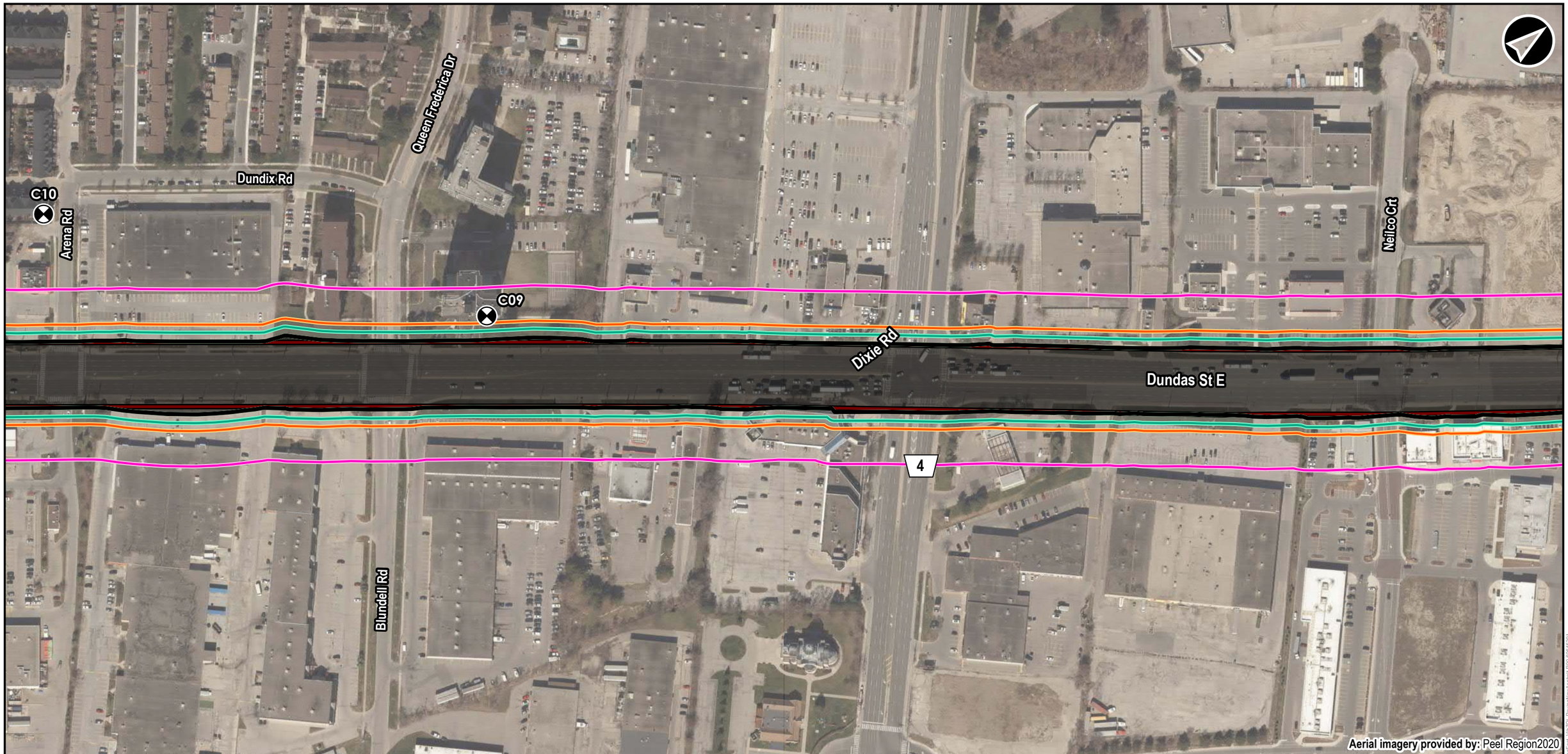
0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 22-03**
P:60645291	Rev:00	



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
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Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

0 20 40 80 120 160 M

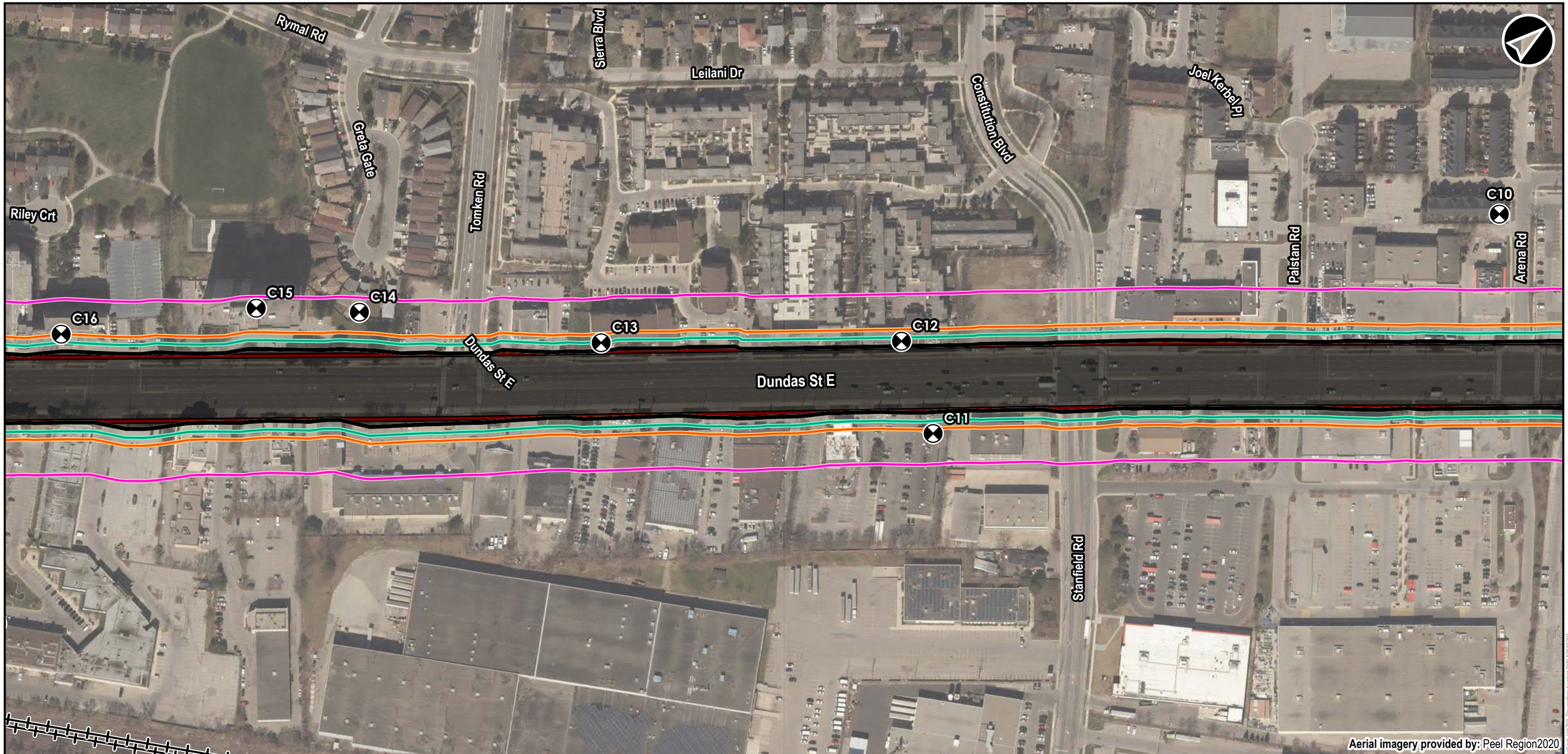
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500
P:60645291	Rev:00

Figure: 22-04



Legend

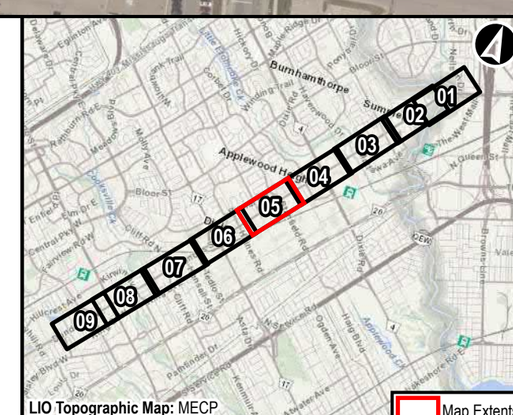
- Receptor
- Heritage Property Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500
P:60645291	Rev:00

Figure: 22-05

Lolita Gdns
Private Rd
Cawthra Rd
Dundas St E
Cedar Creek Lane
Riley Crt
Haines Rd
Needham Lane
17
C16
C17
C18
C19
C20
C21
C41
C42
C43
Aerial imagery provided by: Peel Region2020

Legend

- Receptor
- Heritage Property Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
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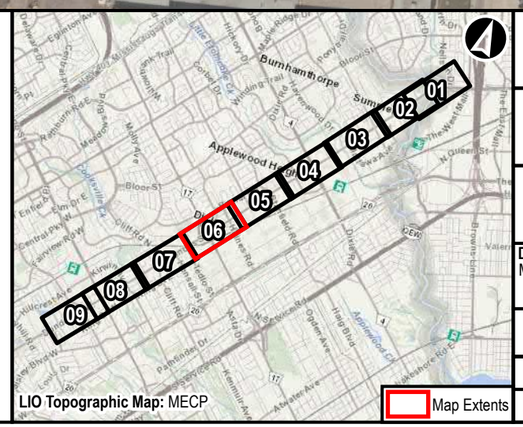
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

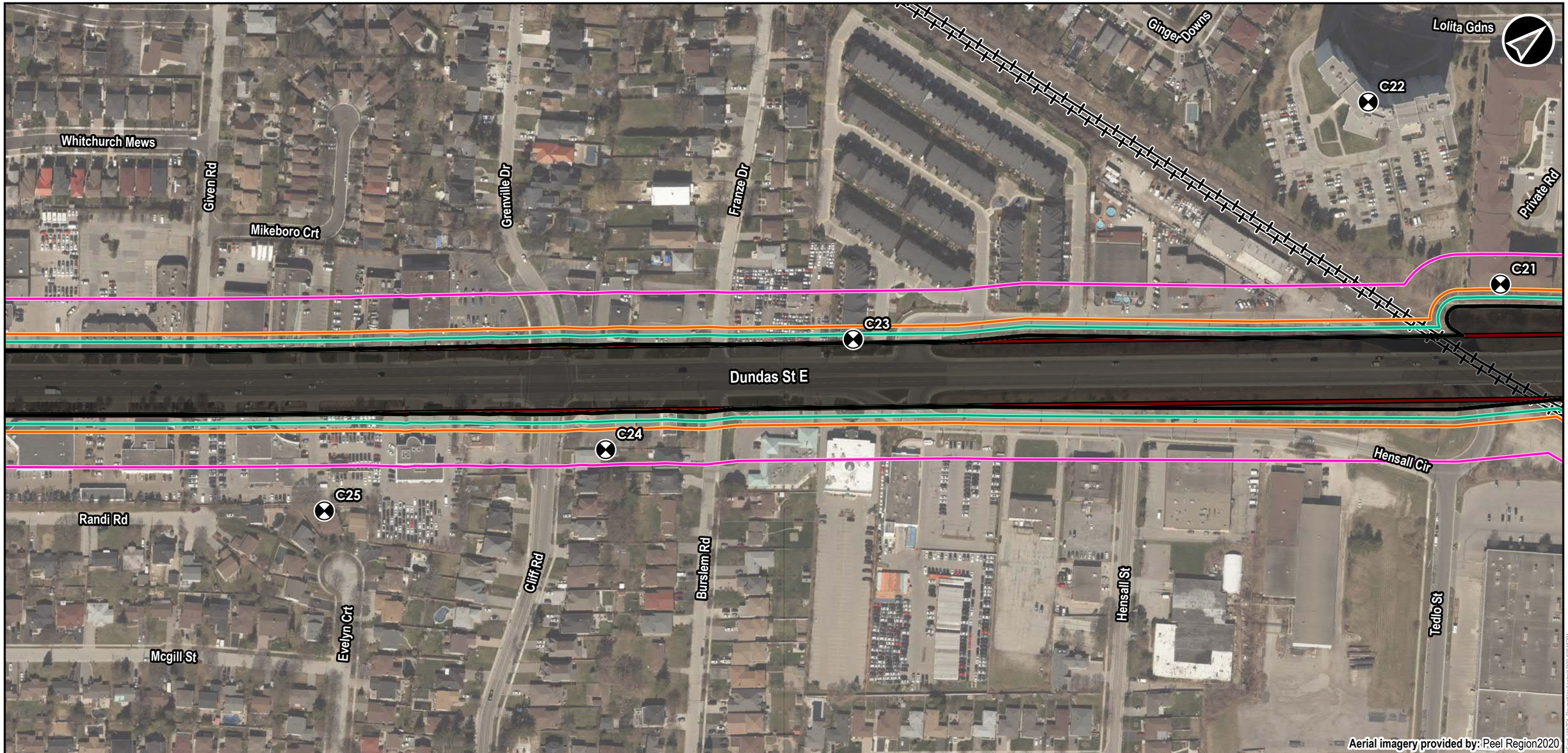
0 20 40 80 120 160 M
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500
P:60645291	Rev:00

Figure: 22-06



Legend

- Receptor
- Existing Asphalt Removal Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
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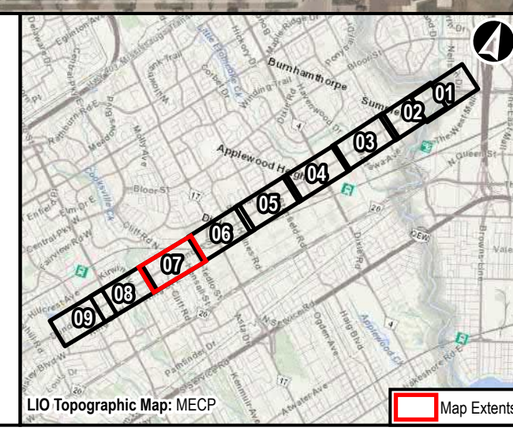
Base Layers

- Municipal Boundary
- Railway



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

0 20 40 80 120 160 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500	**Figure: 22-07**
P:60645291	Rev:00	

Aerial imagery provided by: Peel Region2020

Legend

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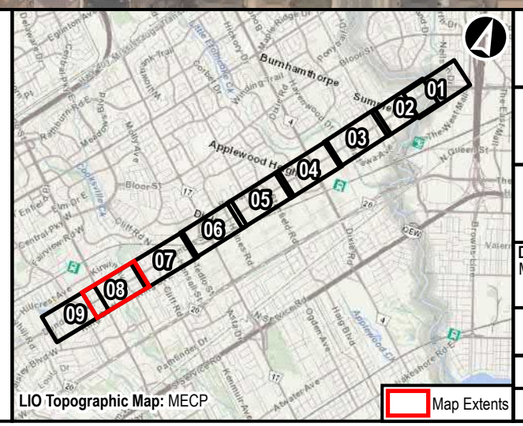
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

0 20 40 80 120 160 M

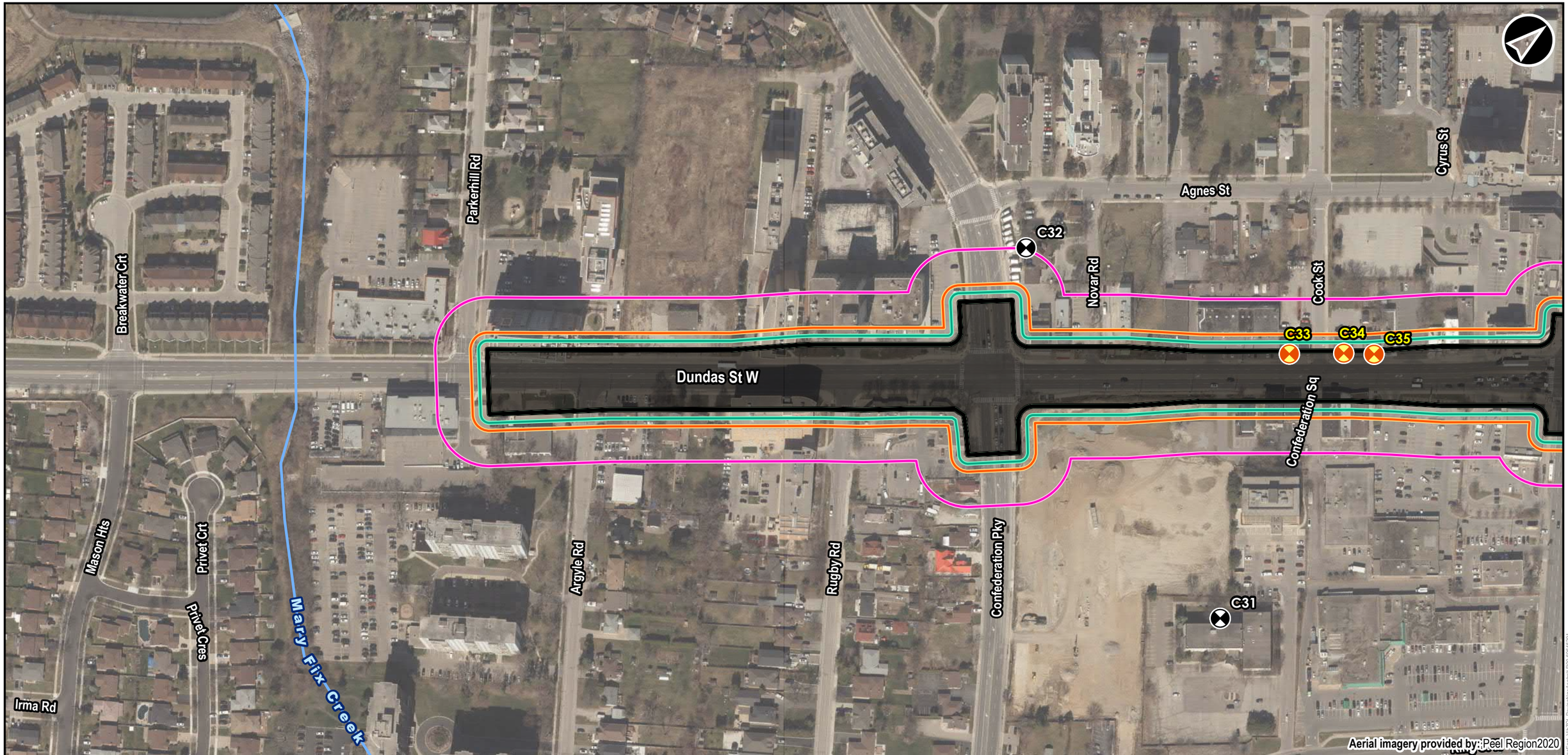
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500
P:60645291	Rev:00

Figure: 22-08



Legend

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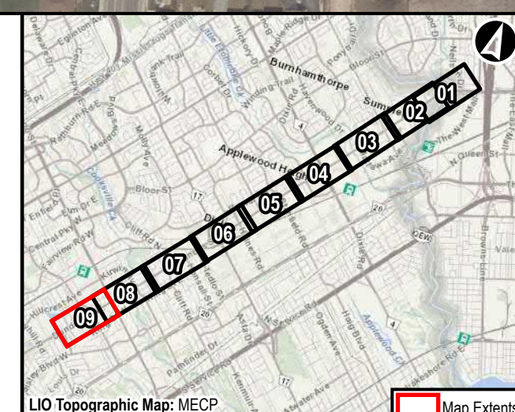
- Watercourse



Dundas Bus Rapid Transit

Paving New Asphalt
Construction Vibration Zone of Influence

0 20 40 80 120 160 M

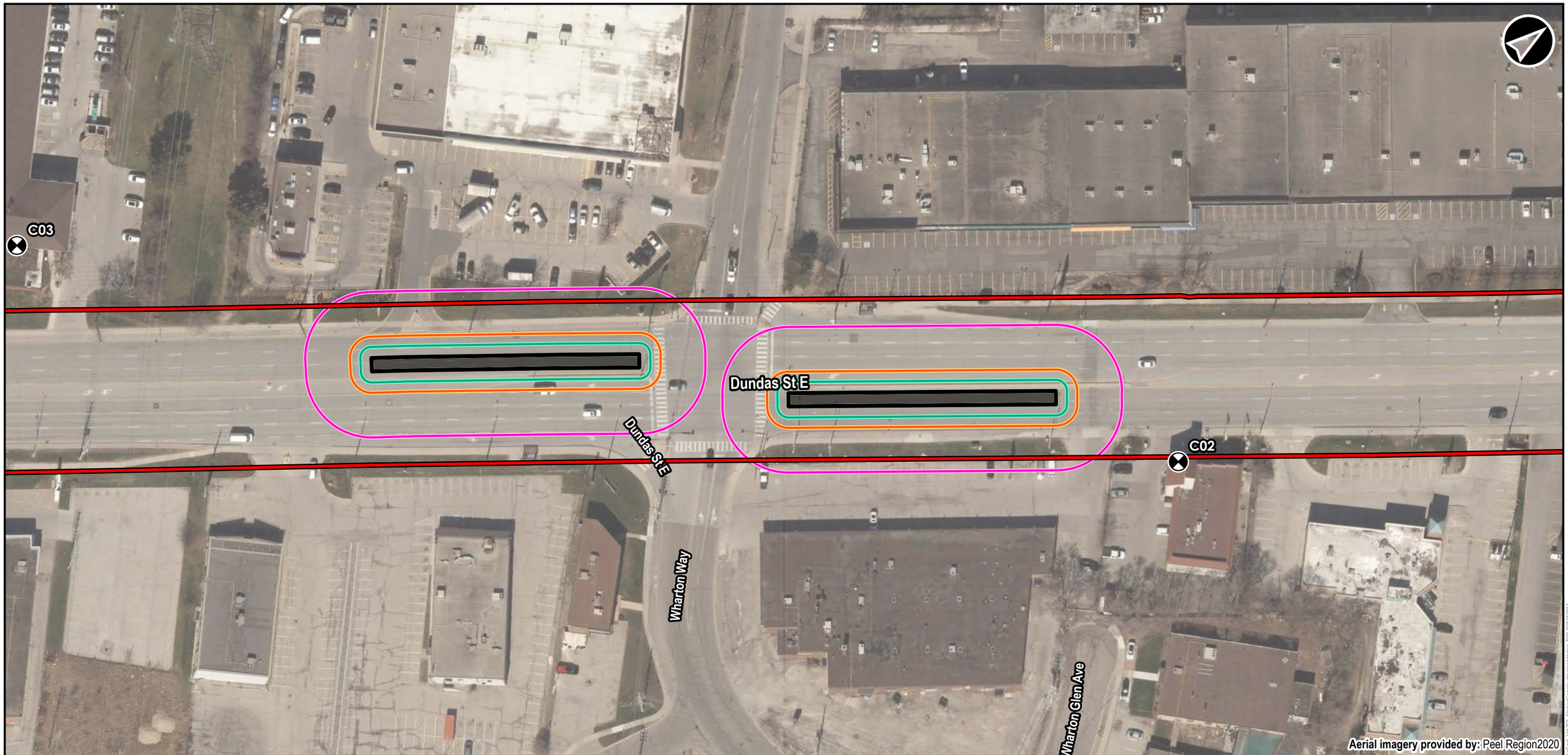
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:2,500
P:60645291	Rev:00

Figure: 22-09



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
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Base Layers

- Municipal Boundary

Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

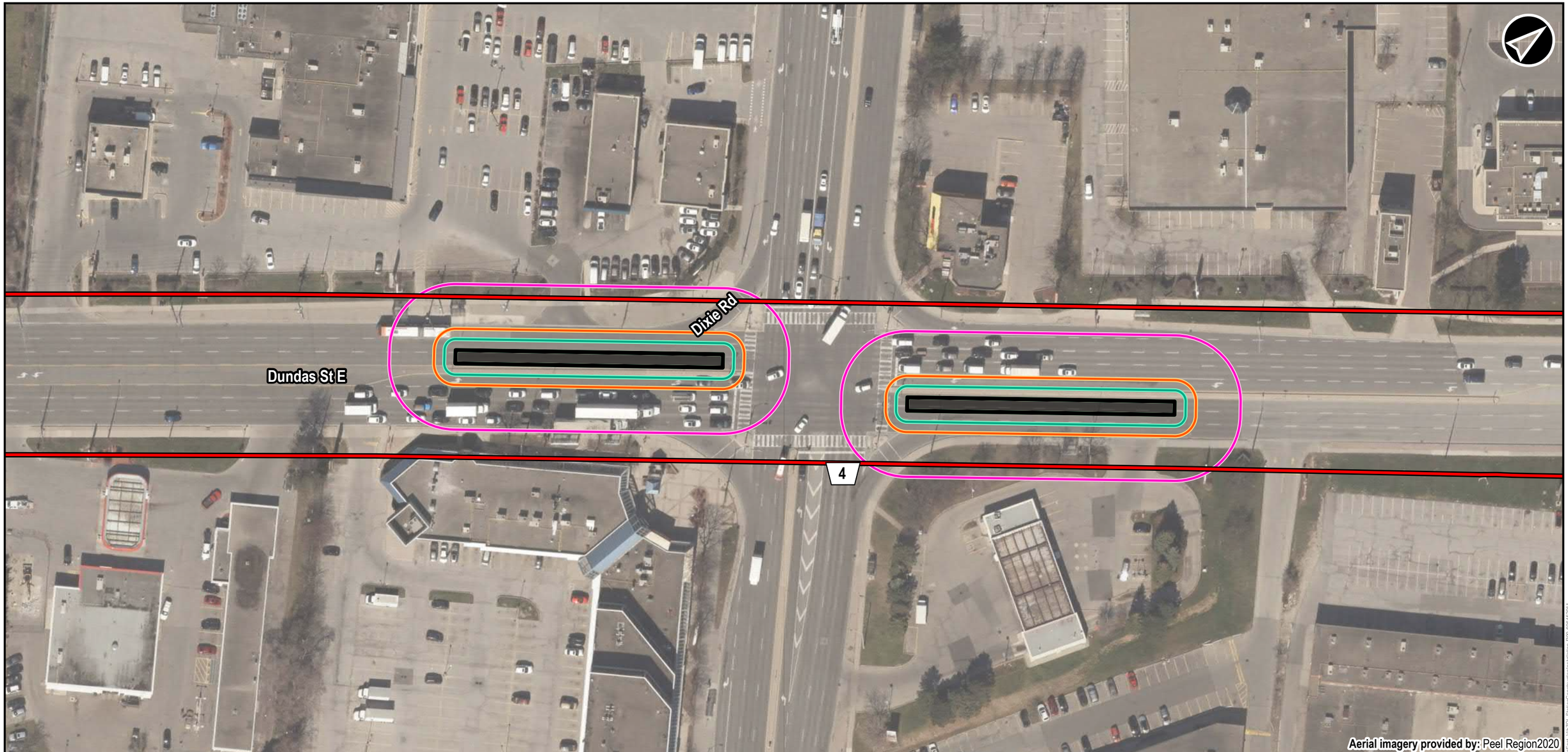
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000	**Figure: 23-01**
P:60645291	Rev:00	



Legend

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- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
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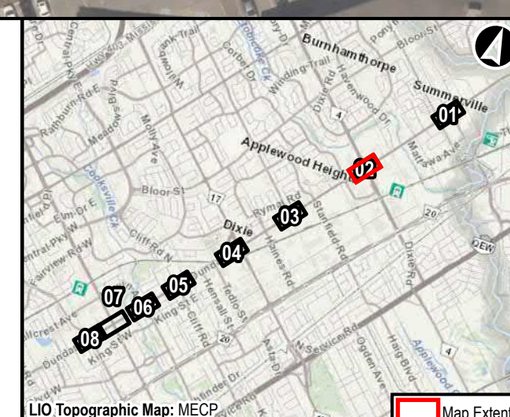
Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

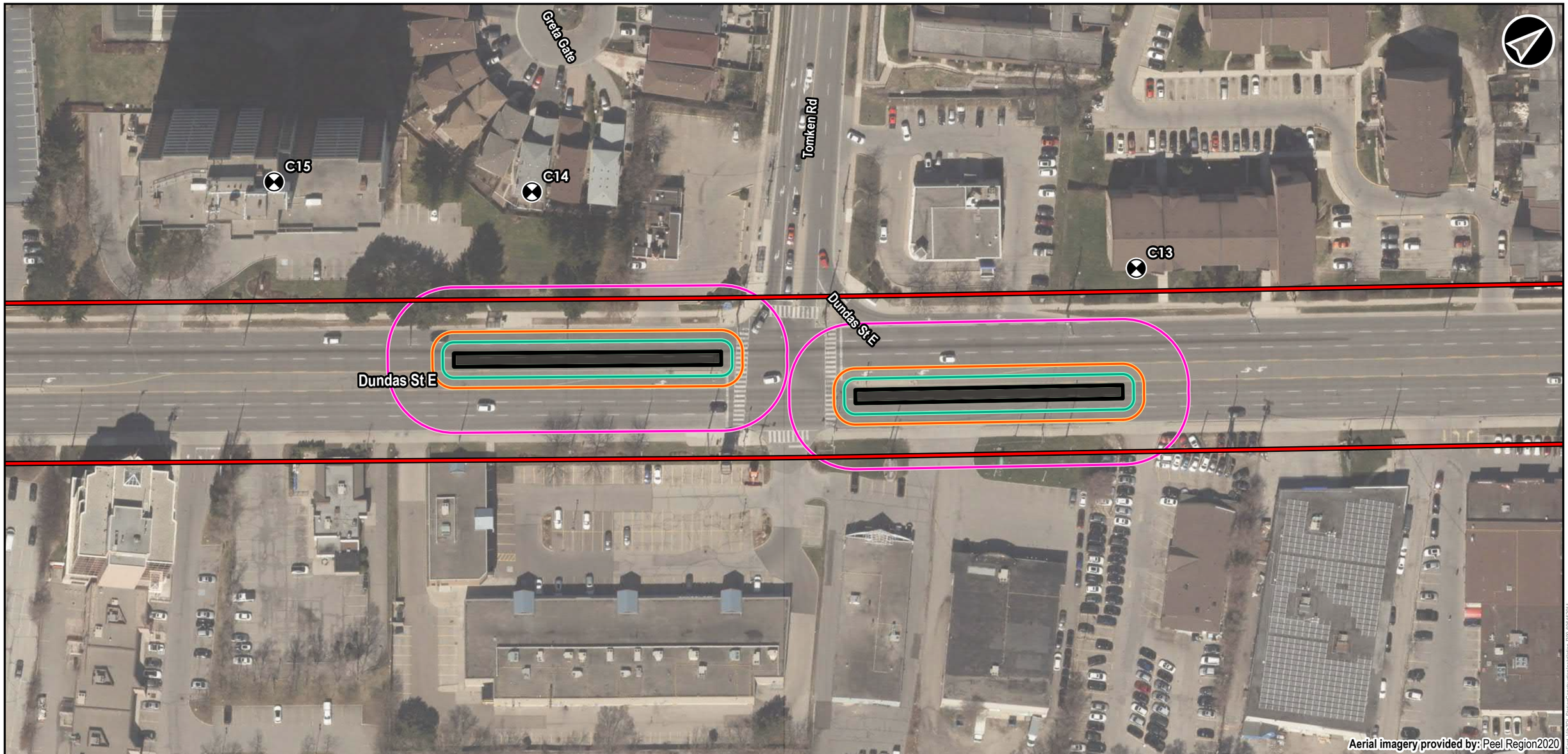
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000	**Figure: 23-02**
P:60645291	Rev:00	



Legend

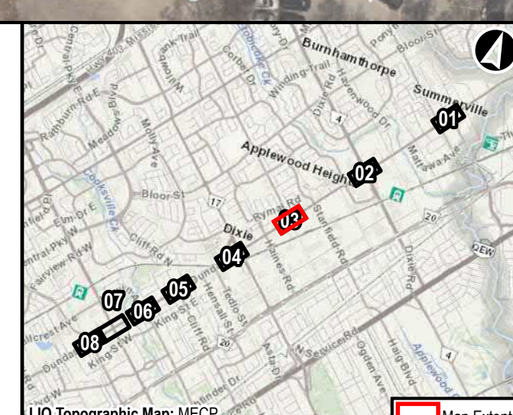
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

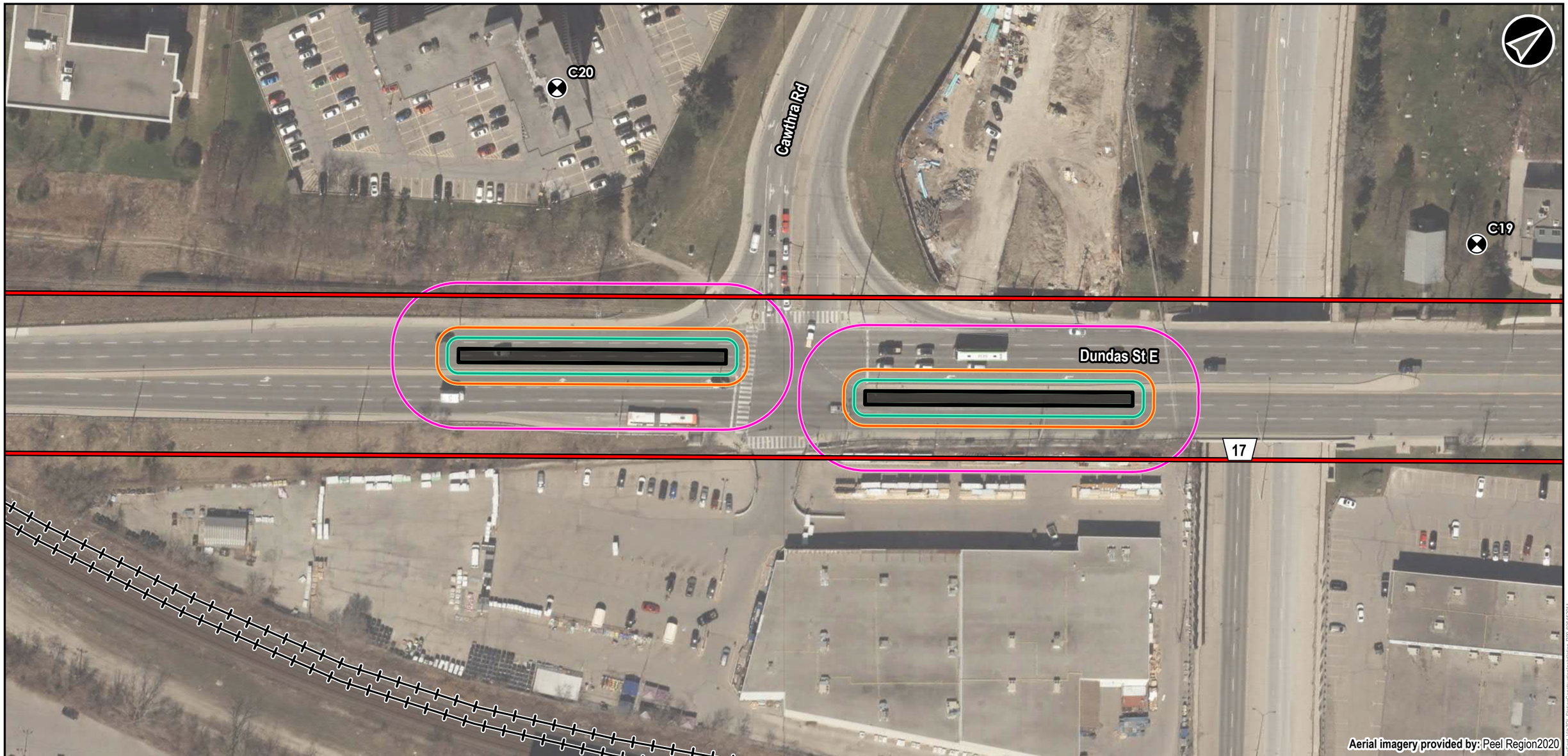
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000	**Figure: 23-03**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
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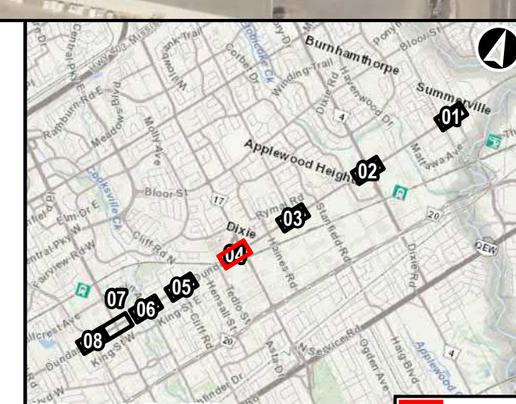
Base Layers

- Municipal Boundary
- Railway



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

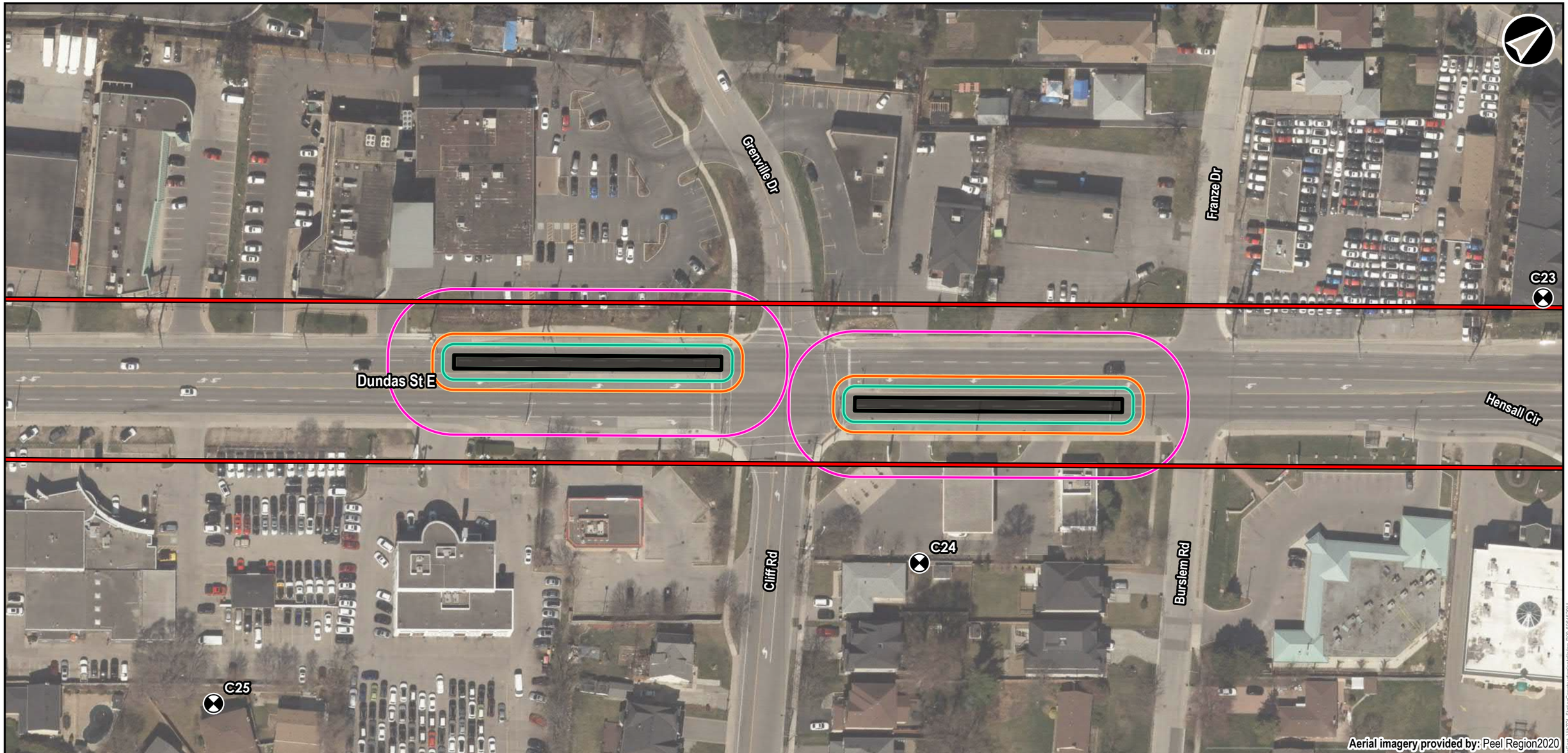
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000	**Figure: 23-04**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
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Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

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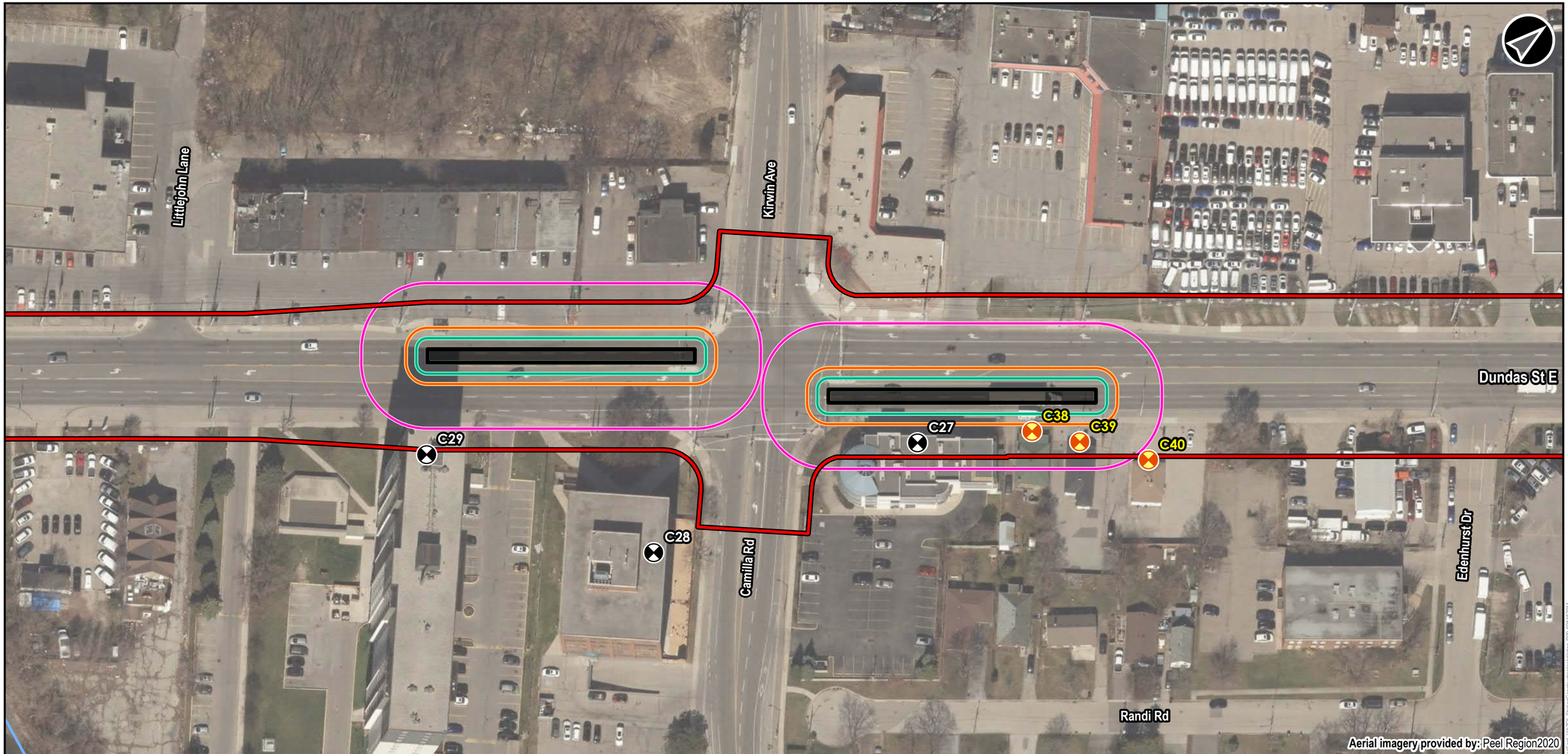
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000	**Figure: 23-05**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
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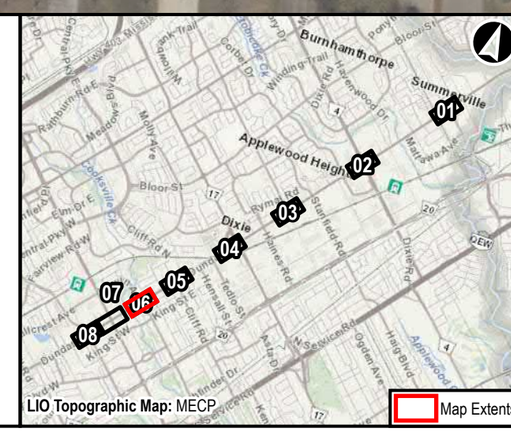
- Watercourse



Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

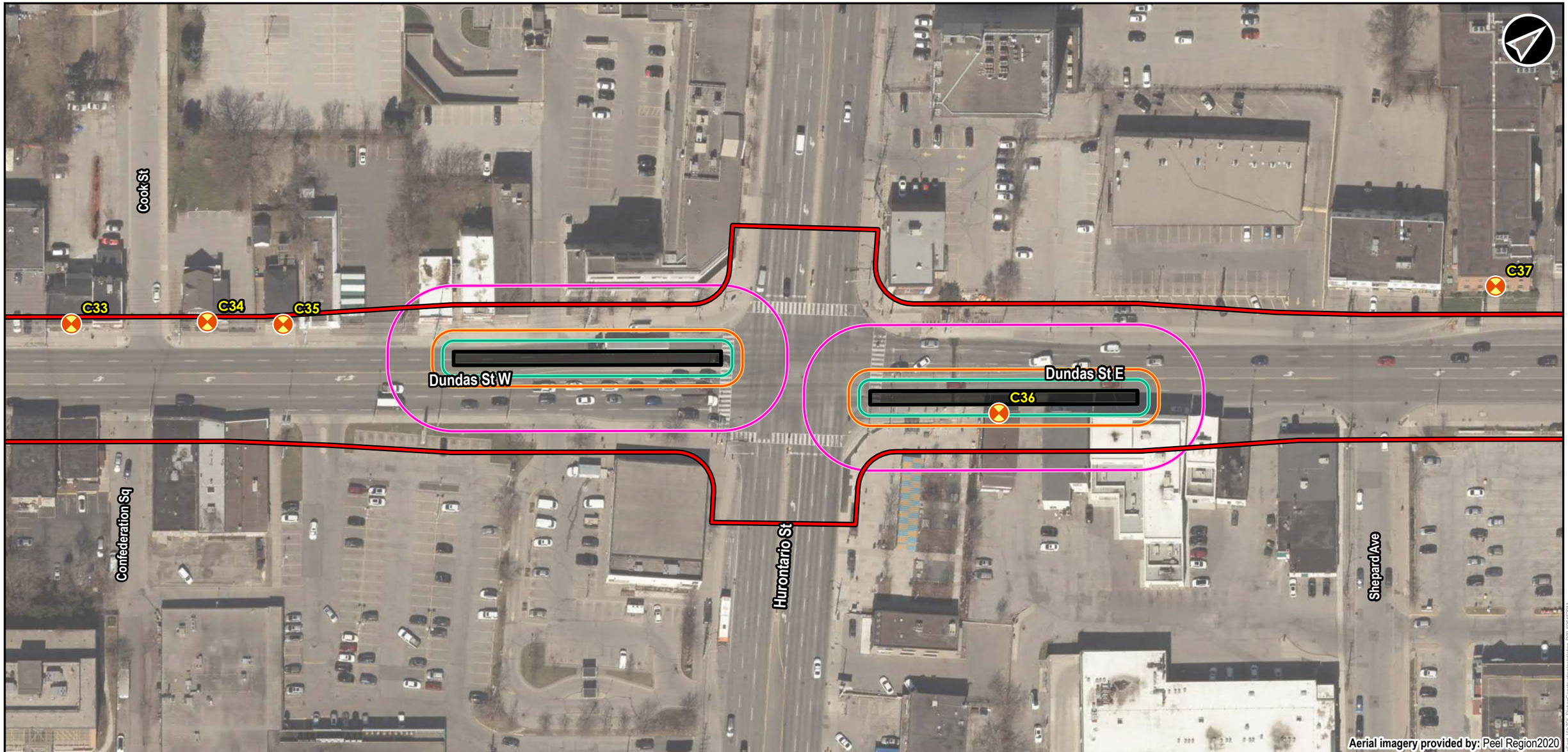
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000	**Figure: 23-06**
P:60645291	Rev:00	



Legend

- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
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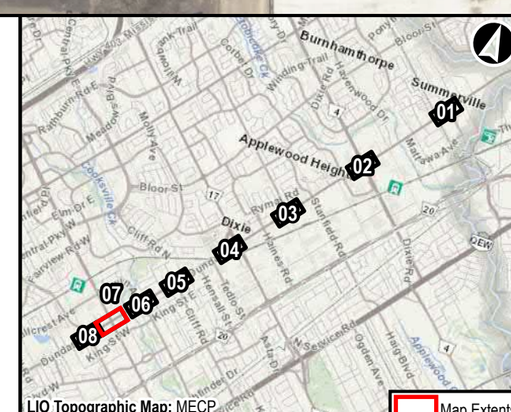
Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

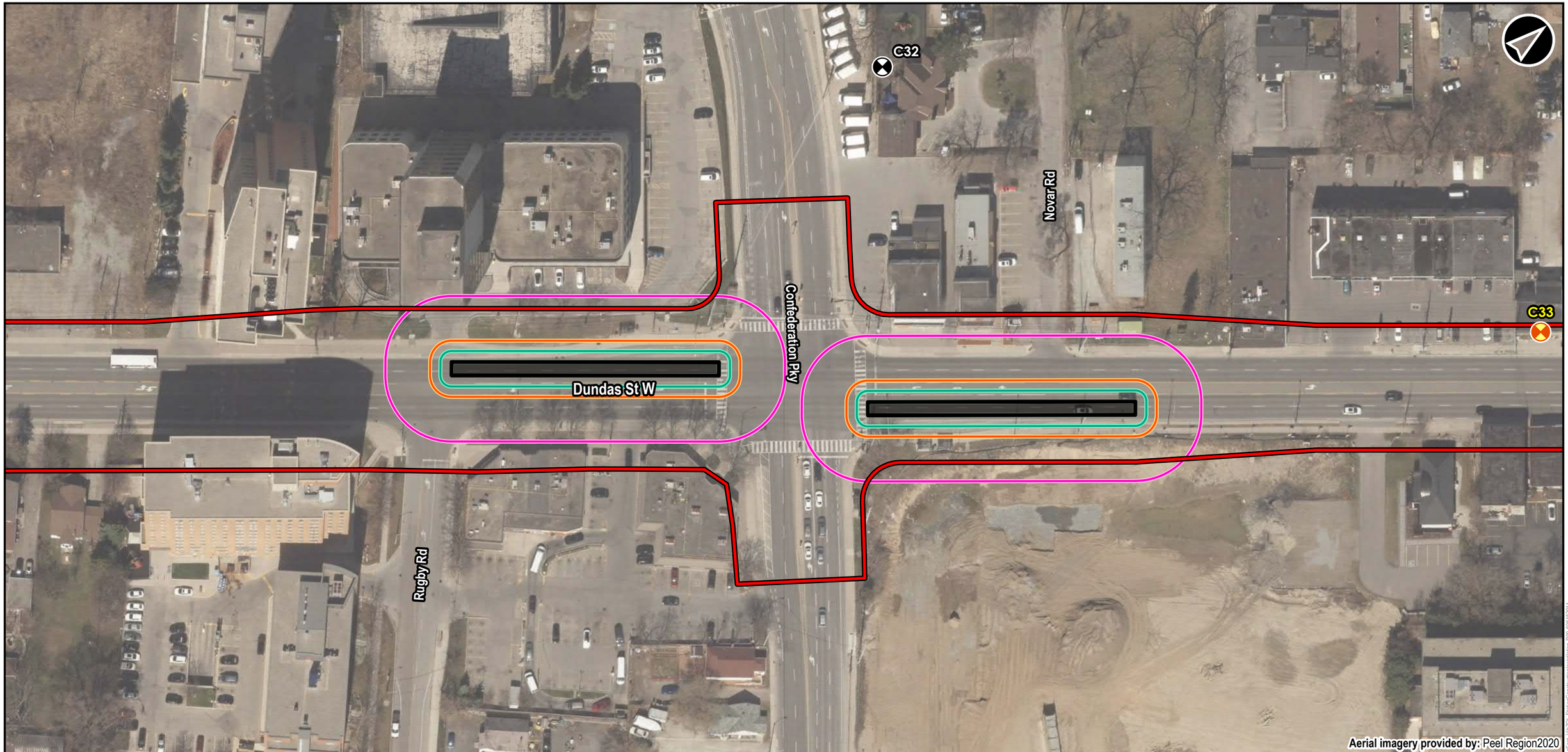
0 5 10 20 30 40 50 60 70 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000	**Figure: 23-07**
P:60645291	Rev:00	



Legend

- Receptor
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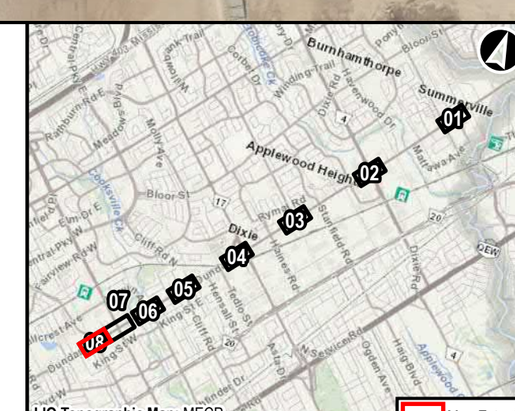
Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Station Construction Installation
Construction Vibration Zone of Influence

0 5 10 20 30 40 50 60 70 M

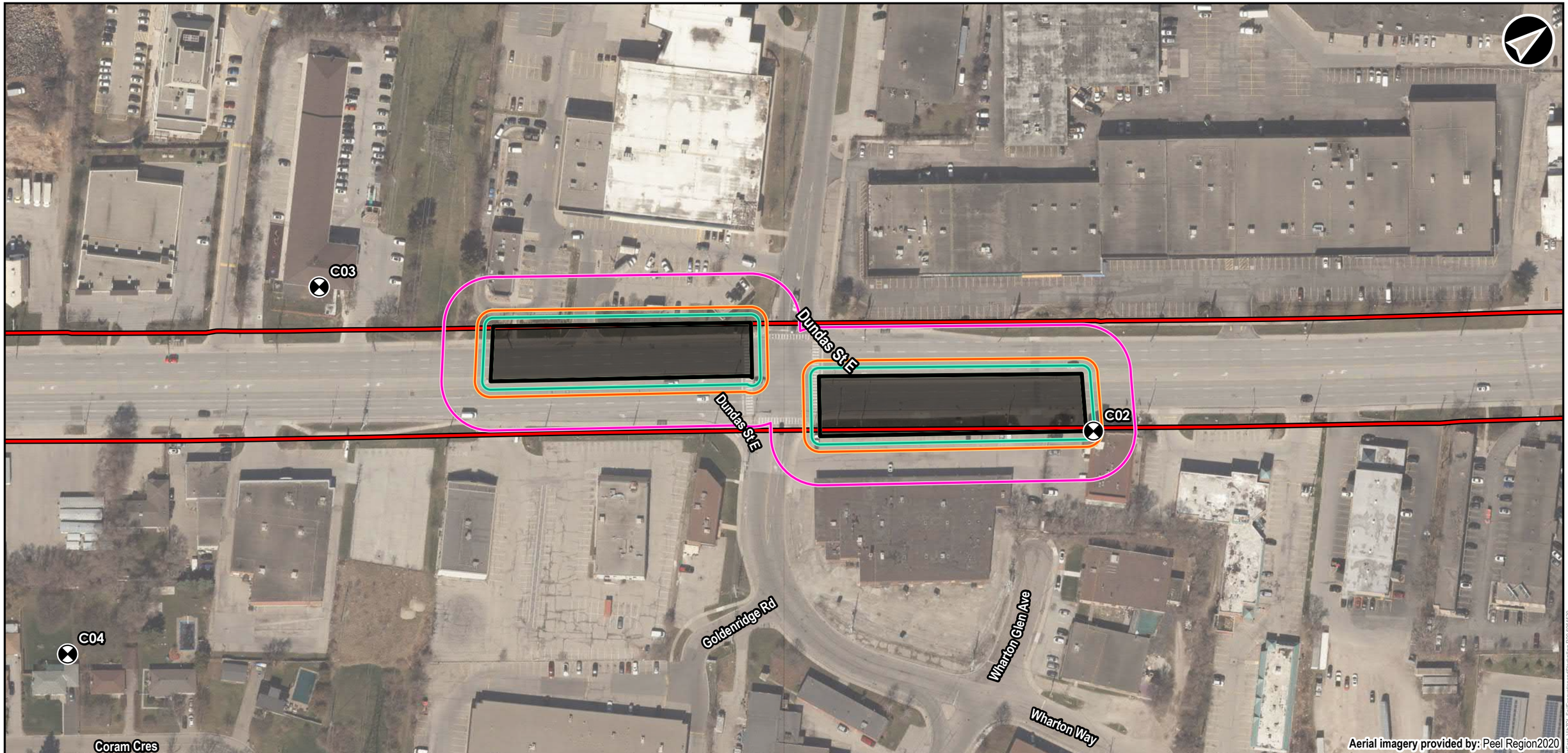
NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,000
P:60645291	Rev:00

Figure: 23-08



Legend

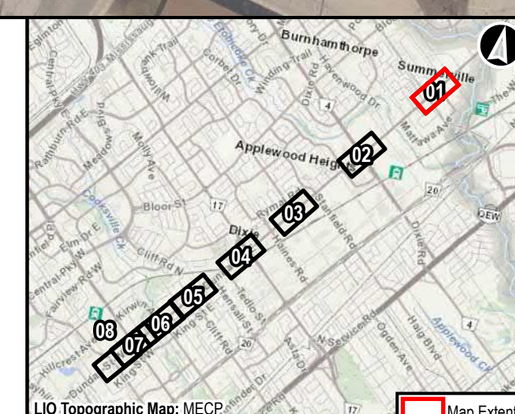
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,500	**Figure: 24-01**
P:60645291	Rev:00	

C09

Dundas St E

Dixie Rd

Neilco Crt

4

Aerial imagery provided by: Peel Region2020

Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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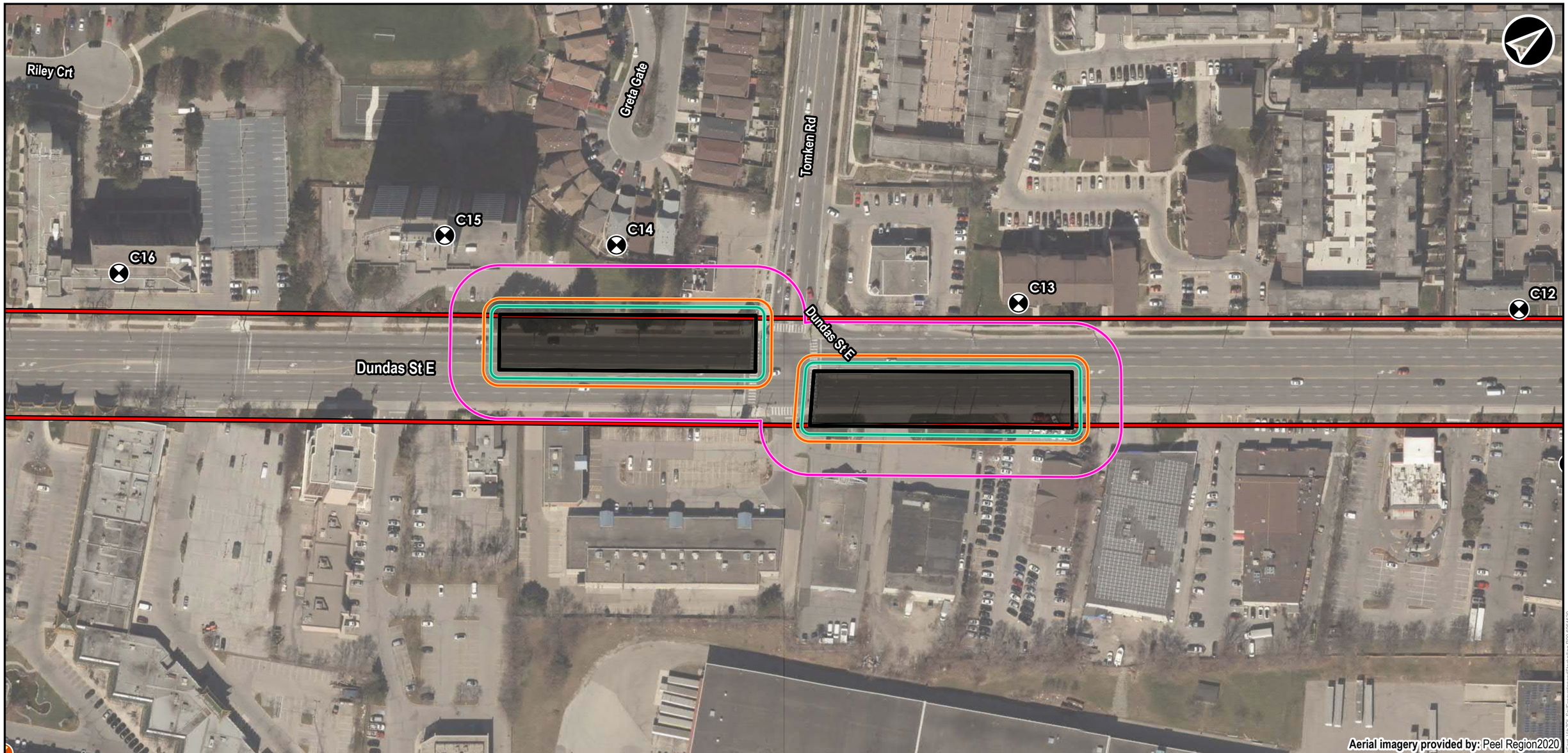
P:60645291	Rev:00

Figure: 24-02



Legend

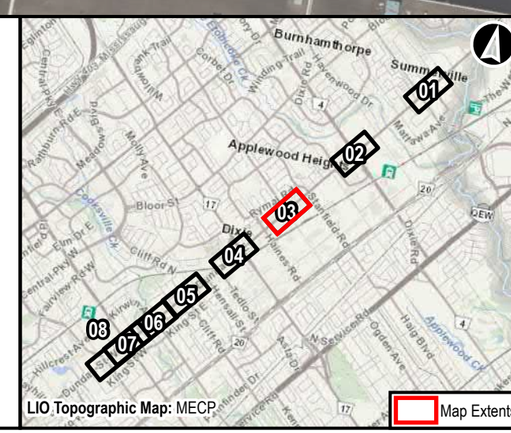
- Receptor
- Heritage Property Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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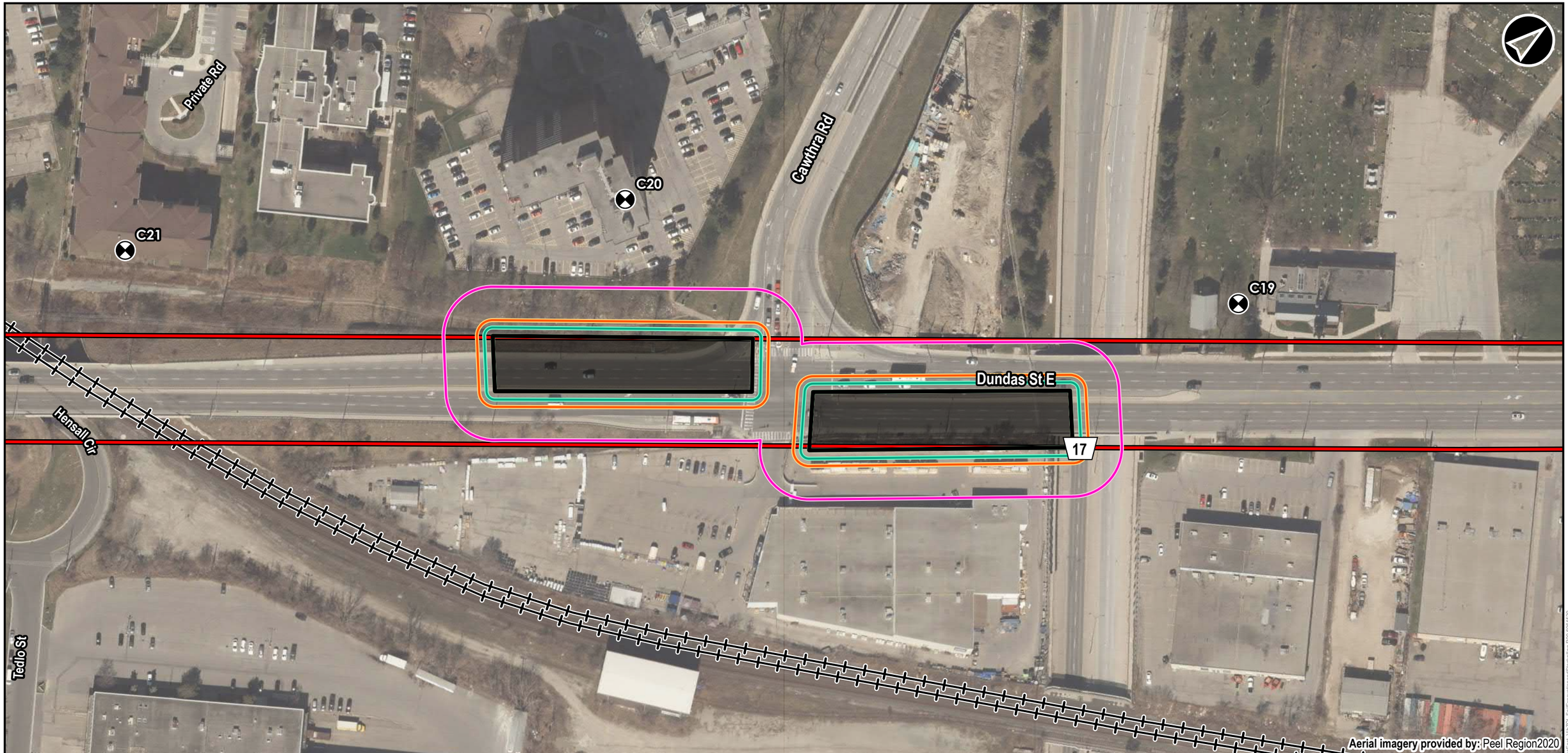
P:60645291	Rev:00	



Legend

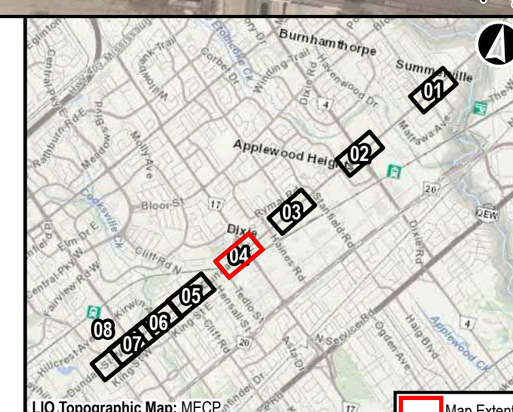
- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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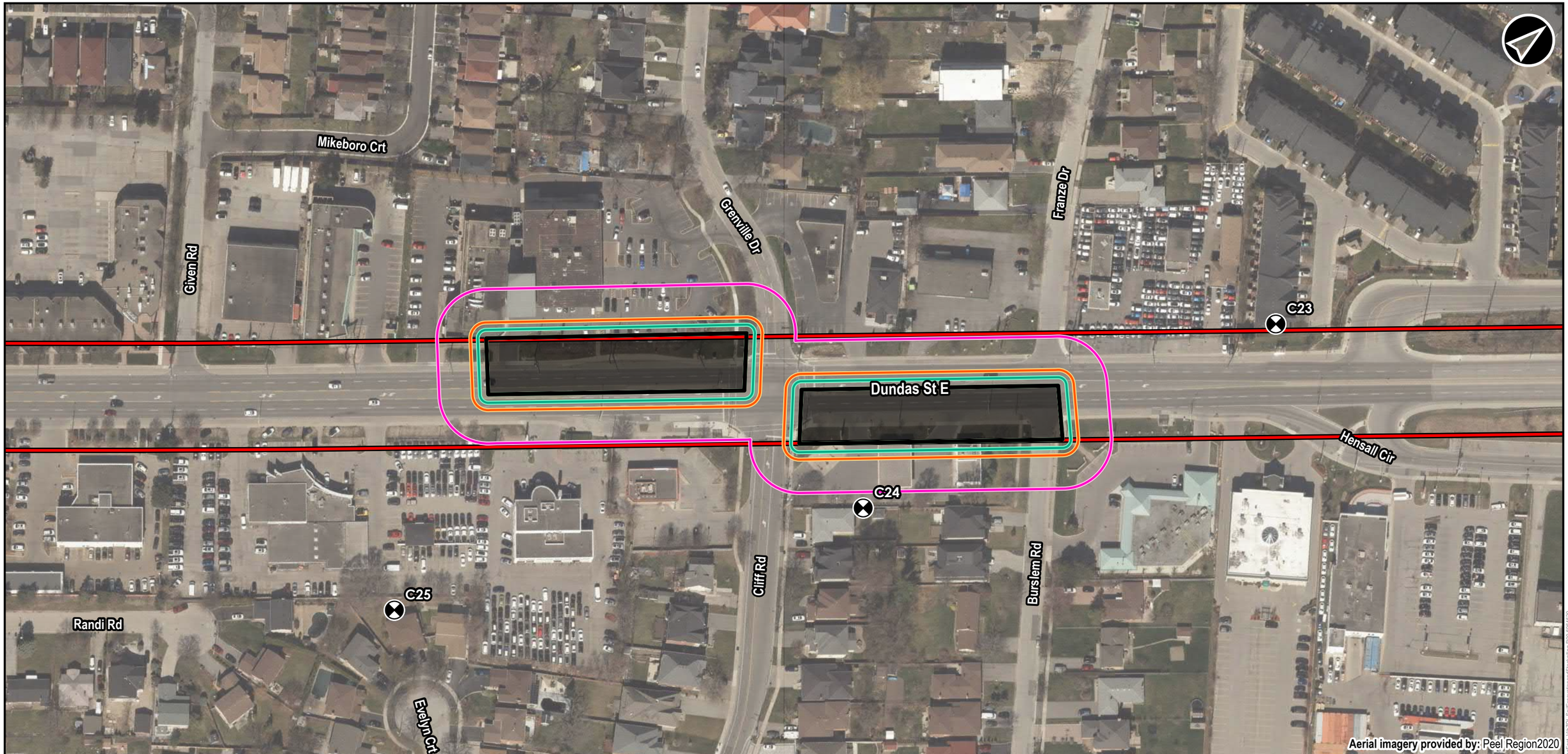
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

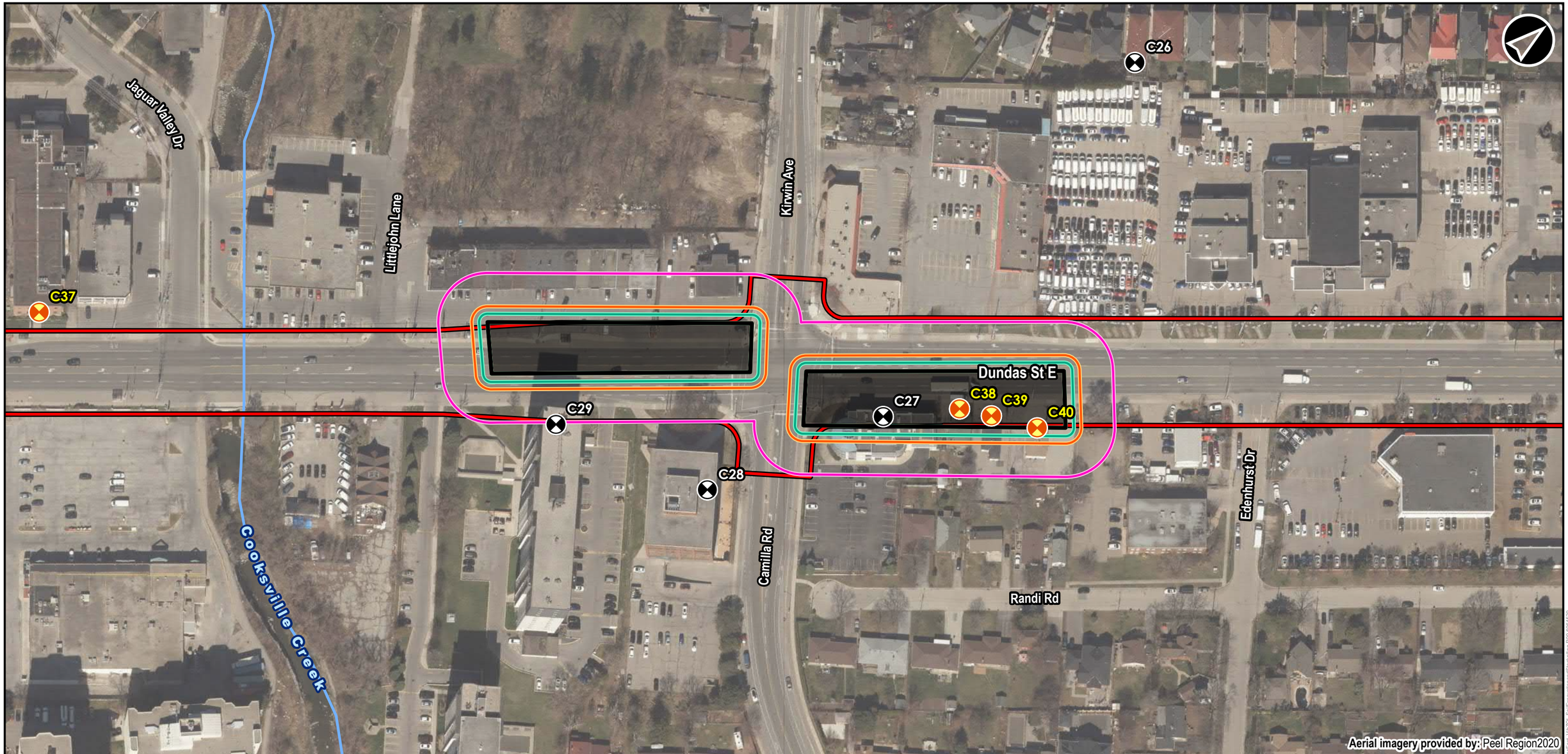
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,500	**Figure: 24-05**
P:60645291	Rev:00	



Legend

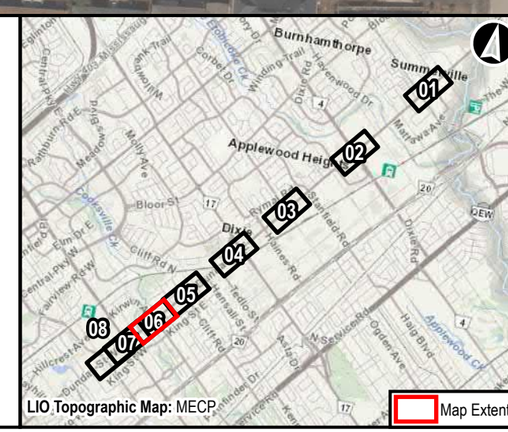
- Receptor
- Heritage Property Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,500	**Figure: 24-06**
P:60645291	Rev:00	

Aerial imagery provided by: Peel Region2020

Legend

- Receptor
- Heritage Property Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse

LIO Topographic Map: MECP

Map Extents

Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

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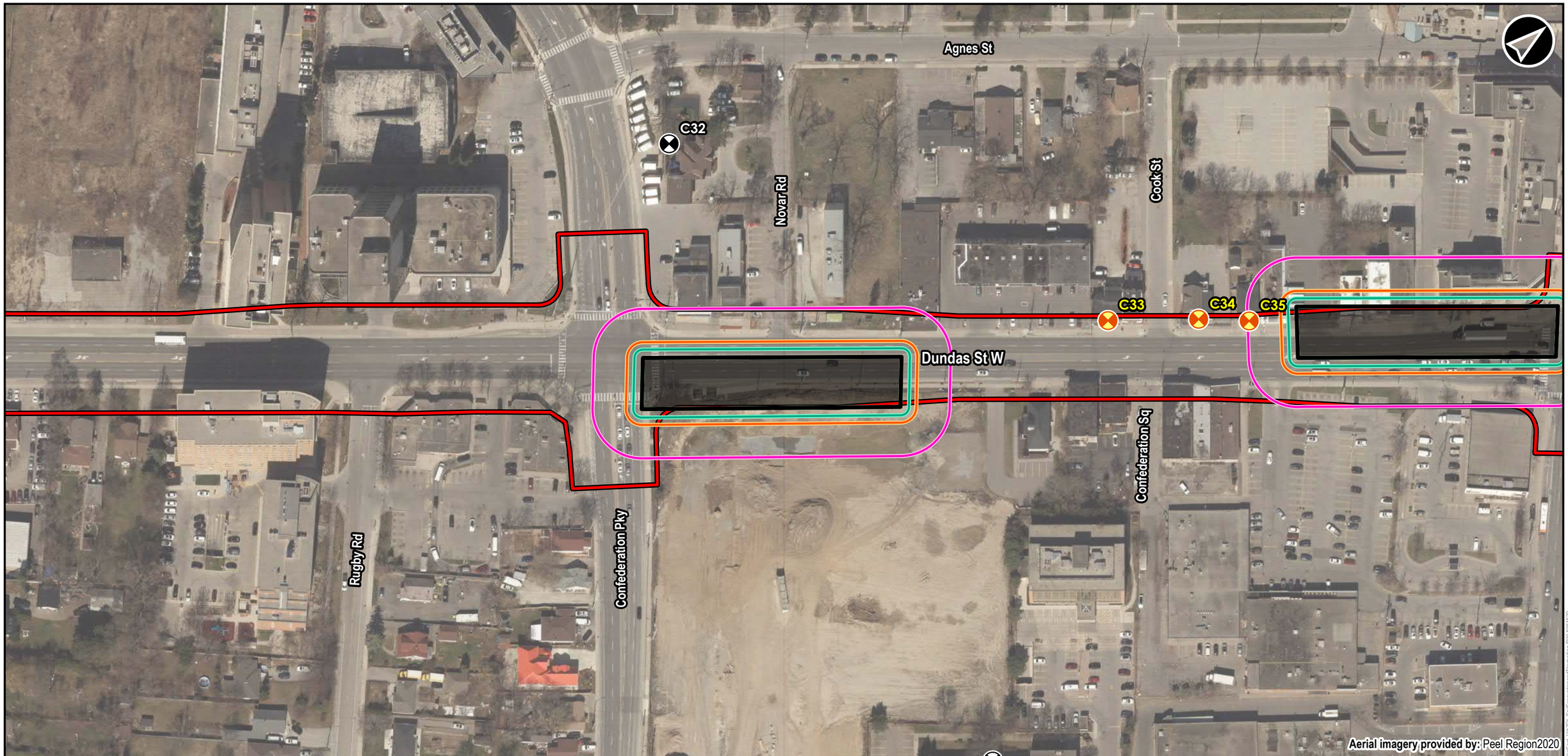
P:60645291	Rev:00

Figure: 24-07



Legend

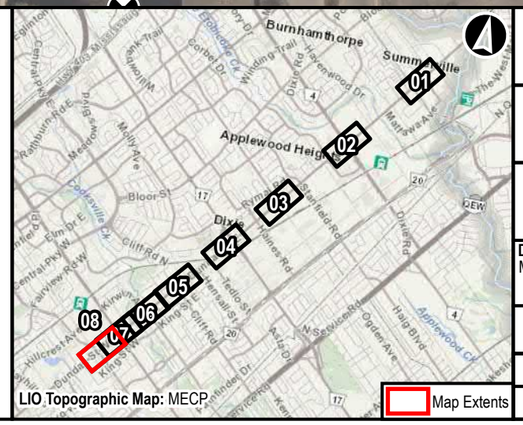
- Receptor
- Heritage Property Receptor
- Proposed Bus Station Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary



Dundas Bus Rapid Transit

Soil Excavation and Stockpiling
Construction Vibration Zone of Influence

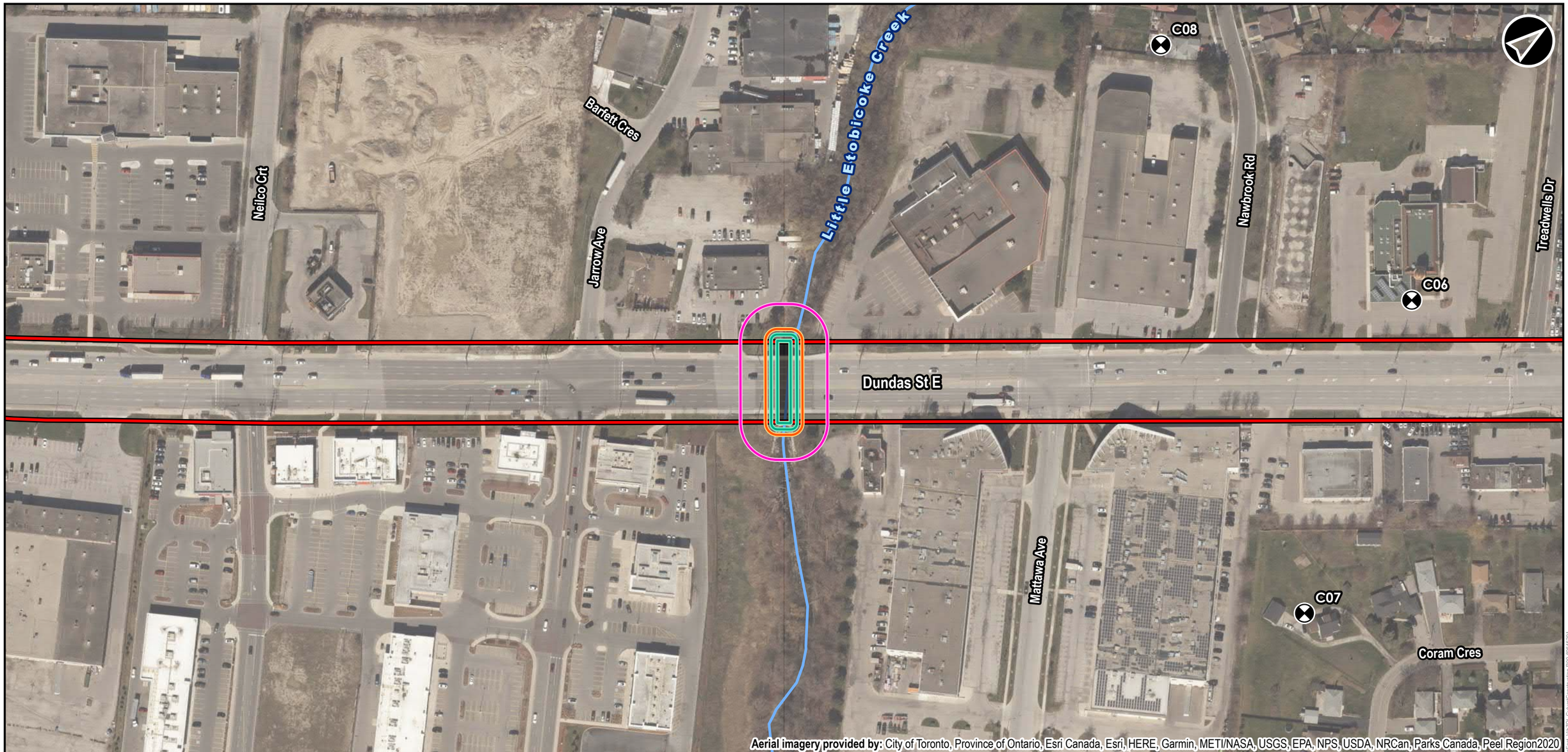
0 5 10 20 30 40 50 60 70 80 90 100 110 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Oct, 2021	1:1,500	**Figure: 24-08**
P:60645291	Rev:00	



Legend

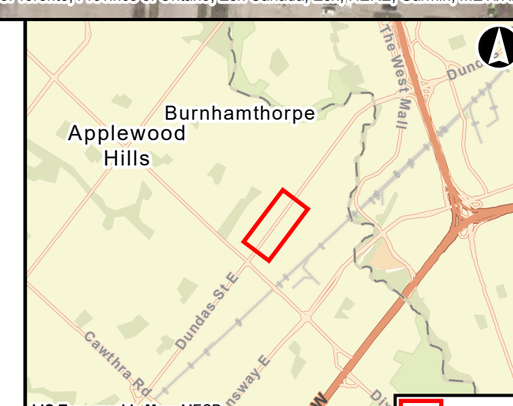
- Receptor
- Proposed Culvert Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Culvert
Construction Vibration Zone of Influence

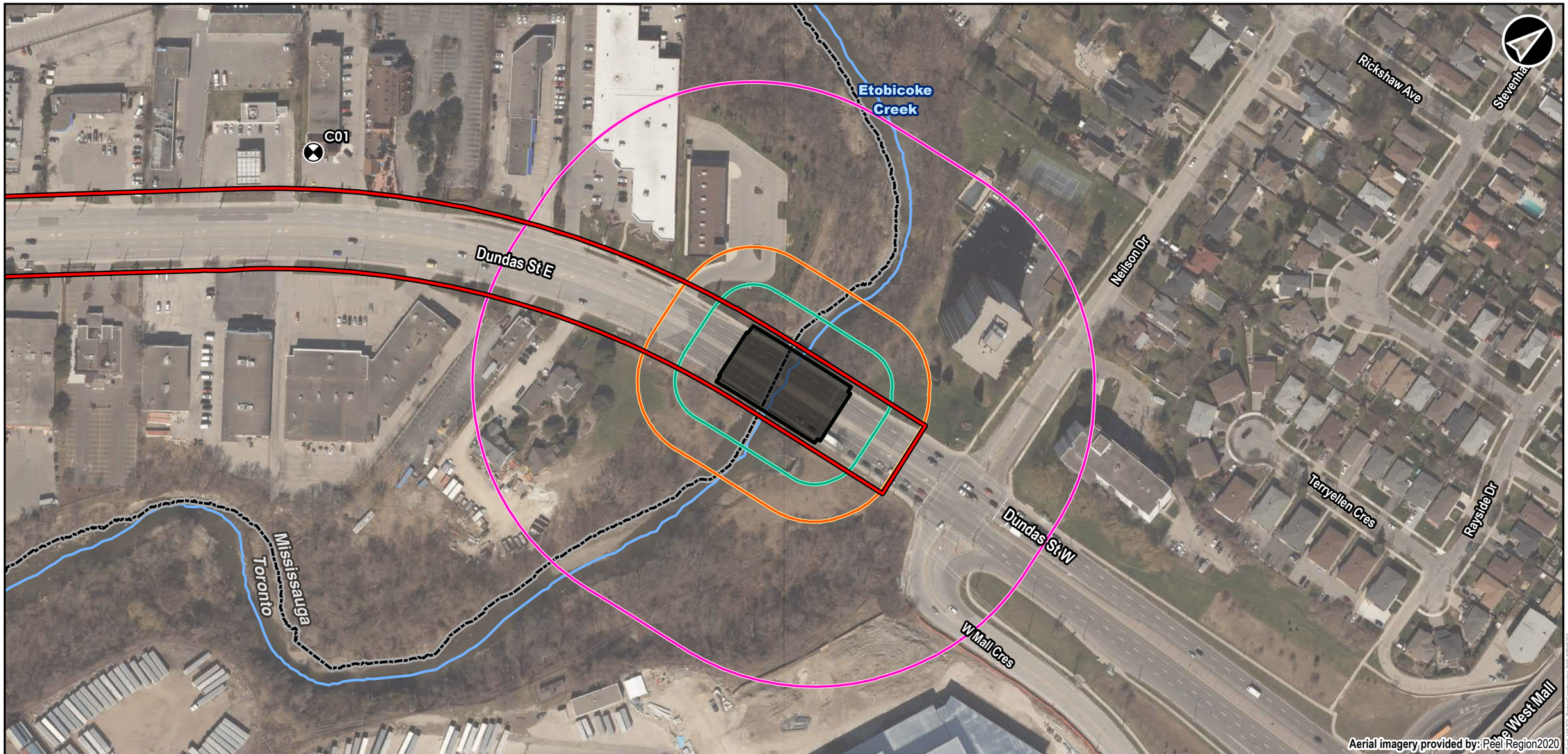
0 10 20 40 60 80 100 120 140 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 25**
P:60645291	Rev:00	



Legend

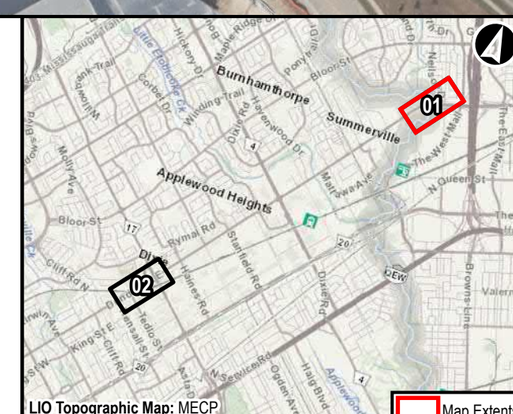
- Receptor
- Proposed Bridge Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Watercourse



Dundas Bus Rapid Transit

Bridge
Construction Vibration Zone of Influence

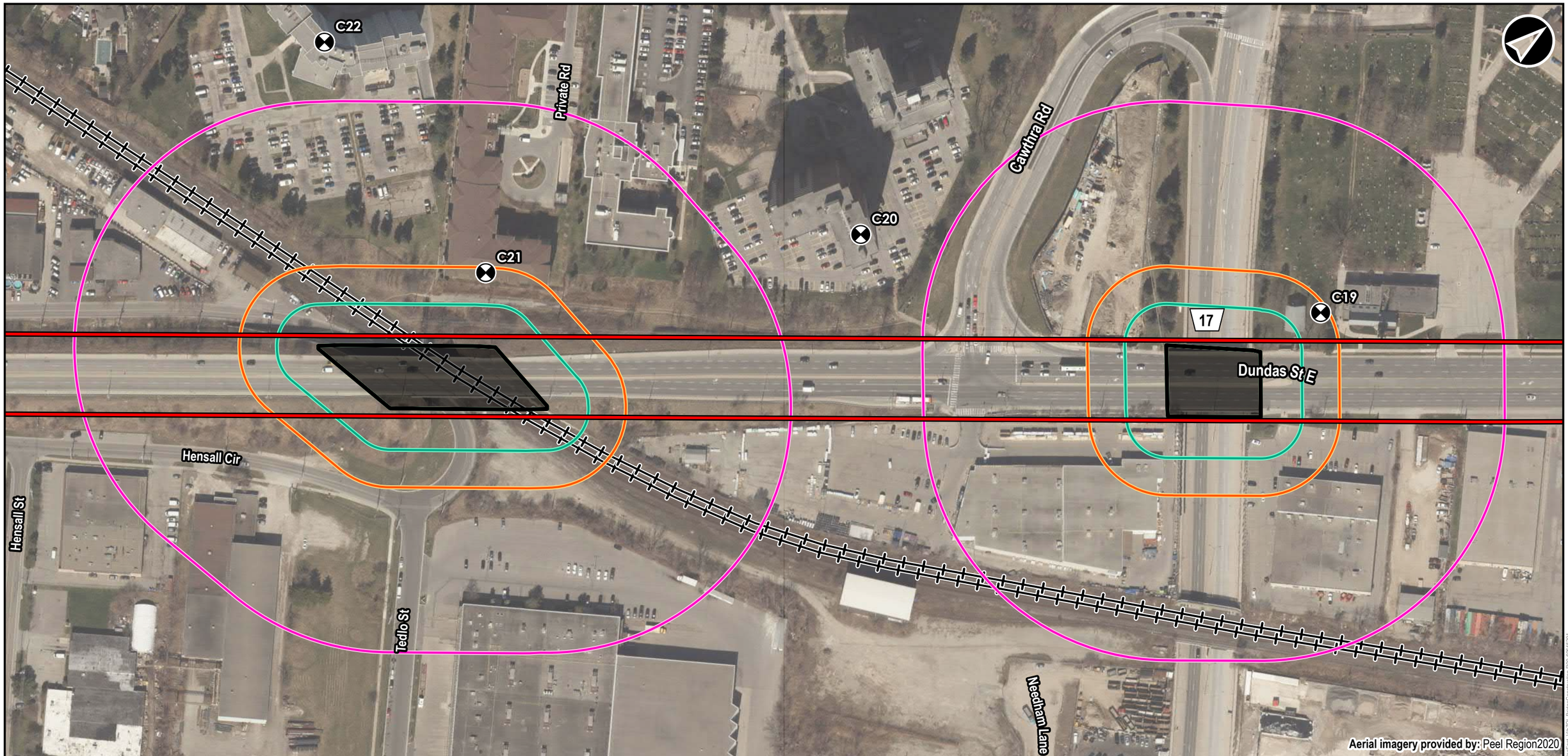
0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 26-01**
P:60645291	Rev:00	



Legend

- Receptor
- Proposed Bridge Construction Limits
- Presumed Exisiting Right of Way

Zone of Influence

- Public Annoyance (0.14mm/s RMSV)
- Normal Building Damage (8 mm/s PPV)
- Fragile or Heritage Building Damage (3 mm/s PPV)

Base Layers

- Municipal Boundary
- Railway

Dundas Bus Rapid Transit

Bridge
Construction Vibration Zone of Influence

0 20 40 80 120 M

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH, Region of Peel

METROLINX | AECOM

Sep, 2021	1:2,000	**Figure: 26-02**
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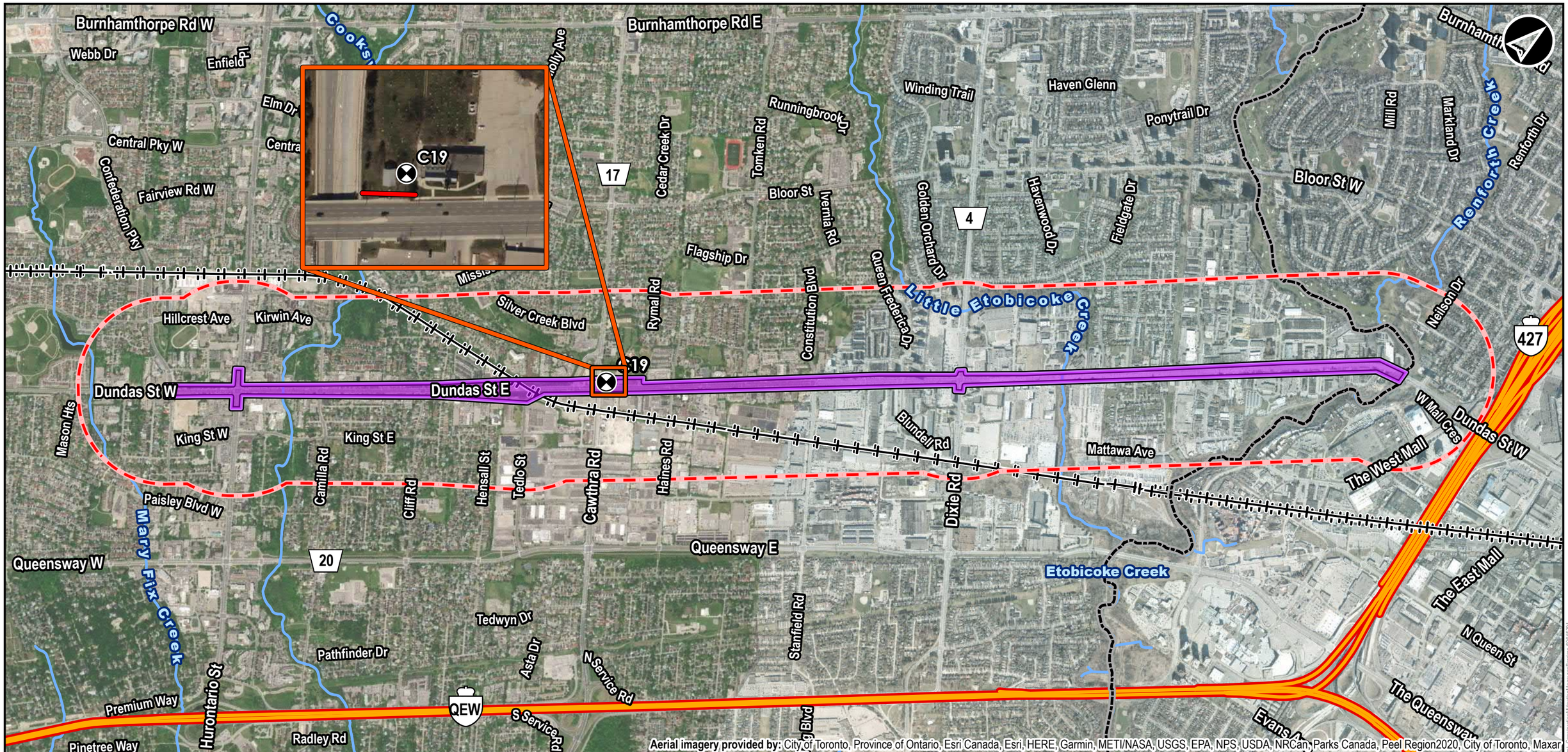
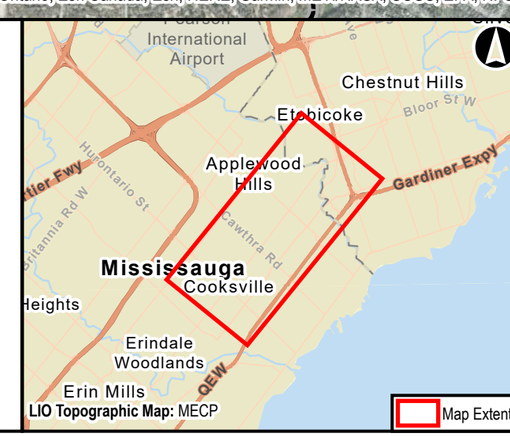


Legend

- Construction Receptors
- Construction Mitigation Measures
- Construction Noise and Vibration Study Area
- Mississauga East Project Area

Base Layers

- Municipal Boundary
- Railway
- Primary Highway
- Watercourse



LIO Topographic Map: MECP

Dundas Bus Rapid Transit

Construction Mitigation Measures
Barrier Extents

0 200 400 800 1,200 Meters

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH

METROLINX | AECOM

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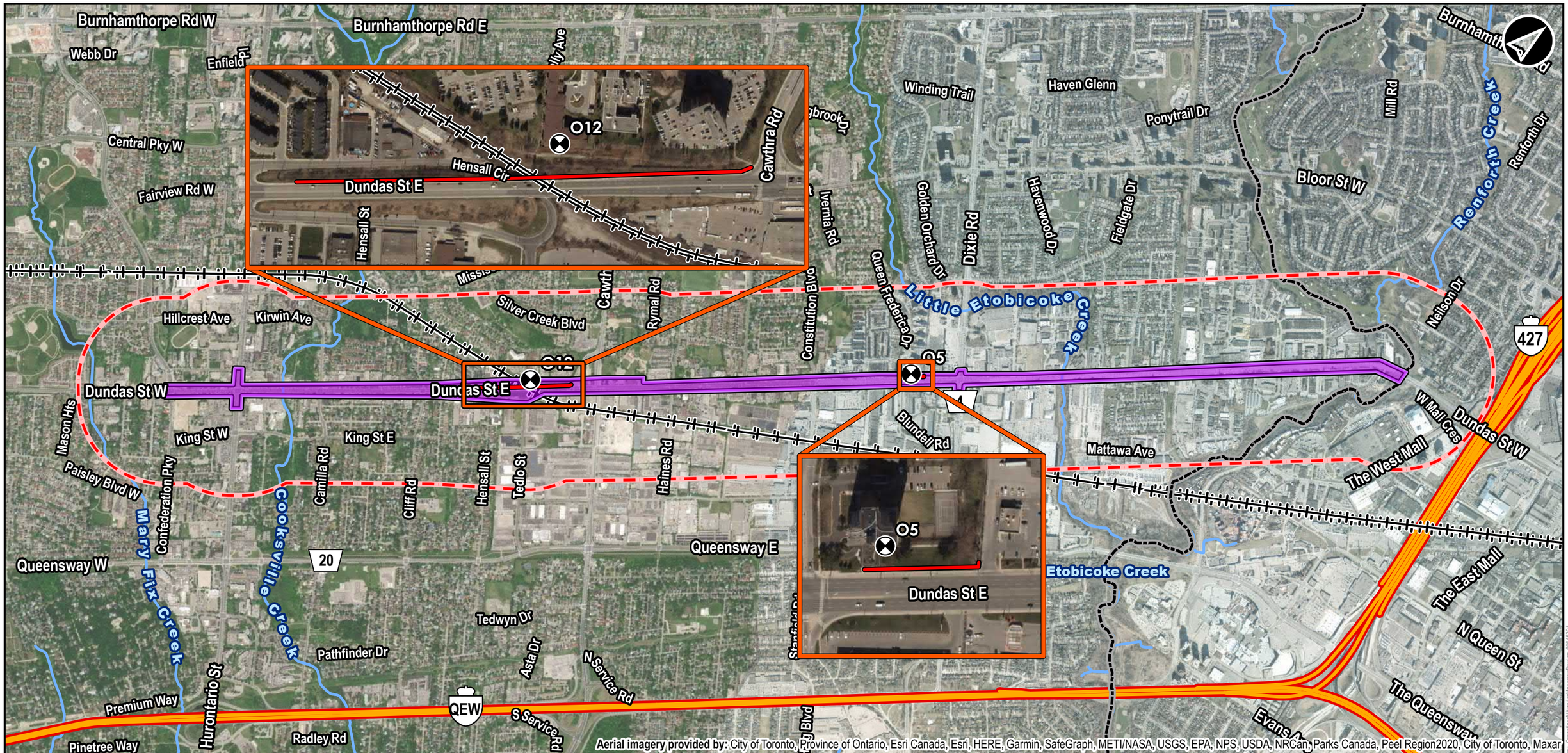
P:60645291	Rev:00	

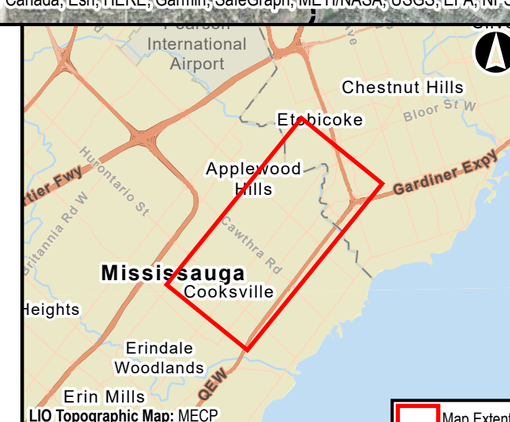


Legend

- Operations Receptor
- Operations Noise Barrier
- Operations Noise and Vibration Study Area
- Mississauga East Project Area

Base Layers

- Municipal Boundary
- Railway
- Primary Highway
- Watercourse



Dundas Bus Rapid Transit

Operations Mitigation Measures
Barrier Extents

0 200 400 800 1,200 Meters

NAD 1983 UTM Zone 17N

Data Sources
MECP, MMAH

METROLINX | AECOM

Dec, 2021	1:22,000	Figure: 28
P:60645291	Rev:00	

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Appendix B

Project Receptors

Table B1: Project Operation Receptors

Receptor ID	Description	Address	Figure Reference	UTM Coordinates Zone 17	
				Easting (m)	Northing (m)
O_01	Family Shelter, outdoor living area.	1767 Dundas St E	2-02	614971	4830425
O_02	Midrise residential building, outdoor living area	1745 Dundas St E	2-02	614884	4830415
O_03	Detached home, outdoor living area	1761 Coram Crescent	2-02	615027	4830260
O_04	Detached home, outdoor living area	1721 B Dundas St E	2-02	614817	4830344
O_05	Highrise residential building, outdoor living area	3025 Queen Frederica Dr	2-02	614077	4829259
O_06	Townhouse, outdoor living area	121 Arena Rd	2-02	613845	4829071
O_07	Townhouse, outdoor living area	3040 Constitution Blvd	2-02	613670	4828712
O_08	Detached Home, outdoor living area	3025 Greta Gate	2-02	613437	4828444
O_09	Midrise building, outdoor living area	880 Riley Ct	2-02	613328	4828281
O_10[1]	Detached Home, outdoor living area	865 Dundas St E	2-02	613293	4828232
O_11	Townhouse, outdoor living area	2 Haines Rd	2-02	613099	4828118
O_12	Highrise residential building, outdoor living area	570 Lolita Gardens	2-02	612721	4827534
O_13	Townhouse, outdoor living area	437 Hensall Cir	2-02	612482	4827182
O_14	Detached Home, outdoor living area	2589 Cliff Rd	2-02	612437	4827011
O_15	Detached Home, outdoor living area	2576 Evelyn Ct	2-02	612352	4826844
O_16	Detached Home, outdoor living area	135 Whitchurch Mews	2-02	612001	4826735
O_17	Daycare, playground/outdoor living area	130 Dundas St E	2-02	612024	4826513

Notes: 1. This location has been identified as a built heritage resource.

Table B2: Project Construction Receptors

Receptor ID	Description	Address	Figure Reference	UTM Coordinates Zone 17	
				Easting (m)	Northing (m)
C_01	Low rise hotel	2171 Dundas St E	2-01	614971	4830425
C_02	Low rise hotel	1886 Dundas St E	2-01	614884	4830415
C_03	Family shelter	1767 Dundas St E	2-01	615027	4830260
C_04	2 storey house	1761 Coram Crescent	2-01	614817	4830344
C_05	1 storey house	1721 B Dundas St E	2-01	614077	4829259
C_06	Church	1699 Dundas St E	2-01	614884	4830415
C_07	2 storey house	1695 Coram Crescent	2-01	615027	4830260
C_08	2 storey house	3054 Nawbrook Rd	2-01	614817	4830344
C_09	mid rise multi-unit building	3025 Queen Frederica Dr	2-01	614077	4829259
C_10	2 storey house	121 Arena Rd	2-01	613845	4829071
C_11	Hotel	1060 Dundas St E	2-01	613670	4828712
C_12	Low rise multi-unit dwelling	3040 Constitution Blvd	2-01	613437	4828444
C_13	Mid rise multi-unit building	1011 Dundas St E	2-01	613328	4828281
C_14	2 storey house	3025 Greta Gate	2-01	613293	4828232
C_15	1 storey house	935 Dundas St E	2-01	613099	4828118
C_16	Low rise multi-unit dwelling	880 Riley Ct	2-01	612721	4827534
C_17[1]	2 storey house	865 Dundas St E	2-01	613292	4828232
C_18	2 storey house	2 Haines Rd	2-01	612437	4827011
C_19	Church cemetery	719 Dundas St E	2-01	612352	4826844
C_20	Low rise multi-unit dwelling	600 Lolita Gardens	2-01	612001	4826735
C_21	Mid rise multi-unit building	570 Lolita Gardens	2-01	612024	4826513
C_22	Low rise multi-unit dwelling	530 Lolita Gardens	2-01	612482	4827182
C_23	2 storey townhomes	437 Hensall Cir	2-01	612437	4827011
C_24	2 storey house	2589 Cliff Rd	2-01	612352	4826844

Receptor ID	Description	Address	Figure Reference	UTM Coordinates Zone 17	
				Easting (m)	Northing (m)
C_25	2 storey house	2576 Evelyn Ct	2-01	612001	4826735
C_26	2 storey house	135 Whitchurch Mews	2-01	612024	4826513
C_27	Medical Centre, mid-rise building	160 Dundas St E	2-01	612001	4826735
C_28	Daycare playground	130 Dundas St E	2-01	612024	4826513
C_29	Daycare located in multi-purpose building	114 Dundas St E	2-01	612001	4826735
C_30	Low rise multi-unit dwelling	3052 Jaguar Valley Dr	2-01	612024	4826513
C_31	mid rise retirement home	73 King St W	2-01	612001	4826735
C_32	Daycare	3022 Novar Rd	2-01	612024	4826513
C_33[1]	Commercial Copy and Printing	51 Dundas St W	2-01	611579	4826043
C_34[1]	Commercial Dentistry Business	47 Dundas St W	2-01	611601	4826071
C_35[1]	Commercial Tattoo and Piercing Business	37 Dundas St W	2-01	611614	4826086
C_36[1]	Min-A-Mart Convenience Store	14 Dundas St E	2-01	611750	4826217
C_37[1]	Commercial Office Building	47 Dundas St E	2-01	611806	4826339
C_38[1]	1 Storey House	168 Dundas St E	2-01	612063	4826596
C_39[1]	Commercial Alex Optical	172 Dundas St E	2-01	612073	4826604
C_40[1]	Commercial L&L Auto	184 Dundas St E	2-01	612088	4826615
C_41[1]	Commercial M Dental	775 Dundas St E	2-01	613136	4828013
C_42[1]	Mixed Use Commercial Building	888 Dundas St E	2-01	613451	4828131
C_43[1]	2 storey house	855 Dundas St E	2-01	613262	4828237

Notes: 1. This location has been identified as a built heritage resource.

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Appendix C

Project Assessment Assumptions

AECOM Imagine it. Delivered.

Metrolinx

Noise and Vibration Assumptions Report

Dundas Bus Rapid Transit Project

Date: July 2021

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1. Assumptions for Traffic Modelling 1

2. Assumptions for Operation Noise Emission 3

3. Assumption for Operation Vibration 5

4. Assumptions for Construction Noise Emission 6

5. Assumptions for Construction Vibration 7

List of Attachments

Attachment 1. 24-hour Traffic & BRT Distribution Summary

Attachment 2. Dundas BRT Construction Noise Sources

1. Assumptions for Traffic Modelling

The following inputs and assumptions have been made for traffic modelling:

1. Peak AM traffic volumes were provided by AECOM Traffic analysts for 2041 Business-as-Usual (BAU) (May 2021) and are assumed to include existing bus routes within the AM Peak counts.

2. The annual average daily traffic (AADT) is assumed to be the provided peak AM traffic volumes multiplied by 10. This assumption is made at the direction of the traffic modelling team to estimate the AADT values.

3. The traffic volumes are split as 90% day / 10% night. This assumption is consistent with the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT).

4. The Peak AM traffic volumes includes total peak hour volumes (e.g. automobiles + trucks), truck volumes (i.e., heavy + medium trucks) and speed limits. However, it did not include distribution percentages for truck type (medium or heavy truck). In cases where truck percentages are not provided, the percentage can be assumed to be 13% (8% heavy trucks and 5% medium trucks) according to the MTO Environment Guide for Noise. The assessment will assume the truck volumes are similarly apportioned, where medium trucks account for 38.5% (equivalent to 5/13) of the total truck volumes; and heavy trucks account for 61.5% (equivalent to 8/13) of the total truck volumes.

5. Dundas Street West with existing and future proposed infrastructure was considered for traffic modelling including traffic counts from north/south intersecting roads, and 400-series highways. For the purposes of this assessment, it is assumed that there will be priority focus given to changes between traffic conditions with and without the Dundas BRT infrastructure, and that these changes will mainly impact traffic along Dundas Street West and not significantly impact traffic on intersecting or adjacent arterial roads within the Study Area.

6. Bus Rapid Transit traffic is assumed to include 50% rolling stock of Metrolinx designated Dundas BRT bus routes and 50% rolling stock from other express service providers such as MiWay Mississauga, or TTC Express routes.

7. As per the Dundas BRT Initial Business Case (September 2020)[1], Segment A combined service provider bus traffic assumed to have a maximum AM & PM peak service level of one bus every minute (60 buses per hour, each direction),

[1] Metrolinx Dundas BRT Initial Business Case, September 2021: http://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/2020-08-17-Dundas-BRT-IBC-Final-Draft.pdf

for each direction, with evening and early morning assumed reduced service levels by half, equating to one bus every 2 minutes (30 buses per hour, each direction), translating to 1,860 buses per day.
**See Table 1 of Attachment 1: "24-hour Traffic & BRT Distribution Summary"*

8. As per the Dundas BRT Initial Business Case (September 2020)[2], Segment B combined service provider bus traffic assumed to have a maximum AM & PM peak service level of one bus every 2 minutes (30 buses per hour, each direction), for each direction, with evening and early morning assumed reduced service levels by half, equating to one bus every 4 minutes (15 buses per hour, each direction), translating to 930 buses per day.
**See Table 1 of Attachment 1: "24-hour Traffic & BRT Distribution Summary"*

[2] Metrolinx Dundas BRT Initial Business Case, September 2021: http://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/2020-08-17-Dundas-BRT-IBC-Final-Draft.pdf

2. Assumptions for Operation Noise Emission

The following inputs and assumptions were used for operation noise assessment of the Dundas BRT Project:

1. The study area for this assessment is within 500m either side of the Dundas corridor.
2. Points of reception locations will be identified based on aerial and street imagery. The selection of the locations was consistent with the approach provided in the Metrolinx Guide.
    a. Additional receptor locations will be added based on the:
        - Draft Socio-Economic and Land Use Study (50% submission) (AECOM April 2021); and
        - Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment (AECOM April 2021)

    These reports identify future development and heritage building locations that may be required for inclusion in the noise assessment

    b. Additional receptor locations will be included based on consultation with Metrolinx and the City of Mississauga
3. Future Conditions without Project and with Project were assessed for the year 2041.
4. Existing noise walls within the City of Mississauga were provided by the City and included in the assessment. Other structures resembling a wall along the alignment were assumed to be privacy fences (i.e., not a noise barrier).
5. Roll plans including future road alignment, grading and bus stations were provided in:
    - Dundas BRT Segment B Corridor Design: Cooksville to Etobicoke Creek Roll Plan (AECOM June 2021).
    - Dundas BRT Segment B Corridor Design: Ninth Line to Cooksville Roll Plan (AECOM June 2021).
    - Dundas BRT Segment A Alternative 1 Pinch Point Design: Full CoT Row with 2 Centre Running BRT Lanes (AECOM May 2021)

    This information will be included as inputs for the noise assessment.

6. Noise propagation predictions due to road traffic were based on ORNAMENT. Predictive analysis was performed using the STAMSON modelling software.

7. Buses for the Project are modelled based on reference sound levels from ORNAMENT for medium trucks. However, this reference does not account for the routing of exhaust to roof level for modern buses. Therefore, an adjusted source height of 2.4m for the BRT buses is used in this assessment to reflect the acoustic centre of the roof level exhaust and mounted engine.

8. Other non-express bus service traffic were assumed to be included in the BAU and future traffic data.

9. Metrolinx Bus Rapid Transit rolling stock is assumed to be 100% "Transit Bus" emissions, using diesel fuel for all Metrolinx BRT rolling stock service.
   Note: there has been preliminary discussion on implementation of electric buses for the Dundas BRT project. In order to presume a worst-case scenario, diesel buses will be modeled. Should a quantitative assessment of electric buses for the Dundas BRT be required, additional scope for modelling a secondary Future Build scenario will be required.

10. Other express service providers such as MiWay Mississauga, or TTC Express routes is conservatively assumed to have existing rolling stock powered by diesel fuel, with a percentage reduction of associated emissions matching respective commitments from both providers, namely:

    a. MiWay Mississauga commitment to 80% emission reductions by 2050, and

    b. TTC commitment to 100% emission reductions by 2040[3].

[3] TTC Green Initiatives: http://www.ttc.ca/Riding_the_TTC/green_initiatives.jsp

3. Assumption for Operation Vibration

In the context of environmental assessments in the province of Ontario, vibration impact assessments for rubber-tired vehicle projects have historically not been completed. Research of other Canadian jurisdictions also indicate that quantitative assessments of vibration due to rubber-tired vehicles are not required. Finally, the US FTA Noise and Vibration Impact Assessment Manual notes that “Because the rubber tires and suspension systems on buses provide vibration isolation, it is unusual for buses to cause ground-borne vibration or noise problems.”. In consideration of the above, a quantitative vibration assessment due to the operation of the BRT project is not planned.

4. Assumptions for Construction Noise Emission

The following inputs and assumptions will be used when estimating the noise emissions from construction activities:

1. The study area for this assessment is within 500m either side of the Dundas corridor.
2. Points of reception locations will be identified based on aerial and street imagery. The selection of the locations was consistent with the approach provided in the Metrolinx Guide.
    a. Additional receptor locations will be added based on the:
        i. Draft Socio-Economic and Land Use Study (50% submission) (AECOM April 2021); and
        ii. Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment (AECOM April 2021)

    These reports identify future development and heritage building locations that may be required for inclusion in the noise assessment

    b. Additional receptor locations will be included based on consultation with Metrolinx and the City of Mississauga
3. A Zone of Influence will be developed to define the geographic area within which receptors may be exposed to unmitigated noise levels higher than the defined limits.
4. Worst-case conditions were assumed for the following six construction activities:
    a. Road Works: existing asphalt removal and site preparation
    b. Road Works: paving new asphalt
    c. Station Construction: installation
    d. Soil Excavation and Stockpiling
    e. Culvert Construction
    f. Bridge Construction

Noise emission sources including load factor and usage hours for each construction activity are included in Attachment 2 “Dundas BRT Construction Noise Sources”.

5. Assumptions for Construction Vibration

The following assumptions will be used for the construction vibration assessment:

1. Vibration levels will be predicted according to U.S. Federal Transit Administration procedures for predicting vibration transmission.

2. Points of reception locations will be identified based on aerial and street imagery. The selection of the locations was consistent with the approach provided in the Metrolinx Guide.

    a. Additional receptor locations will be added based on the:

        i. Draft Socio-Economic and Land Use Study (50% submission) (AECOM April 2021); and

        ii. Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment (AECOM April 2021)

    These reports identify future development and heritage building locations that may be required for inclusion in the noise assessment

    b. Additional receptor locations will be included based on consultation with Metrolinx and the City of Mississauga

3. The building damage limits are based on in-ground vibration levels, adjacent to the building. Perceptible vibrations would result from in-building floor vibrations, but the limits for construction vibration perceptibility are also taken as in-ground vibration levels. This approach is consistent with the U.S Federal Transit Administration procedures.

4. For conservative analysis, all construction activities were assumed to be located at a point within the planned construction site(s) closest to each receptor under assessment.

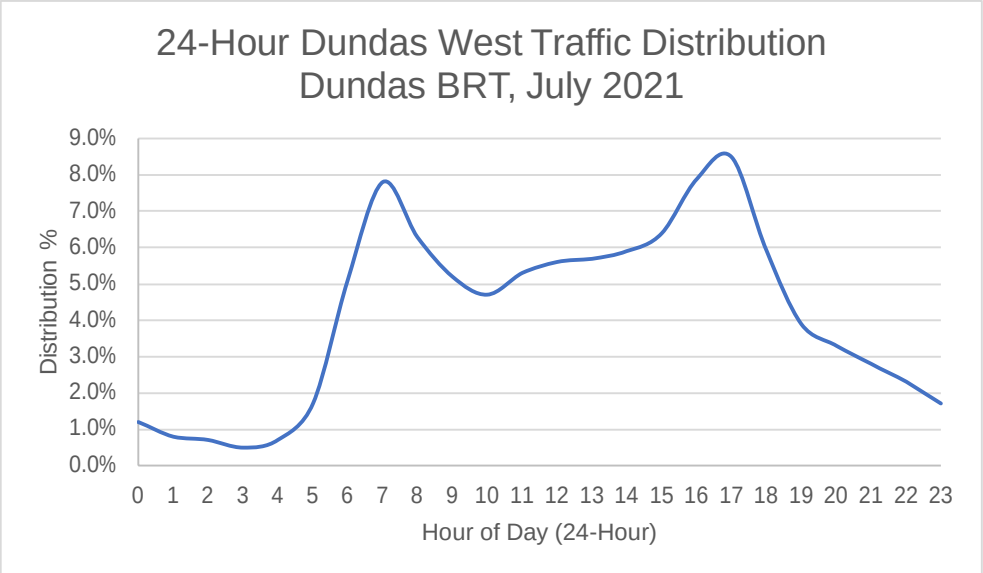
Attachment 1

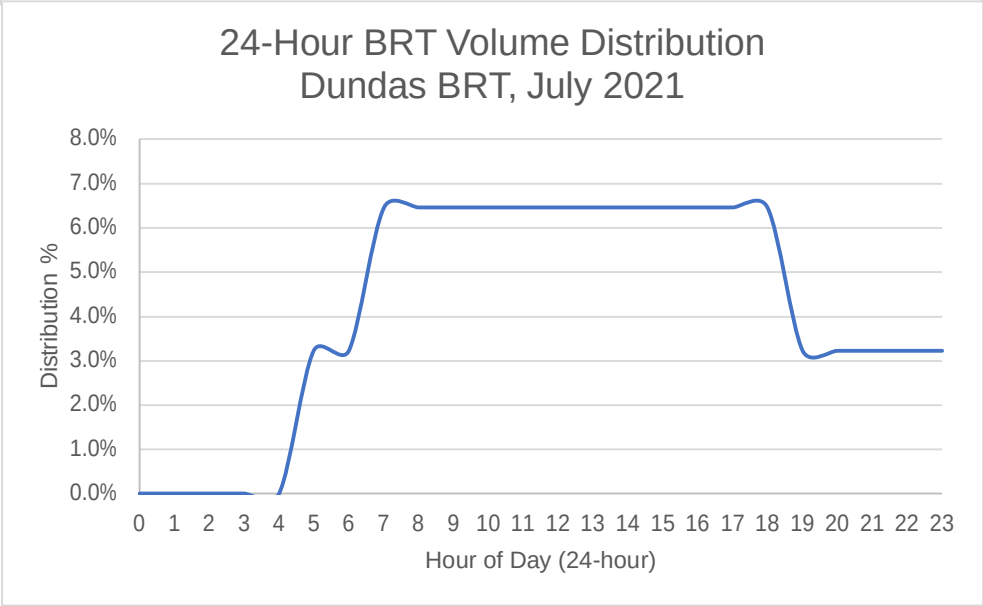
24-hour Traffic & BRT Distribution Summary

Dundas Bus Rapid Transit (BRT)

Table 1: 24-Hour Distribution Volume

Dundas BRT Segment A & Segment B Study Areas				
Link ID	**All**	**Seg. A**	**Seg. B**	**All**
Hour Starting	**Dundas West Traffic %**	**# BRT Buses per hour**	**# BRT Buses per hour**	**Dundas BRT %**
0:00	1.2%	0	0	0.0%
1:00	0.8%	0	0	0.0%
2:00	0.7%	0	0	0.0%
3:00	0.5%	0	0	0.0%
4:00	0.7%	0	0	0.0%
5:00	1.7%	60	30	3.2%
6:00	5.1%	60	30	3.2%
7:00	7.8%	120	60	6.5%
8:00	6.3%	120	60	6.5%
9:00	5.2%	120	60	6.5%
10:00	4.7%	120	60	6.5%
11:00	5.3%	120	60	6.5%
12:00	5.6%	120	60	6.5%
13:00	5.7%	120	60	6.5%
14:00	5.9%	120	60	6.5%
15:00	6.4%	120	60	6.5%
16:00	7.9%	120	60	6.5%
17:00	8.5%	120	60	6.5%
18:00	5.9%	120	60	6.5%
19:00	3.9%	60	30	3.2%
20:00	3.3%	60	30	3.2%
21:00	2.8%	60	30	3.2%
22:00	2.3%	60	30	3.2%
23:00	1.7%	60	30	3.2%
Total:	100%	1860	930	100%





Note:

1) Data taken from the "REALCOST" program published by the United States Federal Highway Association
2) 24% Urban AADT data was used to represent the hourly AADT proportions for the Dundas BRT project
3) 24-hour Dundas BRT Volumes assumed to be 1 bus every 30 minutes for night-hours (starting at 5 AM) and evening hours, and 1 bus every 15 minutes during day-time hours

Night
Day
Evening/Early Morning

Attachment 2

Construction Equipment Operation Summary

Table 1. Dundas BRT Construction Noise Sources

Equipment Description	Units per Operation	Equipment Rating (hp)	Load factor (%)	Operation Time (hr/day)	Sound Level (dBA)
Road Works - Existing Asphalt Removal and Site Preparation					
Excavator	2	232	80	12	104
Pickup Truck	5	225	50	12	103
Dump Truck	2	250	80	12	109
Impact Hammer	2	250	80	12	115
Loaders	2	83	80	12	95
Bulldozer	1	190	80	12	103
Road Milling Machine (Cold Recycling Machine)	1	480	85	12	124
Portable Light Generator	5	27	15	12	98
Road Works - Paving New Asphalt					
Dump Truck	2	250	50	12	109
Pickup Truck	5	225	80	12	103
Bottom/Belly Dump Truck	1	250	80	12	109
Grader	1	275	85	12	115
Asphalt Roller	2	194	85	12	109
Water Truck	1	150	50	12	109
Asphalt Paver	1	150	85	12	102
Road Sweeper	2	70	50	12	104
Portable Light Generator	5	27	50	12	98
Station Construction - Installation					
Flatbed Truck	1	650	80	12	111
Crane	1	230	80	12	102
Power Generator	1	268	85	12	106
Concrete Mixer Truck	1	225	80	12	105
Portable Light Generator	5	27	15	12	98
Welding Generator	5	4	80	12	94
Pickup Truck	5	225	50	12	107
Soil Excavation and Stockpiling					
Excavator	2	232	80	12	104
Bulldozer	1	190	80	12	103

Equipment Description	Units per Operation	Equipment Rating (hp)	Load factor (%)	Operation Time (hr/day)	Sound Level (dBA)
Loaders	2	83	80	12	95
Portable Light Generator	5	27	15	12	98
Dump Truck	2	250	50	12	109
Pickup Truck	2	225	80	12	103
Culvert Construction					
Flatbed Trucks	1	360	80	12	111
Excavator	1	500	80	12	104
Loaders	1	83	80	12	95
Dump Truck	2	250	80	12	109
Compactors	1	300	80	12	72
Water Pumps	2	27	100	12	65
Portable Light Generator	5	27	15	12	98
Bridge Construction					
Compressor	2	60	80	12	120
Crane	2	230	80	12	102
Dump Truck	2	250	80	12	109
Flatbed Truck	2	360	80	12	111
Concrete Mixer Truck	2	225	80	12	105
Man Lift	2	67	50	12	105
Impact Pile Driver	1	249	80	12	115
Excavator	1	232	80	12	104
Concrete Mixer	1	225	80	12	105
Concrete Pump Truck	1	229	80	12	103
Power Generator	1	268	90	12	106
Portable Light Generator	3	27	15	12	98

Note:
Day= 07:00 hr to 23:00 hr

AECOM

Appendix D

Example Calculations

Receiver
Name: house
ID: C19
X: 612352.10 m
Y: 4826843.68 m
Z: 1.50 m

Area Source, ISO 9613, Name: "Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
132	612985.25	4827791.37	1.50	0	DEN	32	53.4	33.5	0.0	0.0	0.0	72.1	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	15.7
132	612985.25	4827791.37	1.50	0	DEN	63	66.6	33.5	0.0	0.0	0.0	72.1	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	28.8
132	612985.25	4827791.37	1.50	0	DEN	125	68.2	33.5	0.0	0.0	0.0	72.1	0.5	-0.1	0.0	0.0	4.8	0.0	0.0	24.4
132	612985.25	4827791.37	1.50	0	DEN	250	68.7	33.5	0.0	0.0	0.0	72.1	1.2	1.2	0.0	0.0	3.6	0.0	0.0	24.1
132	612985.25	4827791.37	1.50	0	DEN	500	72.4	33.5	0.0	0.0	0.0	72.1	2.2	-0.3	0.0	0.0	4.8	0.0	0.0	27.0
132	612985.25	4827791.37	1.50	0	DEN	1000	84.5	33.5	0.0	0.0	0.0	72.1	4.2	-3.3	0.0	0.0	4.8	0.0	0.0	40.2
132	612985.25	4827791.37	1.50	0	DEN	2000	75.8	33.5	0.0	0.0	0.0	72.1	11.0	-3.7	0.0	0.0	4.8	0.0	0.0	25.1
132	612985.25	4827791.37	1.50	0	DEN	4000	72.1	33.5	0.0	0.0	0.0	72.1	37.3	-3.7	0.0	0.0	4.8	0.0	0.0	-5.0
132	612985.25	4827791.37	1.50	0	DEN	8000	63.5	33.5	0.0	0.0	0.0	72.1	133.2	-3.7	0.0	0.0	4.8	0.0	0.0	-109.4
137	613017.52	4827810.66	1.50	0	DEN	32	53.4	32.7	0.0	0.0	0.0	72.4	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	14.7
137	613017.52	4827810.66	1.50	0	DEN	63	66.6	32.7	0.0	0.0	0.0	72.4	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	27.8
137	613017.52	4827810.66	1.50	0	DEN	125	68.2	32.7	0.0	0.0	0.0	72.4	0.5	-0.1	0.0	0.0	4.8	0.0	0.0	23.3
137	613017.52	4827810.66	1.50	0	DEN	250	68.7	32.7	0.0	0.0	0.0	72.4	1.2	1.2	0.0	0.0	3.6	0.0	0.0	23.0
137	613017.52	4827810.66	1.50	0	DEN	500	72.4	32.7	0.0	0.0	0.0	72.4	2.3	-0.3	0.0	0.0	4.8	0.0	0.0	25.9
137	613017.52	4827810.66	1.50	0	DEN	1000	84.5	32.7	0.0	0.0	0.0	72.4	4.3	-3.3	0.0	0.0	4.8	0.0	0.0	39.0
137	613017.52	4827810.66	1.50	0	DEN	2000	75.8	32.7	0.0	0.0	0.0	72.4	11.3	-3.8	0.0	0.0	4.8	0.0	0.0	23.7
137	613017.52	4827810.66	1.50	0	DEN	4000	72.1	32.7	0.0	0.0	0.0	72.4	38.5	-3.8	0.0	0.0	4.8	0.0	0.0	-7.1
137	613017.52	4827810.66	1.50	0	DEN	8000	63.5	32.7	0.0	0.0	0.0	72.4	137.2	-3.8	0.0	0.0	4.8	0.0	0.0	-114.4

Point Source, ISO 9613, Name: "PILE-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
147	613003.75	4827822.93	0.60	0	DEN	32	67.6	0.0	0.0	0.0	0.0	72.4	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	-3.8
147	613003.75	4827822.93	0.60	0	DEN	63	80.8	0.0	0.0	0.0	0.0	72.4	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	9.3
147	613003.75	4827822.93	0.60	0	DEN	125	97.9	0.0	0.0	0.0	0.0	72.4	0.5	0.0	0.0	0.0	4.7	0.0	0.0	20.2
147	613003.75	4827822.93	0.60	0	DEN	250	106.4	0.0	0.0	0.0	0.0	72.4	1.2	1.6	0.0	0.0	3.2	0.0	0.0	28.0
147	613003.75	4827822.93	0.60	0	DEN	500	107.8	0.0	0.0	0.0	0.0	72.4	2.3	2.1	0.0	0.0	2.7	0.0	0.0	28.4
147	613003.75	4827822.93	0.60	0	DEN	1000	110.0	0.0	0.0	0.0	0.0	72.4	4.3	-2.3	0.0	0.0	4.8	0.0	0.0	30.8
147	613003.75	4827822.93	0.60	0	DEN	2000	106.2	0.0	0.0	0.0	0.0	72.4	11.4	-3.8	0.0	0.0	4.8	0.0	0.0	21.4
147	613003.75	4827822.93	0.60	0	DEN	4000	102.0	0.0	0.0	0.0	0.0	72.4	38.5	-3.8	0.0	0.0	4.8	0.0	0.0	-9.9
147	613003.75	4827822.93	0.60	0	DEN	8000	90.9	0.0	0.0	0.0	0.0	72.4	137.5	-3.8	0.0	0.0	4.8	0.0	0.0	-120.0

Point Source, ISO 9613, Name: "Site Generator-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
166	613019.27	4827820.44	0.90	0	DEN	32	70.9	0.0	0.0	0.0	0.0	72.5	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	-0.6
166	613019.27	4827820.44	0.90	0	DEN	63	80.7	0.0	0.0	0.0	0.0	72.5	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	9.1
166	613019.27	4827820.44	0.90	0	DEN	125	88.8	0.0	0.0	0.0	0.0	72.5	0.5	0.0	0.0	0.0	4.8	0.0	0.0	11.1
166	613019.27	4827820.44	0.90	0	DEN	250	97.3	0.0	0.0	0.0	0.0	72.5	1.2	1.5	0.0	0.0	3.3	0.0	0.0	18.8
166	613019.27	4827820.44	0.90	0	DEN	500	98.7	0.0	0.0	0.0	0.0	72.5	2.3	1.3	0.0	0.0	3.4	0.0	0.0	19.2
166	613019.27	4827820.44	0.90	0	DEN	1000	99.9	0.0	0.0	0.0	0.0	72.5	4.3	-2.7	0.0	0.0	4.8	0.0	0.0	21.0
166	613019.27	4827820.44	0.90	0	DEN	2000	99.1	0.0	0.0	0.0	0.0	72.5	11.4	-3.8	0.0	0.0	4.8	0.0	0.0	14.2
166	613019.27	4827820.44	0.90	0	DEN	4000	94.9	0.0	0.0	0.0	0.0	72.5	38.8	-3.8	0.0	0.0	4.8	0.0	0.0	-17.3
166	613019.27	4827820.44	0.90	0	DEN	8000	89.8	0.0	0.0	0.0	0.0	72.5	138.3	-3.8	0.0	0.0	4.8	0.0	0.0	-121.9

Point Source, ISO 9613, Name: "Compressor-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
172	612975.28	4827770.60	0.60	0	DEN	32	62.6	0.0	0.0	0.0	0.0	72.0	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	-8.3
172	612975.28	4827770.60	0.60	0	DEN	63	75.8	0.0	0.0	0.0	0.0	72.0	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	4.8
172	612975.28	4827770.60	0.60	0	DEN	125	81.9	0.0	0.0	0.0	0.0	72.0	0.5	0.0	0.0	0.0	4.8	0.0	0.0	4.7
172	612975.28	4827770.60	0.60	0	DEN	250	83.4	0.0	0.0	0.0	0.0	72.0	1.2	1.6	0.0	0.0	3.2	0.0	0.0	5.5
172	612975.28	4827770.60	0.60	0	DEN	500	93.8	0.0	0.0	0.0	0.0	72.0	2.2	2.1	0.0	0.0	2.7	0.0	0.0	14.9

Point Source, ISO 9613, Name: "Compressor-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
172	612975.28	4827770.60	0.60	0	DEN	1000	98.0	0.0	0.0	0.0	0.0	72.0	4.1	-2.3	0.0	0.0	4.8	0.0	0.0	19.5
172	612975.28	4827770.60	0.60	0	DEN	2000	97.2	0.0	0.0	0.0	0.0	72.0	10.8	-3.8	0.0	0.0	4.8	0.0	0.0	13.5
172	612975.28	4827770.60	0.60	0	DEN	4000	90.0	0.0	0.0	0.0	0.0	72.0	36.6	-3.8	0.0	0.0	4.8	0.0	0.0	-19.5
172	612975.28	4827770.60	0.60	0	DEN	8000	82.9	0.0	0.0	0.0	0.0	72.0	130.5	-3.8	0.0	0.0	4.8	0.0	0.0	-120.6

Point Source, ISO 9613, Name: "Compressor-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
249	612996.09	4827795.88	0.60	0	DEN	32	62.6	0.0	0.0	0.0	0.0	72.2	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	-8.6
249	612996.09	4827795.88	0.60	0	DEN	63	75.8	0.0	0.0	0.0	0.0	72.2	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	4.5
249	612996.09	4827795.88	0.60	0	DEN	125	81.9	0.0	0.0	0.0	0.0	72.2	0.5	0.0	0.0	0.0	4.7	0.0	0.0	4.4
249	612996.09	4827795.88	0.60	0	DEN	250	83.4	0.0	0.0	0.0	0.0	72.2	1.2	1.6	0.0	0.0	3.2	0.0	0.0	5.2
249	612996.09	4827795.88	0.60	0	DEN	500	93.8	0.0	0.0	0.0	0.0	72.2	2.2	2.1	0.0	0.0	2.7	0.0	0.0	14.6
249	612996.09	4827795.88	0.60	0	DEN	1000	98.0	0.0	0.0	0.0	0.0	72.2	4.2	-2.3	0.0	0.0	4.8	0.0	0.0	19.1
249	612996.09	4827795.88	0.60	0	DEN	2000	97.2	0.0	0.0	0.0	0.0	72.2	11.1	-3.8	0.0	0.0	4.8	0.0	0.0	12.9
249	612996.09	4827795.88	0.60	0	DEN	4000	90.0	0.0	0.0	0.0	0.0	72.2	37.7	-3.8	0.0	0.0	4.8	0.0	0.0	-20.9
249	612996.09	4827795.88	0.60	0	DEN	8000	82.9	0.0	0.0	0.0	0.0	72.2	134.4	-3.8	0.0	0.0	4.8	0.0	0.0	-124.6

Point Source, ISO 9613, Name: "Crane-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
259	612985.30	4827783.79	2.00	0	DEN	32	56.2	0.0	0.0	0.0	0.0	72.1	0.0	-5.7	0.0	0.0	4.8	0.0	0.0	-15.0
259	612985.30	4827783.79	2.00	0	DEN	63	72.4	0.0	0.0	0.0	0.0	72.1	0.1	-5.7	0.0	0.0	4.8	0.0	0.0	1.1
259	612985.30	4827783.79	2.00	0	DEN	125	80.5	0.0	0.0	0.0	0.0	72.1	0.5	-0.2	0.0	0.0	4.8	0.0	0.0	3.4
259	612985.30	4827783.79	2.00	0	DEN	250	83.0	0.0	0.0	0.0	0.0	72.1	1.2	0.8	0.0	0.0	3.9	0.0	0.0	5.0
259	612985.30	4827783.79	2.00	0	DEN	500	89.4	0.0	0.0	0.0	0.0	72.1	2.2	-1.2	0.0	0.0	4.8	0.0	0.0	11.6
259	612985.30	4827783.79	2.00	0	DEN	1000	99.6	0.0	0.0	0.0	0.0	72.1	4.1	-3.4	0.0	0.0	4.8	0.0	0.0	22.0
259	612985.30	4827783.79	2.00	0	DEN	2000	92.8	0.0	0.0	0.0	0.0	72.1	11.0	-3.7	0.0	0.0	4.8	0.0	0.0	8.7
259	612985.30	4827783.79	2.00	0	DEN	4000	84.6	0.0	0.0	0.0	0.0	72.1	37.1	-3.7	0.0	0.0	4.8	0.0	0.0	-25.7
259	612985.30	4827783.79	2.00	0	DEN	8000	73.5	0.0	0.0	0.0	0.0	72.1	132.5	-3.7	0.0	0.0	4.8	0.0	0.0	-132.1

Point Source, ISO 9613, Name: "Crane-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
263	613008.80	4827808.07	2.00	0	DEN	32	56.2	0.0	0.0	0.0	0.0	72.3	0.0	-5.7	0.0	0.0	4.8	0.0	0.0	-15.2
263	613008.80	4827808.07	2.00	0	DEN	63	72.4	0.0	0.0	0.0	0.0	72.3	0.1	-5.7	0.0	0.0	4.8	0.0	0.0	0.9
263	613008.80	4827808.07	2.00	0	DEN	125	80.5	0.0	0.0	0.0	0.0	72.3	0.5	-0.2	0.0	0.0	4.8	0.0	0.0	3.1
263	613008.80	4827808.07	2.00	0	DEN	250	83.0	0.0	0.0	0.0	0.0	72.3	1.2	0.8	0.0	0.0	3.9	0.0	0.0	4.7
263	613008.80	4827808.07	2.00	0	DEN	500	89.4	0.0	0.0	0.0	0.0	72.3	2.2	-1.2	0.0	0.0	4.8	0.0	0.0	11.2
263	613008.80	4827808.07	2.00	0	DEN	1000	99.6	0.0	0.0	0.0	0.0	72.3	4.3	-3.4	0.0	0.0	4.8	0.0	0.0	21.7
263	613008.80	4827808.07	2.00	0	DEN	2000	92.8	0.0	0.0	0.0	0.0	72.3	11.3	-3.7	0.0	0.0	4.8	0.0	0.0	8.1
263	613008.80	4827808.07	2.00	0	DEN	4000	84.6	0.0	0.0	0.0	0.0	72.3	38.2	-3.7	0.0	0.0	4.8	0.0	0.0	-27.0
263	613008.80	4827808.07	2.00	0	DEN	8000	73.5	0.0	0.0	0.0	0.0	72.3	136.4	-3.7	0.0	0.0	4.8	0.0	0.0	-136.3

Point Source, ISO 9613, Name: "Portable Light Generator-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
272	612973.01	4827759.27	0.60	0	DEN	32	51.4	0.0	0.0	0.0	0.0	71.9	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	-19.5
272	612973.01	4827759.27	0.60	0	DEN	63	71.6	0.0	0.0	0.0	0.0	71.9	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	0.6
272	612973.01	4827759.27	0.60	0	DEN	125	79.7	0.0	0.0	0.0	0.0	71.9	0.5	0.0	0.0	0.0	4.8	0.0	0.0	2.6
272	612973.01	4827759.27	0.60	0	DEN	250	84.2	0.0	0.0	0.0	0.0	71.9	1.2	1.6	0.0	0.0	3.2	0.0	0.0	6.4
272	612973.01	4827759.27	0.60	0	DEN	500	80.6	0.0	0.0	0.0	0.0	71.9	2.1	2.1	0.0	0.0	2.7	0.0	0.0	1.8
272	612973.01	4827759.27	0.60	0	DEN	1000	82.8	0.0	0.0	0.0	0.0	71.9	4.0	-2.3	0.0	0.0	4.8	0.0	0.0	4.4
272	612973.01	4827759.27	0.60	0	DEN	2000	83.0	0.0	0.0	0.0	0.0	71.9	10.7	-3.8	0.0	0.0	4.8	0.0	0.0	-0.6
272	612973.01	4827759.27	0.60	0	DEN	4000	80.8	0.0	0.0	0.0	0.0	71.9	36.3	-3.8	0.0	0.0	4.8	0.0	0.0	-28.3
272	612973.01	4827759.27	0.60	0	DEN	8000	72.7	0.0	0.0	0.0	0.0	71.9	129.3	-3.8	0.0	0.0	4.8	0.0	0.0	-129.5

Point Source, ISO 9613, Name: "Portable Light Generator-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
278	612996.88	4827806.51	0.60	0	DEN	32	51.4	0.0	0.0	0.0	0.0	72.3	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	-19.9
278	612996.88	4827806.51	0.60	0	DEN	63	71.6	0.0	0.0	0.0	0.0	72.3	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	0.2
278	612996.88	4827806.51	0.60	0	DEN	125	79.7	0.0	0.0	0.0	0.0	72.3	0.5	0.0	0.0	0.0	4.7	0.0	0.0	2.2

Point Source, ISO 9613, Name: "Portable Light Generator-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
278	612996.88	4827806.51	0.60	0	DEN	250	84.2	0.0	0.0	0.0	0.0	72.3	1.2	1.6	0.0	0.0	3.2	0.0	0.0	5.9
278	612996.88	4827806.51	0.60	0	DEN	500	80.6	0.0	0.0	0.0	0.0	72.3	2.2	2.1	0.0	0.0	2.7	0.0	0.0	1.3
278	612996.88	4827806.51	0.60	0	DEN	1000	82.8	0.0	0.0	0.0	0.0	72.3	4.2	-2.3	0.0	0.0	4.8	0.0	0.0	3.8
278	612996.88	4827806.51	0.60	0	DEN	2000	83.0	0.0	0.0	0.0	0.0	72.3	11.2	-3.8	0.0	0.0	4.8	0.0	0.0	-1.5
278	612996.88	4827806.51	0.60	0	DEN	4000	80.8	0.0	0.0	0.0	0.0	72.3	38.0	-3.8	0.0	0.0	4.8	0.0	0.0	-30.4
278	612996.88	4827806.51	0.60	0	DEN	8000	72.7	0.0	0.0	0.0	0.0	72.3	135.4	-3.8	0.0	0.0	4.8	0.0	0.0	-136.0

Point Source, ISO 9613, Name: "Portable Light Generator-Bridge 2", ID: "!0501!"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
283	613030.33	4827837.38	0.60	0	DEN	32	51.4	0.0	0.0	0.0	0.0	72.6	0.0	-5.8	0.0	0.0	4.8	0.0	0.0	-20.2
283	613030.33	4827837.38	0.60	0	DEN	63	71.6	0.0	0.0	0.0	0.0	72.6	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	-0.1
283	613030.33	4827837.38	0.60	0	DEN	125	79.7	0.0	0.0	0.0	0.0	72.6	0.5	0.0	0.0	0.0	4.7	0.0	0.0	1.8
283	613030.33	4827837.38	0.60	0	DEN	250	84.2	0.0	0.0	0.0	0.0	72.6	1.3	1.6	0.0	0.0	3.2	0.0	0.0	5.6
283	613030.33	4827837.38	0.60	0	DEN	500	80.6	0.0	0.0	0.0	0.0	72.6	2.3	2.1	0.0	0.0	2.7	0.0	0.0	0.9
283	613030.33	4827837.38	0.60	0	DEN	1000	82.8	0.0	0.0	0.0	0.0	72.6	4.4	-2.3	0.0	0.0	4.8	0.0	0.0	3.3
283	613030.33	4827837.38	0.60	0	DEN	2000	83.0	0.0	0.0	0.0	0.0	72.6	11.6	-3.8	0.0	0.0	4.8	0.0	0.0	-2.2
283	613030.33	4827837.38	0.60	0	DEN	4000	80.8	0.0	0.0	0.0	0.0	72.6	39.4	-3.8	0.0	0.0	4.8	0.0	0.0	-32.2
283	613030.33	4827837.38	0.60	0	DEN	8000	72.7	0.0	0.0	0.0	0.0	72.6	140.6	-3.8	0.0	0.0	4.8	0.0	0.0	-141.5

Project Name: Dundas BRT Mississauga East Segment
Date: 8/21/2021

Title: Noise Zone of Inflience - Leq, 15HR
Description: Construction Noise Zone of Influence Inputs and Calculations

$$L_{EQ}(point\ of\ reception) = SPL_{equipment\ @\ ref} - 20\log(D_{point\ of\ reception} / D_{ref}) + 10 * \log(D.C.)$$

Where:

- $L_{EQ}(point\ of\ reception)$ = sound level of the piece of equipment at the point of reception (dBA),
- $SPL_{equipment}$ = sound pressure level of equipment at a reference distance (usually 15 m or 50 ft),
- $D_{point\ of\ reception}$ = straight line distance from equipment to point of reception (m),
- D_{ref} = reference distance provided in $SPL_{equipment}$ (m), and
- $D.C.$ = fraction of time, or duty cycle, that a piece of equipment usually operates.

Road Works - Existing Asphalt Removal and Site Preparation

Equipment	$SPL_{equipment}$ (dBA)	D_{ref} (m)	D.C.	# Units	D (POR) (m)	L_{eq} (POR) (dBA)
Excavator	76	10	0.8	2	77	60
Pickup Truck	75	15.2	0.5	5	77	65
Dump Truck	81	10	0.8	2	77	65
Impact Hammer	87	10	0.8	2	77	72
Loaders	67	10	0.8	2	77	51
Bulldozer	75	10	0.8	1	77	57
Road Milling Machine (Cold Recycling Machine)	76	10	0.85	1	77	57
Portable Light Generator*	98	N/A	0.15	5	77	51
Backup Alarms (Tonal)	90	6	0.15	14	77	71
					Total Leq	75

Notes

* Reference sound level represents sound power.

Construction Noise Exposure Limit - Residential Weekday: 75 dBA

Mississauga East Segment - Dundas BRT

PROJECT NAME	Dundas BRT	PAGE	1	OF	1
PROJECT NUMBER	60645291	ENGINEER	JJD		
BASE DRAWING		DATE	August 21, 2021		

RECEIVER	SOURCE	Future without Project																		Future with Project																				
		θ1	θ2	TOPO	WOODS	No. Rows	@ Density	Ground Surface Type	Receiver Height (r) (m)	Source Receiver Dist (m)	Barr θ1	Barr θ2	er Height (m)	Barrier Receiver Distance (m)	n Change (e) (m)	Source Ground Elevation (m)	er Ground Elevation (m)	Base of Barrier Elevation (m)	Leq(Day) or Leq(1hr) (dBA)	Leq (Night) (dBA)	θ1	θ2	TOPO	WOODS	No. Rows	@ Density	Ground Surface Type	Receiver Height (r) (m)	Source Receiver Dist (m)	Barr θ1	Barr θ2	Barrier Height (m)	Barrier Receiver Distance (m)	Elevation Change (e) (m)	Source Ground Elevation (m)	Receiver Ground Elevation (m)	Base of Barrier Elevation (m)	Leq(Day) or Leq(1hr) (dBA)	Leq (Night) (dBA)
O_3	line 1a	-90	90	1	-	-	-	1	1.5	29	-	-	-	-	-	-	-	-	66.68		-90	90	1	-	-	-	1	1.5	28	-	-	-	-	-	-	-	-	66.93	
	line 1b	-90	90	1	-	-	-	2	1.5	43	-	-	-	-	-	-	-	-	68.27		-90	90	1	-	-	-	2	1.5	48	-	-	-	-	-	-	-	-	67.80	
	Diesel Bus																				-90	90	1	-	-	-	1	1.5	37	-	-	-	-	-	-	-	-	53.57	
	Electric Bus																				-90	90	1	-	-	-	1	1.5	37	-	-	-	-	-	-	-	-	47.32	
	Total																		70.56																			70.51	
	dB increase																																					-0.05	

Project Name: Dundas BRT Mississauga East Segment
Date: 8/21/2021

Title: Vibration Zone of Inflience
Description: Existing Asphalt Removal and Site Preparation - Vibration Zone of Influence Inputs and Calculations

$$PPV = PPV_{ref} * \left(\frac{D_{ref}}{D}\right)^{1.5}$$

$$D = D_{ref} * \left(\frac{PPV_{ref}}{PPV}\right)^{2/3}$$

Limit Type	Vibration Limit (mm/s)
Public Annoyance	Root mean square velocity not to exceed 0.14 mm/s or current conditions (whichever is higher)
Building Damage (Normal)	Peak Particle Velocity limit according to frequency (Hz): • < 4 Hz 8 mm/s • 4 Hz to 10 Hz 15 mm/s • > 10Hz 25 mm/s
Building Damage (Fragile or Heritage)	Peak Particle Velocity limit of 3 mm/s

Equipment	Reference PPV				Zone of Influence (m)				
	Dref		PPV		Building Damage			Fragile Buildings	Public Annoyance*
	ft	m	in/sec	mm/s	<4Hz	4Hz to 10Hz	>10Hz		
Excavator	25	7.62	0.089	2.26	1.5	2.2	3.3	6.3	19.3
Pickup Truck	25	7.62	0.076	1.93	1.4	1.9	3.0	5.7	17.4
Dump Truck	25	7.62	0.076	1.93	1.4	1.9	3.0	5.7	17.4
Impact Hammer	25	7.62	0.035	0.89	0.8	1.2	1.8	3.4	10.4
Loaders	25	7.62	0.089	2.26	1.5	2.2	3.3	6.3	19.3
Bulldozer	25	7.62	0.089	2.26	1.5	2.2	3.3	6.3	19.3
Road Milling Machine	25	7.62	0.089	2.26	1.5	2.2	3.3	6.3	19.3
Portable Light Generator	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

* Conversion to Vrms assumes a crest factor of 4