

Technical Memorandum

To: Marina Portugal, P.Eng. **Date:** March 15, 2023
From: Don McLeod, C.E.T., PMP **Project No:** 19M-00836-03
 Melissa Poulin, MLA, OALA, CSLA, GRP

Subject: Rathburn Road and Ponytrail Drive Integrated Road Project - Median Treatment Memo – FINAL

The purpose of this memo is to provide guidance and background context for the implementation of median treatments for the Rathburn Road and Ponytrail Drive Integrated Road Project. This memo provides a high-level overview of the justification for this project, summarizes the review of median treatment best practices to provide direction, guidance, and rationale for the proposed works, and presents the recommended median treatments for this project.

1 Introduction

The City of Mississauga is undertaking the Rathburn Road and Ponytrail Drive Integrated Road Project in accordance with Schedule A+ of the Municipal Class Environmental Assessment (MCEA) process. A map illustrating the project area is shown below.

Figure 1.1 Project Area





The purpose of the Rathburn Road and Ponytrail Drive Integrated Road Project is to coordinate the planning, design and construction of various operational improvements along Rathburn Road East and Ponytrail Drive. This includes pavement rehabilitation, safety upgrades, storm drainage, noise walls, cycling and intersection improvements. The proposed improvements will create a safer and more sustainable environment for all road users, including pedestrians, cyclists and transit users.

2 Preliminary Design

A complete Preliminary Design Report has been prepared to document the results of the studies and the decisions made during the planning and preliminary design phases of the Rathburn Road and Ponytrail Drive Integrated Road Project.

The Preliminary Design Report was prepared to inform and provide a basis for the detailed design and is available for viewing on the following City of Mississauga website:

mississauga.ca/rathburn-ponytrail

During the preliminary design phase, several design alternative concepts were identified, analyzed, and evaluated based on the following project objectives:

Separation of road users:

- Dedicated cycling and pedestrian facilities.
- Cycling facilities adjacent to the road to be constructed flush with top of curb separated with a green continuity strip of 0.1m behind the back of curb (BOC).
- Bidirectional cycling facilities to be separated from pedestrian facilities by a grass boulevard.

Continuous active transportation facilities in both directions:

- Unidirectional cycling facilities separate from pedestrian facilities.
- Bidirectional cycling facilities with connections to side streets and existing trails.
- Short stretches of asphalt multi-use trail to be considered in lieu of cycling facilities where space limitations exist.

Reduction in operating vehicular speeds:

- Reduced number of travel and auxiliary lanes where possible.
- Minimum lane widths to promote lower speeds.

Intersection Improvements:

- Optimal design approach that takes into consideration all vehicular, pedestrian, and cyclist movements through an intersection.
- Pavement markings per Ontario Traffic Manual (OTM) Book 18, industry best practices and City of Mississauga Standard Drawings.
- Elimination of channelized right turn lanes.
- Enhanced treatment to meet Accessibility for Ontarians with Disability Act (AODA) standards, including ramping, tactile warning plates and signage.

Comfortable for all users:

- 0.6m separation between cyclists and pedestrians wherever space is available.
- 2.0m cycling facility with a 0.1m continuity strip along BOC where space permits.
- Landscape elements to improve conditions for users, including street trees for shade and plantings to provide buffers (physical, aesthetic, spray, wind, and noise).

Transit Accessibility Improvements:

- Design considerations for MiWay stops including bus shelters and/or laybys.

Pedestrian conflicts:

- Lateral separation of 0.6m between the pedestrian and cyclist zones, where space is available, to clearly define the limits between the cycling operating spaces and pedestrian clearway zones; additional strategies such as alternative pavement markings to be explored.
- Additional crossing facilities for pedestrians and cyclists, and improvements to existing ones, including provision of raised crossing facilities, where possible, at uncontrolled crossing locations and stop controlled intersections.

Landscaping

- Minimum impacts to existing trees and identification of landscaping opportunities for new street tree planting where feasible.
- Street greening where feasible, including potential boulevard and median planting strategies. Planting strategies to consider maintenance obligations and potential non-standard treatments (such as xeriscaping with hardy, drought tolerant low growing plantings where space permits).
- Consideration for low maintenance and/or multi-functional landscape treatments (nature-based solutions) to improve the aesthetic quality of the corridor, address climate change



related challenges (such as the use of Low Impact Development solutions for stormwater management, and biodiversity protection and enhancement), and reduce costs associated with ongoing maintenance.

Street Lighting and Traffic Signals

- Upgrades to illumination and traffic signals for all users.

Storm Drainage

- Stormwater quality control, stormwater quantity control and runoff volume reduction through the implementation of best management practices where feasible.

Maintenance

- Clearway for snow removal operations behind the back of curb where feasible.
- Consideration for maintenance requirements and limitations.
- Consideration for maintenance crew safety.

3 Public Consultation and Preferred Design

This project has been carried out in accordance with the planning principles of the Municipal Class Environmental Assessment (MCEA) process (October 2000, as amended in 2015). The proposed road improvements fall under Schedule A+ classification of the MCEA and as such, this project is pre-approved under the Ontario Environmental Assessment Act.

During the planning and preliminary design phases, the City completed a comprehensive and extensive engagement consultation with the community. During the consultation period, the City identified, analyzed, and evaluated alternative solutions in consultation with the public and external agencies. The preferred design alternative was selected based on the results of the technical evaluations and took into consideration comments received from the community.

The following are the typical roadway cross sections derived from the MCEA process, which incorporate cycling facilities that are in alignment with the recommendations outlined in the Cycling Master Plan.

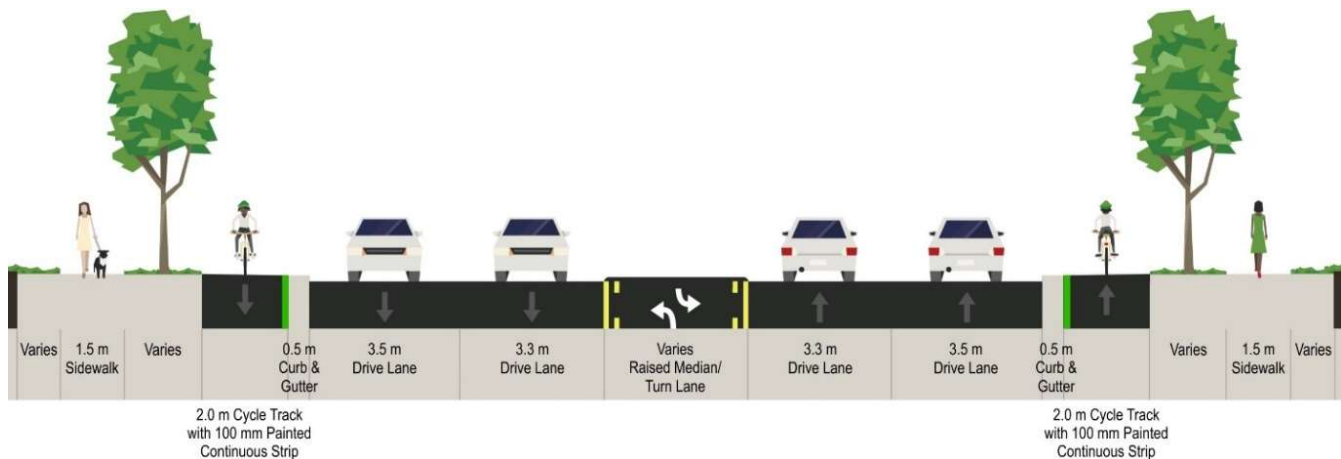
These cross sections are consistent with the recommendations as outlined in the latest edition of the City of Mississauga Design Guidelines and Standards, Transportation Authority of Canada (TAC), and Ontario Traffic Manual (OTM), including 2020 OTM Book 18 (cycling) update.

3.1 Rathburn Road East and Ponytrail Drive (Dixie Road to Burnhamthorpe Road East)

The typical roadway cross section proposed along this section of road is illustrated below and includes:

- 2.0m separated unidirectional cycle track on both sides
- 3.5m curb lane
- 3.3m through lane
- Raised median at various locations with varying widths throughout

Figure 3.1 Typical Cross Section – Rathburn Road East and Ponytrail Drive (Dixie Road to Burnhamthorpe Road East)

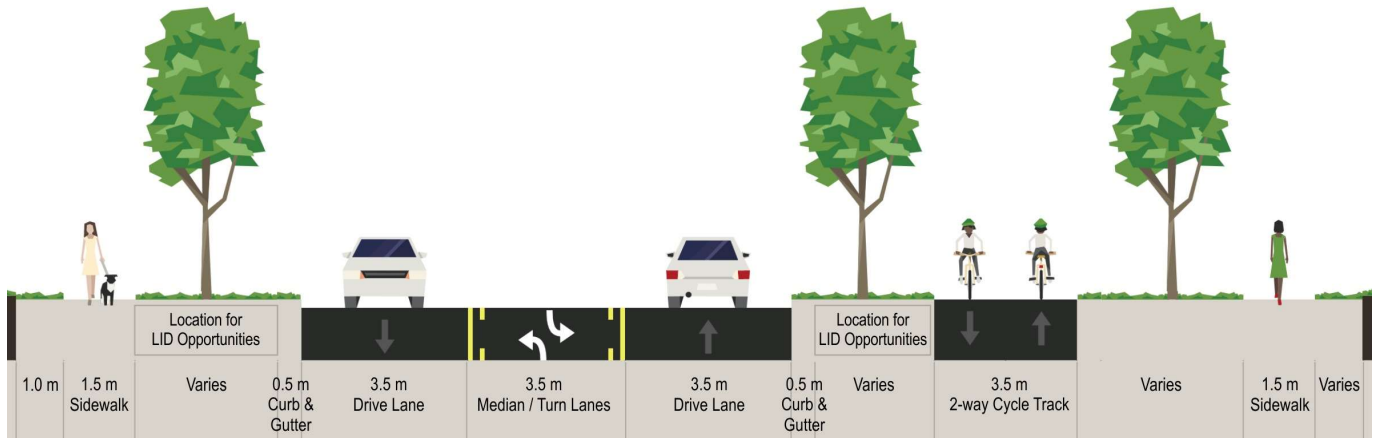


3.2 Rathburn Road East (Ponytrail Drive to End of Cul-de-Sac)

The typical roadway cross section proposed along this section of road is illustrated below and includes:

- Reduced travel lanes from 2 lanes to 1 lane in each direction
- A 3.5m bidirectional cycle track on the east side
- Painted median and retention of existing turn lanes
- Considerable boulevard landscaping opportunities
- Low Impact Development solutions within boulevard area

Figure 3.2 Typical Cross Section - Rathburn Road East (Ponytrail Drive to End of Cul-de-Sac)



The bidirectional cycle track was selected as the preferred alternative over separated bike lanes, as it enables additional tree planting and landscaping features to be incorporated into the streetscape design along this section of Rathburn Road East.

In addition to the landscaping benefits, there are also a number of other benefits associated with the bidirectional cycle track alternative including:

- Opportunity to provide additional pedestrian crossings along this section of Rathburn Road East
- Easier maintenance of the pavement surface and landscape features.

3.3 Tree Management

Within the overall project area, there are approximately 230 existing trees within the boulevard.

The number of trees required to be removed to accommodate the proposed improvements and the number of new trees to be planted are currently being determined as part of the detailed design.

The City is making every effort to increase the number of trees in the project area through various design adjustments at several locations, with a focus on meeting or exceeding the City's tree replacement requirements.

The preliminary tree impacts and protection measures are shown in the Tree Preservation Plans included in the Preliminary Design Report (PDR) available on the project website. Please note that the Tree Preservation Plans are currently being updated as part of the detailed design.

4 Preferred Alternative (Medians)

4.1 Existing Conditions

Raised centre medians currently exist within the project limits. The widths of the existing medians vary from 1.5m to 5.5m and are constructed with hardscaping treatments, including asphalt and concrete.

4.2 Proposed Conditions

To achieve the project objectives outlined in Section 2 and doing so within City property, the existing centre medians were required to be reduced in size or eliminated where possible.

Raised medians provide several safety and practical benefits in the project area, and as such complete elimination of the raised medians is not suitable for this project. Raised medians reduce the risk of left-turn and vehicle head-on collisions, calm traffic by narrowing roadway and enhance pedestrian safety and accessibility by reducing crossing distances and providing refuge for pedestrians to cross the roadway in stages. In addition, raised medians provide space to locate pedestrian safety features and traffic control devices.

The medians proposed by the preliminary design team and carried forward as the preferred alternative to the detailed design are illustrated on the plans located on the project website and include varying widths between 1.5m and 4.5m.

To accommodate the proposed infrastructure improvements, the majority of the medians were reduced to the minimum allowable width of 1.5m. Where width permits, the preliminary plan proposes to replace the existing asphalt or concrete median treatments with topsoil and sod.

Sod is a visually appealing grass cover that reduces high temperatures by natural transpirational cooling and lessens the amount of carbon emissions in the atmosphere by absorbing pollutants such as carbon dioxide from the air. In addition, sod contributes to flood prevention as it reduces stormwater runoff by encouraging infiltration and enhances water quality as it filters and cleans the water permeating through the soil and into natural bodies of water and drainage systems.




Where topsoil and sod are not feasible, the preliminary plans propose concrete. Concrete is a very strong and durable material. It provides for a rigid pavement that sustains high traffic volumes and winter road maintenance materials and ensures a long service life with a minimal need for maintenance.





Through the detailed design phase, the project team is further reviewing and refining the landscape plans in an effort to maximize the number of landscaping opportunities, including the consideration for planting opportunities within the medians where feasible. These solutions may include xeriscaping with low growing, drought tolerant, hardy perennials where medians are sufficiently large, to improve the streetscape quality.





5 Median Surface Treatments

The following is a review of alternative median treatments being considered in the context of this project:

Table 5-1: Median Treatment Assessments

OPTIONS	Overview	Feasibility	Capital Cost	Maintenance Cost	Photo
Trees	Trees improve the aesthetic and environmental functions of medians. However, median trees must fit in a confined space between paved traffic lanes and endure harsh conditions. The City requires a minimum 8m width curb-to-curb to sustain trees planted in medians. This includes a 0.75m wide splash pad on each side of the median for maintenance crew safety and a minimum 6.5m wide curbed area to ensure the health and longevity of trees.	Median widths on this project vary between 1.5m and 4.5m. In accordance with City standards, trees planted in a median are not a viable option for this project due to the limited median sizes. The City's past attempts to sustain trees in harsh growing conditions and insufficient space for tree roots to grow, have not been successful.	Low	High	
Shrubs, perennials, groundcovers	Shrubs, perennials and groundcovers enhance the public realm and improve traffic calming and environmental functions of the medians. However, when planted in medians, shrubs, perennials and groundcovers have a limited amount of soil volume and must endure harsh site conditions. Plant selection for medians is limited to low growing, drought, and urban condition-tolerant species to ensure minimum irrigation requirements and prevent sightline obstructions. The City requires a minimum 3.5m width curb-to-curb for planted medians. This includes a 0.75m wide splash pad on each side of the median for maintenance crew safety and a minimum 2.0m wide area to keep shrubs, perennials and groundcovers healthy and viable. Additionally, lane closures are required to provide safe working conditions for maintenance staff.	Median widths on this project vary between 1.5m and 4.5m. Where median widths vary from 3.5m to 4.5m and sightline visibility can be maintained, planted medians are a viable option . Note that to minimize occupational health and safety issues during maintenance operations associated with this median treatment alternative, lane closures will be required to accommodate maintenance staff, including those with only one lane of traffic in each direction, which will result in considerable disruptions to traffic at these locations.	Low	High	
Raised Planters	Raised planters are curbed planting areas that provide ground soil volume for planting. The City requires a minimum 3.5m width curb-to-curb for raised planters to be installed in medians. This includes a 0.75m splash pad on each side of the median and a minimum 2.0m wide curbed area for the planters.	Median widths on this project vary between 1.5m and 4.5m. Where median widths vary from 3.5m to 4.5m and sightline visibility can be maintained, raised planters are a viable option . Note that to minimize occupational health and safety issues during maintenance operations associated with this median treatment alternative, lane closures will be required to accommodate maintenance staff, including those with only one lane of traffic in each direction, which will result in considerable disruptions to traffic at these locations.	Medium	Medium - High	

OPTIONS	Overview	Feasibility	Capital Cost	Maintenance Cost	Photo
Sod	Sod is a visually appealing grass cover that provides environmental benefits over paved surfaces. It provides a cooling effect, enhances water and air quality, and contributes to flood prevention as it reduces stormwater runoff. However, when planted in medians, sod must endure harsh site conditions. The City requires a minimum 2.0m width curb-to-curb for sodded medians to support healthy growth, accommodate grass cutting equipment and ensure maintenance crew safety.	Median widths on this project vary between 1.5m and 4.5m. Where median widths vary from 2.0m to 4.5m, sodded medians are a viable option .	Low	Medium	
Concrete	Concrete is a very strong and durable material. It provides for a rigid pavement that sustains high traffic volumes and winter road maintenance materials, and ensures a long service life with a minimal need for maintenance. There are no median size limitations.	Median widths on this project vary between 1.5m and 4.5m. Where median widths are less than 2.0m, concrete medians are a suitable option .	High	Medium	
Stamped Concrete	Stamped concrete is poured concrete with a stamped pattern and colour treatment that adds visual interest. Stamped concrete provides for similar benefits to concrete with a more aesthetically pleasing view. There are no median size limitations.	Median widths on this project vary between 1.5m and 4.5m. Where median widths are less than 2.0m, stamped and/or coloured concrete medians are a suitable option .	Very High	Medium	
Asphalt	Asphalt is a very strong and durable material that provides for a flexible pavement that sustains high traffic volumes and winter road maintenance materials. Asphalt also provides for consistent appearance with the traffic lanes. There are no median size limitations.	Median widths on this project vary between 1.5m and 4.5m. Where median widths are less than 2.0m, asphalt medians are a suitable option .	Medium	Low	

OPTIONS	Overview	Feasibility	Capital Cost	Maintenance Cost	Photo
Stamped and/or coloured Asphalt	Stamped asphalt is asphalt with a stamped pattern, which may also have colour treatment to add visual interest. Stamped asphalt also provides for consistent appearance with similar aesthetic effect as stamped/coloured concrete. A minimum 0.5m width is required to accommodate the stamping plates.	Median widths on this project vary between 1.5m and 4.5m. Where median widths are between 0.5m and 2.0m, stamped asphalt medians are a suitable option .	High	Low	
Crushed Stone, Pea Gravel	Crushed stone/pea gravel are small, loose hardscaping material that enhance the look of landscaping areas and promote infiltration. However, they have a tendency to travel and scatter, which poses public safety concerns. Crushed stone/pea gravel are also vulnerable to weeds and pose risks to maintenance operations.	Due to public safety concerns and occupational health and safety issues during maintenance operations associated with this median treatment alternative, crushed stone/pea gravel within medians are not a suitable option .	Medium	High	
Permeable Pavers	Permeable pavers are permeable interlocking concrete pavements that are durable and promote infiltration. However, permeable pavers have a tendency for differential displacement between adjacent units and require deep open-graded base to infiltrate water into, which may be impractical for raised median application on this project due to site constraints.	Due to its expensive capital cost of implementation, site constraints, high maintenance costs, and potential for displacement, permeable pavers are not a suitable option .	Very High	High	
Eliminate Raised Medians	This option entails the removal of raised medians, realignment of the roadway and widening of the boulevards for additional tree planting opportunities.	Raised medians reduce the risk of left-turn and vehicle head-on collisions, calm traffic by narrowing roadway and enhance pedestrian safety and accessibility by reducing crossing distances and providing refuge for pedestrians to cross the roadway in stages. In addition, raised medians provide space to locate pedestrian safety features and traffic control devices. Due to the several safety and practical benefits raised medians provide, complete elimination of the raised medians is not a suitable option .	N/A	N/A	

6 Stormwater Management

A Drainage and Stormwater Management Report has been developed to document the stormwater management requirements for this project. The calculations for the required 'water quantity storage', 'water quality treatment volume' and 'stormwater volume runoff reduction' have been completed for the project area and is outlined in the Drainage and Stormwater Management Report included in the Preliminary Design Report (PDR) available on the project website. These calculations provide the basis for the selection of the most appropriate stormwater Best Management Practices (BMPs) for this project.

The proposed stormwater BMPs will include Low Impact Development (LID) practices to provide stormwater management in areas where additional paved surfaces are being proposed. These LID's are used to mitigate the impacts of urbanization on stormwater. Note that, under existing conditions, the overall hard surface area amounts to 79% of the project area. Under proposed conditions, the overall hard surface area will be reduced to 78%, resulting in an overall reduction of 1% of hard surface area. Therefore, this project will result in reduced stormwater runoff within the project area.

The details of the type and location of the proposed stormwater LID practices will ultimately be determined by the geotechnical and hydrogeological investigations currently being completed as part of the detailed design background study. Once the information is available, these details will be finalized.

Stormwater LIDs are proposed to be installed within the boulevard area (i.e. outside of the paved roadway). The preliminary design identifies potential locations for LIDs on the east side of Rathburn Road East from Ponytrail Drive to the east limits of the City and is noted on the preliminary design plans available on the project website.

It is also important to note that LIDs within the medians are not suitable for this project due to site constraints. There are existing sewer mains and other underground utilities located in the middle of the roadway, which makes the installation of the LIDs within the medians unfeasible.

7 Conclusions and Recommendations

The City is undertaking this project with clear objectives to create a corridor that is a safer and more sustainable environment for all road users, including pedestrians, cyclists and transit users.

The project team has undertaken a thorough review of the potential median treatment opportunities to maximize the number of landscaping features within the medians. This review has been

undertaken in an effort to enhance the public realm while taking into consideration maintenance requirements and safety goals for all road users.

As discussed in this memo, the existing wide centre medians were required to be significantly reduced in size or eliminated in some locations to allow for the installation of additional cycling facilities within the current City's right-of-way. The reduction to the median widths has limited the median treatment opportunities that can practically be implemented on this project.

Through the evaluation of industry best practices, the most appropriate and suitable median treatment alternatives have been identified, analyzed and selected. The following are the median treatments the City is proposing for this project:

1. Raised Planters and/or Shrubs and Perennials

The City proposes raised planters and/or shrubs and perennials where median width is larger than 3.5m and where safety is not compromised. Median planting enhances the public realm and improves the aesthetic, traffic calming and environmental functions of the medians. The raised planters are preferable over shrubs and perennials as they provide additional protection for the plants from mechanical damage caused during snow removal and reduce the amount of road salt and pollution within the planter.

Note that, while medians of this size are capable of accommodating planting, median planting presents a number of challenges. A planting bed located in the centre of an active roadway offers plants a harsh environment with minimal soil volume, limited access to water and exposure to many environmental pollutants. As a result, the City can not guarantee their success in the long term. Plant selection must be limited to species with exceptional tolerance for both drought and urban pollution. In addition, median plantings require maintenance by City staff including but not limited to planting, weeding and watering. Traffic lane closures are required to protect workers while working within the roadway. Lane closures will be required on all roads with landscaped medians, including those with only one lane of traffic in each direction and will result in considerable disruptions to traffic at these locations.

Further to the sustainability of the plantings, when providing landscaping in medians, the safety of all road users remains the priority. Median locations and any associated plant selection must be limited to low-growing species that will not obstruct sightlines.

2. Sod

The City proposes sod where median width ranges from 2.0m to 3.5m. Medians of this size are capable of promoting healthy sod growth, accommodate grass cutting equipment and ensure maintenance crew safety. The proposed sodded medians will provide for an aesthetically pleasing view while improving the environmental functions of the median, compared to paved

surfaces, as sod regulates temperature, enhances water and air quality, and contributes to flood prevention as it reduces stormwater runoff.

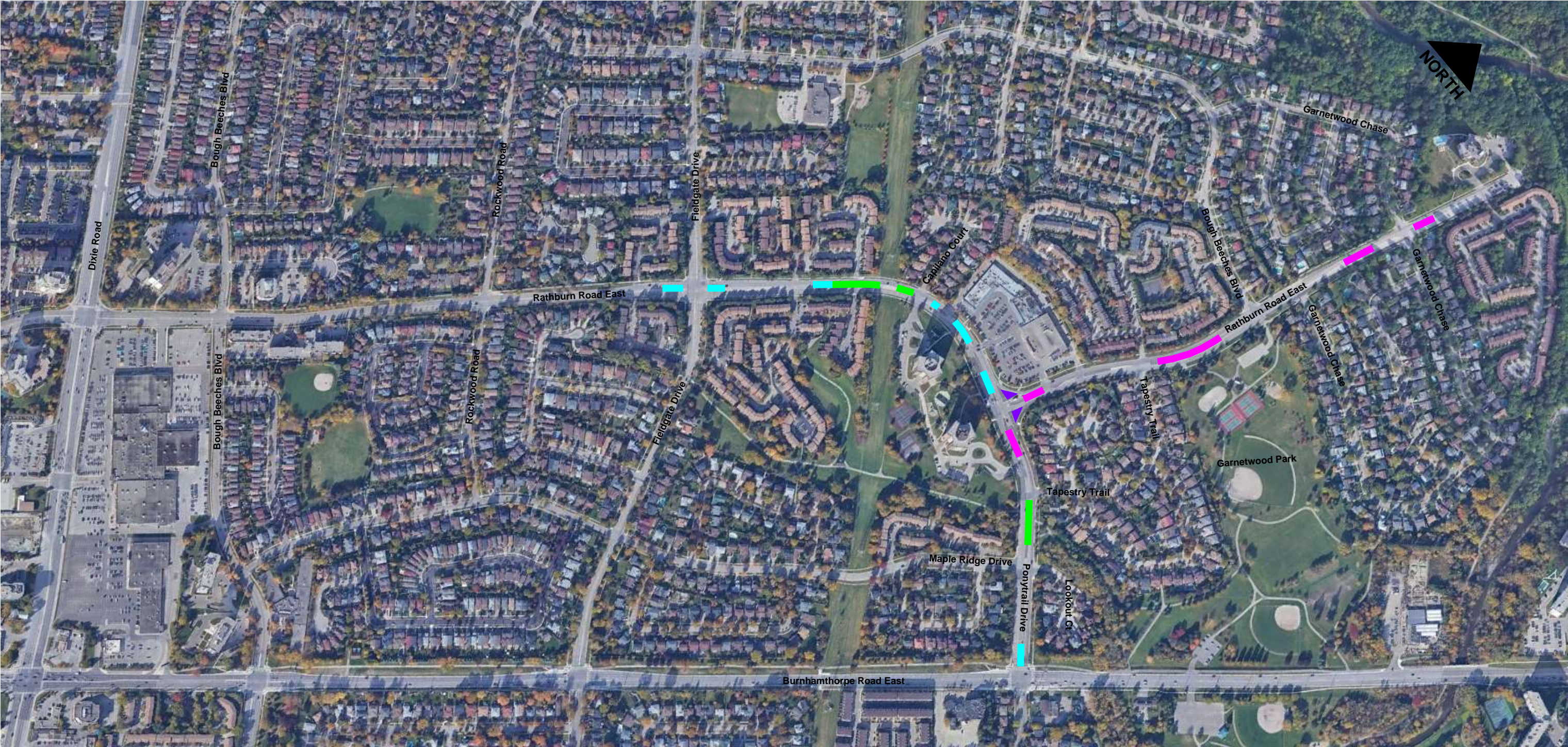
3. Stamped Concrete

Where median width is less than 2.0m, the City proposes stamped concrete. Stamped concrete is a hardscape treatment that offers aesthetically pleasing patterns and colours that can also promote safety by the use of contrasting colors that alert drivers to slow down. This hardscape treatment provides for a very distinctive median that is very strong and durable with a rigid pavement that sustains high traffic volumes and winter road maintenance materials with the additional benefit of being aesthetically pleasing.

In addition to the above-noted median treatment opportunities, the removal of the channelized right turn lanes at the intersection of Rathburn Road East and Ponytrail Drive has created an opportunity for new green space that can be utilized to enhance the area with appropriate native plantings. The creation of this green space has potential co-benefits through improving biodiversity and enhanced year-round aesthetic quality. This is being considered as part of the detailed design.

The proposed median treatments noted above have been selected with the aesthetic and environmental quality of the corridor in mind while balancing maintenance and public safety obligations. The location of the proposed median treatments are shown in the Median Treatment Location Plan included as part of this memo.

RATHBURN ROAD AND PONYTRAIL DRIVE INTEGRATED ROAD PROJECT
- MEDIAN TREATMENT LOCATION PLAN -



LEGEND:



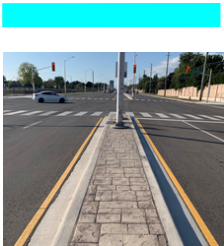
RAISED
PLANTERS



SHRUBS &
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SOD



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CONCRETE