Traffic Calming Achieved Using Street Beautification in the Village of Alton Streetscaping Project

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ABSTRACT

Queen Street and Main Street in the Village of Alton, in the Town of Caledon, ON serves two distinctly different purposes.

For locals and tourists, Main Street and Queen Street serve as the main thoroughfares in a picturesque, historic village. Lined with shops, restaurants, schools, churches, bed and breakfasts, spas and other small businesses; their sidewalks are filled with pedestrians at peak times. For trucks and others passing through, it is a Regional Road that is the fastest way to get to other larger Towns and Cities; and is a primary trucking route. Thus, competing uses provide a challenge in road design.

This situation is not unique, but rather reflective of the typical road configuration in many parts of Ontario, and in Canada in general. The challenge presents itself to ensure pedestrian safety for towns in which their main thoroughfare also serves as a brief slowdown in what is otherwise a high-speed connector road. It has been demonstrated in similar scenarios that reducing regulatory speed limits does not achieve the desired level of speed reduction. Providing supplementary traffic calming features, such as splitter islands, narrowed lane widths, and streetscaping has been used effectively to further lower average speeds and improve pedestrian safety.

Alton is one village that was identified by the Region of Peel as target for traffic calming improvements. At the same time, it was also identified in the Township of Caledon as one of the targets of the "Six Villages Community Improvement Plan", a revitalization strategy to provide improvements in streetscaping, pedestrian connectivity, signage and other beautification in target villages.

Through extensive design collaboration, stakeholder consultation, community outreach and project delivery, unique streetscaping features were developed that achieved the dual purpose of beautification with traffic calming. The most challenging project constraints included working within a narrow, 15 to 20-meter-wide right of way without acquiring property; environmental impacts; heritage buildings and geometric design considerations.

The project includes a Municipal Class Environmental Assessment (Schedule B), bridge replacement in a Provincially Significant Wetland; vegetated face retaining walls; traffic calming islands with plantings and a gateway feature; decorative streetlighting and pedestrian lighting; new lay-by parking; decorative concrete; and rest areas.

The first construction phase is scheduled to be completed in Spring of 2019. The second phase commenced in the Spring of 2019 and is scheduled to be completed in December of 2019.

1. INTRODUCTION

The Village of Alton, settled in the early 1800's is located in the northwest quadrant of the Region of Peel, in the Town of Caledon. The primary arterial road through Alton is Regional Road 136, also referred to as Queen Street East and traverses over Shaw's Creek (a tributary of the Credit River). This village has a charming quality, with historic 19th century buildings and architecture.

The original bridge over Shaw's Creek dates back to 1925, with a widening being undertaken in 1964 and a rehabilitation in 1984. A capital project was initiated in 2014 to include a full bridge replacement. The

scope of the project was further expanded to include the replacement of an existing box culvert, and upgrades to the roadway. Following the Town of Caledon's Report – The Six Villages Improvement Plan and extensive consultation with the community of Alton, further elements were added to the scope which included: traffic calming measures, accessibility features, on-street parking, gateway features and overall streetscaping upgrades.

To achieve the desired goal of traffic calming through Alton Village, a wide variety of traffic calming strategies were employed. Of the 16 traffic calming strategies suggested in the Global Streets Design Guide, a total of ten were utilized in the design of Alton Village which include the following:

- Lane narrowing;
- Reduced corner radii;
- Additional trees and plantings;
- Gateway treatments;
- Pinch points;
- Chicanes and lane shifts;
- Two-way streets;
- Medians and refuge islands;
- Pavement materials and appearance; and,
- Shared streets

2. DESIGN CONSIDERATIONS

2.1 Community Requirements

Due to expanded scope of the project from the initial stage, the Design Team established a working group with key representatives from the community: Alton Village Association, Regional and Local Councillors, Town of Caledon and Heritage Resource Officers, key businesses: Alton Greenhouses, Alton Mills, General Convenience Store, Alton Public Elementary School, Fire Station 301, and other residents highly involved in the community. With all these key representatives and people, the Team looked to them for feedback, ideas; and listened to them with openness to find solutions and create a design that would work with them and embrace the look that they wanted in their community of Alton. The Team held several Public Information Centres during the design stage, which is typically done during the Environmental Assessment stage. The consultations with the public allowed the Team to develop preliminary designs and concept rendering drawings.

The community meetings and surveys clearly showed that Alton's natural and cultural heritage and the Village character were its most valued attributes. Therefore, the retention of these had to be paramount in any development initiative. Village Entrance features had to be prominent on all roads leading into Alton. These features had to reflect the Village Mill/River heritage; but also, be in keeping with the working Village character, like the historic district.

The extensive consultations generated a variety of suggestions and options for improvement and the overall vision for the Village. One common improvement that was voiced was to slow down vehicles and reduce truck traffic while providing beautification and a 'facelift' for the Village. The primary contributing factors to high traffic speeds in the Village were road width and lack of curvature. The road width appeared larger to motorists due to the mountable curbs and parallel parking on the sides of the roadway.

The new design would require considerations for perceived and actual roadway width reduction; while still maintaining the same or better on-street parking facilities. The suggestion to redesign the Main and Queen Intersection to include right angle corners on all sides, and making it a four-way stop, was evaluated. This would slow traffic and discourage truck traffic while utilizing additional lands available for beautification purposes.

The combination of younger families and aging population in the Village impacted the increase in pedestrian traffic with new accessibility requirements. Deteriorating infrastructure with poor connectivity prevented safe passage to the school, businesses and other amenities.

Figure 1-1: Conceptual Rendering with Monument - Traffic Calming Island at Main Street South

2.2 Technical Design Requirements

The requirement to reduce the speed of through traffic in the Village was the main driver of the design speed for the road. Regional roads are required to be designed for a posted speed of no less than 50 km/h with a design speed of at least 60 km/h. The existing 50km/h regulatory speed limit zones through the Village were extended further into the existing 80 km/h speed limit zones outside the Village to provide additional distance for vehicles to decelerate before entering the Village.

Horizontal and vertical curves, sight distances, side clearances and all other geometric design were designed in accordance with TAC 2017 Geometric Design Standards for Canadian Roads. The added trees, streetscaping features and traffic calming features were carefully positioned to avoid conflicts with sightlines and turning movements from the numerous side streets and driveways in the project area.

The additional hardscaping resulting for the project resulted in the need to provide additional stormwater quality and quantity controls. All stormwater management was designed in accordance with Credit Valley Conservation (CVC)'s Low Impact Development (LID) Stormwater Management Planning and Design Guide 2010 and Ministry of Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design manual requirements.

The objective of stormwater management was to develop a plan that addresses the following:

- Control post-development peak flows to pre-development conditions;
- Shaw's Creek – 2, 5,10, 25, 50 & 100-year control to be provided by underground storage system located south of Queen Street East approximately at Station 1+367;
- Ensure no flooding to downstream properties and/or infrastructure;
- Provide Level 1 Enhanced (80% long-term TSS removal) for all flows entering Shaw's Creek;
- Erosion control through onsite retention and infiltration of minimum 5mm of every rainfall event; and,
- 230 mm per year infiltration

2.3 Region of Peel Requirements

The primary arterial road through Alton Village is Regional Road 136. The roadway was downloaded by the Ministry of Transportation to the Region of Peel in 1997. Through Region of Peel's Road Characterization Study, Main Street South and Queen Street East were given classification as Rural Main Street.

A Rural Main Street is the heart of a village centre. It is typically a short area of concentrated development in the centre of town that is frequently a retail hub. Often, the main street includes local civic structures and services such as banks, stores and post offices. Buildings are typically located close to the right-of-way and on-street parking is often available to service the businesses. Pedestrian traffic is moderate to high and bicycling activity variable in most Rural Main Street communities.

The Region of Peel required a development of a Rural Main Street based cross section, which would contribute to the enhancement of the Village of Alton, with the objective of achieving a more sustainable community that promotes health and the delivery of a high quality of life. The requirements were set to identify the framework for addressing community needs, including main street revitalization, signage improvements, streetscaping/planters/beautification of public areas, improved drainage and on-street parking, new streetlighting, pedestrian/bicycle connections, accessibility, and traffic calming.

Regional Road 136 is also classified as a trucking route, which carries certain limitations to the acceptable means of controlling speed. For example, roundabouts would need to consider the turning radii for WB-20 trucks, resulting in significant land acquisition. Speed bumps, speed humps, speed cushions and other speed control measures that create raised surfaces in the road are also not permitted.

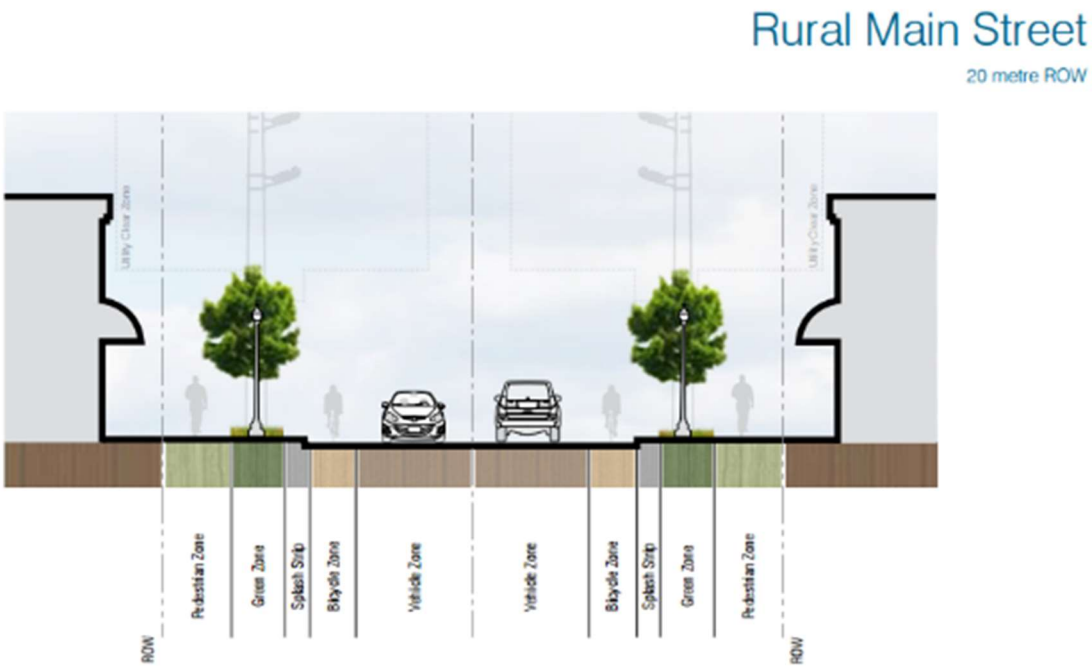

Figure 2-2: Typical Rural Main Street Section

2.4 Other Stakeholder Requirements

The easterly part of the project passes through a Provincially Significant Wetland (PSW). The Ministry of Natural Resources and Forestry owns, regulates, and manages the property. The Ministry's clear mandate for this section was not to fill or grade onto the wetlands. The Design Team established advanced consultations with both MNRF and CVC to determine the requirements, prepared and further refined the design and agreed in principal the final concepts. The design team was required to make environmentally consciousness decisions while designing vertical vegetated retaining walls.

The westerly and southerly parts of the project, also known as a Historic district, go through the downtown core of the village. There is a significant number of old buildings constructed in close proximity to the existing right-of-way with additions: porches, gardens, retaining walls and lighting. The narrow road allowance and environmental constraints provided design challenges and restricted the number of improvements. The design team engaged a qualified Realty Team and Communication Lead to generate and establish communication protocols with all owners to address individual needs and requirements in order to secure permission to enters for grading purposes. The team worked extensively with individual owners well in advance of any construction activities to obtain the agreements and establish the requirements, which formed part of the Contract documents.

Comprehensive communication protocols with businesses and owners were established in conjunction with advanced detour plans. Based on consultations, various restrictions on work zones and provision of additional guidance signage were developed.

3. DESIGN SUMMARY

3.1 Typical Cross Section

Figure 3-1 provides the typical cross-section for the project through the urbanized road sections, however due to property constraints, the splash pad and sidewalks were narrowed in some places. This design was aimed at providing additional lay-by parking, while also incorporating the key elements of Peel Region's "Rural Main Street, 20-meter ROW" design outlined in their 2013 Road Characterization Study. This configuration limits the width of the road platform, which creates a pinch point versus the more open rural configuration outside of the reduced speed zone. It also provides several additional elements close to the road, including decorative lighting, flower baskets, banners, and shared-use for cyclists.

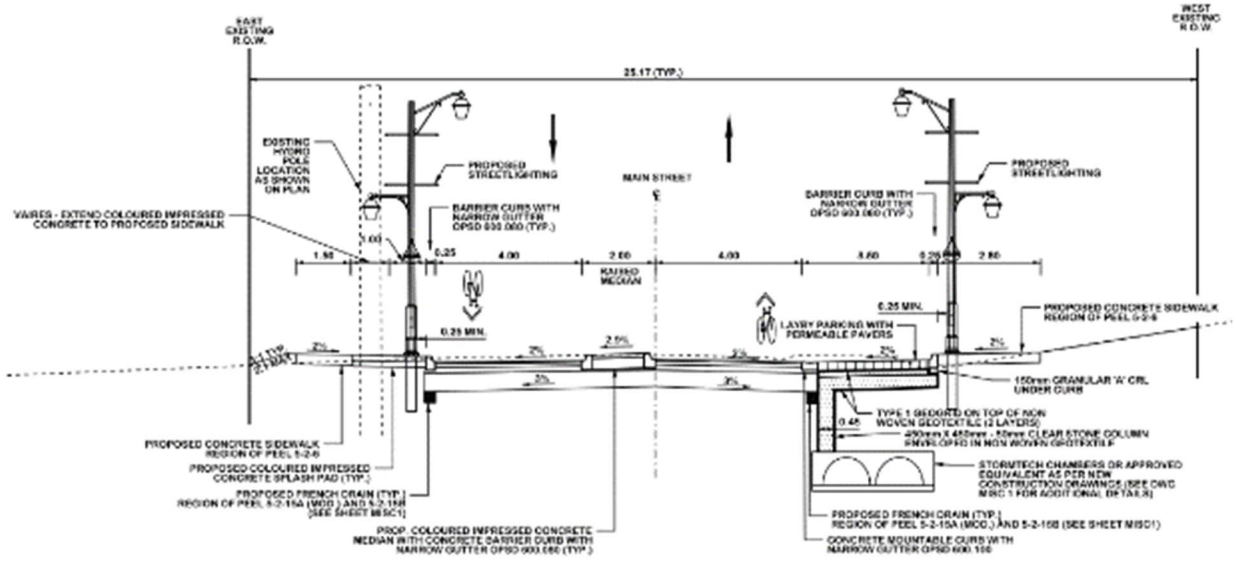

Figure 3-1

3.2 Traffic Calming Medians, Chicanes and Lane Shifts

At the south limit of the Village on Main Street, as well as the east limit on Queen Street, a series of various shaped medians were provided, which force traffic out a straight path of travel and encourage a lower speed to navigate through the S-shaped bends in the road[1]. In addition to providing a traffic calming effect, these medians feature landscape plantings, gateway monuments complete with spotlights, armour stones and coloured impressed concrete splash pads, which serve as additional visual cues for traffic calming[1].

The traffic islands required careful positioning and geometric design to ensure that driveway access and adequate stopping sight distances were provided. It would not be acceptable to implement the installation of these traffic calming features, only to introduce new safety concerns arising from inadequate sightlines. Of particular concern was the positioning of the tall gateway monuments. Impacts to sightlines were also avoided using low-growth plantings. A diagram showing the configuration of the traffic calming features on Queen Street East is shown in **Figure 3-2** below. This traffic calming island is preceded by a 90-degree bend in the road, which aids in traffic calming before the medians.

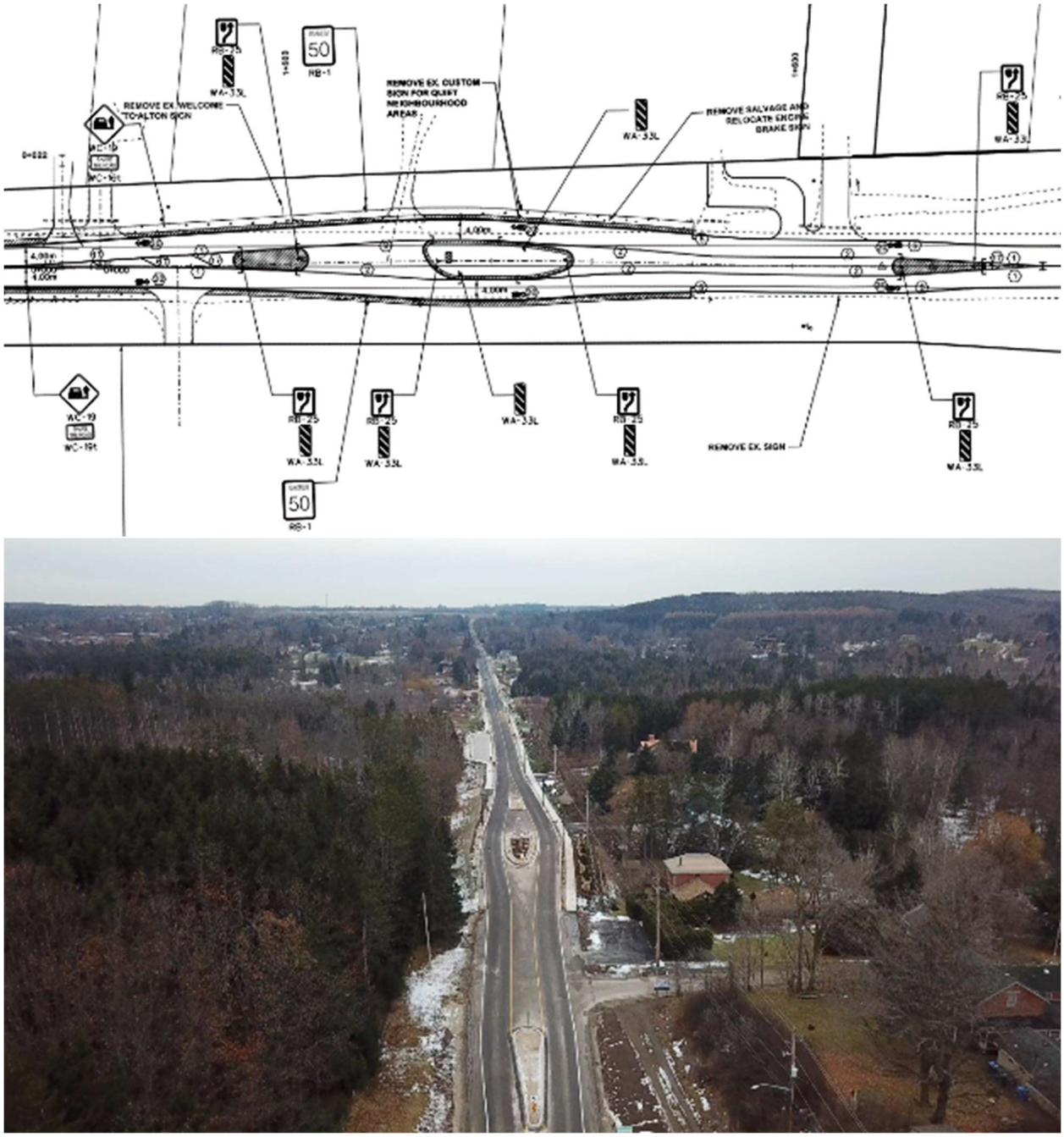

Figure 3-2: Traffic Calming Islands at Queen Street East

The traffic calming features at the approach from the south of the village on Main Street are more extensive, as speed of traffic from this direction has been more problematic due to it not being preceded by a 90-degree bend in the road. Although a roundabout was initially the preferred approach to calming in this location, additional property would have been required and was not feasible. The layout of the south traffic calming features is shown in **Figure 3-3** below.

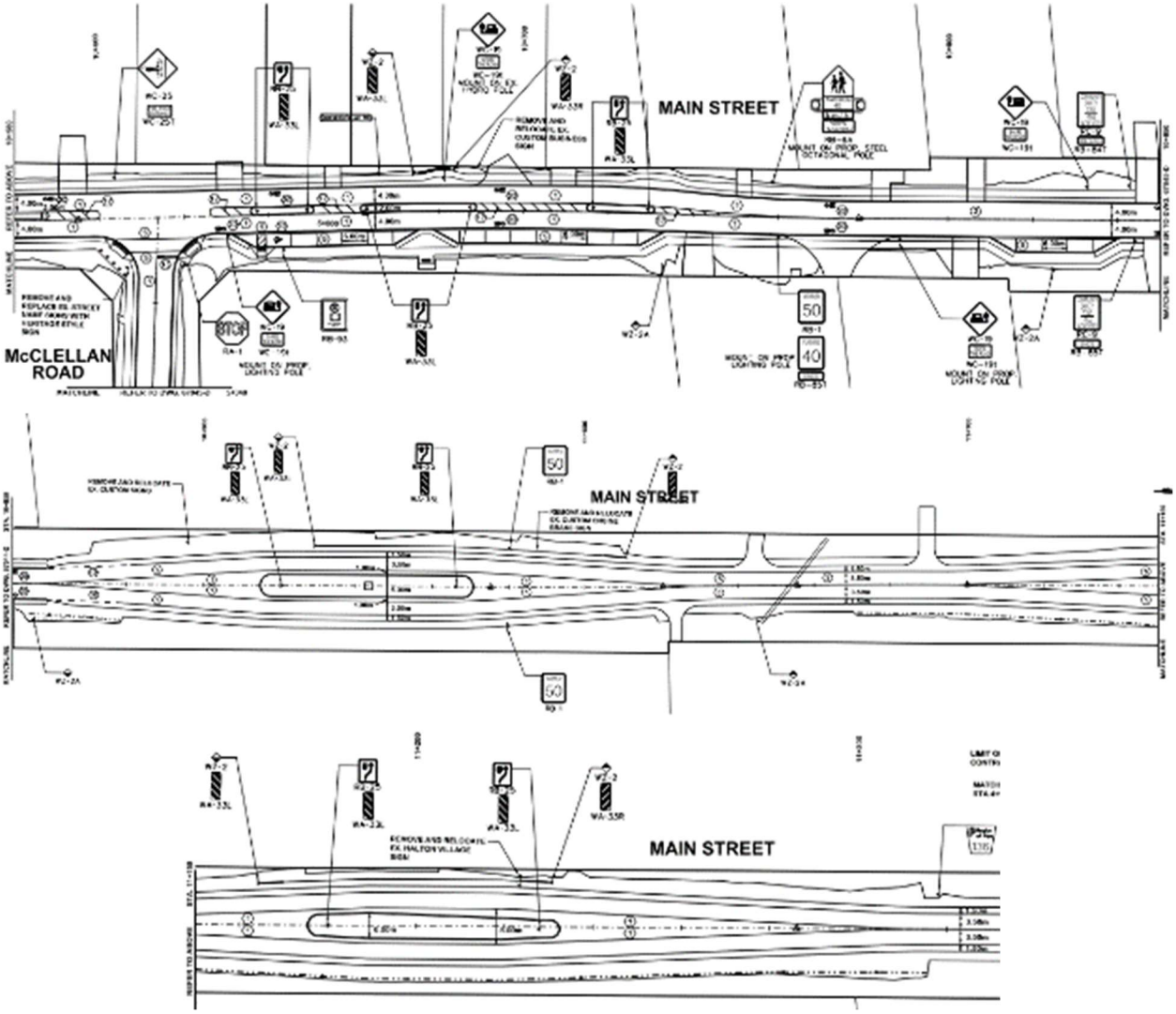

Figure 3-3: Traffic Calming Islands at Queen Street East

3.3 Rest Areas and Streetscaping

The streetscaping design for the Village included the addition of several rest areas, a new parkette in the middle of the Village, and new plantings throughout the village. The rest areas were designed with permeable pavers to mitigate the impact to overall stormwater peak runoff quantities. Additionally, new street furniture and decorative lighting were provided with input from the local community.

The addition of the plantings, rest areas and decorative lighting added more visual cues to drivers to reduce speed. Providing additional visual cues to drivers that they are entering an urban environment has been suggested as a means of encouraging traffic calming[1].

3.4 Parking Lay-Bys

The initial parking arrangement along Main Street and Queen Street was provided by poorly-defined gravel shoulders, and asphalt paving outside of mountable curbs. This configuration resulted in safety concerns from having parked vehicles with no physical separation from sidewalks. Also, having no clear delineation of permitted parking areas resulted in driveways with obstructed sightlines and unsafe conditions for backing out.

The new design for Main Street and Queen Street included the provision of clearly delineated parking spaces with full barrier curbs separating vehicles from sidewalks. These spaces were positioned to allow for proper sightlines and safe backing out of driveways. Permeable pavers were provided in these lay-by parking areas to provide infiltration for storm water.

Figure 3-4: Parking Lay-By at Queen Street East

Figure 3-5: Permeable Pavement at Parking Lay-By at Queen Street East

3.5 Structures

One of the most challenging aspects of the design for Queen Street was the new bridge and culvert located in the Provincially Significant Wetland (PSW) at the east end of the Village. The existing 10-meter-long bridge was approaching the end of its service life and had an inadequate hydraulic opening to convey the design storm flows. It was replaced by a 25 meters long bridge, and a 10-meter-long culvert-bridge, and an increase of 1.6 meters to the road profile. I addition to the increase in profile, sidewalks and shared-use lanes were added, all without extending the toe of the embankment further in the PSW. This was achieved by using vegetated face retaining walls (see **Figure 3-7**) and low-profile Nu-Guard 31 guiderails.

The improve the cosmetic appearance of the bridges, decorative formliners, ornamental railings and coloured stains were applied. Pilasters and decorative lighting were also added to bridges. See **Figures 3-6** and **3-7** below for photos of the structures.

Figure 3-6 – Decorative Formliners

Figure 3-7 – Vegetated Retained Soil Slopes

Figure 3-7 – Vegetated Retained Soil Slopes

Figure 3-8 – Structures

Figure 3-9 – Structures

Figure 3-10 – Shaw's Creek Bridge

Figure 3-11 – Culvert Bridge at Shaw's Creek Tributary

Figure 3-12 – Rest Area

4. SUMMARY AND CONCLUSION

An overall summary of the effective means of traffic calming provided in Peel Region's Alton Village Road Reconstruction projects are summarized as follows:

Traffic Calming Strategy	Implementation
Lane Narrowing	Utilizing the narrowest permissible lane widths for 60 km/h design speed was used throughout project area.
Corner Radii	Removing right-turn channel at Main and Queen, reduced radii at street corners
Buildings and Trees	New landscape plantings, including trees close to the road.
Gateway Treatments	Two new gateway monuments located on decorative islands, complete with landscape plantings.
Pinchpoints	Gateway islands constrict road to minimum width for 60 km/h at both end of the reduced speed zone.
Chicanes and Lane Shifts	Gateway islands are provided at both ends of reduced speed zone which are large enough to force lane shifts. Additional chicane added after gateway at south end of the Village.
Medians and Refuge Islands	10 new medians and/or refuge islands added throughout the project area.
Pavement Materials and Appearance	Red and white colours added to pavement at crosswalks at Main and Queen intersection. Lay-by parking areas and splash pads are a disctinct colour and made from different materials than the road asphalt.
Two-Way Streets	Utilizing the narrowest permissible lane widths for 60 km/h design speed was used throughout project area with two-way traffic.
Shared Streets	Shared-use bike lanes marked with "sharrow" provided through most of project area.

By utilizing a wide variety of traffic-calming measures, traffic speeds in Alton Village were effectively reduced. The project objectives were met in reducing speeds while not impeding the flow of through traffic and trucks. Construction of the first phase of the works was completed in the Winter of 2018. The second phase of work is scheduled to be completed in the Winter of 2019.

5. REFERENCES

Global Street Design Guide, pages 132-136. Global Designing Cities Initiative, National Association of City Transportation Official. Island Press.

Transportation Association of Canada . *Geometric Design Standards for Canadian Roads.* 2017 Edition.