

13. Recommended Solution

13.1 Functional Design Plan of the Recommended Solution

The functional design plan of the Recommended Solution for the HCV study area is shown in **Exhibit 13-1**. This functional design plan includes the transportation infrastructure elements (i.e., the Preferred Solution elements) that were previously described in **Section 10**.

The following sub-sections provide additional detail on the functional design plans for the individual Schedule A+ projects, and the concept plans for the recommended Schedule C project. A full size version of the functional design plans for the Recommended Schedule A+ projects are included in **Appendix L**. The design criteria that were established and applied in the preparation of the functional design plans is also included in **Appendix L**.

13.1.1 Schedule A+ Projects

The recommended Schedule A+ projects are summarized below and the functional design plan, urban design plan, and typical section and shown in the noted exhibits. The 1:500 scale versions of these plans are included in **Appendix L**.

Old Kingston Rd Streetscape (Exhibit 13-2, Exhibit 13-3, Exhibit 13-4, and Exhibit 13-5):

- streetscape improvements; and conversion to parallel parking on Old Kingston Road and Morrish Road
- reconfiguration of Kingston Road and Old Kingston Road intersection

Military Trail Traffic Signal (Exhibit 13-6 and Exhibit 13-7):

- new Highway 2A signalized intersection;
- closure of Military Trail ramps / accesses;
- streetscape improvements and parking on Military Trail;
- cycling connections between Military Trail & Lawson Road

New Laneway (shown in Exhibit 13-1; individual plans not included):

- new laneway between Military Trail and Morrish Road

Re-Alignment of Kingston Road and Morrish Road (Exhibit 13-10, Exhibit 13-9, Exhibit 13-10 and Exhibit 13-11):

- road re-alignment / “loop” connection;
- streetscape improvements and parking on Kingston Road & Morrish Road;
- closure of Kingston Road & Morrish Road ramps / accesses

13.1.2 Schedule C Projects

The recommended concept design plan and typical sections for the recommended Schedule C project are shown in **Exhibit 13-12, Exhibit 13-13, Exhibit 13-14, Exhibit 13-15, and Exhibit 13-16**. The 1:500 scale versions of these plans are included in **Appendix L**.

Highland Creek Overpass Removal:

- Highland Creek Overpass and Lawson / Hwy 2A ramp closure;
- new Highway 2A signalized intersection;
- conversion of Highway 2A into arterial road near the Highland Creek Overpass;
- closure of Lawson Road ramps / accesses
- conversion of Highway 2A into an arterial road near Military Trail;

Exhibit 13-1: Functional Design Plan of the Recommended Solution

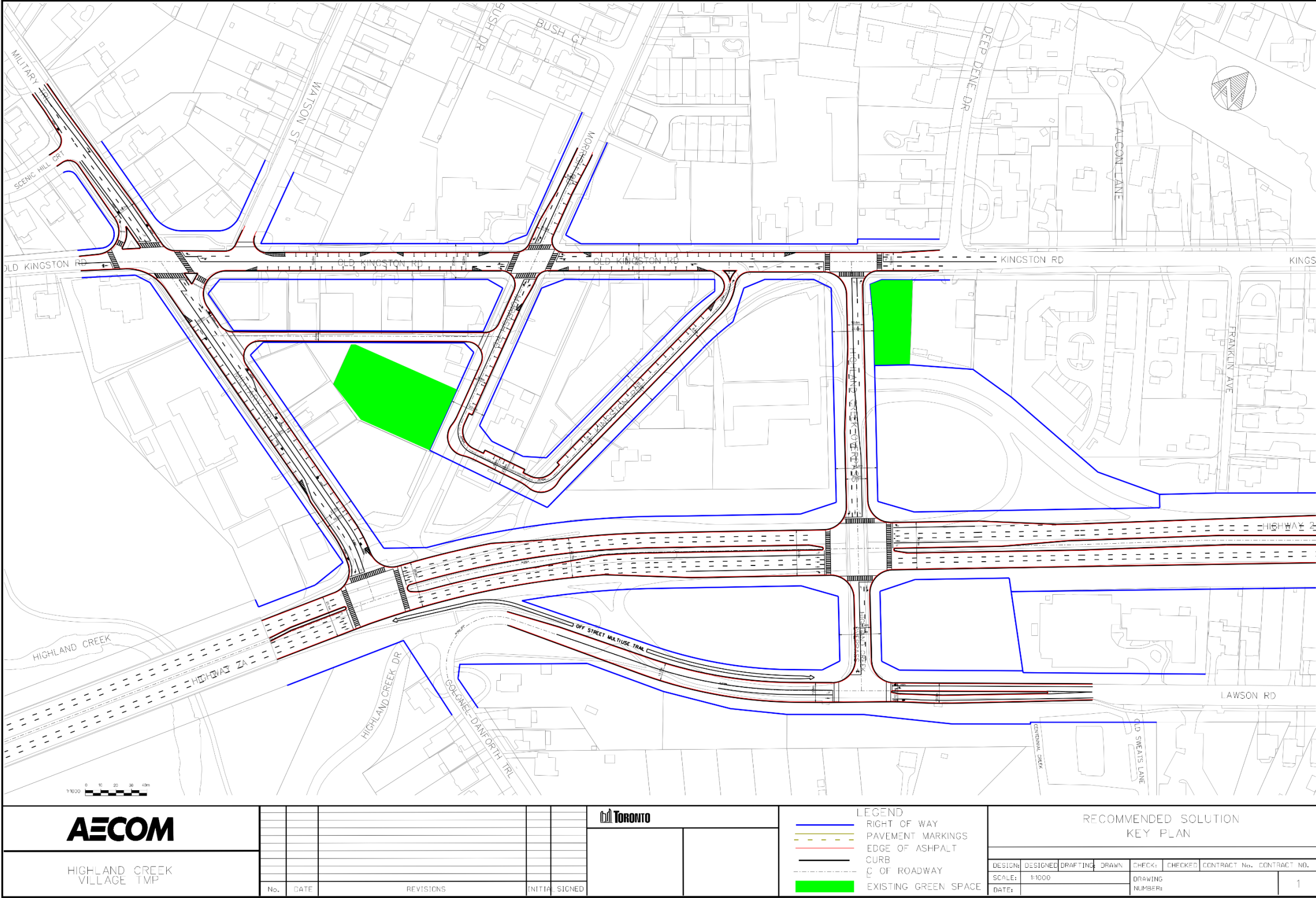


Exhibit 13-2: Functional Design Plans for Schedule A+ Project: Old Kingston Road Streetscape (East Half)

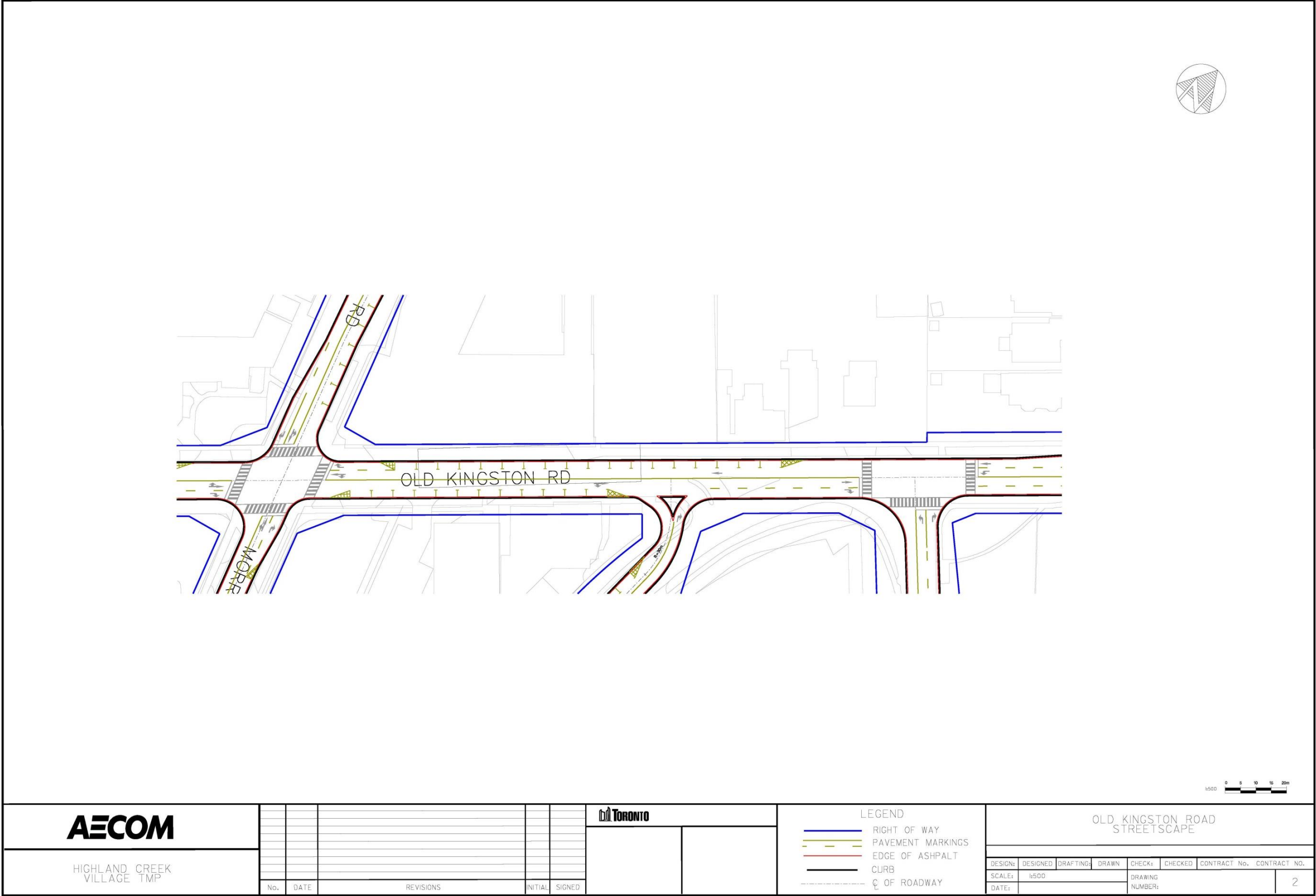


Exhibit 13-3: Functional Design Plans for Schedule A+ Project: Old Kingston Road Streetscape (West Half)

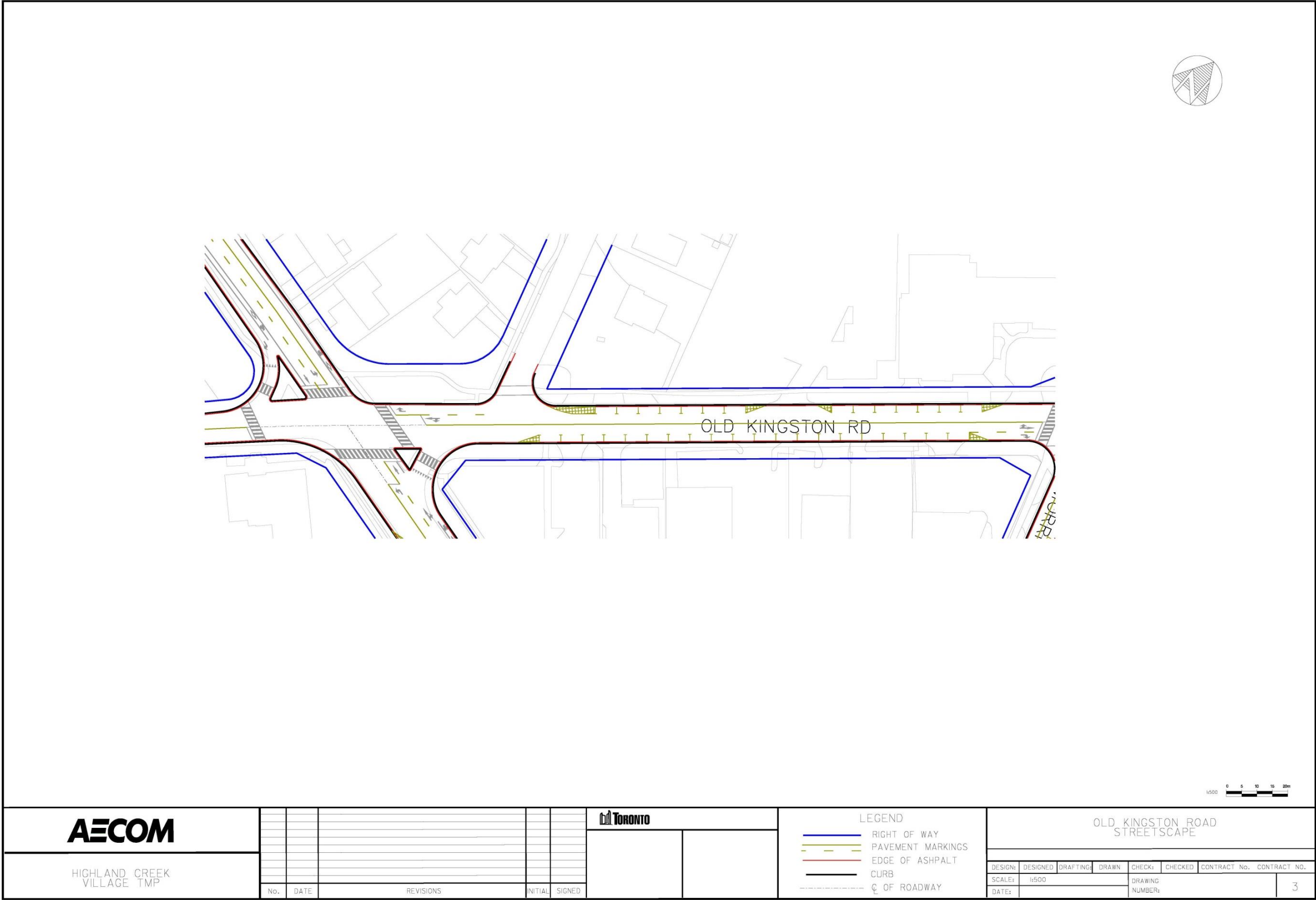


Exhibit 13-4: Urban Design Plan for Schedule A+ Project: Old Kingston Road Streetscape

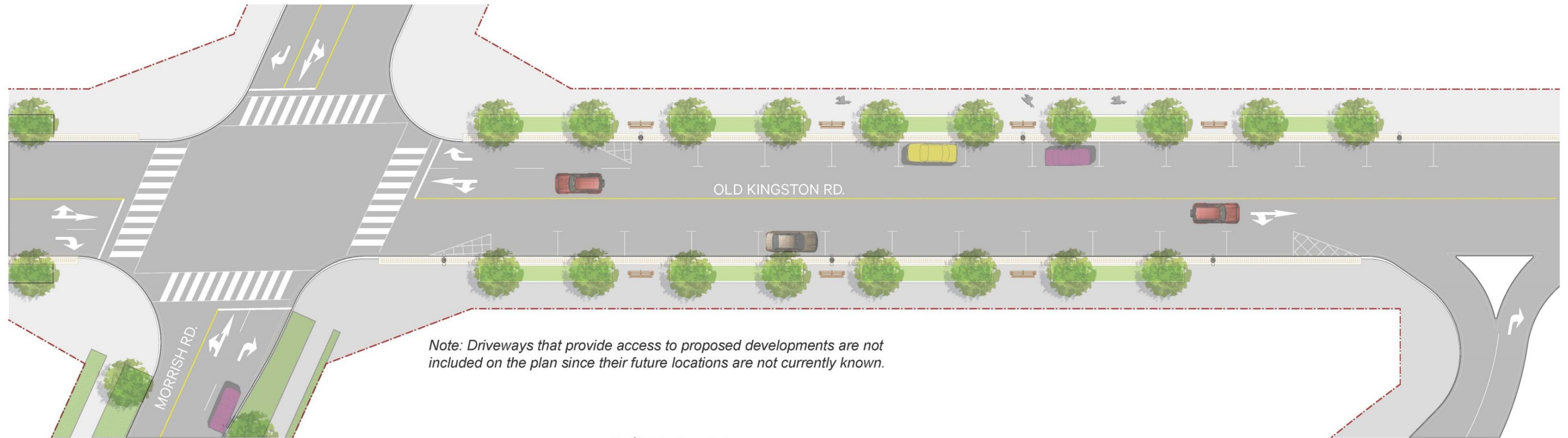


Exhibit 13-5: Typical Section for Schedule A+ Project: Old Kingston Road Streetscape (East of Morrish Road)

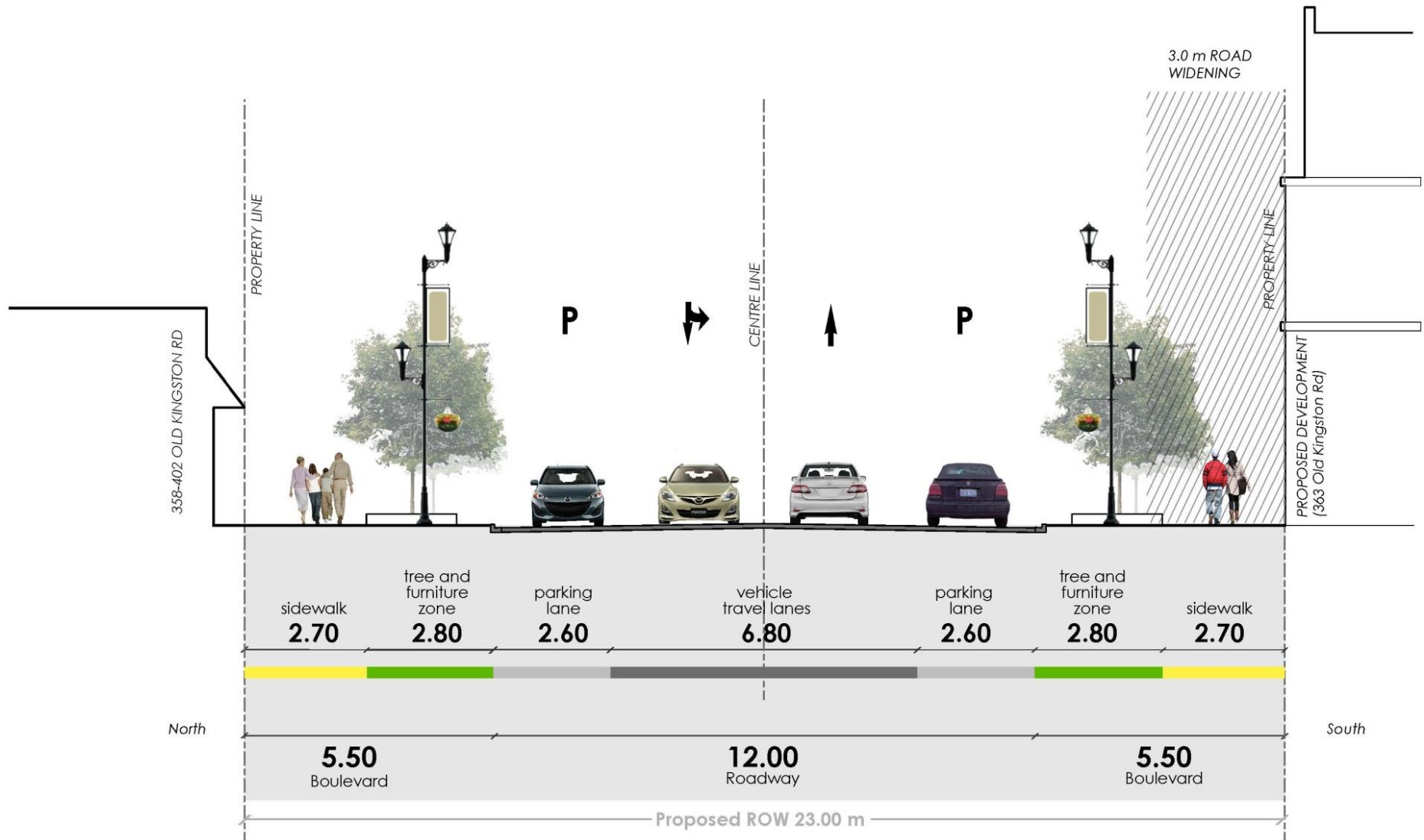


Exhibit 13-6: Functional Design Plan for Schedule A+ Project: Military Trail Signals

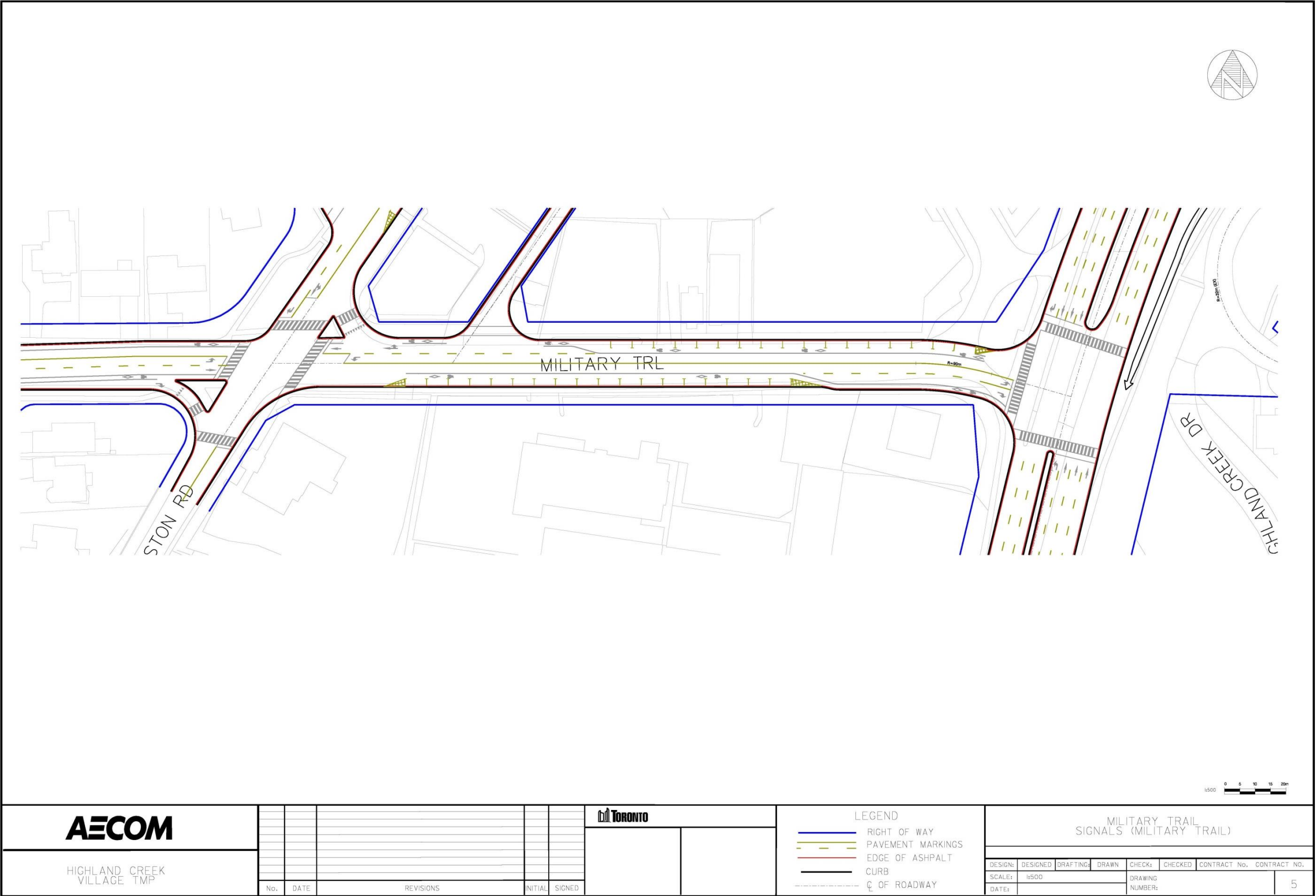


Exhibit 13-7: Typical Section for Schedule A+ Project: Military Trail Signals (Military Trail South of Old Kingston Road)

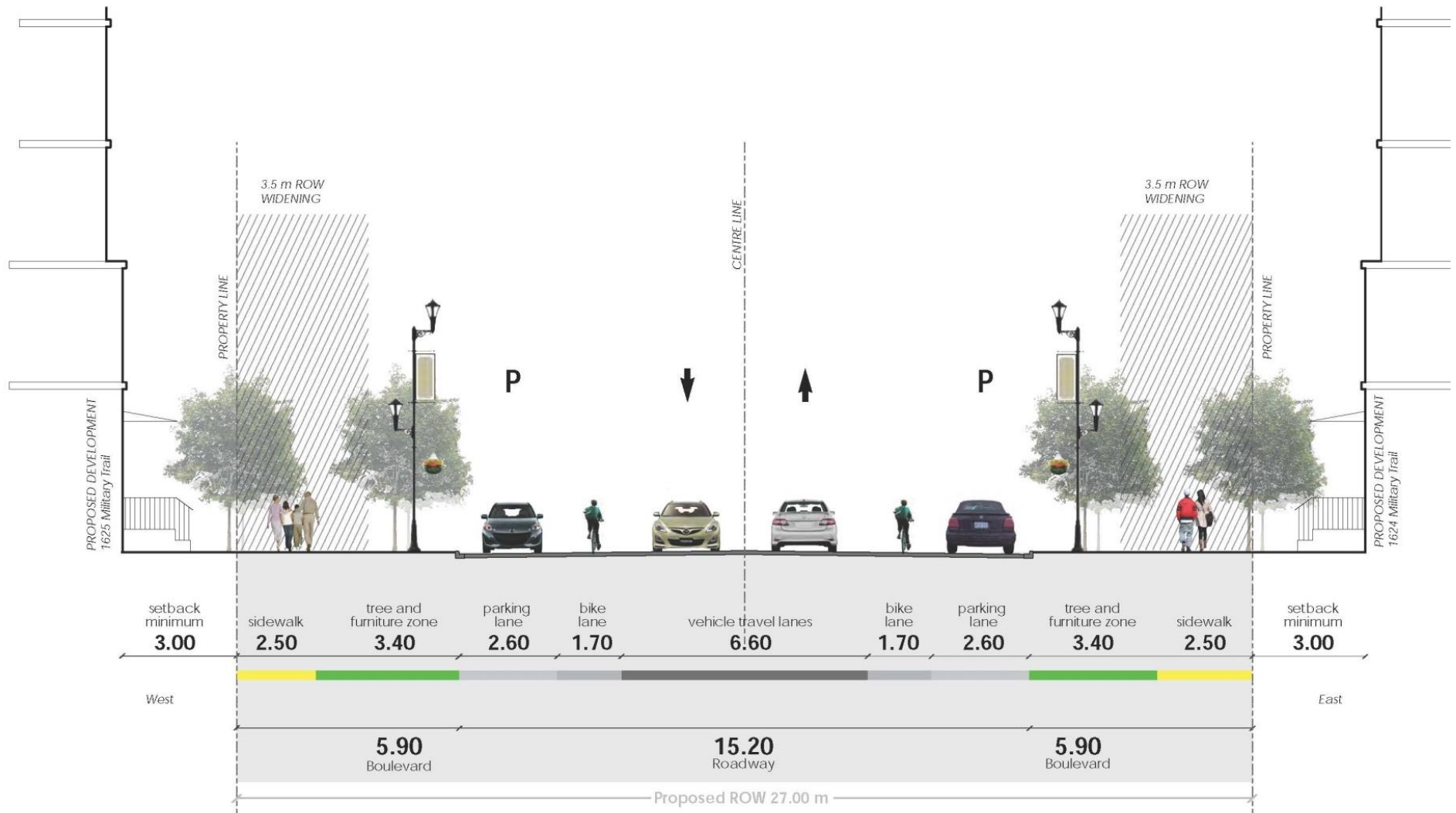


Exhibit 13-8: Functional Design Plan for Schedule A+ Project: Realignment of Kingston Road and Morrish Road

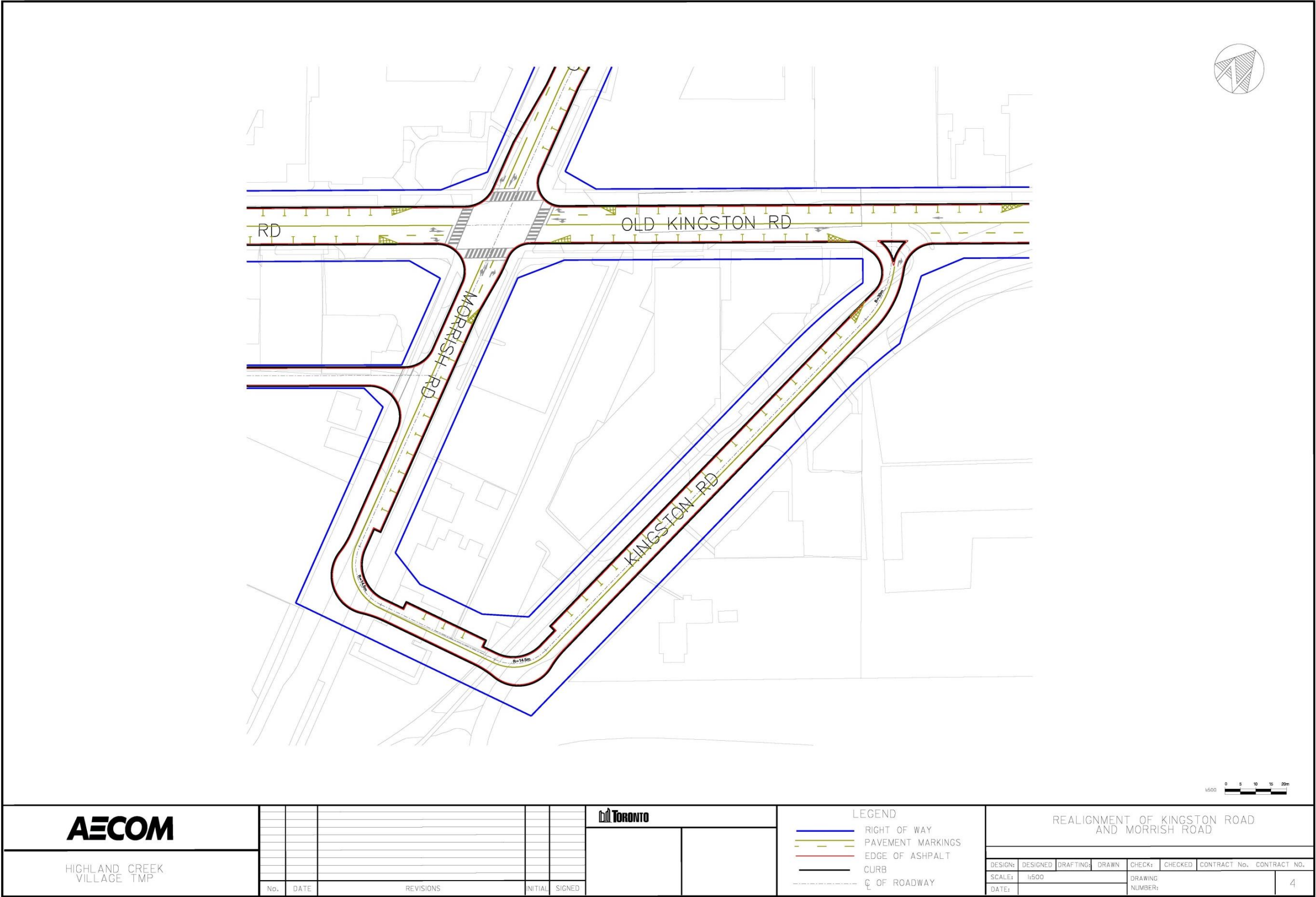


Exhibit 13-9: Urban Design Plan for Schedule A+ Project: Realignment of Kingston Road and Morrish Road



Exhibit 13-10: Typical Sections for Schedule A+ Project: Realignment of Kingston Road and Morrish Road (Kingston Road South of Old Kingston Road)

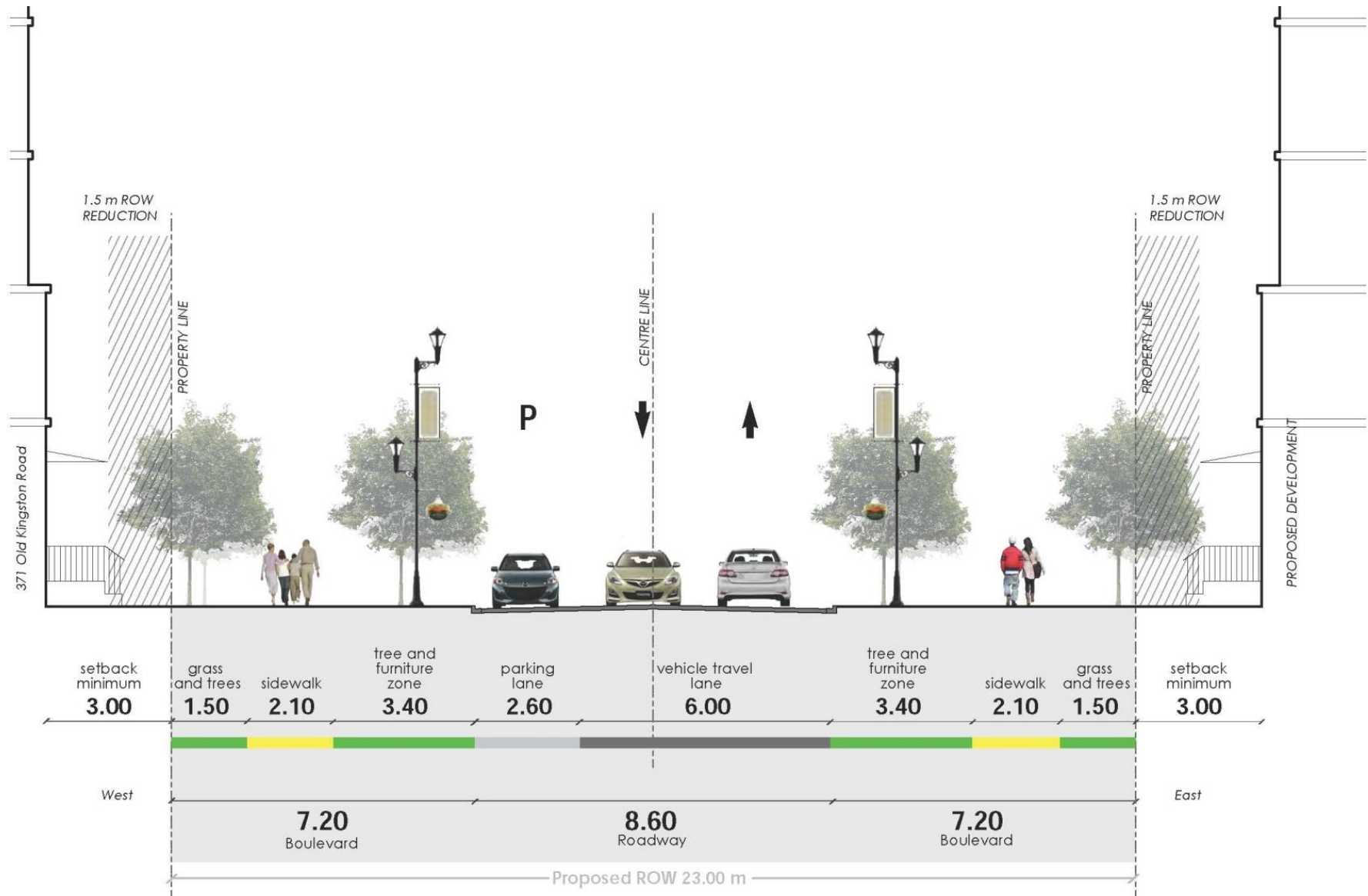


Exhibit 13-11: Typical Sections for Schedule A+ Project: Realignment of Kingston Road and Morrish Road (Morrish Road South of Old Kingston Road)

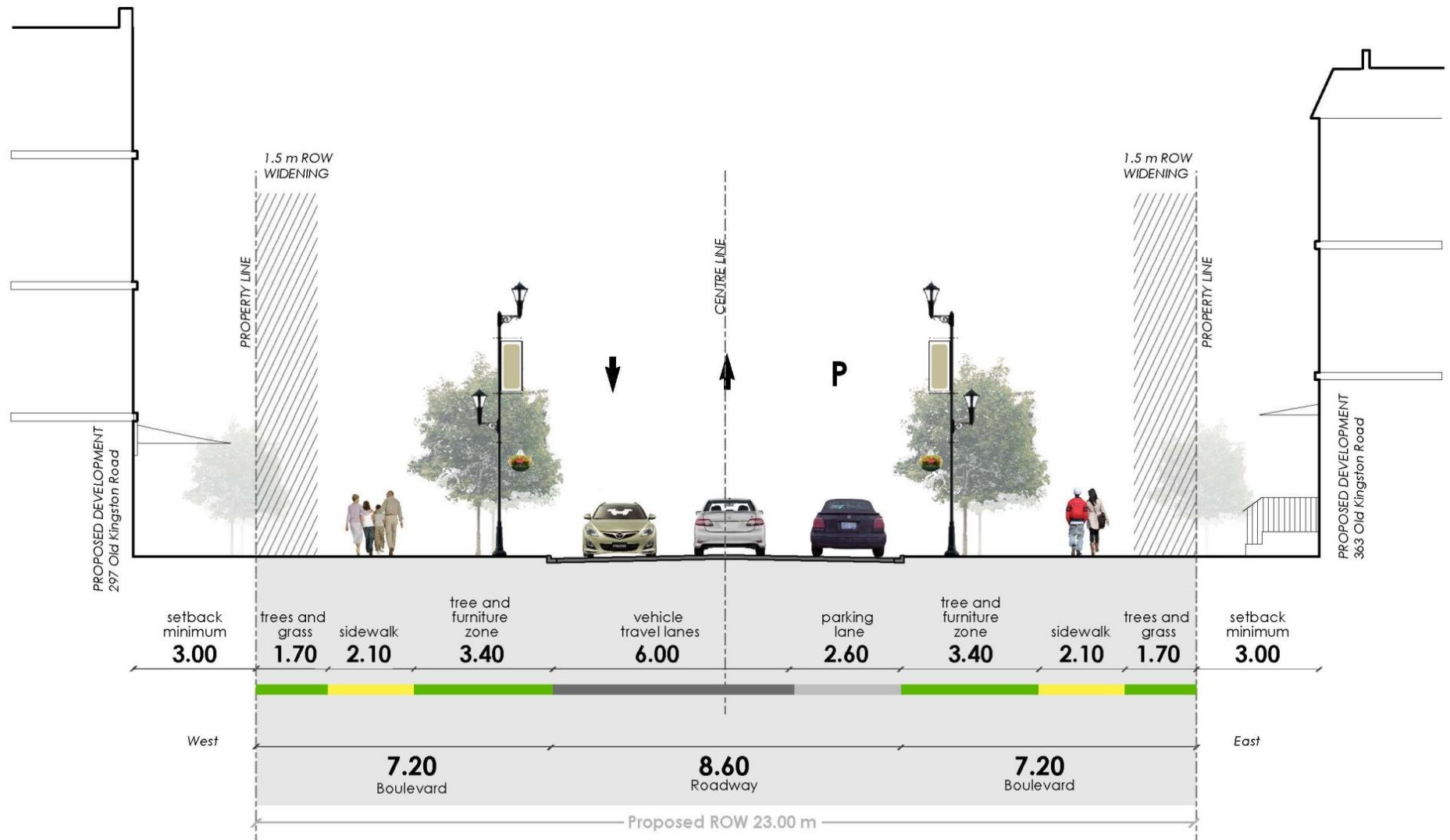


Exhibit 13-12: Functional Design Plan for Schedule C Project: Highland Creek Overpass (Highway 2A at Military Trail)

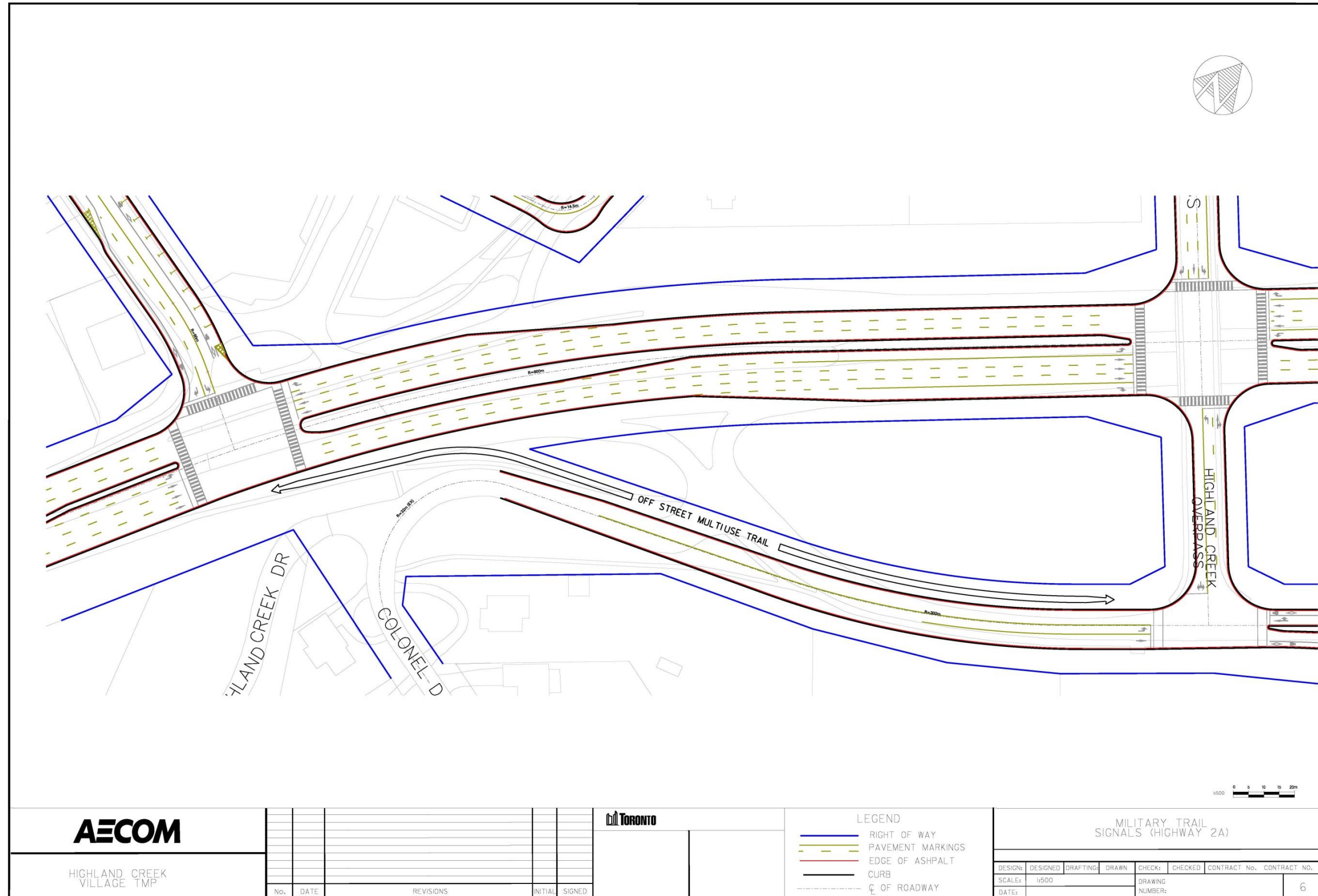


Exhibit 13-13: Typical Section for Schedule C Project: Highland Creek Overpass (Highway 2A West of Highland Creek Overpass)

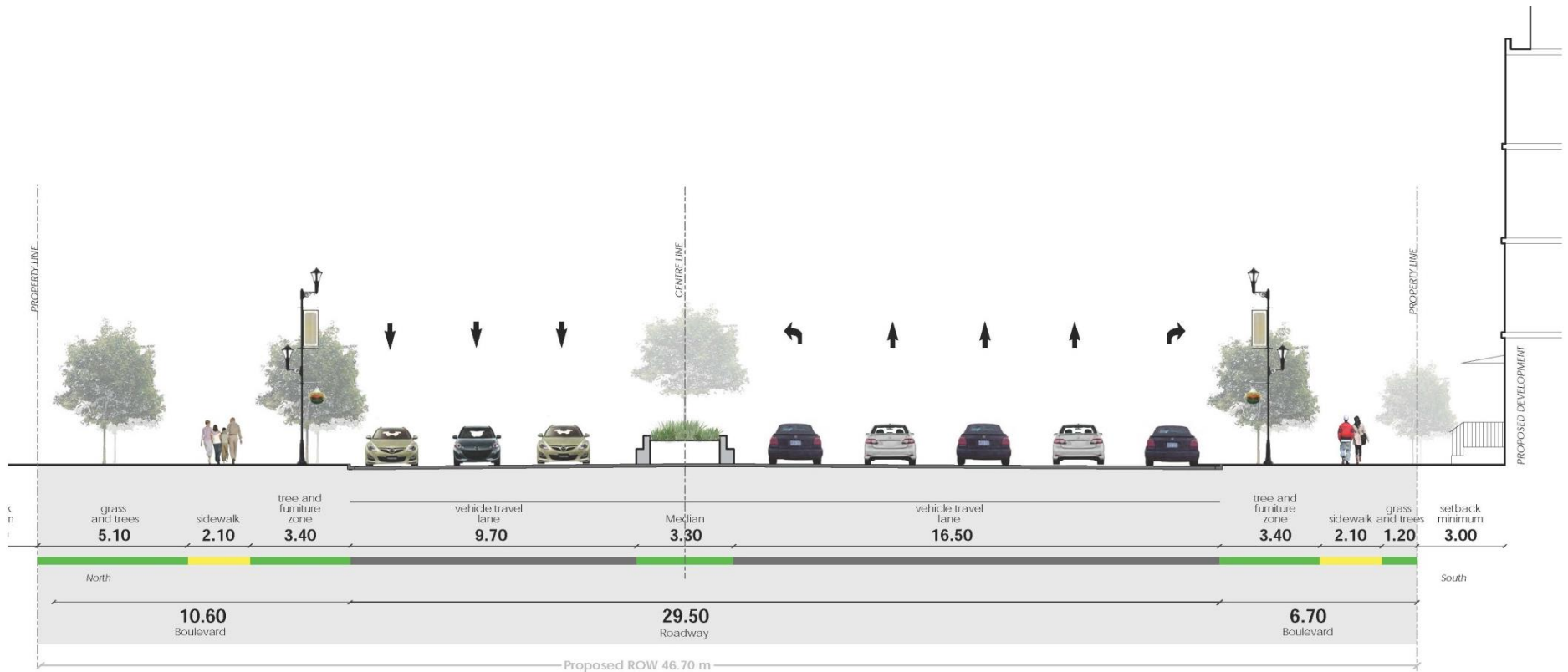


Exhibit 13-14: Functional Design Plan for Schedule C Project: Highland Creek Overpass (Highway 2A at Highland Creek Overpass)

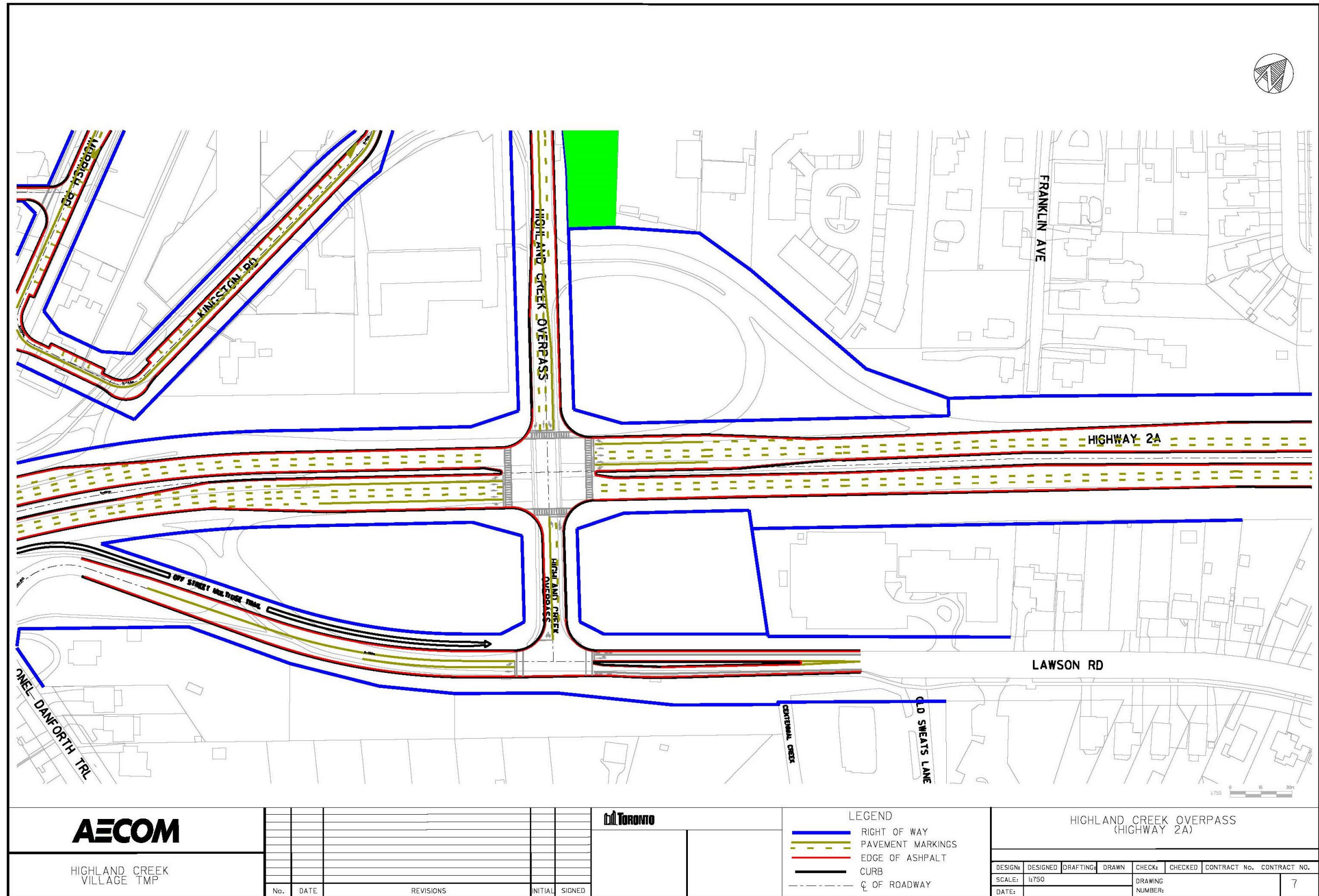


Exhibit 13-15: Functional Design Plan for Schedule C Project: Highland Creek Overpass

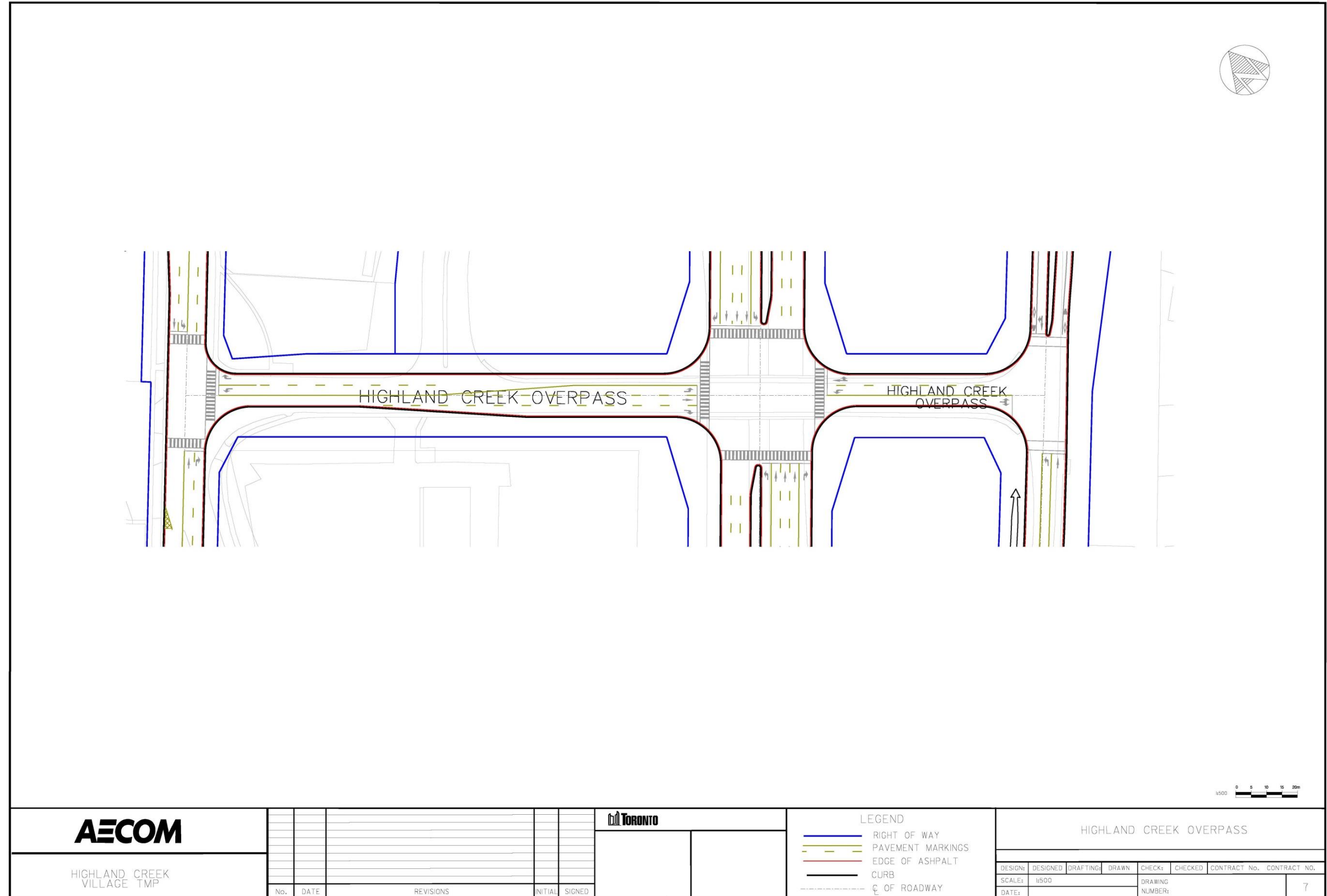
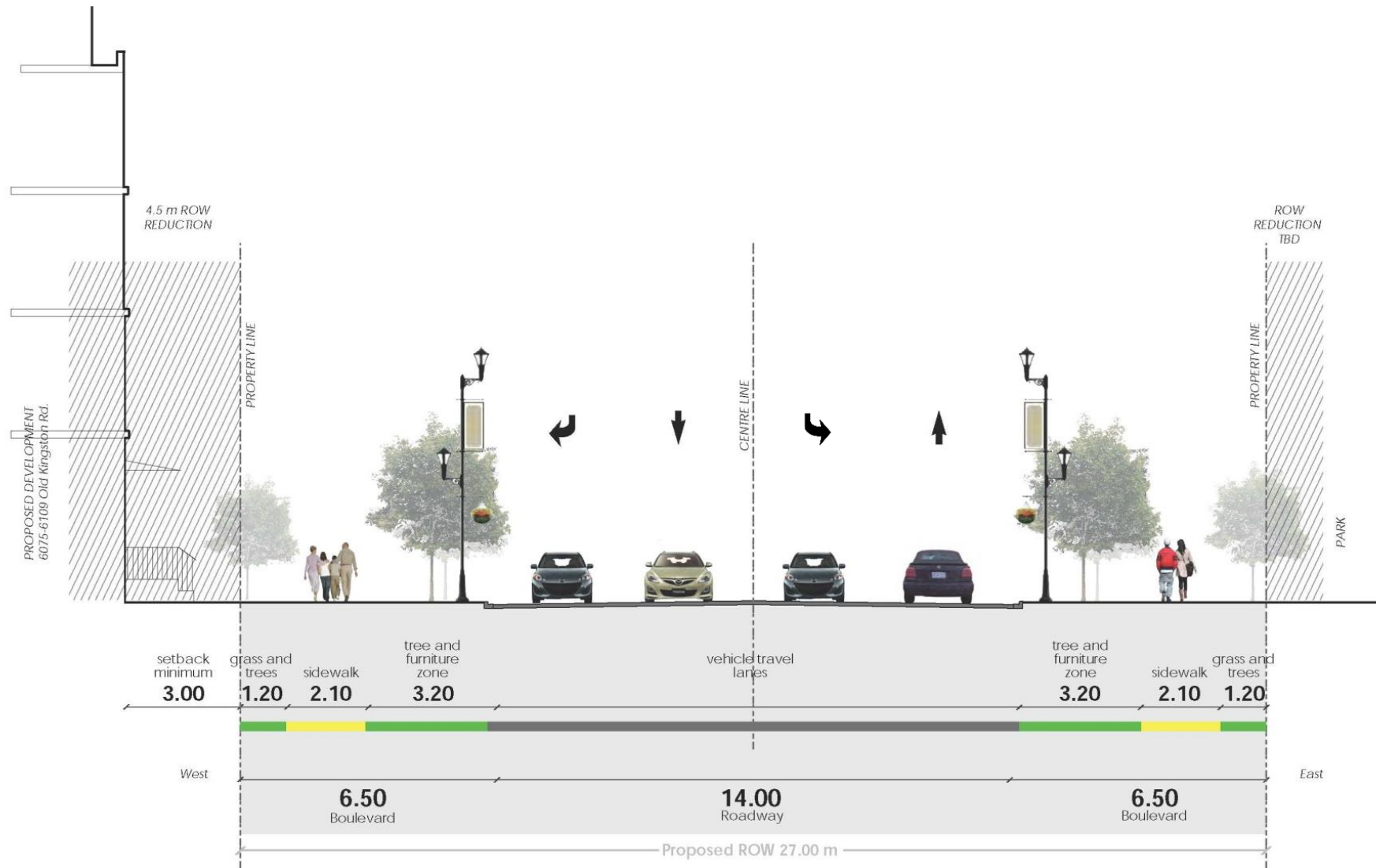


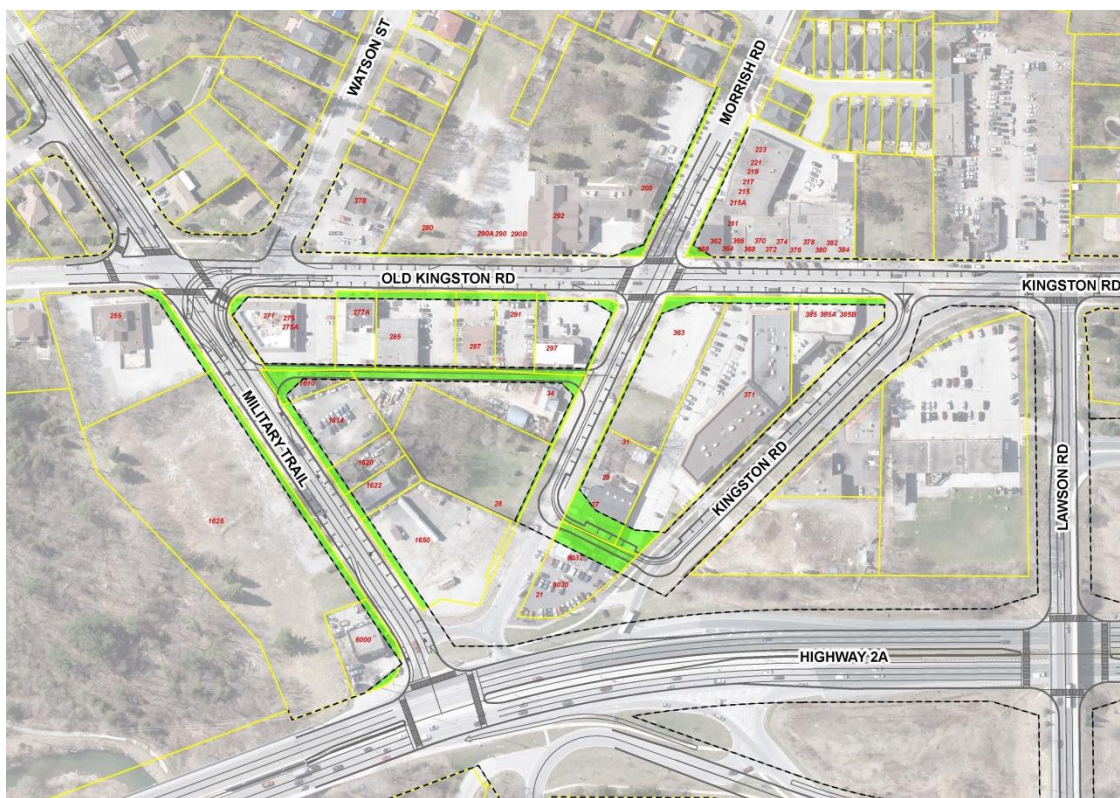
Exhibit 13-16: Typical Section for Schedule C Project: Highland Creek Overpass (North of Highway 2A)



13.2 Property Dedication

Some property is required to be secured to support the recommendations of this study. This TMP has performed an initial assessment of where property may be required to allow for the recommended plan to be implemented and to achieve the required public ROW. The approximate property requirements are depicted on a map of the study area in **Exhibit 13-17** and **Appendix L** (green highlighted areas are the identified property requirements).

Exhibit 13-17: Property Dedication



These initial property requirements have been used to support the development of cost estimates in **Section 13.3** and in the event the infrastructure improvements advance prior to sites redeveloping. Most, if not all, property requirements are expected to be realized through the development approval process and will occur over an extended period of time (10-20+ years). Where improvements precede the redevelopment of sites, the City will consult with affected property owners prior to construction. Potentially affected property owners have been notified of potential impacts via targeted letters that were mailed as part of this study. Final property requirements will be confirmed during the detailed design activities that will follow this study.

13.3 Infrastructure Cost Estimates

Preliminary cost estimates have been prepared for the major infrastructure improvements recommended in this TMP. The cost estimates presented in this report are based on the Functional Design Plan of the Recommended Solution (refer to **Section 13.1**) and unit cost estimates that reflect the basic cost per linear metre of roadway for various design configurations. For significant cost items not reflected in the typical unit cost figure (i.e., overpass removal), these items have been estimated using cost estimates derived from typical costs experience in other areas. The cost estimates for road improvements reflect the basic costs associated with the work required to build the roadways and exclude the costs associated with general servicing (i.e., water, sewer, storm sewer) of the lands within the study area. These costs have been estimated separately as part of the servicing component of this TMP (see **Section 13.4** and **Appendix M** for more details).

More detailed design work will be completed during subsequent work activities that are beyond the scope of this TMP. Through detailed design, the cost estimates presented in this report will be refined and updated to reflect the final alignment and configuration of the individual roads, a more complete assessment of soil and groundwater conditions on the site, specific design treatments implemented to mitigate identified or potential environmental impacts, integration with plans for adjacent land uses, and the addition of design features and supporting infrastructure that may be constructed in conjunction with the individual projects. Therefore, the estimates presented in this report are considered as “Planning Level Cost Estimates” and reflect the level of detail in the Functional Design Plan.

The cost estimates for the projects recommended as part of the Highland Creek Village TMP are presented in **Exhibit 13-18** below (in millions of dollars). The supporting details for these cost estimates are included in **Appendix M**.

Currently, road improvements or recommended Projects from this TMP are not identified in the City’s 10-Year Capital Works. As previously noted in **Section 11.1**, through Section 37 of the *Planning Act*, there may be opportunities to secure funds for community benefits such as improving the area’s streetscape for lands other than those abutting a subject property.

Exhibit 13-18: Recommended Design Concept Plan – Cost Estimates (2021)

Project	Included Improvements	EA Schedule	Anticipated Timing	Cost Estimate (in Millions)
Military Trail Traffic Signal	- New Hwy 2A Signalized Intersection - Closure of Military Trail ramps / accesses - Streetscape improvements and parking on Military Trail - Cycling connections between Military Trail & Lawson Road	A+	Short-Term (<10 yr.)	\$1.12 M
Old Kingston Road Streetscape	- Streetscape improvements and conversion to parallel parking on Old Kingston Road & Morrish Road - Reconfiguration of Kingston Road & Old Kingston Road intersection	A+	Short-Medium Term (with development)	\$2.94 M
New Laneway	New laneway between Military Trail and Morrish Road	A+	Short-Medium Term (with development)	\$0.53 M
Re-Alignment of Kingston Road and Morrish Road	- Road re-alignment / “loop” connection - Streetscape improvements and parking on Kingston Road & Morrish Road - Closure of Kingston Road & Morrish Road ramps / accesses	A+	Medium-Term (10-20 yr.)	\$2.77 M
Highland Creek Overpass	- Highland Creek Overpass and Lawson / Highway 2A ramp closure - New Highway 2A signalized intersection - Conversion of Highway 2A into arterial near Overpass - Closure of Lawson Rd ramps / accesses - Conversion of Highway 2A into arterial near Military Trail	C	Medium Term (10-20 yr.)	\$10.56 M

13.4 Water, Wastewater and Stormwater Servicing

The review of the existing servicing conditions within the Functional Servicing Report (FSR) study area determined that although the transportation network modifications proposed by the Recommended Solution do impact existing infrastructure, the required infrastructure relocations can be accommodated within the proposed road network. Furthermore, the planned redevelopment and intensification within the FSR study area can be accommodated by improving the capacity of the existing infrastructure. The Recommended Solution also presents opportunities for optimizing the performance of existing City owned infrastructure.

The following is a summary of the FSR's key conclusions and recommendations, which were provided in support of the Recommended Solution and the planned redevelopment within the FSR study area. The conclusions and recommendations are provided for the Water Distribution, Wastewater, and Stormwater Management systems. The full FSR is included in **Appendix N**.

Water Distribution

The existing and proposed watermain infrastructure improvements and realignments are identified in **Exhibit 13-19**.

- There are no capacity issues for the existing water distribution system based on existing land use. The realignment and loop connection of Morrish Road and Kingston Road necessitates the relocation and interconnection of existing watermains within the proposed road allowances.
- Existing watermains less than 300 mm diameter are to be replaced with new watermains upsized to 300 mm diameter to accommodate the planned redevelopment within the FSR study area.
- The Recommended Solution presents an opportunity to improve water distribution network interconnectivity and expanded service area by installing new 300 mm diameter watermains along Lawson Road (Highland Creek Overpass) and Colonel Danforth Drive.

Wastewater

The existing and proposed sanitary sewer infrastructure improvements and realignments are identified in **Exhibit 13-19**.

- There are no capacity issues for the existing wastewater collection system based on existing land uses.

- The realignment of Morrish Road and Kingston Road necessitates the construction of additional pipes along the proposed realignment and the removal of the existing pipes within the existing ROW.
- The existing wastewater collection system adjacent to Kingston Road and Old Kingston Road can accommodate the proposed redevelopment.

Stormwater Management

The proposed storm sewer improvements are identified in **Exhibit 13-20**.

- There are no capacity issues for the existing storm sewer system; however, the assessment of the existing storm sewer identified pipe surcharging on Kingston Road with a load of 105% and 110% for the 450 mm and 600 mm, respectively, and surcharging at Highway 2A and Military Trail with a load of 103% for the 450 mm sewer. For the proposed conditions, all developers will be required to meet a maximum runoff coefficient of 0.5. Should this criterion be applied there will be no pipe surcharging under proposed conditions.
- There is no known basement flooding and/or drainage related concerns within the study area.
- The overall stormwater management design objectives for the Highland Creek Village study area should be achieved through the implementation of low-impact development (LID) collection and conveyance measures such as bio-engineered swales, bio-retention gardens, and tree pits in the roadway boulevards as well as and potentially permeable pavements within on-street parking lanes where feasible.
- The southeast quadrant of the Lawson Road (Highland Creek Overpass) and Highway 2A intersection provides an opportunity for an end-of-pipe stormwater management bio-retention / exfiltration facility that can potentially also serve as a stormwater detention facility for controlling peak flows to Centennial Creek. Cost sharing with future Developers could be developed to assist in funding the construction of the facility. However, if a shared end-of-pipe is not feasible, not in the interest of the City, or private site development proceeds prior to implementation of the stormwater management facility the developer will be required to manage stormwater controls on-site following WWMFG and applicable water quality quantity and erosion control requirements.
- The realignment and loop connection of Morrish Road and Kingston Road necessitates the relocation and interconnection of existing storm sewers within the proposed road allowances and an easement for overland flow routing to Highway 2A.

- The northeast quadrant of the Military Trail / Highway 2A intersection provides an opportunity to construct a linear bio-engineered swale to provide water quality treatment for the Morrish Road and Kingston Road ROW.
- The existing parkette south of the proposed laneway provides an opportunity to construct a linear bio-engineered swale to provide water quality treatment for the laneway ROW.
- The reconfiguration of Highway 2A will provide the opportunity to adjust the vertical profile of the roadway as required to potentially mitigate any existing overland flow issues experienced for Centennial Creek downstream of Highway 2A.
- Preliminary sizing for identification of land requirements for stormwater management facilities based on the preferred land use alternatives should be further refined at future design stages. To assess if the selected suite of best management practices (BMPs) effectively meet the design criteria either computer models or simple spreadsheet model should be used. Model selection will be based on the size and type of development and may include models such as OTTHYMO, PCSWMM, HSP and QUALHYMO
- Site-specific hydrogeological/geotechnical investigations will be required during future design stages to understand soil conditions, percolation/infiltration rates and groundwater levels to assess overall effectiveness of the LID measures to meet the design criteria. Common tests may include the Portland Method (Percolation Test), Modified Percolation Testing, Double-Ring Infiltrometer Test, Guelph Pressure Infiltrometer, or laboratory testing.

Exhibit 13-19: Existing and Proposed Watermains/Sanitary Sewer Infrastructure Improvements and Realignments

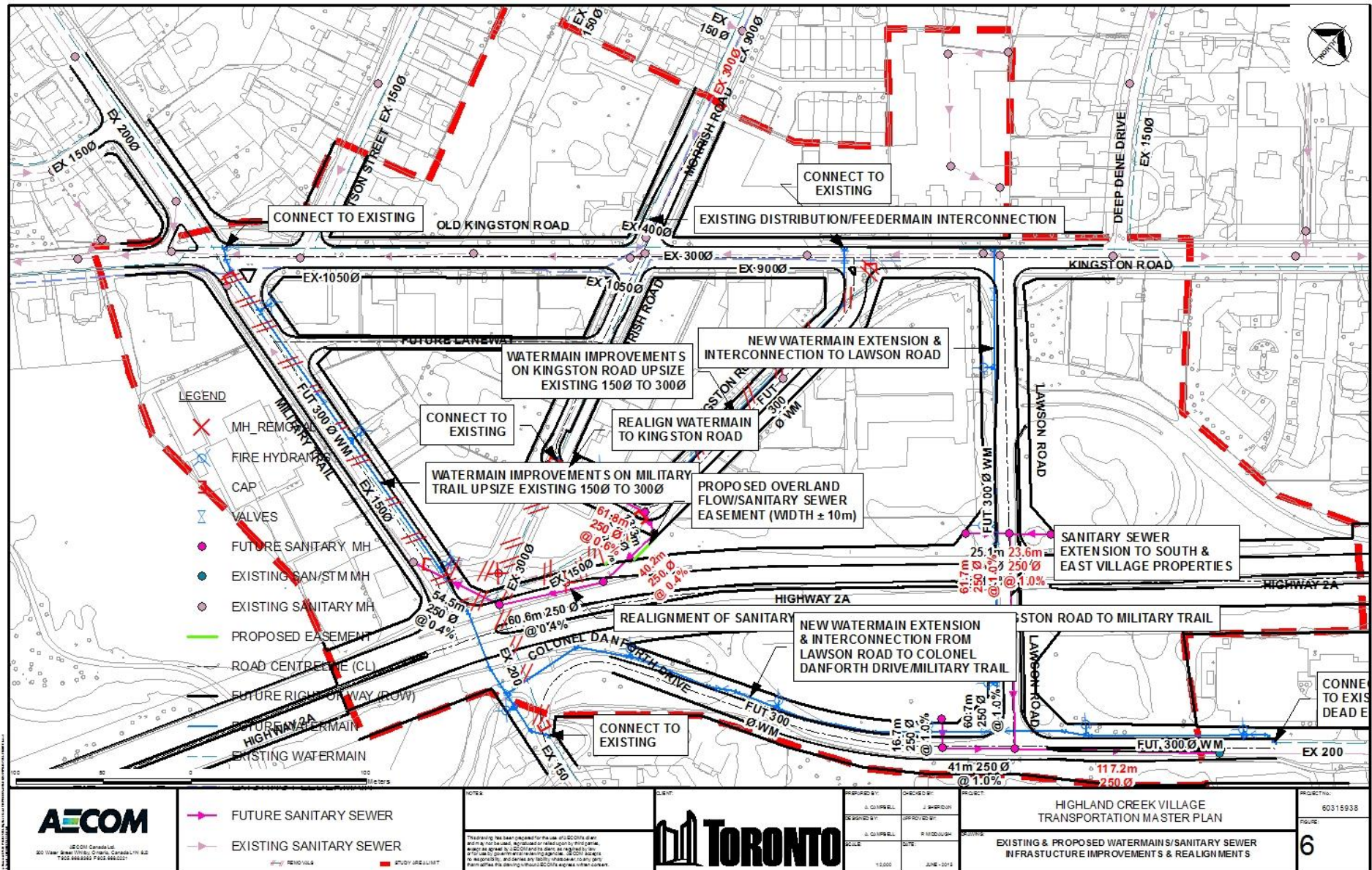


Exhibit 13-20: Proposed Storm Sewer Improvements

