A.0 GEOMETRY & LAYOUT

- Square excavation;
- Ensure that the surface of the Tree Pit is level;
- Suitable where native soil permeability is >15mm/hr .

A.1 FILTER MEDIA

- Pre-mixed from an approved vendor;
- Filter media composition:
  - Sand - 75 to 85%
  - Fines - 2 to 5%
  - Organic Matter - 8 to 10%
  - P-Index value 12 to 30 ppm
  - Soluble Salts <2.0mmhos/cm
  - Cationic exchange capacity >5 meq/100 g
  - pH - 5.5 to 7.5
  - Infiltration rate > 120 mm/hr, max. 300mm/hr
- Depth varies -Minimum depth 1.0m;
- Capacity - Volumetric computation should be based on surface area and depth.

A.2 MULCH

- Depth - 75 mm;
- Material - Shredded hardwood bark mulch.

A.3 PLANTING

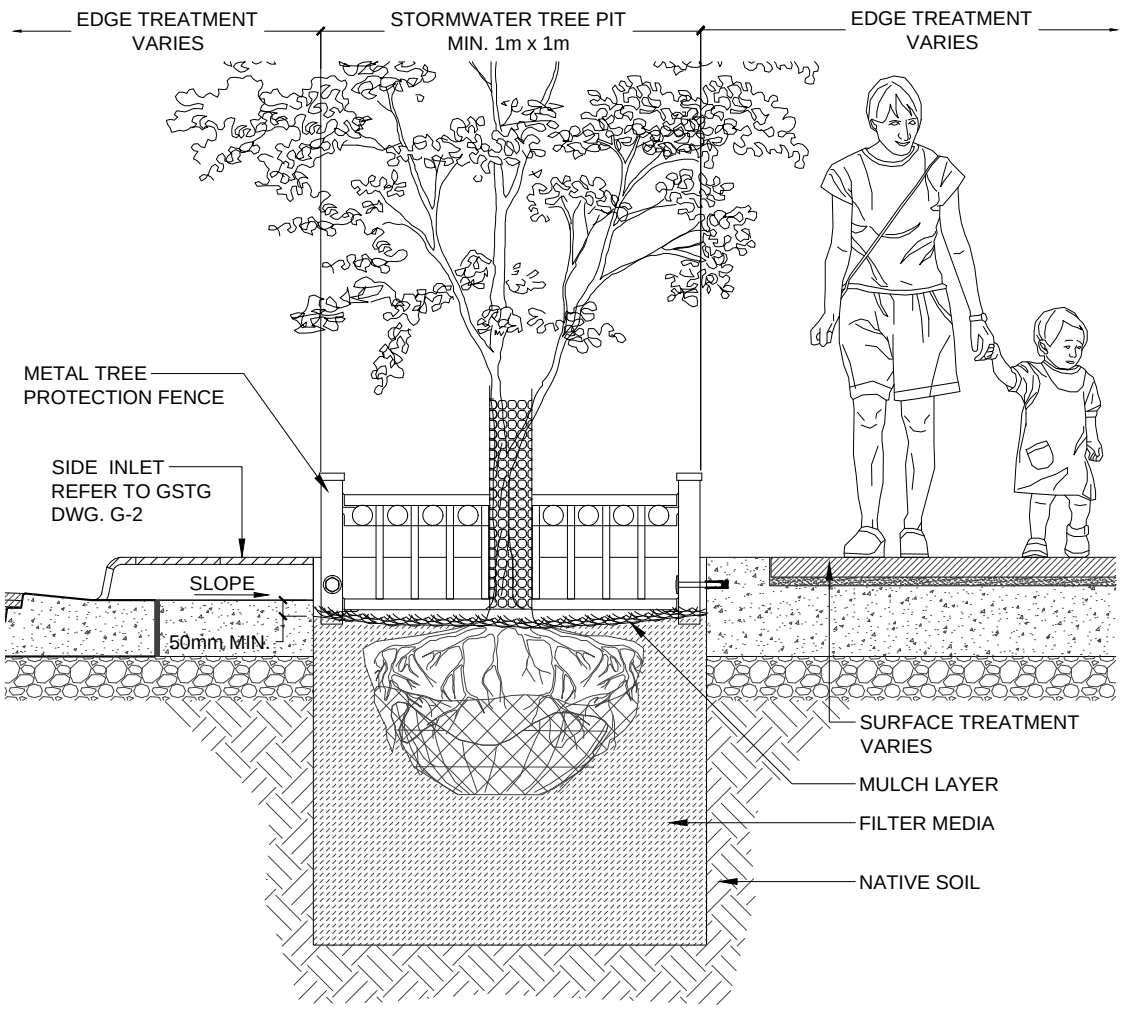
Plant material selection and arrangement considerations:

- Native trees should be selected wherever possible;
- Trees should be selected for their tolerance of salt and urban conditions;
- Refer to the GSTG Vegetation Selection Tool for appropriate tree species;
- Refer to Construction Specification for Planting (TS 5.30).

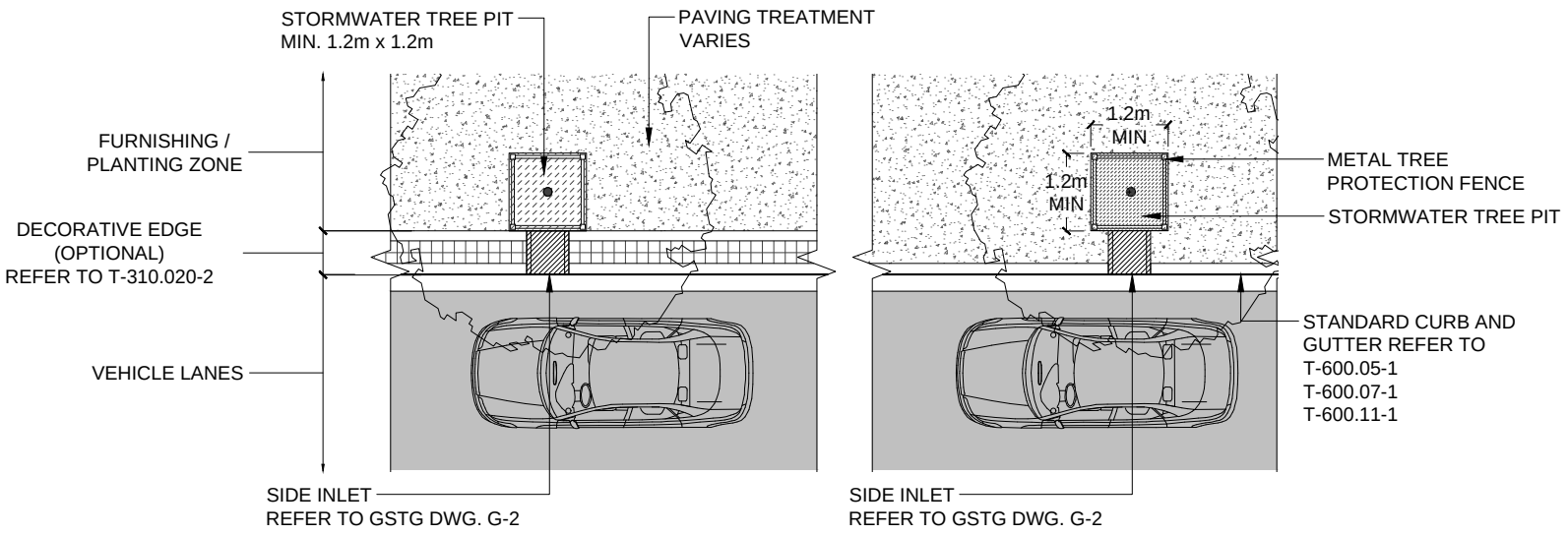
A.4 IDENTIFICATION MEDALLION

- To be installed on curb. Refer to guideline drawing G-1.

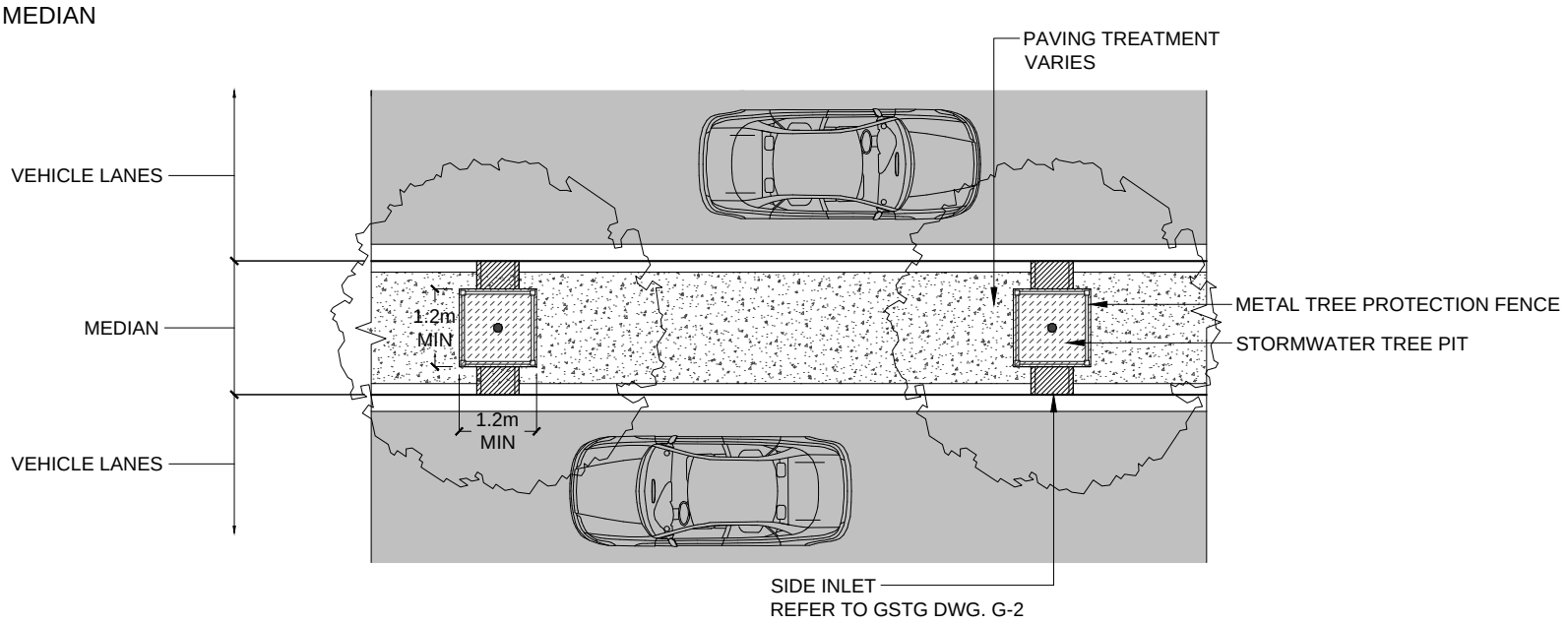
STORMWATER TREE PIT IN FRONTAGE ZONE



TREE PIT IN FURNISHING ZONE



TREE PIT IN MEDIAN



All dimensions are in millimetres unless otherwise shown.

	CITY OF TORONTO GUIDELINE DRAWING	REV 0	APR 2017
TORONTO	STORMWATER TREE PIT SECTIONS AND LAYOUTS	WQ-16.1	
		NTS	1 OF 1

A.0 GEOMETRY & LAYOUT

- Square excavation;
- Ensure that the surface of the Tree Pit is level;
- Structural soil trench connecting Tree Pits
- Suitable where native soil permeability is >15mm/hr

A.1 TREE PIT FILTER MEDIA

- Pre-mixed from an approved vendor;
- Filter media composition:
  - Sand - 75 to 85%
  - Fines - 2 to 5%
  - Organic Matter - 8 to 10%
  - P-Index value 12 to 30 ppm
  - Soluble Salts <2.0mmhos/cm
  - Cationic exchange capacity >5 meq/100 g
  - pH - 5.5 to 7.5
  - Infiltration rate > 120 mm/hr, max. 300mm/hr
- Depth varies -Minimum depth 1.0m;
- Capacity - Volumetric computation should be based on surface area and depth.

A.2 MULCH

- Depth - 75 mm;
- Material - Shredded hardwood bark mulch

A.3 PLANTING

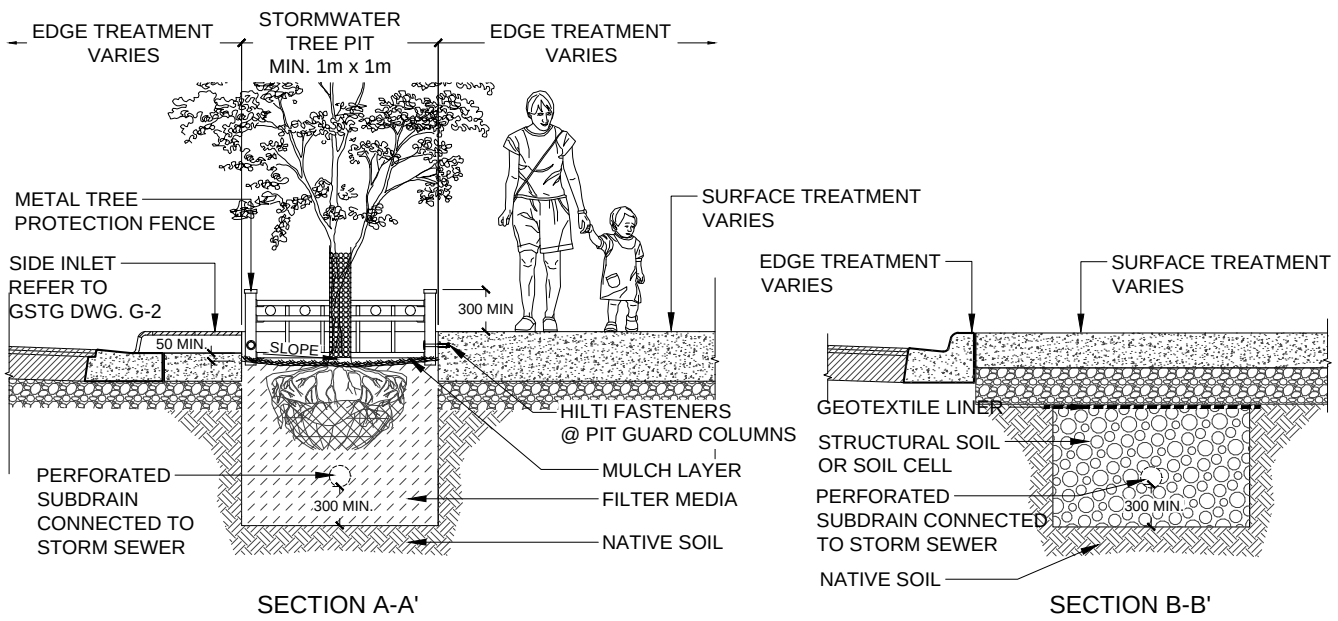
Plant material selection and arrangement considerations:

- Native trees should be selected wherever possible;
- Trees should be selected for their tolerance of salt and urban conditions;
- Refer to the GSTG Vegetation Selection Tool for appropriate tree species;
- Refer to Construction Specification for Planting (TS 5.30).

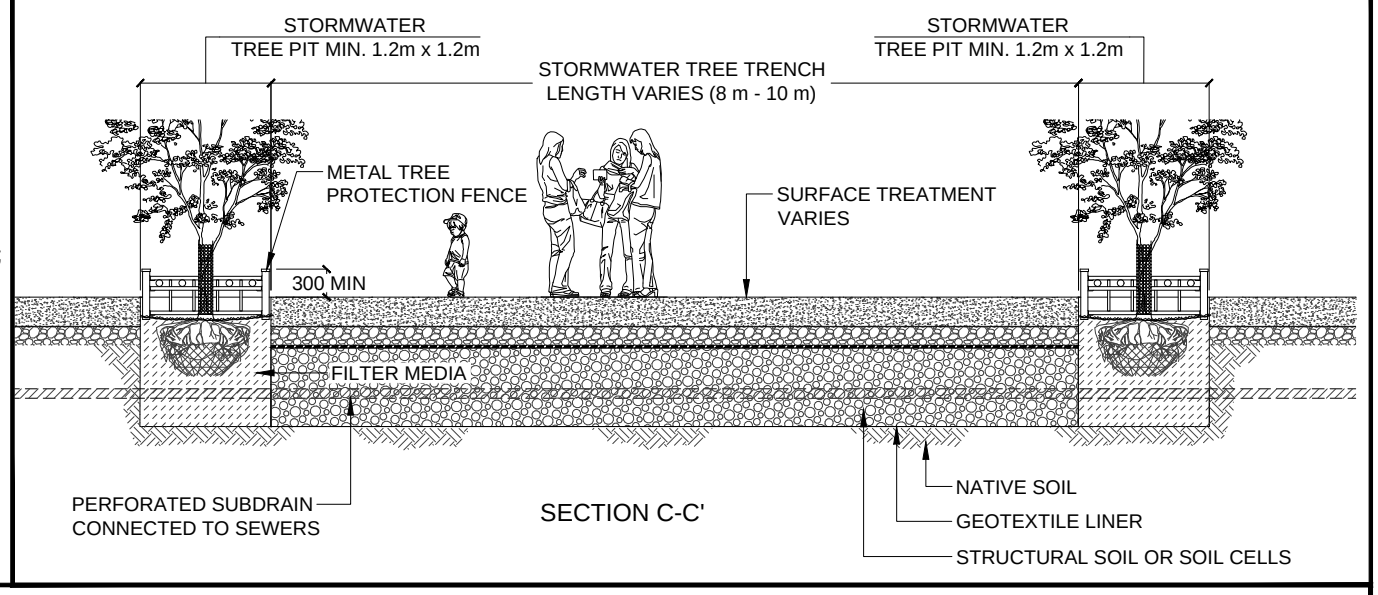
A.4 IDENTIFICATION MEDALLION

- To be installed on curb. Refer to guideline drawing G-1.

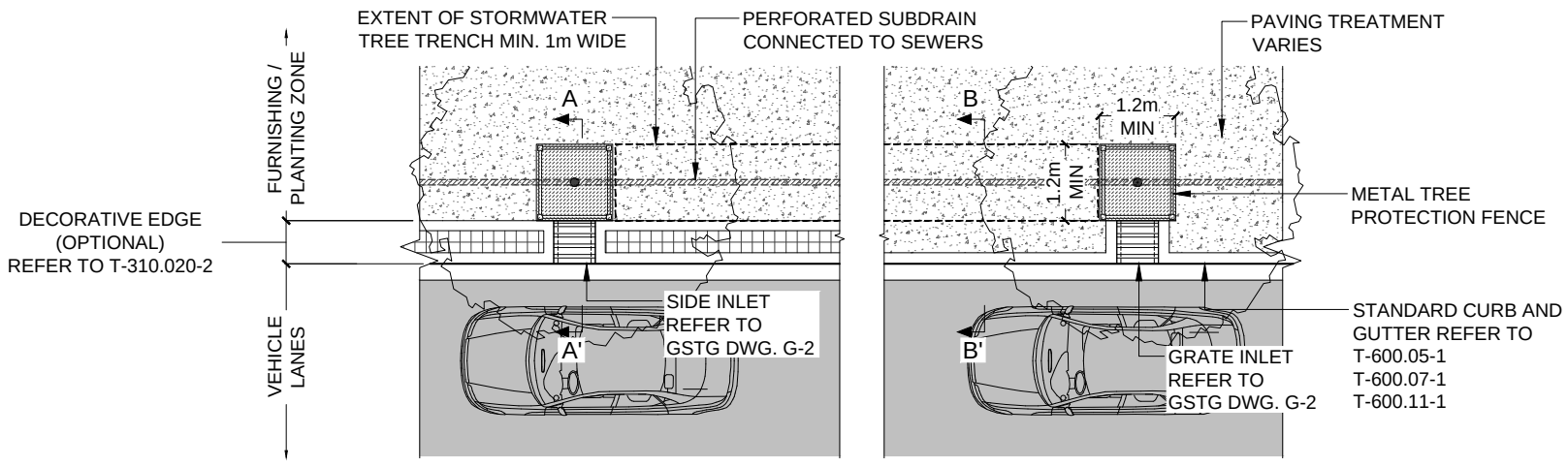
STORMWATER TREE TRENCH CROSS-SECTIONS



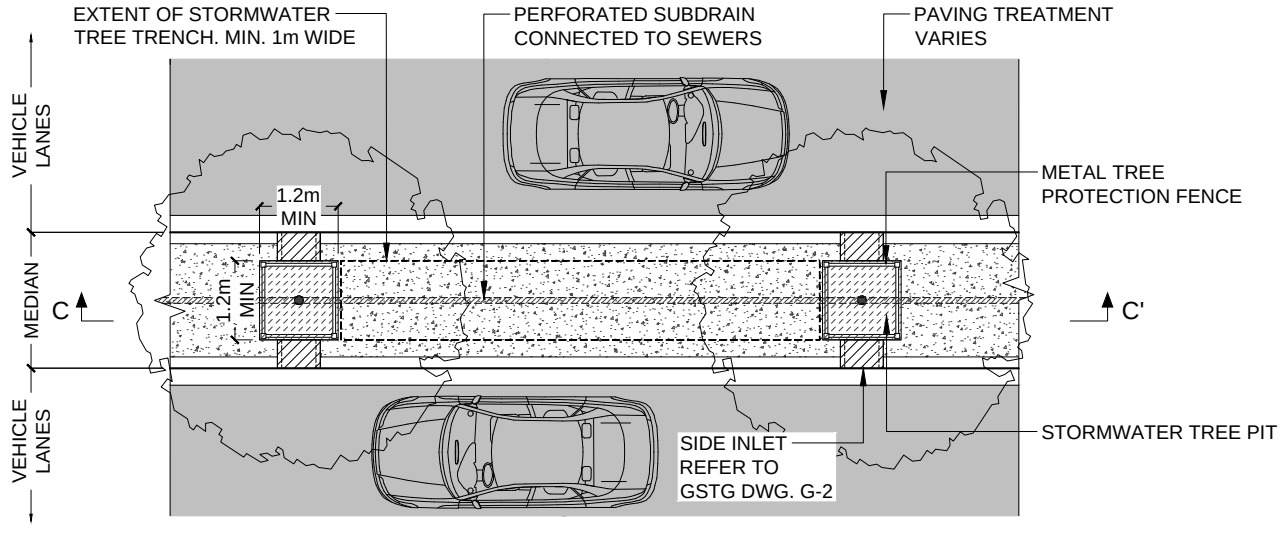
STORMWATER TREE TRENCH LONGITUDINAL SECTION



TREE TRENCH IN FURNISHING ZONE



TREE TRENCH IN MEDIAN

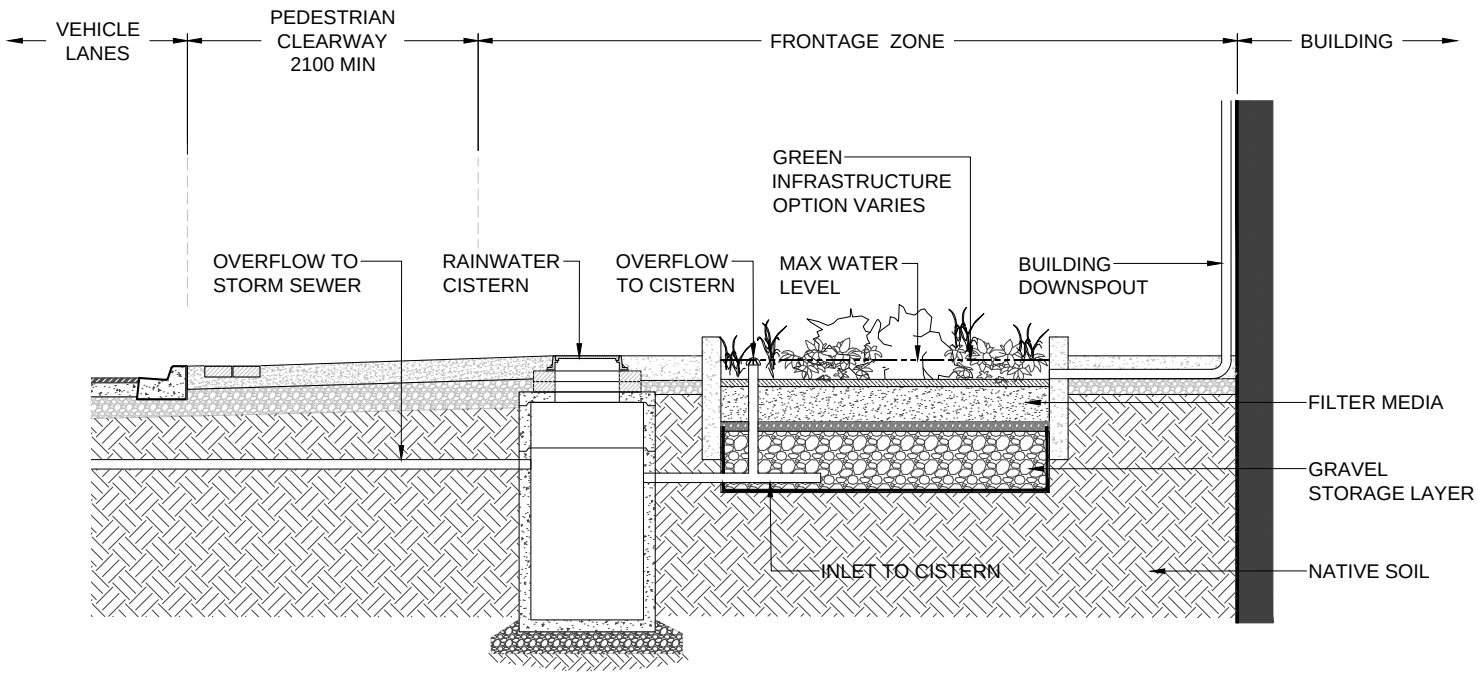


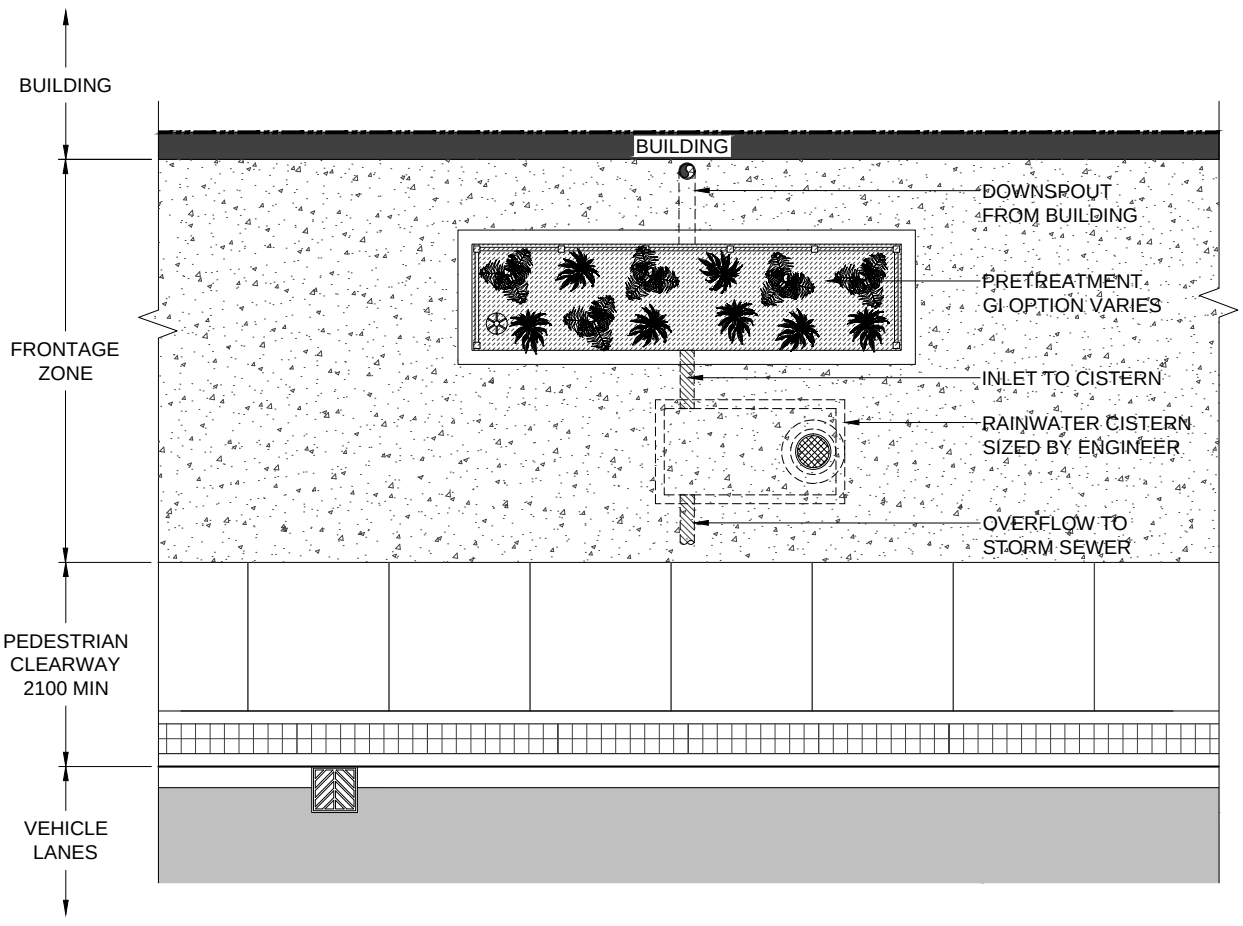
All dimensions are in millimetres unless otherwise shown.

	CITY OF TORONTO GUIDELINE DRAWING	REV 0	APR 2017
TORONTO	STORMWATER TREE TRENCH SECTIONS AND LAYOUTS	WQ-17.1	
		NTS	1 OF 1

RAINWATER CISTERN IN THE FRONTAGE ZONE

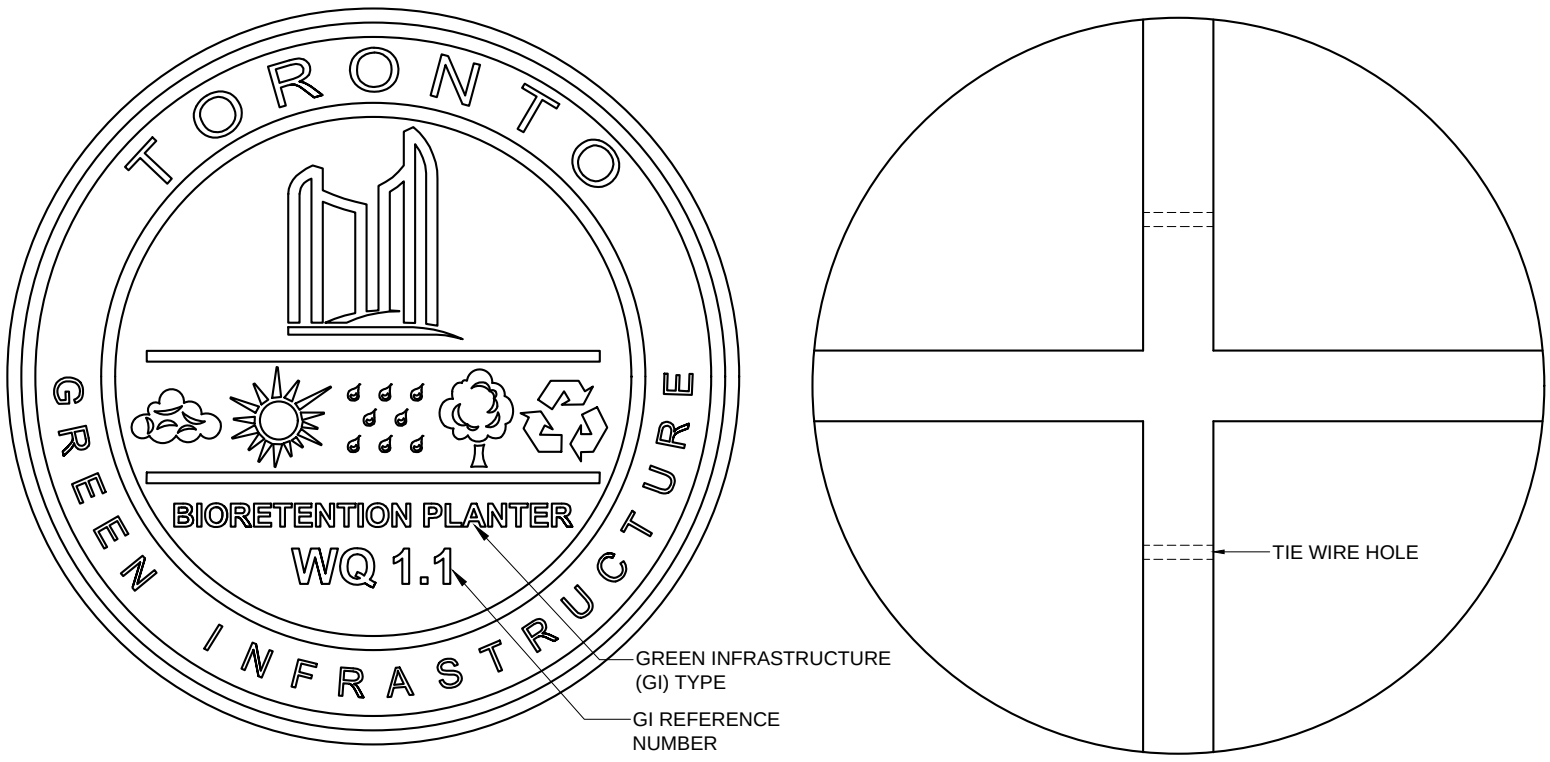
For sites with contaminated subsoil or high water table





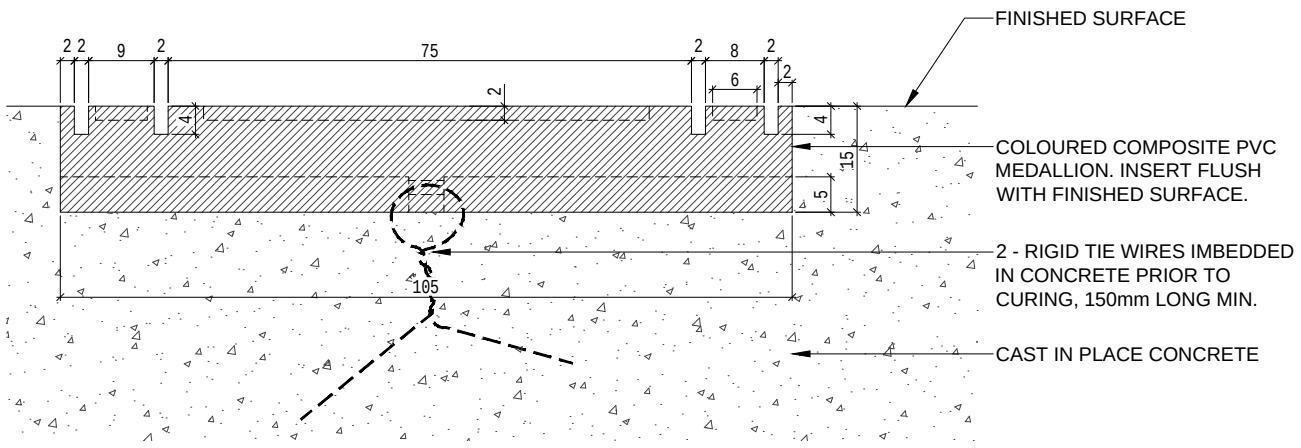
All dimensions are in millimetres unless otherwise shown.

	CITY OF TORONTO GUIDELINE DRAWING	REV 0	APR 2017
TORONTO	RAINWATER CISTERN SECTION & LAYOUT	WQ-18.1	
		NTS	1 OF 1



FRONT

BACK



SECTION

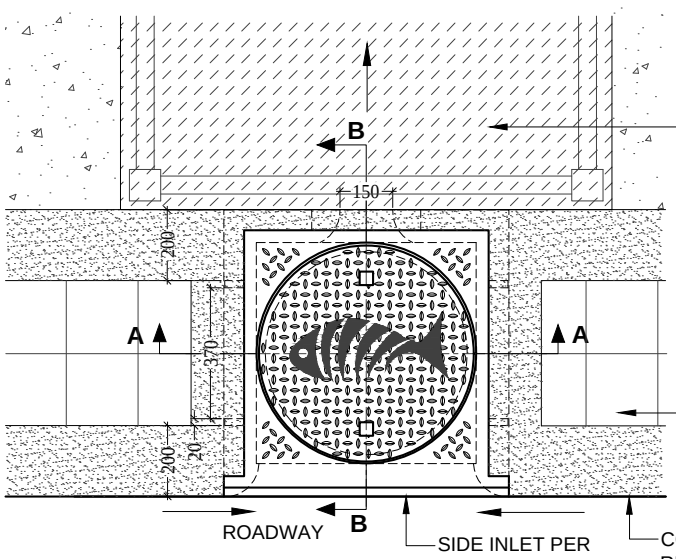
NOTES

- MEDALLION TO BE INSTALLED ON SURFACE OF SIDEWALK OR CURB, OR ON FACE OF GREEN INFRASTRUCTURE OPTION.
- MEDALLIONS TO BE INSTALLED TO DEMARCATE THE EXTENT OF SUBSURFACE INFRASTRUCTURE.
- FOR LINEAR SUBSURFACE INSTALLATION, MEDALLIONS ARE TO BE INSTALLED AT A SPACING OF 20m ON CENTER

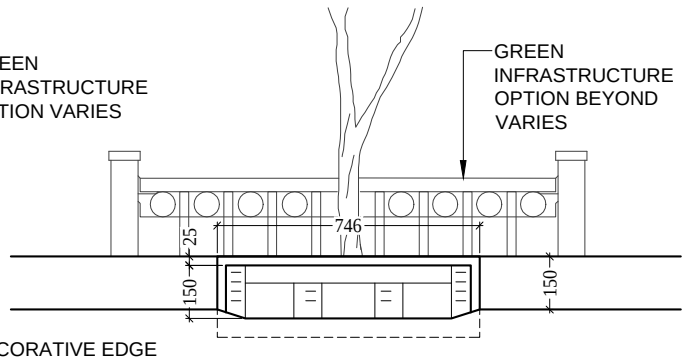
All dimensions are in millimetres unless otherwise shown.

	CITY OF TORONTO GUIDELINE DRAWING	REV 0	APR 2017
TORONTO	GREEN INFRASTRUCTURE IDENTIFICATION MEDALLION	G-1	
		NTS	1 OF 1

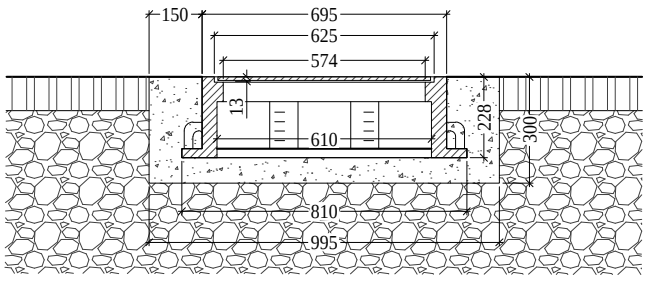
SIDE INLET



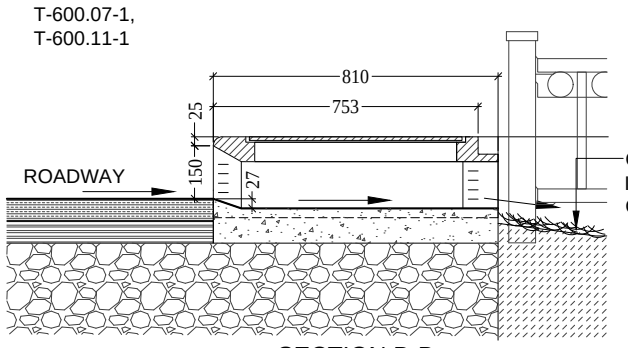
PLAN



CURB ELEVATION

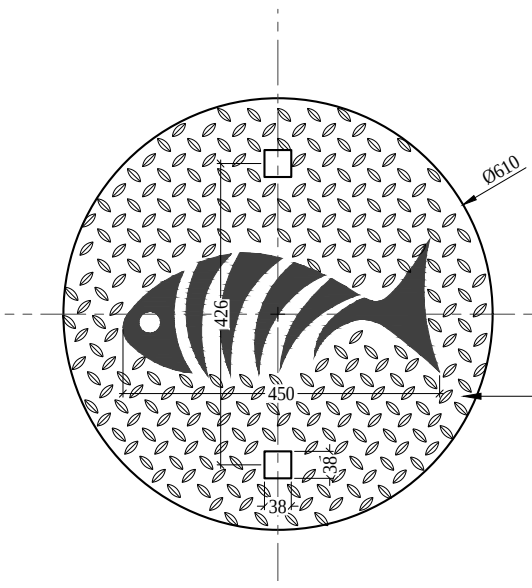


SECTION A-A

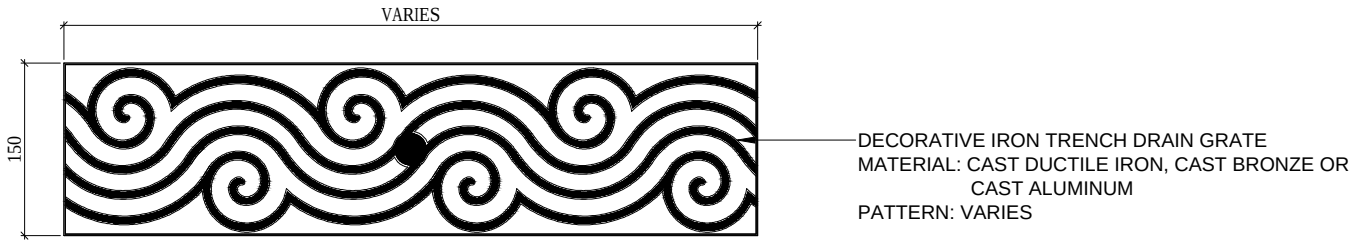


SECTION B-B

SIDE INLET HATCH COVER



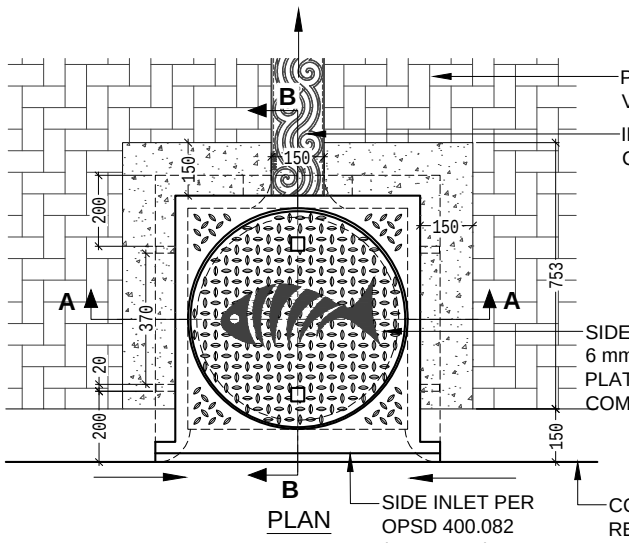
TRENCH DRAIN GRATE



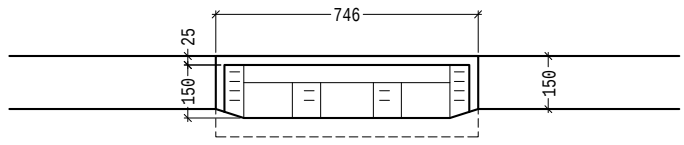
All dimensions are in millimetres unless otherwise shown.

	CITY OF TORONTO GUIDELINE DRAWING	REV 0	APR 2017
TORONTO	SIDE INLET AND COVER DETAIL	G-2	
		NTS	1 OF 1

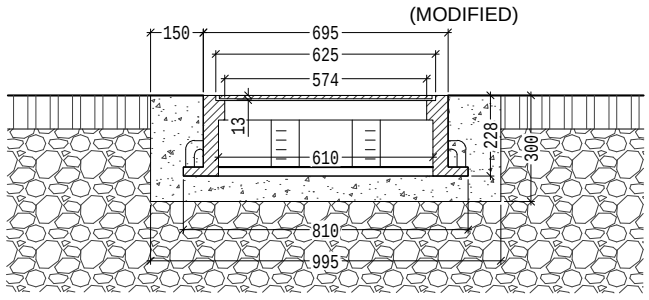
SIDE INLET WITH TRENCH DRAIN



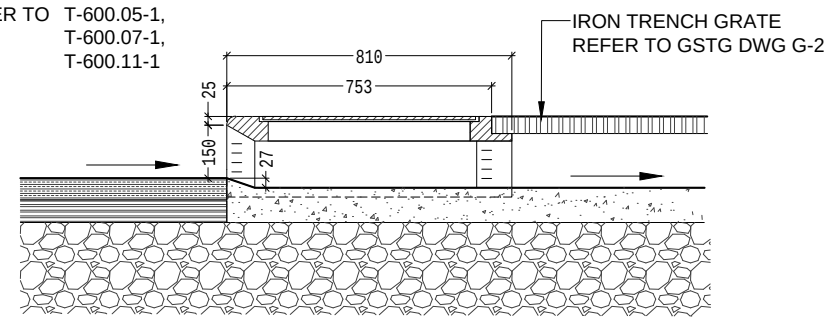
PLAN



CURB ELEVATION

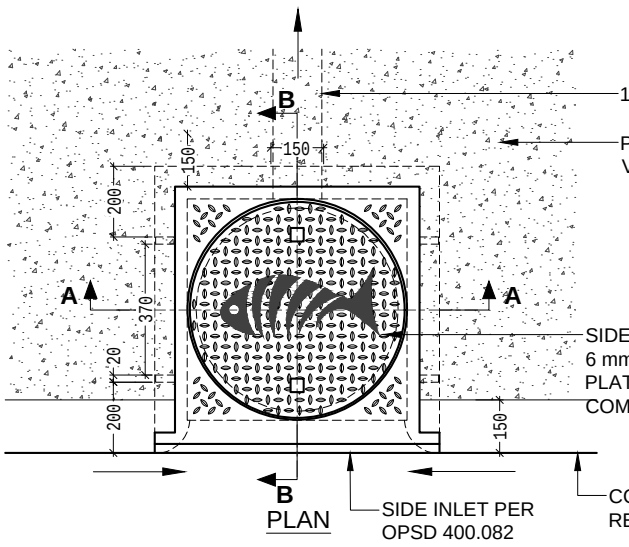


SECTION A-A

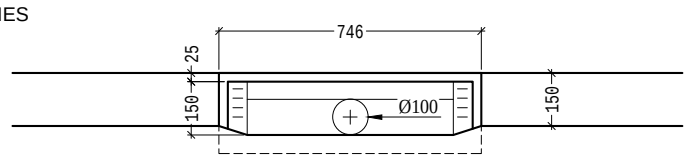


SECTION B-B

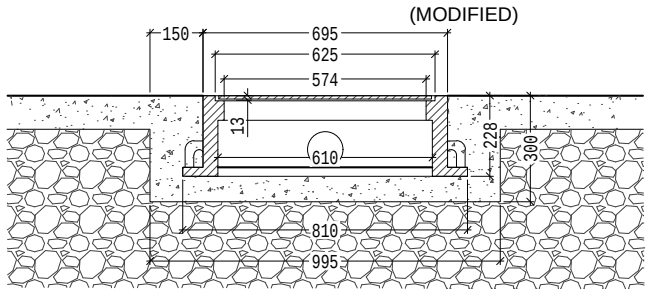
SIDE INLET WITH PIPE DRAIN



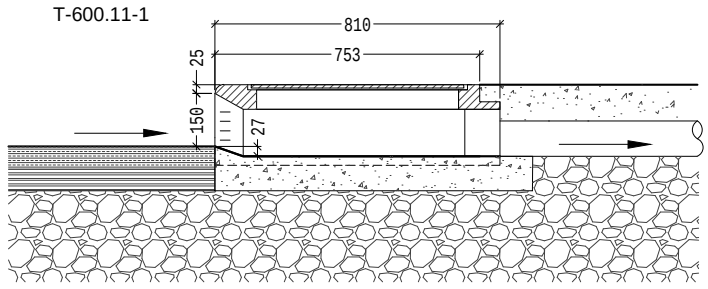
PLAN



CURB ELEVATION

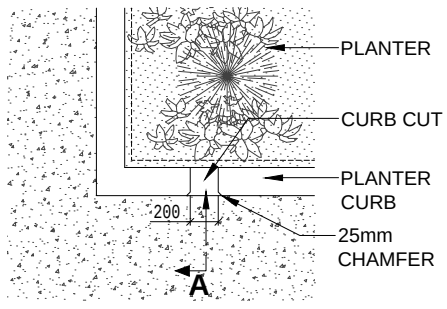


SECTION A-A

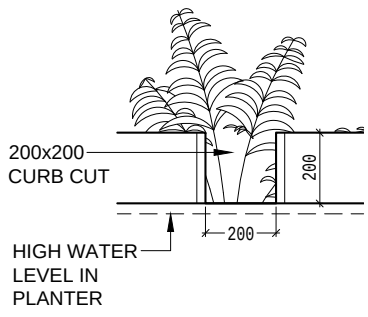


SECTION B-B

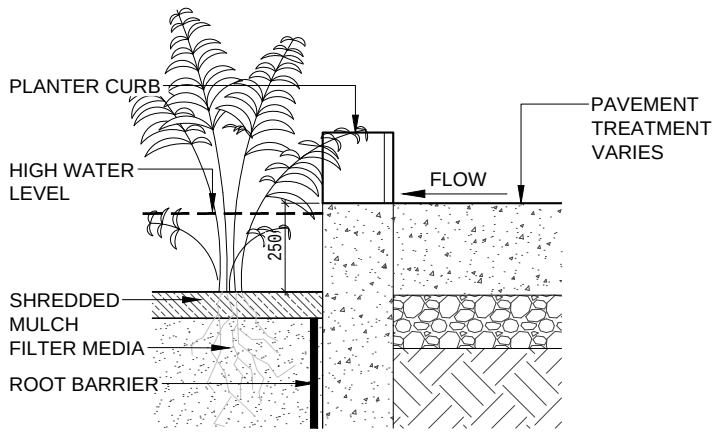
PLANTER CURB CUT



PLAN



ELEVATION



SECTION A

All dimensions are in millimetres unless otherwise shown.

	CITY OF TORONTO GUIDELINE DRAWING	REV 0	APR 2017
TORONTO	SIDE INLETS	G-3	
		NTS	1 OF 1

D.0

APPENDIX D - METHOD FOR UTILIZING THE GREEN INFRASTRUCTURE SELECTION TOOL

D.0 METHOD FOR UTILIZING THE GREEN INFRASTRUCTURE SELECTION TOOL

Direction

The Green Infrastructure (GI) Selection Tool is designed to be used by addressing the 'Type of Work', 'Street Type' and/or 'Application' first and then working from left to right through the parameters in the database to further refine the search. If however, there is a specific parameter criterion that is critical to the search, then that parameter should be considered first.

The Selection Tool is operated through the filter function of Microsoft Excel. When a parameter applies to a GI option an 'X' is placed in the intersecting cell, when it applies with conditions an asterisk is used followed by an acronym identifying the consideration, and when it does not apply then the cell is left blank.

Example

The following example provides step-by-step instructions to direct the use of the GI Selection Tool to identify a palette of GI options based on known site characteristics and required tolerances. In this example, the site has the following characteristics:

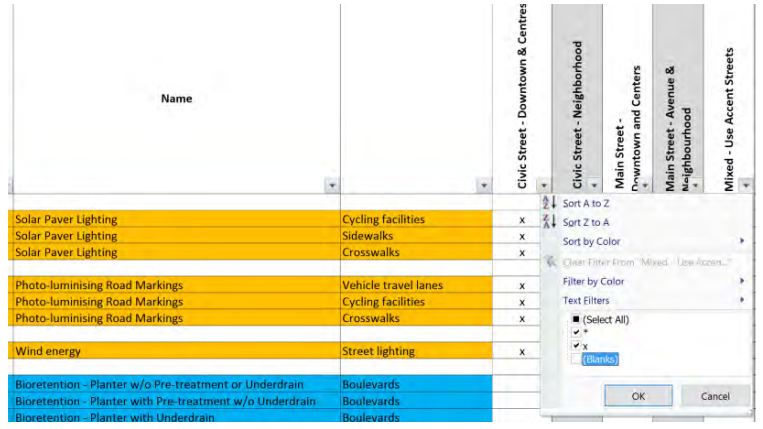
- **Type of Construction |**
  New Street Construction
- **Street Type |**
  Mixed-Use Accent Street
- **Application|**
  All except Bridges
- **Soil Permeability |**
  <15mm/hr
- **Topography |**
  3%
- **Depth to Water Table |**
  1-2m
- **Depth to bedrock |**
  >2m
- **Known Soil Contamination |**
  No
- **Open Space Context |**
  Adjacent a Park
- **Storm Sewer Infrastructure |**
  Urban Separated
- **Transit Infrastructure |**
  No Subway, No LRT
- **Utilities Infrastructure |**
  Underground Only
- **Known Flooding |**
  Contributing to Flood Areas
- **Urban Forest |**
  Low
- **Watershed Context |**
  Moderate
- **Operations and Maintenance |**
  Curbside Waste Removal and Sand Application

Step 1

Select Tab 3.0 to begin screening for a 'New Street' construction project

Step 2

Start the process by screening for the 'Type' of street, in this case a Mixed-Use Accent Street. Refer to the Complete Streets Guidelines for a comprehensive description of each street type. To select for Mixed Use Accent Streets, click the drop down arrow in the Mixed-Use Accent Streets cell and deselect the 'blank' filter and then click OK. This will reduce the number of options available to only those that would be viable.



Step 3 | Applications:

All Applications are considered except bridges, therefore, select the drop-down in the Bridges cell, deselect 'X' and click OK. This will remove any options that apply to Bridges specifically.

Step 4 | Soil Permeability: Deselect the 'blank' option in the drop-down for SP-1 (<15mm/hr). This will remove options that are only suitable in highly permeable soils.

Step 5 | Topography: There are no 'blanks' in the drop down for 1%-5%. Therefore there are no changes to be made to the drop-down menu.

Step 6 | Depth to Water Table: Deselect the 'blank' option in the drop-down for WT-2 (1-2m). This will remove options that are not suitable in areas with water table depth less than 1m or greater than 2m.

Step 7 | Depth to Bedrock: There are no 'blanks' in the drop-down for BE-3 (>2m). Therefore there are no changes to be made.

Step 8 | Known Soil Contamination: Deselect the 'blank' option in the drop-down menu for 'NO'. This will restrict options to those suitable in areas with no soil contamination.

Step 9 | Open Space Context: All remaining options are suitable adjacent a park, therefore no changes are necessary as there are no 'blank' options to deselect.

Step 10 | Storm Sewer Infrastructure: Deselect the 'blank' option in the drop-down for Urban Separated Sewers. This will restrict options to those suitable for urban separated sewers.

Step 11 | Transit Infrastructure: There is no transit infrastructure to contend with in this scenario, therefore there are no changes required in this section.

Step 12 | Utilities Infrastructure: All remaining options are suitable in coordination with underground utilities. As this is a new street construction, every effort should be made to place utilities such that they do not interfere with GI options.

Step 13 | Known Flooding: All remaining options are suitable in contributing to flood prone areas, therefore no changes are necessary as there are no 'blank' options to deselect.

Step 14 Urban Forest: All remaining options are suitable in areas of low urban canopy, therefore no changes are necessary as there are no 'blank' options to deselect.

Step 15 Watershed Context: All remaining options are suitable in areas of moderate erosion vulnerability, therefore no changes are required as there are no 'blank' options to deselect.

Step 16 Operations and Maintenance: Deselect the 'blank' option in the drop-down menus for "curb-side waste removal" and "sand application". This will restrict options to those suitable given these maintenance and operation parameters.

The resulting list below provides a palette of GI options that are viable within the right-of-way of this sample street

Number	Name	
E-1	Natural Canopy	
AQ-1	Green Roof	
AQ-2	Street Trees	
GHG-1a	LED Lighting	Street lighting
GHG-2a	Solar Photovoltaic Panels	Street lighting
GHG-2c	Solar Photovoltaic Panels	Parking meters
GHG-2d	Solar Photovoltaic Panels	Vehicle charging stations
GHG-2e	Solar Photovoltaic Panels	Feature paving
GHG-3a	Solar Roadways	Sidewalks
GHG-3b	Solar Roadways	Cycling facilities
GHG-3c	Solar Roadways	Crosswalks
GHG-3d	Solar Roadways	On-street parking lanes
GHG-4a	Solar Paver Lighting	Cycling facilities
GHG-4b	Solar Paver Lighting	Sidewalks
GHG-4c	Solar Paver Lighting	Crosswalks
GHG-5a	Photo-luminising Road Markings	Vehicle travel lanes
GHG-5b	Photo-luminising Road Markings	Cycling facilities
GHG-5c	Photo-luminising Road Markings	Crosswalks
WQ-2.1d	Bioretention - Curb Extension/Bump-out with Pre-treatment &	Intersections
WQ-13.3b	Soakaway/Infiltration Gallery/Dry Well/Soakaway Pit with pre-	Furnishing zones
WQ-14.1b	Perforated Pipe System - with pre-treatment	Vehicle travel lanes
WQ-16.2	Planter Boxes/Movable Planters	Furnishing zones
WQ-17.2	Precast Tree Planters	Furnishing zones
WQ-23.2	Structural Soil	Furnishing zones
WQ-24.1c	CIP Structural Concrete Panels Over Continuous Growing Medi	Furnishing zones
WQ-24.1d	CIP Structural Concrete Panels Over Continuous Growing Medi	Furnishing zones
WQ-24.2c	Precast Structural Concrete Panels & Unit Paving Over Continu	Furnishing zones
WQ-24.2d	Precast Structural Concrete Panels & Unit Paving Over Continu	Furnishing zones
WQ-25.2	Soil Cell in Continuous Growing Medium Trench	Furnishing zones
WQ-26.1c	Open Tree Planters	Furnishing zones
WQ-26.1d	Open Tree Planters with Soil Cells	Furnishing zones

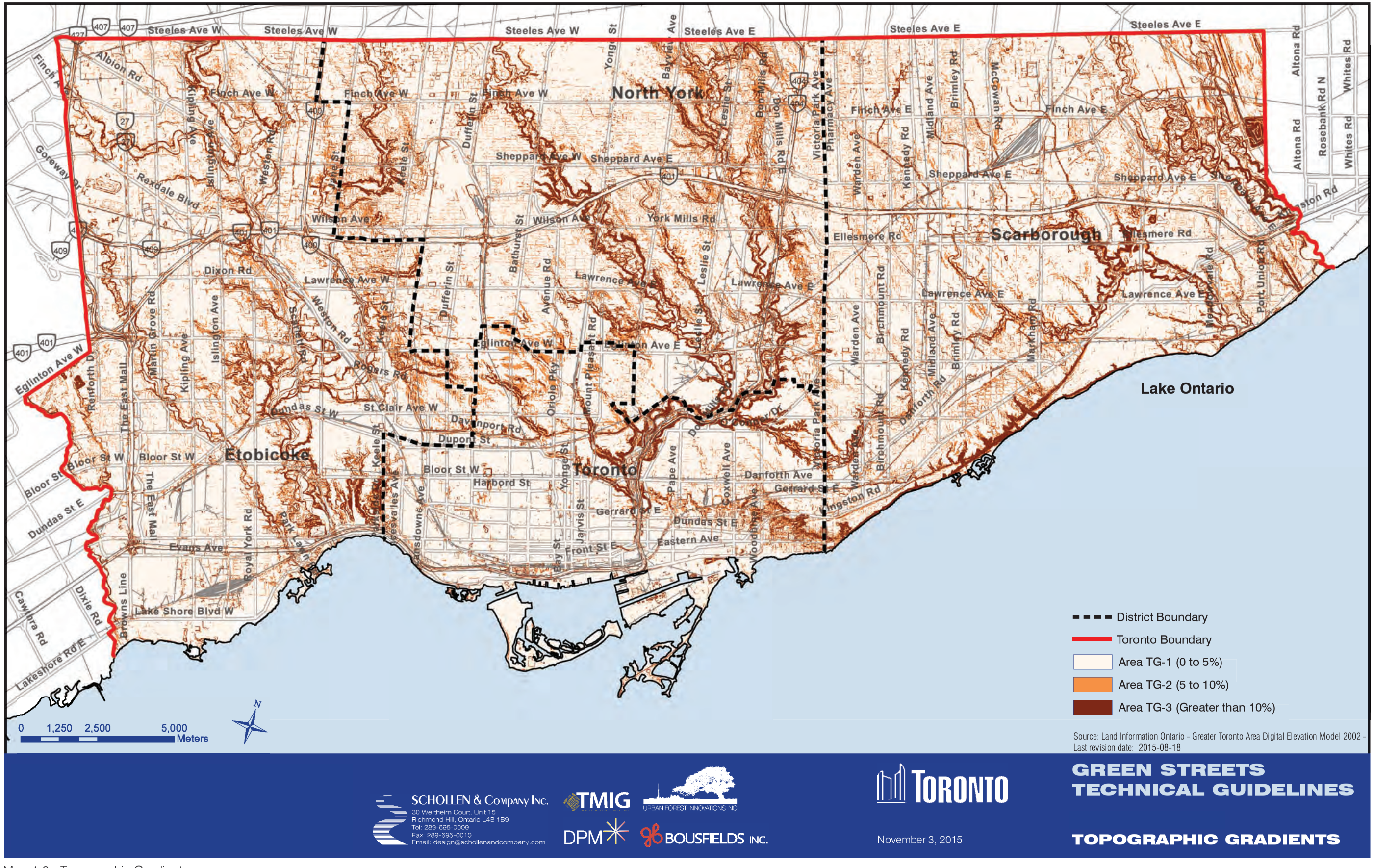
Reset the Selection Tool

To reset the Tool click 'clear' under Sort & Filter in the Data menu. Green infrastructure options resulting from this example relate to four of five TGS priorities including: Ecology, Air quality, GHG / Energy Efficiency & Water Quality, Quantity and Efficiency. Once a palette of options are identified, then the GI selection, design and implement processes can begin.

Each GI option has an associated reference number. These numbers correlate to Guideline Drawings for each GI option (and permutation thereof) within the Selection Tool.

E.0

APPENDIX E - CITY-WIDE REFERENCE MAPS



District Boundary
Toronto Boundary
Area TG-1 (0 to 5%)
Area TG-2 (5 to 10%)
Area TG-3 (Greater than 10%)

Source: Land Information Ontario - Greater Toronto Area Digital Elevation Model 2002 -
Last revision date: 2015-08-18

SCHOLLEN & Company Inc.
30 Wertheim Court, Unit 15
Richmond Hill, Ontario L4B 1B9
Tel: 289-695-0009
Fax: 289-695-0010
Email: design@schollenandcompany.com

TMIG

URBAN FOREST INNOVATIONS INC

DPM

BOUSFIELDS INC.

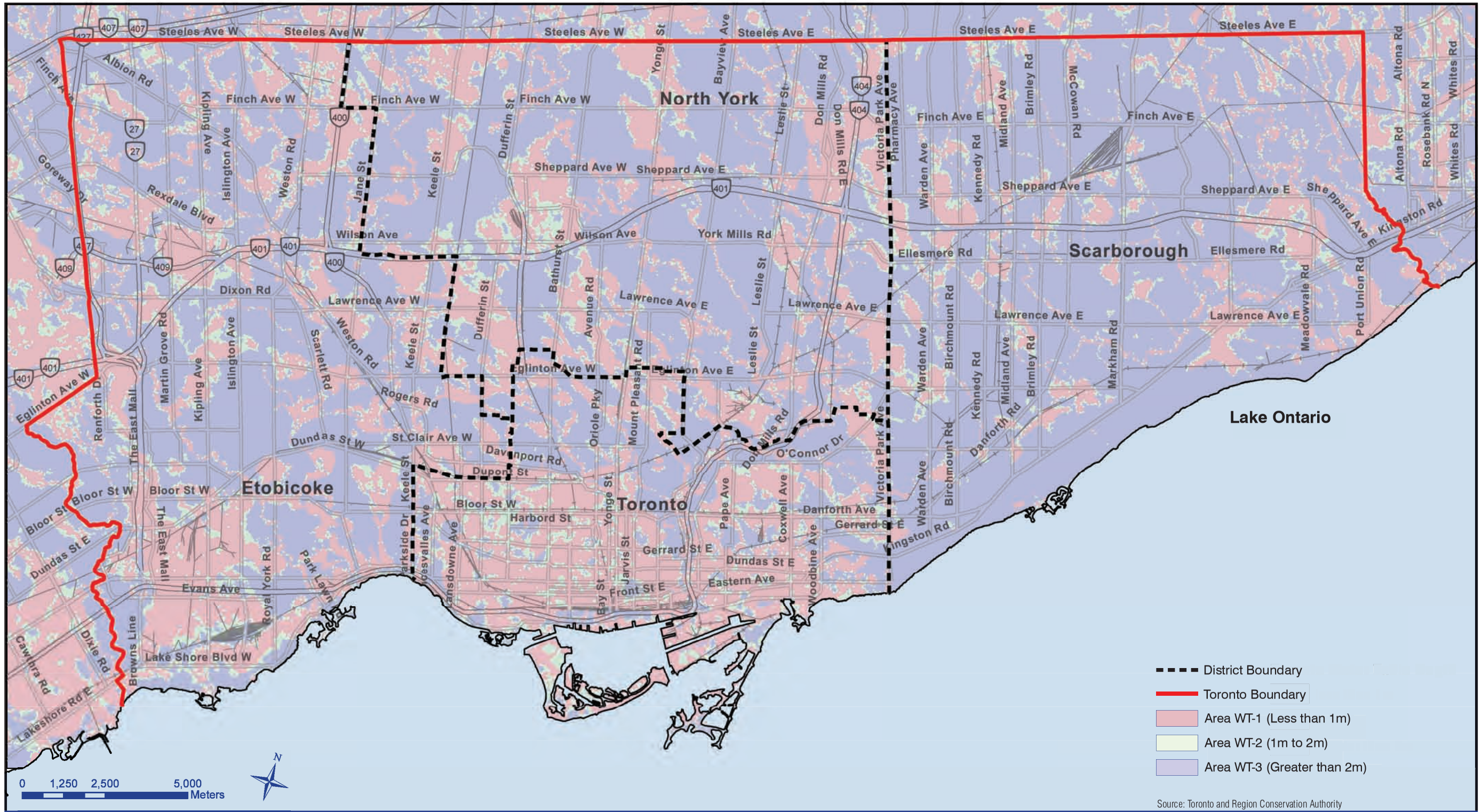
TORONTO

November 3, 2015

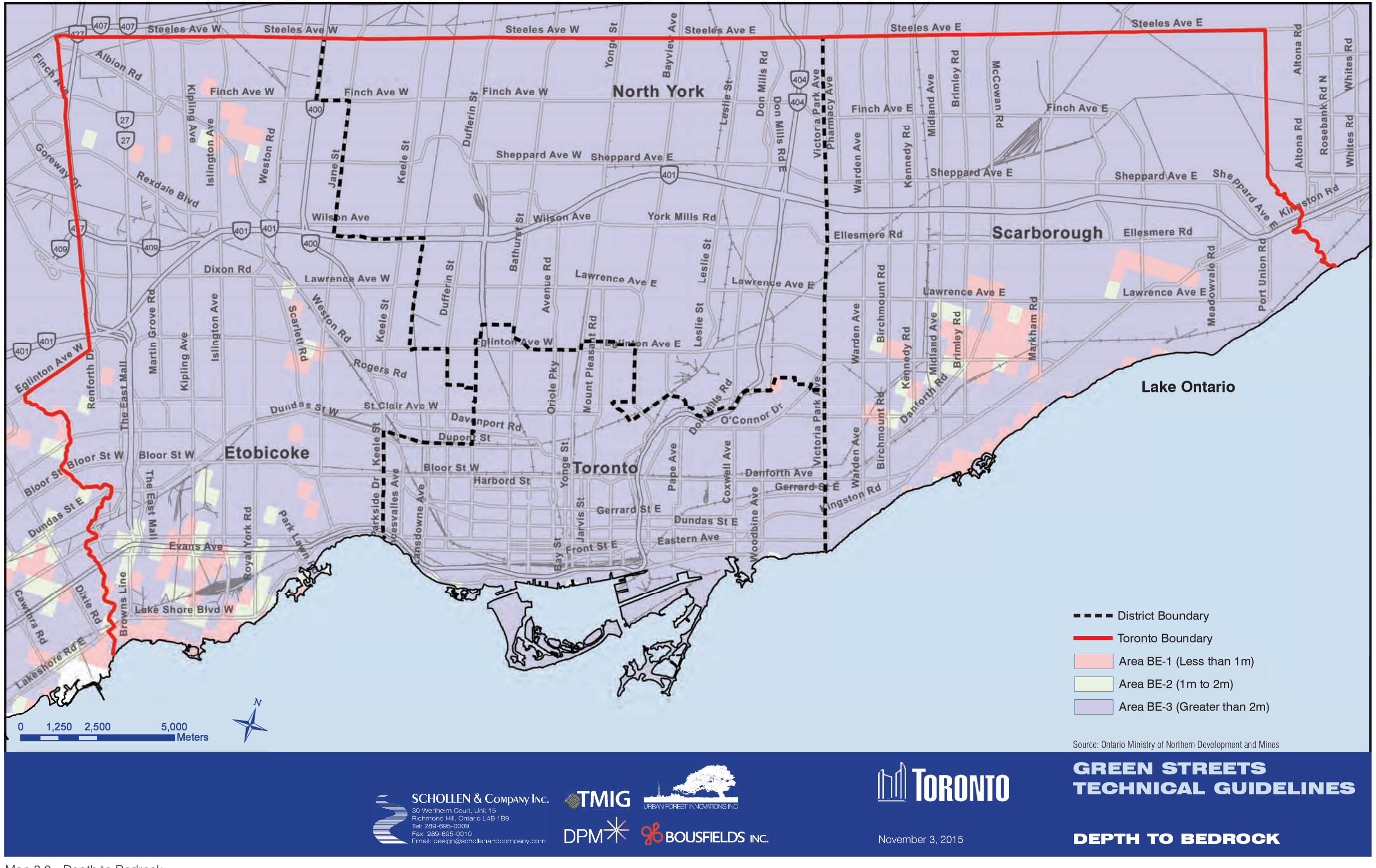
GREEN STREETS TECHNICAL GUIDELINES

TOPOGRAPHIC GRADIENTS

Map 1.0 - Topographic Gradients



Map 2.0 - Depth to Water Table



Source: Ontario Ministry of Northern Development and Mines

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Fax: 289-695-0010
Email: design@schollenandcompany.com

TMIG
URBAN FOREST INNOVATIONS INC
DPM
BOUSFIELDS INC.

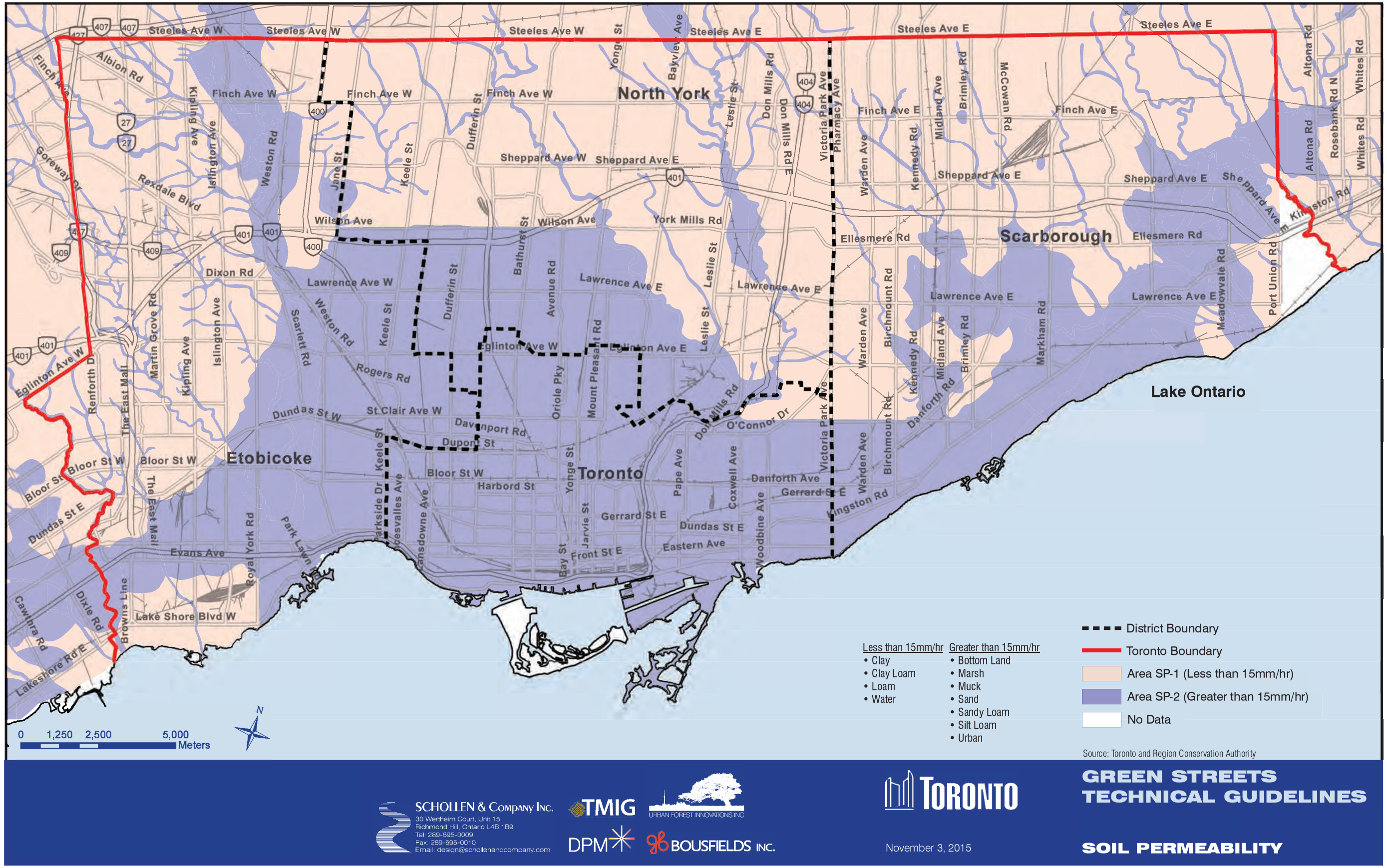
TORONTO

November 3, 2015

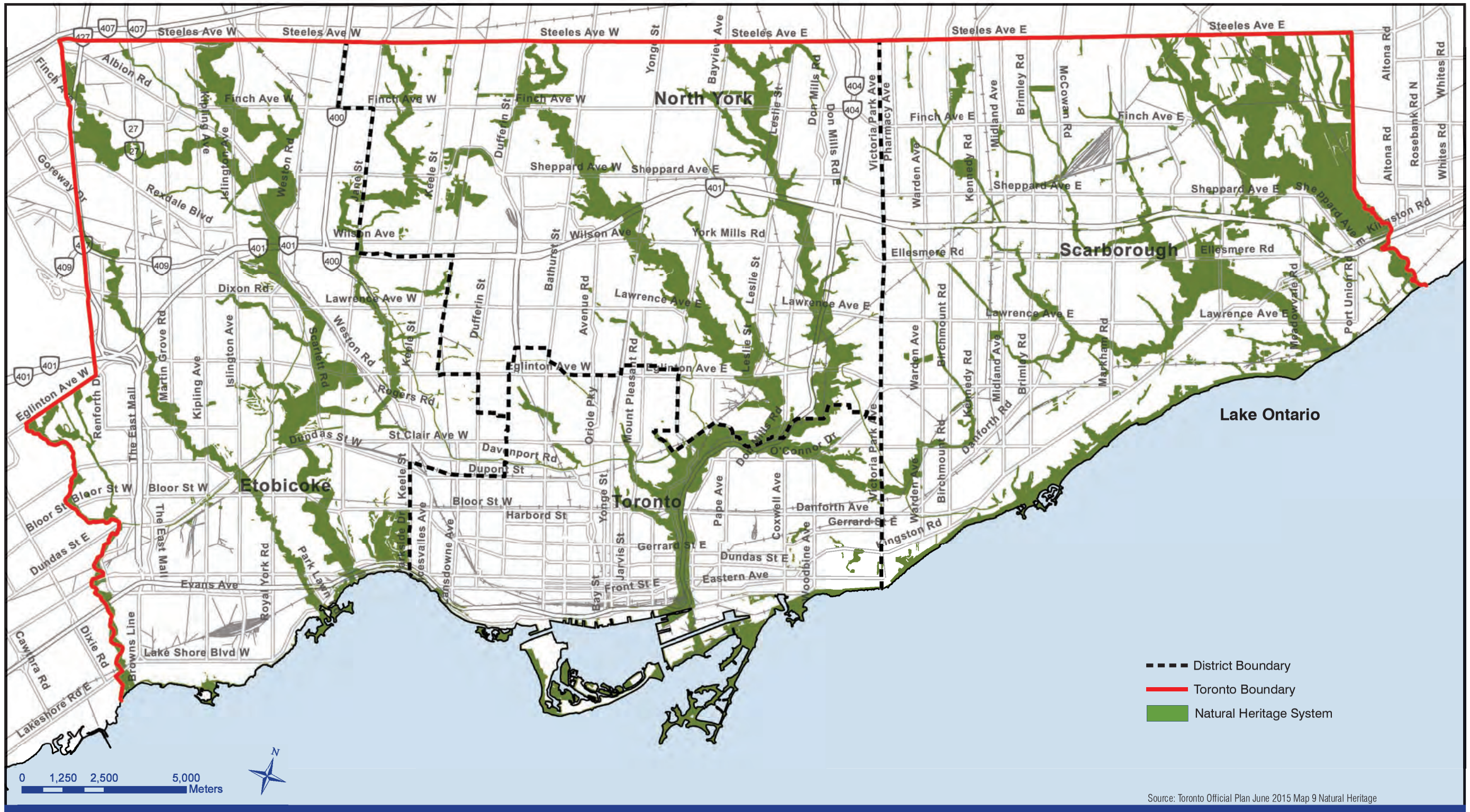
GREEN STREETS TECHNICAL GUIDELINES

DEPTH TO BEDROCK

Map 3.0 - Depth to Bedrock



Map 4.0 - Soil Permeability



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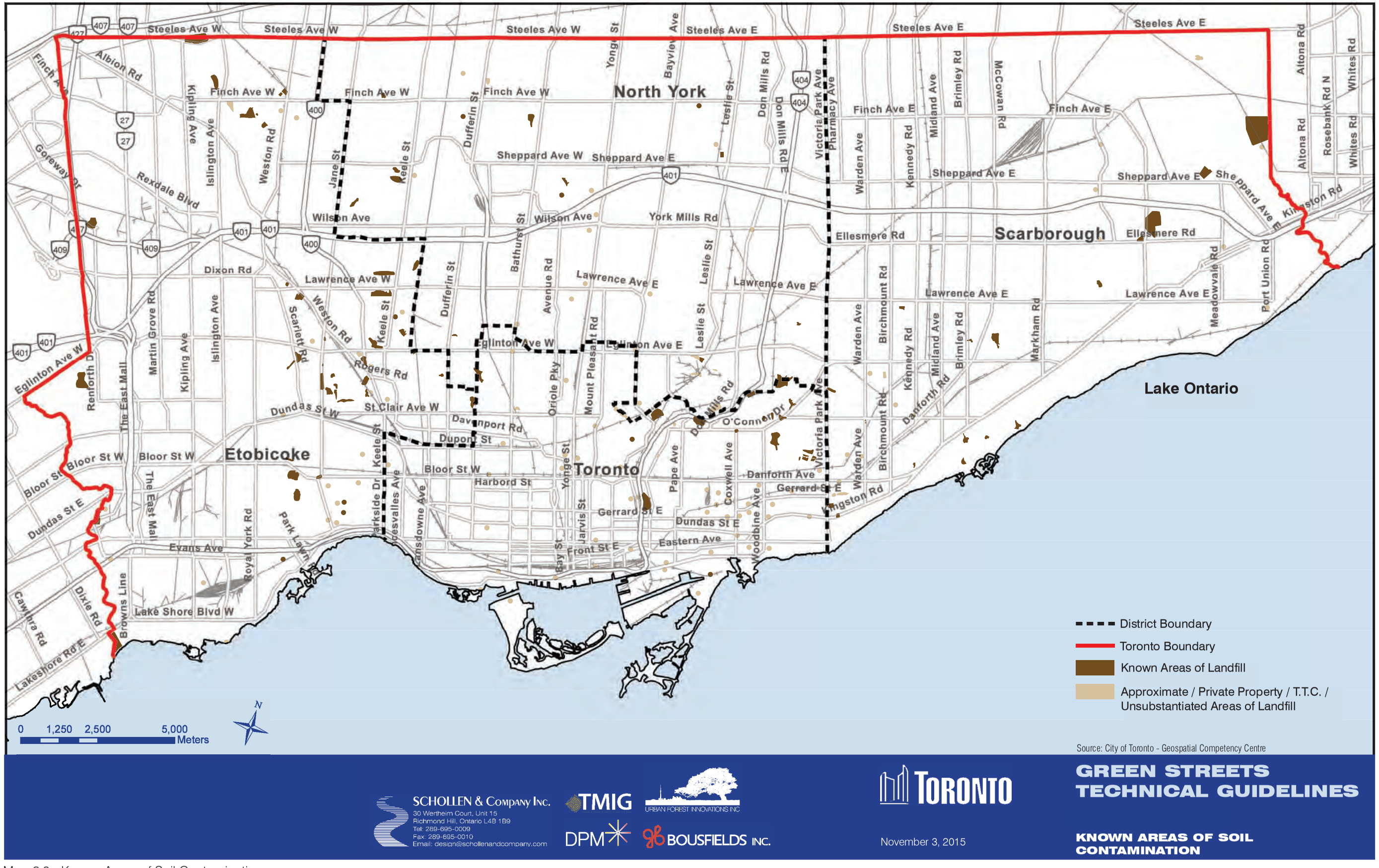
GREEN STREETS TECHNICAL GUIDELINES

NATURAL HERITAGE SYSTEM

Map 5.0 - Natural Heritage System



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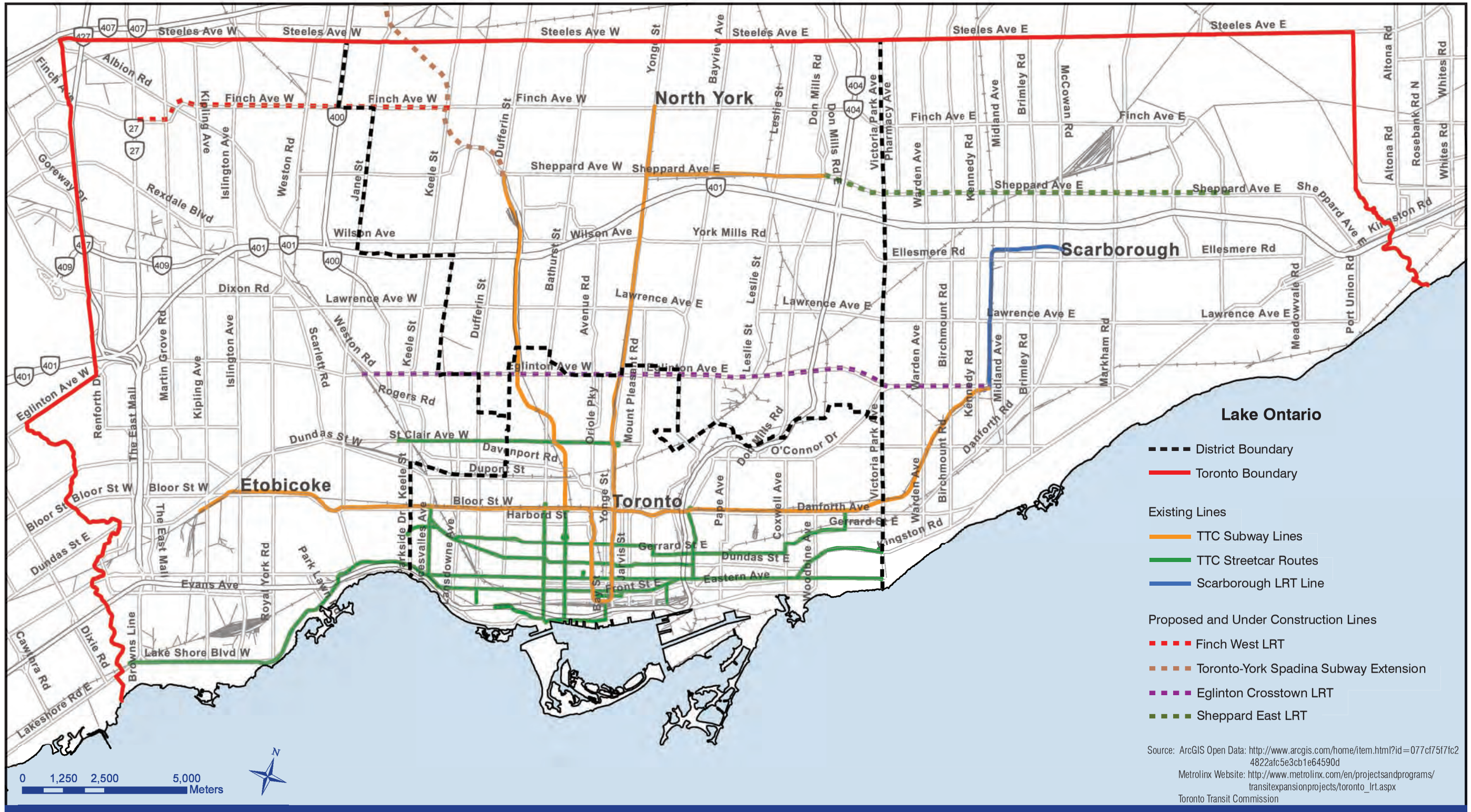
KNOWN AREAS OF SOIL CONTAMINATION

Map 6.0 - Known Areas of Soil Contamination



Source: ArcGIS Open Data: http://www.arcgis.com/home/item.html?id=077cf75f7fc24822afc5e3cb1e64590d
Metrolinx Website: http://www.metrolinx.com/en/projectsandprograms/transitexpansionprojects/toronto_lrt.aspx
Toronto Transit Commission

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SUBWAY, STREETCAR AND LRT LINES

Map 7.0 - Subways, Streetcars and LRT Lines