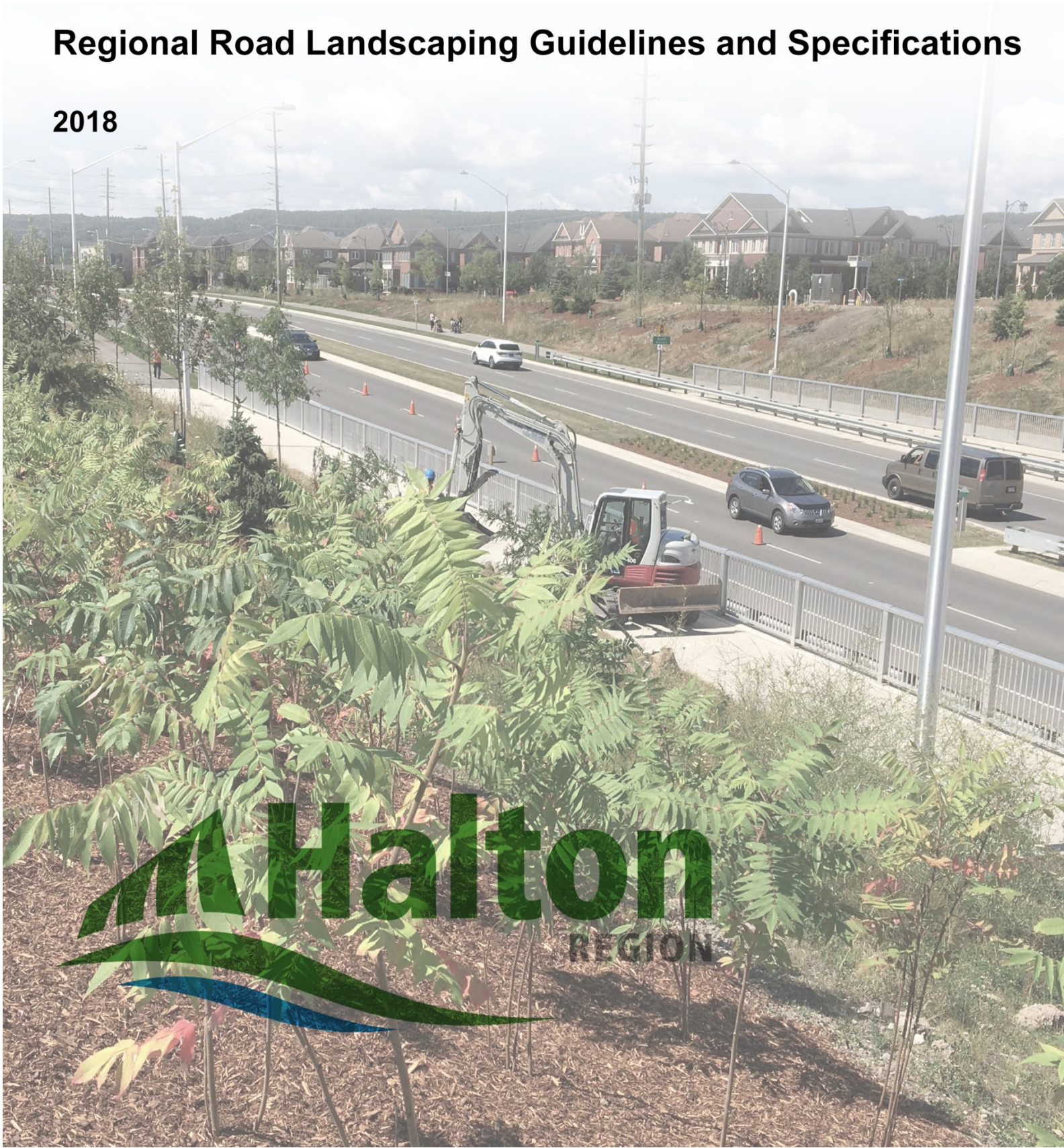
The Regional Municipality of Halton

Regional Road Landscaping Guidelines and Specifications

2018



Executive Summary

The purpose of this set of Regional Road Landscaping Guidelines and Specifications is to direct landscape enhancements within the right-of-way, but with a significant focus on lowering the cost for long term maintenance, providing low to no maintenance landscaping features for high risk maintenance areas such as centre medians, and ensuring long-term success of all plantings.

The main goals of the Regional Road Landscaping Guidelines and Specifications are to guide Regional Municipality of Halton (Halton Region) project managers in the preparation of quality landscape plans for various urban and rural scenarios, develop guidelines for sustainable, low impact landscape designs within the Regional right-of-way (ROW), provide detailed construction and planting standards and specifications in an effort to ensure long-term success of all plantings and provide aesthetically pleasing landscapes on Regional roads while reducing long term maintenance costs.

Research was conducted as to the best management practices and industry standards for roadside and streetscape landscaping. Findings were presented and discussed with Region of Halton staff in a facilitated project initiation session with the objective to brief the entire project team on the project. Key Regional staff, and Local Municipality staff, in Road Operations, Engineering and Construction, Infrastructure Planning, Planning Services, and Sustainable Planning, were consulted and current specifications were reviewed. Current maintenance practices and capabilities for new construction, ongoing concerns and challenges that are experienced in maintaining the road and roadside landscapes, and the current warranty program were considered.

The Guidelines and Specifications include:

- Guidelines for the landscaping design, including specific recommendations for treatments within centre medians, in boulevards, bioswales, roundabouts and in rural areas;
- Low-maintenance, low impact development landscaping design guidelines;
- Typical cross-sections and plan views indicating preferred planting locations;
- Planting details and specifications for all recommended types of native plantings – through research and conducted meetings with the Regional staff and the four Local municipalities, an assortment of appropriate vegetation species for the area has been determined, recommendations for species to be used in each Local municipality based on site conditions have been provided, maintenance needs / costs, hardiness, salt resistance, natural heritage systems, etc. have been discussed.
- Topsoil and planting mix specifications with specific acceptable ranges on chemical and physical properties for noted soils.
- Best management maintenance and warranty specifications, as well as special provisions

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1. Introduction

Research was conducted on best management practices and industry standards for streetscape and roadside landscape design to produce a set of landscape guidelines, to direct regional road right of way landscape design in The Regional Municipality of Halton (Halton Region). Halton Region and its four Local municipalities, the Town of Halton Hills, the Town of Milton, the Town of Oakville and the City of Burlington, were consulted to determine current and preferred landscape design implementation, operations and maintenance practices to further inform the guidelines. The following document presents these landscape guidelines, a two-step design framework, and a comprehensive technical landscape installation package to standardize Regional road landscapes and to achieve the following objectives.

1.1 Guideline Objectives:

1. To prescribe design consistency for a cohesive Regional landscape aesthetic.
2. To uphold rural and urban Regional patterns.
3. To lower long term cost of maintenance after the warranty period.
4. To prescribe resilient and low impact design solutions that are sensitive to Regional growth.
5. To provide the tools needed to assess potential planting sites and to determine best site-specific design.
6. To align with service agreements between the Region and Local municipalities.
7. To design for safer landscape maintenance operations.
8. To protect and enhance the Region's natural heritage system.

1.2 Site Inventory, Analysis and Design

The first section of this document presents design standards, as the foundation for a diverse and healthy landscape, that ultimately respond to urbanization and expansion in the Halton Region. It outlines challenges faced by planted vegetation in urban environments, site inventory and analysis, land use opportunities and constraints, and the integration of such vegetation with existing and proposed utilities and infrastructure. These landscape guidelines provide the designer with a species palette and typical landscape layouts for various urban and rural land uses, and respective landscape typologies: boulevards, medians and roundabouts.

1.3 Methods and Materials

The second section of this document focuses on design implementation / landscape installation. It includes typical methods and materials created with best management practices in mind.

1.4 Post Occupancy

The third section of this document outlines the process of managing the landscape from substantial completion to Local municipality takeover, and beyond.

1.5 Appendix

The Appendix contains tools referred to by the guidelines that are needed to accomplish the design, implementation, and maintenance of a Halton Region road landscape.

2. Site Inventory, Analysis and Design

2.1 Healthy Landscapes

A major challenge in landscape design and implementation is maintaining vegetation health. There are rural and urban environmental factors that affect the resilience of streetscape planting during and beyond establishment.

2.1.1 Inappropriate Species Selection

Matching species selection with tolerance to site conditions increases survival rate. In a planting plan, consideration should be given to many factors, including:

- Variability in stock origin and quality.
- Age diversity and diversity of tolerant species to resist disease and insect impacts.
- Tolerance to roadside environmental impacts (heat, wind, salt, etc.)
- Moisture regime.
- Exotic pests and invasive plants.

2.1.2 Poor Site Conditions

Physical challenges in the streetscape environment include water stress due to soil properties, microclimate and maintenance practices, increased drought, salt pollution, and air pollution. The streetscape environment creates microclimate extremes due to wind tunnelling, reflected heat from asphalt, concrete and light and shade from surrounding structures. Inadvertent damage caused by vehicles, snow plows, lawn equipment and vandalism threaten the health of trees and shrubs, and make them more susceptible to secondary stresses. Weakened and stressed plants are more susceptible to secondary insects and disease damage.

2.2 Landscape Context

In addition to site-specific inventory and analysis, potential sites must be assessed for opportunities and constraints in terms of Regional and local contexts.

2.2.1 Regional Context

Located in Ontario, the Halton Region encompasses the City of Burlington and the Towns of Halton Hills, Milton and Oakville. It offers a wide range of plant species in landscapes ranging from rural to high-density urban, with areas of the Niagara Escarpment and 25km of Lake Ontario frontage along the south side of the region. Soil types vary across the region and should be assessed on a site by site basis as later discussed in this document. The Halton Region is located within Zones 5b, 6a and 6b (of the 2000 Natural Resources Canada Plant Hardiness Zone Map), based on the region's average annual minimum temperature. The two main forest types present in the region are the Southern Deciduous Forest (Carolinian Zone) and the Great Lakes St. Lawrence Forest characterized by warm summers and cold, snowy winters. The mean temperature for the growing season is 17 degrees Celsius and the frost-free growing season is over 160 days. Based on Environment Canada climate stations, the average annual precipitation between 1986 and 2006 averaged 850mm/year. January and February tend to be the driest months with <60mm on average, while August and September are the wettest averaging >80mm. 15% of annual precipitation occurs as snow falls between December and March (Environment Canada

2007). Additionally, the Halton Region holds many Natural Heritage Systems (NHSs) which should be identified during the site inventory phase of any design project, as discussed later in this document. **The most recent version of the Regional Official Plan can be found online at http://www.halton.ca, and should be consulted with attention to Maps 1 and 1G. These two maps can also be found in Appendix A.**

An understanding of the regional context helps to design regionally recognizable streetscape and road landscapes. In the case of the Halton Region, native, top performing species can be carried throughout the four Local municipalities to reinforce the regional natural character in rural and urban situations. Enhanced planting at gateway areas can create a sense of arrival as users enter the region. Typical layouts can pull influence from the two forest types of the region, the escarpment and the connection to the Lake Ontario shoreline. **Layouts can also respond to regional growth and urbanization by accommodating space for future roadway expansion.**

2.2.2 Local Context

Local Context deals with the resources, methods, and policies that determine planning and development decision-making in each of the four Local municipalities. Since Regional roads traverse multiple Local municipalities at multiple times, a combination of preferred and best management practices must be implemented from the design phase to the Local municipality takeover. The designer will include the involved Local municipalities during every phase of the project to instil a sense of ownership and to ensure the project is being designed to fit Local municipality maintenance capabilities. Designs are to be consistent with the municipalities' operations and maintenance service agreements with the Region. In some cases, the designer and the Region must also be prepared to obtain required approval from conservation authorities such as Halton Conservation for the proposed landscape project.

2.2.3 Site Context

When choosing potential planting areas, the designer must consider multiple factors including climate, soil characteristics, environmental conditions, plant spacing, site location, existing vegetation, existing overhead and underground utilities, visibility and accessibility, aesthetics, land use, ownership and regulations, maintenance requirements, and awareness for Crime Prevention Through Environmental Design (CPTED). By fully understanding the site context, conflicts are minimized, maintenance needs are reduced, public safety is enhanced and long term costs are reduced. Planting strategies can be considered in the context of the specific site and prioritized to maximize ecological services/assets for long term benefits.

Choosing an appropriate planting site must consider the following:

- Adequate soil volume and quality to support future healthy tree growth.
- User safety considering visibility and accessibility.
- Preventing compaction of planting area soils by construction and foot traffic
- Resolving conflicts between roadway signs, trees and utilities, pavement and lighting.
- Reducing impact of tree exposure to emissions, polluted runoff, wind and drought.
- Allowing for snow removal and storage and prevent salt damage, ice damage and trunk scour
- Preventing damage to trees from cars, vandalism and other conflicts
- Considering proximity to features that could reduce the need for cost or impact of construction.

2.3 Site Inventory

2.3.1 Ecological Service Protection

Before thinking about design, site inventory must be performed to identify any existing ecological services/assets to be protected. Usually, these site assets are existing trees. It is typical for construction documents to include a tree removal and preservation plan, if any existing trees are to be preserved within the limit of site work, and these plans are to refer to Halton Region's standards for protecting existing trees, which can be found in **Appendix B** and the detail in **Appendix C**.

Designers are also responsible for identifying and protecting any Regional Natural Heritage Systems that may be impacted by the project. **The most recent version of the Regional Official Plan can be found online at http://www.halton.ca, and should be consulted with attention to the Regional Natural Heritage System Maps 1 and 1G, which can also be found in Appendix A.**

2.3.2 Soil Quality

Refer to **SP102 Topsoil, Appendix B, Special Provisions** for a complete description of an acceptable range of chemical elements for topsoil. Ideal growing medium is comprised of 45% mineral materials (sand, silt and clay), 50% open pore space and 5% organic matter and organisms. Root growth also depends on:

- Soil bulk density restricting root growth and penetration strength
- Water content, oxygen and air pore space in soil
- Temperature limits
- pH of soil

If adequate topsoil / growing medium is not present on site, it must be imported to fill appropriate growing space for proposed vegetation. Soil testing procedures and soil preservation plan requirements can be found in **Appendix B, Special Provisions – General, Landscape and Maintenance**.

2.3.3 Spatial Requirements and Soil Volume

Soil volume criteria are based on the expected size and stature of a particular tree species. For example, a 12m canopy tree requires 36 cubic meters of growing medium, while a 6m canopy tree requires 9 cubic meters of growing medium. Where space is limited, site specific enhanced planting strategies shall be designed to extend the root zone under hard surfaces. Consideration should include but not be limited to techniques such as continuous planting trenches, structural soils, soil cells and permeable paving.

MINIMUM SOIL VOLUME REQUIREMENT BY TREE SIZE *			
	Large Tree ≥60cm DBH	**Medium Tree ≥40cm DBH**	**Small Tree ≤20cm DBH**
Volume for single tree	45 cubic meters	28 cubic meters	17 cubic meters
Volume per tree in shared soil	30 cubic meters	18.5 cubic meters	11 cubic meters
*Allowable shared volume**	15 cubic meters	9.5 cubic meters	6 cubic meters
Note: Minimum soil depth shall be no less than 0.45m when space shared with underground utilities, while all other areas shall be no less than 0.90m deep. Maximum soil depth shall be 1.2m. * Tree size is measured by Diameter at Breast Height (DBH) at tree maturity. * Allowable shared volume is the maximum amount of soil volume permitted to be shared, as a portion of the total per tree.			

2.4 Two-Step Framework for Regional Right of Way Site Design

Regional right of ways (ROWs) include: roundabouts, medians and boulevards on a Regional road. To guide the landscape design of typical Regional ROWs, the following framework is to be used in conjunction with **Section 2.5 Supplementary Design Considerations.** Regional ROW design is determined by two factors which are addressed in this framework. (1) Regional right of ways travel through various development zones which help to dictate plant material selection, as covered in Step 1, and (2) Regional right of ways can be categorized as Rural Regional Right of Ways, Corridors or Nodes, according to *The Halton Region Transporation Master Plan – The Road to Change (to 2031), Regional Right of Way Guidelines*. **Combining results from Step 1 (a planting palette) and Step 2 (a typical cross section and layout), a standardized Regional ROW site design can be created by the designer.**

Notes:

- *This framework addresses typical situations therefore site-specific adaptations may be applied at the discretion of the designer on an atypical situational basis. Preservation of ecological assets, such as existing trees, may occur in the majority of a design space, for example.*
- *In addition to typical situations, certain Regional ROWs sections may be assigned an Enhanced Design or Storm Water Management (SWM) Sensitive Design by the Region.*

2.4.1 Step 1: Plant Material Selection

The first step of this framework utilizes Regional ROW landscape typologies (boulevards, medians and roundabouts), and land use (general development zone categories) opportunities and site considerations to guide which species the designer is to select from typical Plant Lists when building their planting palette. To accomplish Step 1, identify the zoning category (or categories) through which the Regional ROW travels, as described in the Land Use Table on the following page. Select species from **Appendix C, Plant Lists**, that correspond with the Regional ROW landscape typologies of the project (boulevards, medians and/or roundabouts) and fit with the identified zoning category land uses. The designer shall use discretion to match land uses with species attributes and site context.

LAND USE TABLE

LAND USE	OPPORTUNITIES	SITE CONSIDERATIONS
Industrial Open Space	• generous setbacks, establishment of larger trees • naturalization where feasible • bioswales	• wind exposure • heat from pavement • high pollution levels from vehicle emissions • soil variability and construction contamination • underground utilities • existing vegetation
Commercial / Institutional	• consolidated planting areas • bioswales	• soil compaction due to foot traffic • soil volume difficult to achieve • underground utilities • existing vegetation
Residential-Urban	• bioswales	• soil volume • underground utilities • existing vegetation
Residential - Rural	• generous setbacks, establishment of larger trees • bioswales	• existing vegetation • above ground utilities
Natural Heritage System	• naturalization and enhance existing view • Natural Heritage System buffer • bioswales	• habitat protection • existing vegetation

2.4.2 Step 2: Layout Design

The second step of this framework uses the transportation categories, **Rural Regional ROWs, Corridors and Nodes**, in conjunction with cross sections found in *The Halton Region Transporation Master Plan – The Road to Change (to 2031), Regional ROW Guidelines*, to assign typical landscapes to Regional ROW median and boulevard landscape designs. The designer shall identify the transportation zones within the project as listed in the table below, using the Halton Region Transportation Master Plan (2031) Map found in **Appendix D**. The designer shall cross reference transportation zones with typical Regional ROW cross sections and utility cross sections provided by the Region to determine landscape layout and plant spacing. In addition to the typical landscape layouts, a typical roundabout landscape treatment is provided in **Appendix D** and is based on the same criteria.

TYPE	RURAL		CORRIDOR (URBAN)					NODE (URBAN)	
Transportation zone	R1	R2	C1	C2	C3	C4	C5	N1	N2
ROW Width	35m	42m	42m	35m	42m	47m	50m	50m	50m

The designer shall also refer to the most current version of the Ontario Roadside Design Manual (currently, 2017 version), Section 2.3 which specifies Desirable Clear Zones. Table 2-2, from this section, provides Desirable Clear Zone Values as shown below.

Design Speed Km/h	AADT	Negative Foreslope (Fill)				Positive Foreslope		
		3H:1V	4H:1V to 5H:1V	6H:1V or flatter	10H:1V or flatter	6H:1V or flatter	5H:1V to 4H:1V	3H:1V or steeper
≥ 110	≥ 6,000	Note 1	14	10.5	9.5	9	9	7.5
	≥ 1,500	Note 1	13	10	9	8.5	7.5	6
	≥ 750	Note 1	11	8	7	6.5	6	5
	< 750	Note 1	8	6	5.5	5	5	3.5
100	≥ 6,000	Note 1	13.5	10	9	8.5	8	6.5
	≥ 1,500	Note 1	12	9	8.5	8	6.5	5.5
	≥ 750	Note 1	10	7.5	7	6.5	5.5	4.5
	< 750	Note 1	7.5	5.5	5.5	5	4.5	3.5
90	≥ 6,000	Note 1	10	7.5	7.5	7.5	6.5	5.5
	≥ 1,500	Note 1	9	6.5	6.5	6.5	5.5	5
	≥ 750	Note 1	7.5	5.5	5.5	5.5	5	3.5
	< 750	Note 1	5.5	4.5	4	3.5	3.5	3
70 to 80	≥ 6,000	Note 1	8.5	6.5	6.5	6.5	6	5
	≥ 1,500	Note 1	8	5.5	5.5	5.5	5	4.5
	≥ 750	Note 1	6	5	5	5	4.5	3.5
	< 750	Note 1	4.5	3.5	3.5	3.5	3	3
≤ 60	≥ 6,000	Note 1	5.5	5	5	5	5	5
	≥ 1,500	Note 1	5	4.5	4.5	4.5	4.5	4.5
	≥ 750	Note 1	4.5	3.5	3.5	3.5	3.5	3.5
	< 750	Note 1	3	3	3	3	3	3

Note 1: Errant vehicles encroaching onto non-recoverable slopes (parallel foreslopes steeper than 4H:1V) likely will not be able to stop or return to the roadway easily, and typically can be expected to encroach beyond the toe of slope. Fixed objects should not be present in the vicinity of the toe of non-recoverable slopes. Determination of the width of recovery area at the toe of slope should take into consideration right-of-way availability, width of shoulder, environmental constraints, collision history, and slope beyond toe of slope. Desirable width of recovery area at toe of slope when slope beyond toe of slope is relatively flat should be the applicable desirable clear zone value for 10H:1V slope or flatter, minus width of shoulder and half width of rounding, and should not be less than 3m.

Table 2-2: Desirable Clear Zone Values

2.4.3 Enhanced Designs

At the discretion of the Region, gateway or entryway landscapes may receive enhanced designs to create a sense of entry into or exit from the Region, or other significant area. The designer shall consult with the Region to identify potential gateway areas at, for example, regional borders, specific districts or neighbourhoods. Appropriate species are noted in each Plant List in **Appendix C**. Enhanced designs are to consider sight lines, sight triangles and setbacks for future road expansion. As a vegetative gateway, planting plans shall have a gradation from deciduous and coniferous trees to accent shrubs, ornamental grasses and perennials / groundcovers. While maintaining simplicity and functionality, the planting plan for an enhanced design is to be distinct from typical Regional ROW planting.

2.4.4 Stormwater Management and Low Impact Designs

There are a number of low impact landscape design solutions that can positively contribute to the stormwater management (SWM) of a Regional ROW. If the Region identifies that the ROW is to have a SWM sensitive design, the designer shall review options suggested by Conservation Halton (CH) and Credit Valley Conservation (CVC), and the following low impact design systems. The designer shall also consult with municipal SWM engineers, as well as staff involved in long term maintenance of the Regional ROW after the warranty period, to ensure proper maintenance of the SWM system in place.

2.4.5 Soil Cells

Modular soil cells can drastically increase soil volume potential in a densely urban environment without interfering with the tangle of underground utilities, sharing the same space. In considering further urbanization for Halton Region, it is reasonable to design such planting solutions into streetscapes that are scheduled to become heavily intensified. In addition to increasing planting potential in an urban site, soil cells can be used to store excess storm water in an environment where runoff would otherwise be routed through conventional fast drainage systems. See **Appendix E, Technical Details** for soil cell details.

2.4.6 Enhanced Swales and Bioswales

Alternative planting designs can reduce surface runoff and slow runoff water to the Municipal stormwater system. Bioswales are vegetated swales which increased infiltration and physically decrease the amount of particles in runoff, en-route. They must be planted with salt tolerant vegetation that can handle runoff inundation and temporary root zone saturation. **It is ideal to include bioswales wherever possible, following typical layouts presented in Step 2 of the framework**. The Toronto and Region Conservation Authority and Conservation Halton have guidelines to inform the design of a bioswale. Consult Local municipality stormwater management staff responsible for long term maintenance. Suggested planting species within the bioswale can be found in **Appendix C**, as well as an Enhanced Swale Seed Mix as per Credit Valley Conservation Authority LID Guidelines.

2.4.7 Slope Stabilization

Significant slopes are to be planted with slope-stabilizer species. These are identified in the Plant Lists found in **Appendix C**. **Appendix B** contains special provisions for planting on a slope, and shall be adhered to.

2.5 Supplementary Design Considerations

The following general design considerations should be used to inform species selection and layout beyond **Step 1** and **Step 2** of the **Framework for Regional Road Site Design**. These design considerations should especially be used when designers must improvise and adapt their typical landscape layout, determined in Step 2, to atypical existing site constraints.

2.5.1 Tree Selection

All trees should fit the microclimate, soils, sun, moisture, budget, maintenance environment and design intentions for which they are planted. Specific site conditions must be fully analyzed and understood prior to plant selection.

The following considerations are critical for appropriate tree selection:

- Site assessment including microclimate and soil.
- Understanding the physiological requirements of tree species to ensure health and longevity.
- Anticipation of potential conflicts with overhead power lines, sidewalks, underground utilities and roadway signs to reduce future maintenance costs.
- Selection of large shade trees where space is available.
- Diversity of species for built in susceptibility to disease and insect infestation. This may also help to mitigate potential widespread mortality related to climate change.
- Native species that are best adapted to the local climate and provide natural wildlife habitats.
- Low maintenance species that require less pruning and are more adaptable to local climate and site conditions.
- Drought resistant species to reduce water consumption requirements.
- Making use of evergreen trees for particulate matter reduction year round, in situations where such trees do not impede visibility.
- Encourage ecological connectivity and habitat

2.5.2 Species Diversity

Proactive management of species and age composition will develop a built in tolerance for pests, disease and other environmental stressors. Diversity should also consider the existing trees in the community. **In terms of tree selection, there shall be no more than 10% of any one species and 20% of any one genus for a given streetscape.**

2.5.3 Top Performing Species

The Local municipalities have identified species, indicated in **Appendix C**, which are preferred for their dependability, low maintenance and observable resilience in the urban Regional landscape.

2.5.4 Median Groundcover

The use of goundcover on center medians is encouraged as a lower-maintenance alternative to turfgrass. If groundcover is not a design option, Eco-Lawn Seed can be used. Using groundcovers in place of turfgrass can provide benefits such as reduced water consumption, reduced erosion, minimized need for chemical amendments, reduced need for supplemental irrigation, eliminating the need for regular mowing, reducing maintenance costs reducing emissions, and reducing damage to trees from mowing and trimming activities. Groundcover areas can also provide a buffer for protection around tree planting to preserve soil and reduce compaction.

2.5.5 Median and Rural Boulevard Native Seed Mixes

Native seed mixes, such as pollinator or upland meadow seed mixes, can be applied to cover a large area beautifully, as opposed to turfgrass. Not only does this landscape option benefit the environment, it lowers the maintenance costs. Native seed mixes and naturalization can also strengthen slopes and deter the growth of invasive understory plants. The requirement for this application in a median is a clean, hardscape border such as a concrete splash strip or strip of river rock embedded in concrete, to create a sense of order to what may otherwise be perceived as too chaotic. To further avoid ‘messy’ or ‘weedy’ planting beds, use the native seed mix provided in **Appendix C**, which contains a higher percentage of flowering species with blooms from early spring to late fall. Finally, it is acceptable and encouraged to specify a re-seeding of the landscape every three years if needed (in addition to regular weeding – see Appendix B), to maintain a thick, intentional groundcover.

2.5.6 Utilities and Infrastructure Layout

Right of way infrastructure design which considers tree placement from the outset of a development will help to mitigate damage and reduce maintenance and replacement costs. The use of root deflectors in tight spaces can also be considered. Table 1 on the following page summarizes tree planting space requirements and ROW infrastructure.

Overhead Conflicts

Electrical Transmission and Distribution Lines:

- Planting located near high voltage electrical transmission and distribution lines should be offset so that mature canopy does not encroach into the easement ROW.
- Select small ornamental tree species near medium to low voltage electrical distribution wires and offset plantings so that mature canopies can be pruned if necessary. In some cases, columnar trees can be acceptable. Verify locations with the Region.
- Refer to the Electrical Safety Authority's "Planting Under of Around Powerlines & Electrical Equipment" at, https://www.esafe.com/assets/image/Tree-Planting.pdf

Insulated Residential Electrical Lines:

- Select small or medium (at maturity) trees if planting under insulated residential electrical wires.

Telephone and Other Non-Energized Lines:

- Full sized trees are acceptable under non-energized lines such as cable or telephone wires.

Utility Poles and Light Standards:

- Trees may not be planted within a 3 meter horizontal distance of a utility pole or light standard.

Buildings and Signs:

- Canopies at mature height conflicting with building faces and signs shall be avoided to minimize maintenance concerns.

Table 1. Spatial Context – R.O.W. Infrastructure

R.O.W. Infrastructure	Depth	Height	Setback/ Offset Requirements	Restrictions/ Notes
house services (water, storm, sanitary)	1.75-2.75m	-	2m from trunk	3m service trench location dependant on lot width
Watermain	1.75m	-	2m from trunk	
Street Light (and utility base)	-	5-8m	4.6m from edge of canopy	maintenance access canopy blocking safety illumination
Hydro Pole	-	9-15m	3m from canopy edge	maintenance access
Overhead Wires	-		canopy 3m below and adjacent crossarms	Pruning harmful to trees Fire and power outages
Hydro/Joint use Trench	1.4m	-	1m from trunk	maintenance access
Telecom. Trench	1.4m	-	1m from trunk	maintenance access
Transformer	-	1.2m	trunk 1.2m from sides trunk 3m from door	maintenance access
Telecom. Box	-	1.2m	1m from trunk	maintenance access
Hydrant	-	1m	3m from trunk	maintenance access
Gas Main	1.2m	-	2m from trunk	canopy limits ability to inspect lines most likely utility to be excavated
Property Boundaries	-	-	1m from trunk	maintenance disputes
Sidewalks (concrete) / Multiuse Paths (pavement)	-	-	2m from trunk	heaving, root flare conflict
Curb	-	-	2.5m from trunk	1m snow storage trucks and overhanging branches car doors on parking lanes
Driveway	-	-	trunk 1.2m residential trunk 3m comm./ind.	visibility
Structures (buildings)	-	-	4-6m from trunk	pruning canopy dependant
Roadway Signs	-	-	5m from trunk	visibility canopy dependant
Ditch (cl)	-	-	1m from trunk	maintenance
Stop Signs & Inters.	-	-	9-15m from trunk	adhere to sight triangle

Surface Conflicts

Electrical Equipment:

- An offset of 3m is required for pad-mounted transformers or switchgears and underground chambers. Contact the power authority to obtain specific setback information.

Other Utilities:

- Minimum required offsets from other utilities such as fire hydrants and Bell boxes shall be observed. Where no offset is provided, a minimum of 1.8m shall be observed.

Bike Racks:

- Plant trees a minimum of 1.8m away from bike racks to discourage the use of the trees as additional bike racks.

Underground Conflicts

- Common underground utilities found in Regional ROWs are:
    - Storm sewers and laterals
    - Sanitary sewers and laterals
    - Water mains and laterals
    - Oil pipelines
    - Gas lines
    - Electrical conduits and vaults
    - Telecommunication conduits and vaults
- Do not plant directly on top of underground utilities and offset a minimum of 3m (this may vary between gas, water, sanitary or storm lines). Where this cannot be achieved, provide root deflectors to redirect tree roots from critical areas.

2.5.7 Daylight Triangles

Daylight triangles must be identified at each intersection (at every corner, 15m x 15m). Only grasses and/or low lying shrubs are to be planted within the Regional ROW daylight triangles. All plantings must have a mature height that does not exceed 1m. Species that deviate from this rule can impact the safety of roadway and sidewalk users at intersections by obstructing site lines.

2.6 Maintenance Contractor Role

The designer must include the Local municipality as the maintenance contractor in all stages of the design project to verify the feasibility of the design from a long term maintenance point of view. Each Local municipality has varying maintenance capabilities that can greatly impact landscape longevity.

3. Methods and Materials

This section outlines the installation of the landscape and the following two-year maintenance and warranty period. **Should the Local municipality decide to take over the project from the contractor, thus voiding the maintenance and warranty period, the following methods and materials are to be applied to the first two years of plant establishment under the permanent care of the Local municipality.**

3.1 Special Provisions – General, Landscape and Maintenance

Appendix B provides general, landscape and maintenance special provisions (specifications) to complete the landscape component of a project. These specifications are designed to replace and/or supplement existing landscape specifications that may be provided by other disciplines on the project.

3.2 Technical Details

Appendix E provides technical details to complete the landscape component of a project.

3.3 Certificate of Completion Letter Template

Appendix F includes the template for the Certificate of Completion Letter to be submitted at the time of substantial completion and to be reviewed by the contract administrator.

3.4 Record of Site Observation and Inspection Report Template

Appendix G includes the report template for the Record of Site Observation and Inspection to be submitted during landscape installation and at the time of substantial completion, and to be completed with contractor, Halton Regional and Local municipality staff.

3.5 Record of Maintenance Report Template

Appendix H includes the report template for the Record of Maintenance to be submitted three times per year (Spring, Summer and Fall), during the two-year maintenance and warranty period by the contractor for receipt of a monetary allowance.

4. Post Occupancy

4.1 Local Municipality Takeover

Upon completion of the landscape contractor's contractual obligations (2 years of warranty and maintenance), the Local municipality maintenance contractor will take over the lifetime maintenance of the installed landscape. The current maintenance agreement between the Region and the Local municipality can be found in the **Contractor's Maintenance Services (Version 4 – September 2016)**, and shall be adhered to.

4.2 Post Occupancy Evaluation

Prior to the Local municipality takeover, an inspection of the landscape shall be performed by a Landscape Architect or Certified Arborist, retained by the Local municipality at the cost of the Region. At this time, the contractor is required to remedy any outstanding deficiencies. General and specific notes regarding all plant health shall be recorded and submitted to the Region and the Local municipality along with the Record of Inspection and Maintenance Letter. **Appendix I** provides a Post Occupancy Evaluation form to guide the Local municipality in reporting the health of the installed landscape to the Region.

4.3 Annual Post Occupancy Evaluation

The same evaluation and report shall occur every year, beginning one year after the end of the warranty period. The purpose of this annual evaluation is to collect data on the performance of each landscape component over time, to inform recommendations found in future versions of these guidelines, and to improve overall Regional roadside and streetscape resilience in the Halton Region. Collected data shall be reported to the Region annually.

APPENDIX A

REGIONAL NATURAL HERITAGE SYSTEMS

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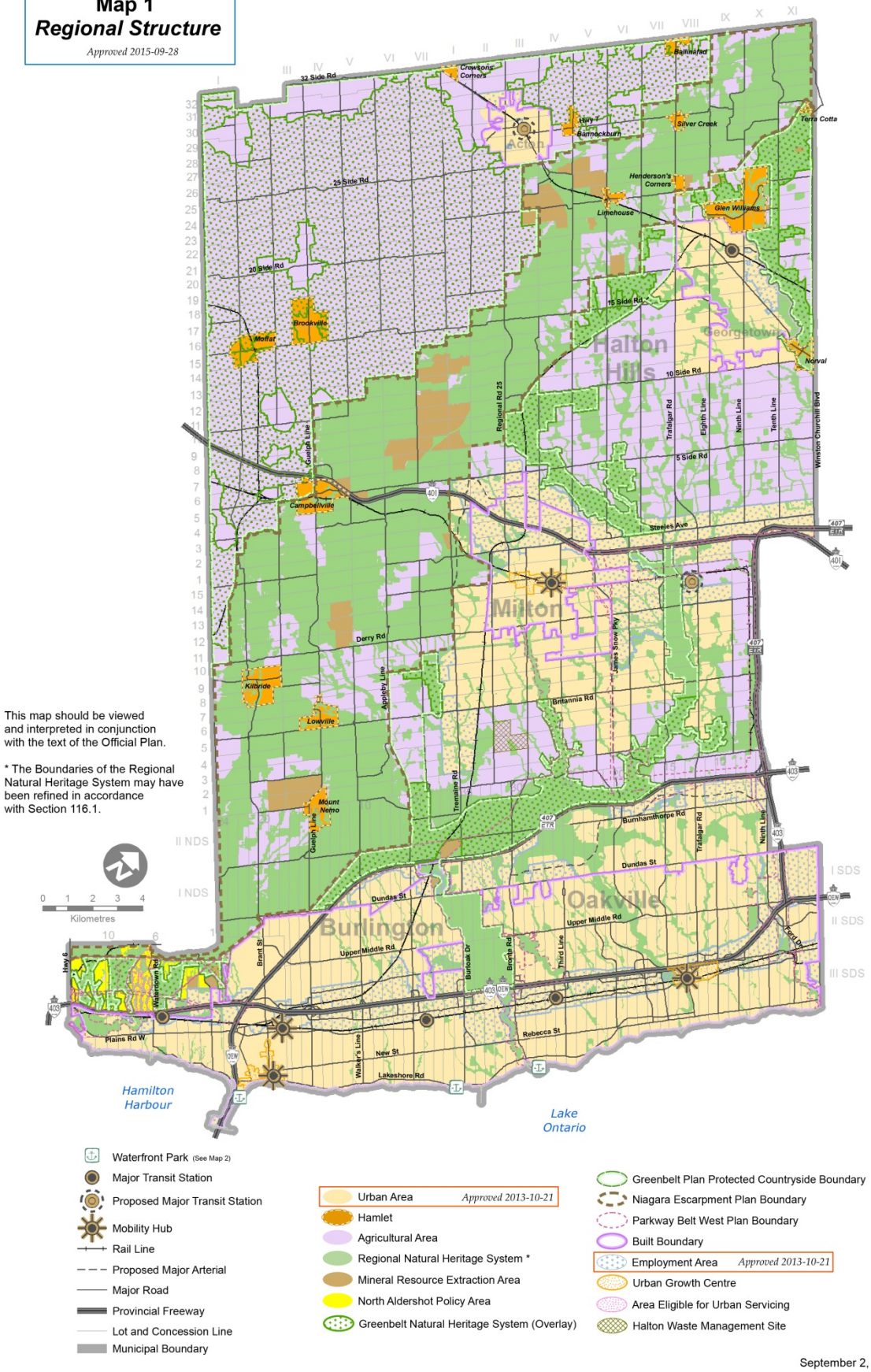
Map 1
Regional Structure
Approved 2015-09-28



This map should be viewed and interpreted in conjunction with the text of the Official Plan.

* The Boundaries of the Regional Natural Heritage System may have been refined in accordance with Section 116.1.

- Waterfront Park (See Map 2)
- Major Transit Station
- Proposed Major Transit Station
- Mobility Hub
- Rail Line
- Proposed Major Arterial
- Major Road
- Provincial Freeway
- Lot and Concession Line
- Municipal Boundary

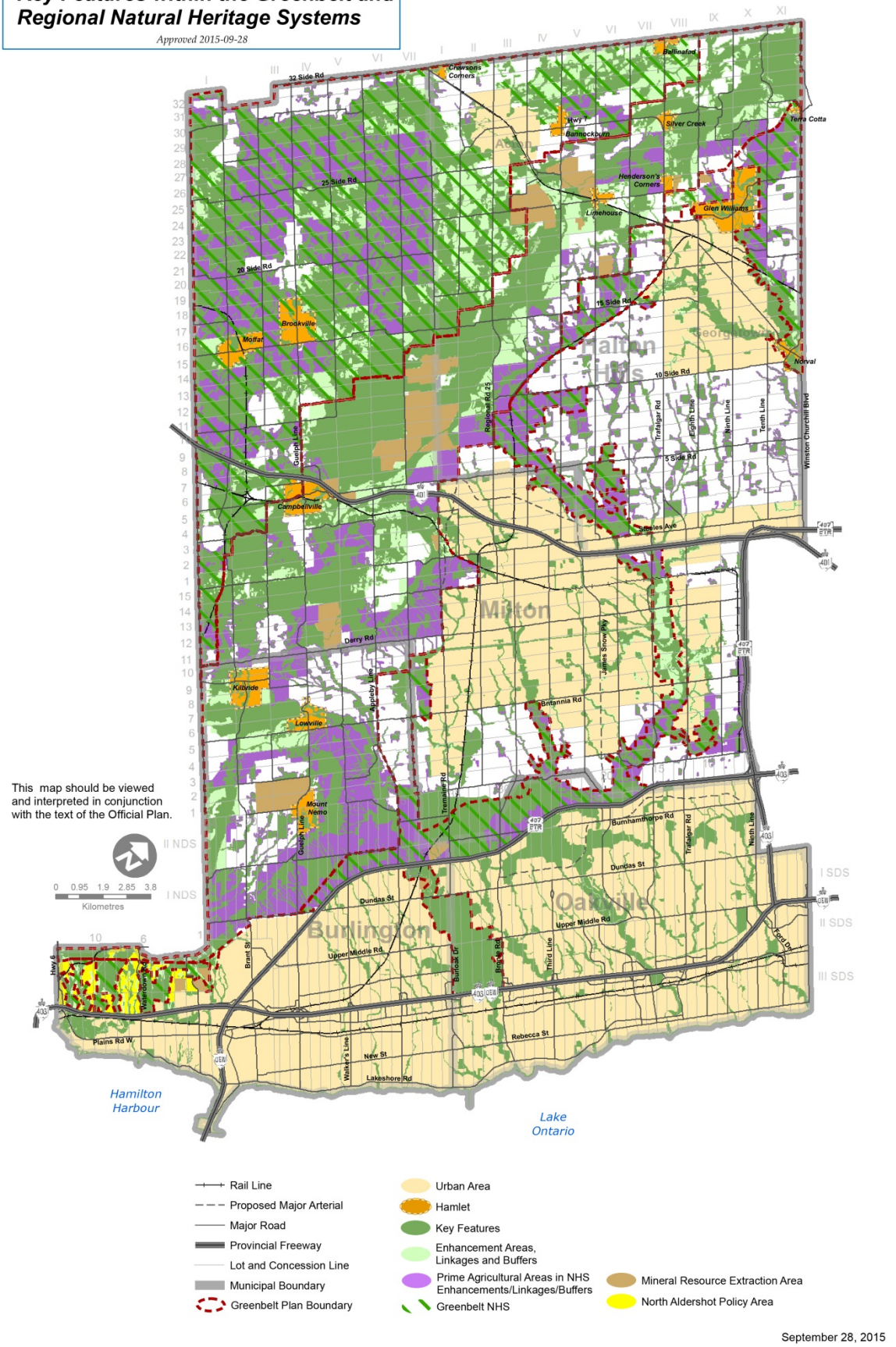
- Urban Area *Approved 2013-10-21*
- Hamlet
- Agricultural Area
- Regional Natural Heritage System *
- Mineral Resource Extraction Area
- North Aldershot Policy Area
- Greenbelt Natural Heritage System (Overlay)

- Greenbelt Plan Protected Countryside Boundary
- Niagara Escarpment Plan Boundary
- Parkway Belt West Plan Boundary
- Built Boundary
- Employment Area *Approved 2013-10-21*
- Urban Growth Centre
- Area Eligible for Urban Servicing
- Halton Waste Management Site

September 2, 2015

Map 1G
Key Features within the Greenbelt and Regional Natural Heritage Systems

Approved 2015-09-28



September 28, 2015

APPENDIX B

SPECIAL PROVISIONS. GENERAL, LANDSCAPE AND MAINTENANCE.

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1 DESCRIPTION OF WORK

This contract is for [Project name and description]
The work to be done generally includes but not limited to the following [designer to edit list as needed]:

- Planting of trees/shrubs/perennials;
- Site restoration; and
- Traffic control.

2 DEFINITION OF OWNER AND ENGINEER

Wherever the words "Region", "Halton" or "Corporation" appear in this contract, it may be interpreted as meaning The "Regional Municipality of Halton".

Wherever the word "Engineer" appears in this Contract, it shall be interpreted as meaning the Commissioner of Public Works for Halton Region, or such other officers as may be authorized by Halton to act in any particular capacity.

3 ONTARIO PROVINCIAL STANDARD SPECIFICATIONS

The work shall be done in accordance with the requirements of the current Ontario Provincial Standard Specifications issued by the Ministry of Transportation, the Municipal Engineers Association and Halton Region and referenced in the Contract except as the Standard Specifications are amended by the Special Provisions or amendments and shall form inter alia, part and parcel of this Contract.

4 MAINTENANCE SECURITY

Maintenance Security in the form of an unconditional, irrevocable draw down Letter of Credit, in the amount of ten to fifteen percent (10-15%) of the value of the accepted works, is to be provided prior to holdback release.

Letters of Credit, when provided, are to be in the form as provided in the contract documents and from a financial institution acceptable to Halton Region. Upon final inspection prior to the expiration of the 12 month warranty period, if all works are deficient free, the Contractor's Letter of Credit will be returned.

5 LIQUIDATED DAMAGES

In accordance with the General Conditions, should the Contractor fail to complete the works to the satisfaction of the Engineer and in accordance with the contract within the Time for Completion specified in the Contract or the extended time allowed in writing by the Engineer, the Contractor shall pay to Halton Region as Liquidated Damages a minimum sum of $____ for each calendar day that the works remain uncompleted after the time so specified or allowed, plus all other reasonable expenses which would include but not be limited to all field and office administration costs arising from or attributed to the delay. Such sums may be deducted by Halton Region from any payments owing to the Contractor.

6 LIABILITY FOR PROPERTY DAMAGE TO THIRD PARTIES

1. LIABILITY FOR PROPERTY DAMAGE TO THIRD PARTIES applies to third party liability claims for property damage that are less than the Contractor's applicable insurance deductible. For clarity, LIABILITY FOR PROPERTY DAMAGE TO THIRD PARTIES does not address the process which must be followed by the Contractor under its contract of insurance for third party bodily injury claims including death, or any claims which exceed its liability insurance deductible.

2. Halton Region and the Contractor shall notify each other in writing forthwith of claims or potential claims arising from the work. Upon receipt of a claim, the Contractor shall then advise Halton Region within 5 days of receipt of such a claim whether it shall assume responsibility for payment of the claim. Should the Contractor accept responsibility of the claim, it shall contact the claimant in writing within 10 days of receipt of the claim and shall provide confirmation in writing to Halton Region that it has done so. The Contractor shall provide notice where applicable to its insurers in accordance with the terms of its insurance contract(s).

3. Where the Contractor does not assume responsibility for the payment of a claim, the Region reserves the right to assign the claim to an independent insurance adjuster for investigation and determination. Halton Region shall acknowledge the claim in writing the claimant within 10 days of Halton Region's receipt of the claim. Halton Region and the Contractor shall fully cooperate with the adjuster in working towards the timely resolution of all claims. The Contractor and Halton Region shall provide the adjuster with access to any and all records or documentation in relation to the works performed under the contract. Halton Region and the Contractor acknowledge that all claims will be investigated and responded to within approximately 30 days of receipt of the claim.

4. In the event of a legal proceeding or a Statement of Claim naming Halton Region and/or the Contractor, the Contractor shall retain legal representation and confirm in writing to Halton Region within 10 days that it shall assume Halton Region's defense in accordance with the indemnification provisions outlined in GC 6.02 -INDEMNIFICATION.

5. Halton Region and the Contractor shall be bound by the final decision of the independent adjuster who shall notify the claimant in writing of the filial decision with respect to the adjustment of the claim. Halton Region shall reserve the right to communicate to the claimant the final decision with respect to the adjustment of the claim. Where liability is found on the part of the Contractor, the adjuster shall handle settlement negotiations and all pertaining financial and legal transactions on behalf of Halton Region and the Contractor, including but not limited to securing a Full and Final Release and issuing the settlement funds.

6. In the event that the adjuster determines the Contractor to be responsible for the damages, all costs for adjuster fees, claims administration and settlement costs will be borne by the Contractor. In this case, the adjusting fees and settlement costs will be funded by Halton Region, and recovered from the Contractor from any money due or which may become due, from Halton Region to the Contractor under this contract or Halton Region may recover that amount from the Contractor in any court - of competent jurisdiction, as a debt due to Halton Region or as otherwise allowed by law.

7. INSURANCE

The insurance policy shall include [all parties involved], as an additional named insured but only in respect of, and during, operations performed by or on behalf of the Contractor and not in respect to any act or omission of Halton Region or any of its servants. In addition, the policy shall contain a cross liability clause endorsement.

Where the Contractor's insurance is subject to aggregate limits, the policies of insurance required by GC 6.03.02.01 and GC 6.03.04 shall not provide coverage that is less than $5 million per occurrence or have aggregate limits of less than $10 million.

8. PROVISIONAL ITEMS

All items in the Schedule of Quantities and Prices marked “Provisional Items" shall be used only where specifically ordered by the Engineer. In the event of any deletions and notwithstanding Section GC3.11.01 of the General Conditions of the contract, no adjustment or compensation will be awarded to the Contractor by Halton for loss of revenue or for any other reason.

9. PRIVATE LANDS

The Contractor shall not enter upon or occupy with people, tools, equipment or materials of any nature, any lands outside of the public streets and roadways and the rights-of-ways or easements shown on the plans, except after consent has been received by the Contractor from the proper parties, a certified copy of which consent shall be furnished to the Engineer.

10. ORGANIZATION OF WORK AND WORKING RESTRICTIONS

Before work commences, the Contractor shall expedite the ordering and delivery of all materials and special equipment required, and shall co-ordinate the sequence of the work. No claim shall be allowed for delays and/or additional expense resulting from failure to accept the delivery of materials from suppliers in a timely manner and subsequent failure to maintain the contract schedule.

The Contractor shall commence work immediately following award of the contract and work in a continuous manner with sufficient intensity of effort and labour to the completion of the project by the date specified.

The Contractor shall provide a mechanical ·sweeper to remove dirt and debris from lanes that will be open to traffic.

The Contractor is advised that no construction equipment or vehicles will be permitted on the adjacent land(s) unless the Contractor has obtained written permission from the owner(s). The Engineer shall receive all copies of written permission from the owners. All areas used by the Contractor for ·access or storage are to be restored to their original condition at the Contractor's expense.

11. DISPOSAL OF SURPLUS OR UNSUITABLE MATERIALS

Materials gained from stripping and excavating operations carried out under this Contract, which are unsuitable for or which are surplus to the requirements, shall be disposed of outside the right-of-way at locations arranged for by the Contractor at their expense. The Contractor shall provide the Engineer with a release form for each disposal site signed by the owner of the site.

Under no circumstances shall any materials be disposed of on lands under the control of the Conservation Authority unless written approval from the Conservation Authority has been obtained. The Province of Ontario provides recommendations governing the disposal of excess soil, which shall be referenced:
https://www.ontario.ca/page/management-excess-soil-guide-best-management-practices

In general, the price bid for the Contract Items requiring excavation and stripping operations shall be full compensation for hauling and placing the unsuitable or surplus materials at the disposal areas.

The Contractor is advised that no specific disposal site has been identified for materials surplus to this project. Therefore, it will be the Contractor's responsibility to arrange for a suitable disposal site(s) for removals, excess, and waste materials generated by the work of this project. There will be no extra payment to the Contractor for the cost of disposing material off-site unless specific items for same exist in the Schedule of Unit Prices.

The cost for loading, haulage, tipping fees, grading/restoration (if applicable), and all other work associated with the Contractor's disposal site(s) shall be included in the appropriate items of the Schedule of Unit Prices.

Current dumping fees will be paid by the Contractor. Compensation for the fees is to be included in the unit prices bid for removal and disposal with no separate pay item in the Schedule of Unit Prices.

The Contractor shall note that earth and excavated materials may contain elevated concentrations of chloride and sodium and may have elevated values for Electrical Conductivity and Sodium Absorption Ratios. For the purpose of this contract, excess earth and excavated materials with salt impacts are not considered to be "contaminated" within the meaning of Table 1 in OPSS 180.

Where the Contractor manages excess earth and excavated materials as disposable fill, the Contractor shall take potential salt impacts into account and ensure that the material is managed responsibly and in an environmentally appropriate manner. Where the Contractor intends to manage the excess earth that may be salt impacted on private property, the Contractor shall make the Property Owner aware that it may be salt impacted by using the attached Property Owner's Release Form in addition to the forms found in OPSS 180. A copy of the each completed form is to be provided to the Contract Administrator.

The Contractor is responsible for conducting such sampling and testing as may be necessary to comply with any requirements imposed by the Property Owner as a condition of accepting the excess earth and excavated materials.

12. MUD CONTROL

The Contractor shall be responsible for all dirt and mud that is tracked onto the roadways from vehicles entering or leaving the job site. They shall, upon request from the Engineer, immediately proceed with cleanup operation at their expense. If after repeated requests, or if in the opinion of the Engineer, the Contractor has not or cannot sufficiently remove the mud from the road, the Engineer will proceed with necessary clean up with all costs being charged to the Contractor.

13. DUST CONTROL

The Contractor shall take such steps as may be required to prevent dust nuisance resulting from his operations either within the right-of-way or elsewhere, or by public traffic where it is the Contractor's responsibility to maintain a roadway through the work.

14. ENVIRONMENTAL CONSIDERATIONS

1. Refuelling and Maintenance Areas

The Contractor shall undertake a detailed review of the proposed route of construction to plan access routes and fuelling areas. Suitable fuelling and maintenance areas shall be established and approved by the Engineer. Refuelling and maintenance of equipment shall not be undertaken in or adjacent to water courses. The minimum watercourse buffer is 30m. This buffer shall be expanded to 100m at the recommendation of the conservation authority if any species at risk are present in the watercourse. Prior to any action, buffers must be verified by the conservation authority.

The exception to this fuelling location requirement shall be diesel generators, cranes or backhoes which may be fuelled at other than the designated fuelling areas. However, no fuelling of backhoes shall be carried out within thirty meters (75 m) of any water course. This requirement may be relaxed at the discretion of the Engineer if non-spill fuelling equipment is

used.

The Contractor shall prepare a contingency plan and have available the means for the interception and rapid clean up and disposal of any spillage to land and/or water. Any spill causing impairment to the natural environment, as defined by current legislation, must be reported immediately by the Contractor to the Halton Region Emergency Spill Response Team at (905) 825-6000 during business hours, and at 1-866-4HALTON (1-866-442-5866) after hours. The Halton Region Emergency Spill Response Team will then inform the Ministry of Environment as required.

2. Approved Water Course Crossing

Water course crossings shall be completed in accordance with the construction drawings and corresponding Special Provisions where so indicated.

Crossings shall be constructed during periods of minimum stream flow, and in accordance with the conditions of any permits issued by the local Conservation Authority and Ministry of Natural Resources.

The Contractor shall notify the nearest district offices of the Ministry of Natural Resources, Ministry of Environment and the local Conservation Authority two working days prior to the commencement of any crossing.

Before any construction of a water course crossing begins, all equipment and backfill material to be used must be on site and ready for placement. The time from excavation to restoration shall be kept to a minimum.

Drainage way protection measures must be in place prior to construction taking place and must be maintained until vegetation is re-established.

Equipment may cross the water course at approved locations only. The stream bed shall not be used as a vehicle or equipment route. The cleaning of equipment in a water course is prohibited.

Stabilization and restoration of the stream bed and banks must be undertaken immediately after the crossing construction is complete.

3. Noise Control

Noise levels shall be controlled in accordance with local By-laws and the Occupational Health and Safety Act.

All internal combustion engines shall be equipped with original equipment in proper working order to minimize noise levels in the project area

For compressors and pumps operated beyond normal working hours, special measures for noise attenuation will be required.

4. Protection of Trees During Construction

The protection of trees not designated for removal shall be completed in accordance with OPSS 801. A vegetation removal and protection plan shall be prepared by a Certified Arborist.

If the contract requires work to be completed within the dripline of a tree or trees which are designated not to be removed, operation of equipment within that dripline area shall be kept to the minimum necessary to perform the work required.

In order to minimize root loss, the Contractor will be required to use vertical trench walls and appropriate wall support systems when excavating within the dripline of trees. All exposed roots

over 25 mm in diameter shall be cut back cleanly to the soil surface within five calendar days.

If root damage or loss is extensive, portions of the tree shall be pruned. All pruning will be carried out by an ISA Certified Arborist or qualified and experienced landscape contractor using approved arboriculture techniques and practices, with the direction of a Certified Arborist. The pruning of trees and shrubs will be carried out in such a manner as to retain as much as possible of the plant's natural form. The Contractor will be responsible for disposing of cut limbs and roots in an approved manner off site. In addition, the remaining root system shall be watered and fertilized by a qualified and experienced landscape contractor.

No extra payment will be made to the Contractor for vertical trenching ·and trench supports, pruning branches and roots, or watering and fertilizing trees when work is required within the dripline.

5. Trees Located within the Right-of-Way

When the branches of trees located within the right-of-way will interfere with the construction operation, they shall be pruned prior to equipment entering the dripline of the tree.

The branches will be cut back to the nearest suitable trunk, crotch or lateral with the minimum clearance needed, in accordance with good arboricultural standards, and where they will no longer interfere with the construction operation.

6. Trees Located on Private Property

When the branches of trees located on private property are overhanging the right-of-way or easement and will interfere with the construction operation, they shall be pruned prior to equipment entering the dripline of the tree.

Prior to pruning, the Contractor and Engineer shall contact the homeowner to receive permission to cut the branches back to the nearest suitable trunk, crotch or lateral where they will no longer interfere with the construction operation.

Should a homeowner refuse entry to cut branches on private property, then the branches shall be cut vertically at the property line.

7. Stockpiles

Stockpiles shall not be located in floodplains, adjacent to drainage ditches or within the dripline of trees. Topsoil shall be salvaged and stockpiled on-site at a location approved by the Contract Administrator. Stockpiled topsoils shall be stored in mounds no greater than 1.3m in height for less than 1 year. Where space limitations apply, topsoil stockpile mound should not exceed 3.0m where feasible.

Topsoil stockpiles should be stabilized by covering with geotextile material to prevent soil erosion and contamination by weeds during storage. Where stockpiles are intended to store topsoil for periods longer than one year, temporary ground cover vegetation composed of a non-invasive stabilizing ground cover (such as annual rye grass) will be requested.

All stockpiling shall be completely surrounded by the required erosion and sediment control fencing, at no additional cost to the City.

Salvaged topsoil shall be re-used on-site prior to the import of topsoil to the site.
·When re-applying topsoils stockpiles in mounds 1.3m in height or less, the top 30cm of the mound shall be mixed with the remainder of the stockpile.
·Topsoil stockpiles in mounds greater than 1.3m or stored longer than 6 months should be amended with compost to re-establish healthy soil structure. To achieve the appropriate amendment rates, a 3:1 ratio of topsoil to compost by volume may be mechanically mixed, or stockpiled topsoil applied to a

depth of 110mm with 40mm of compost and incorporated to a depth of 20cm.Sod Materials

Material piles such as topsoil, planting mix, shredded pine bark mulch, plant material and general supplies shall not be placed on roadways, granular and/or paved shoulders. Material pile locations shall be reviewed and approved by the contract administrator prior to the delivery of materials to the site.

Once the stockpiles have been removed, the affected area will be restored back to its original condition.

8. Sediment Basins and Settling Ponds

This specification covers the requirements for the control of water during construction of works and shall be carried out in accordance with OPSS 518. Consideration shall be given to the document entitled Erosion and Sediment Control Guidelines for Urban Construction 2006.

9. Erosion and Sediment Control

Erosion and sediment control shall be completed in accordance with the construction drawings when provided.

Should the Engineer determine that additional control measures are needed after construction begins, they shall be installed and maintained as detailed in the document. Consideration shall be given to the document entitled Erosion and Sediment Control Guidelines for Urban Construction 2006.

15. EXCESS EXCAVATION

Where the Engineer instructs the Contractor in writing to carry the depth of excavations below the depth shown on the drawings or specified herein to obtain a sound and satisfactory foundation, the extra volume of material excavated, and the extra volume of topsoil or planting soil fill subsequently necessary to fill the void, will be computed and extra payments will be made according to the terms of the General Conditions.

This shall not include extra excavation ordered by the Engineer because a sound foundation has become unacceptable after excavation.

16. OPERATION OF EXISTING WATER SYSTEM

The Contractor must not operate any portion of the existing drinking water system. Existing valves and hydrants must only be operated by Halton's Water Distribution Certified Operators.

The opening and closing of any valves must be co-ordinated with Halton's Construction Technician. All residences disrupted in their water service shall be notified 48 hours prior to shut down.

17. WATER FROM FIRE HYDRANTS

Under no circumstances will the Contractor be allowed to use fire hydrants at site as a source of water for this contract.

18. ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT (AODA)

Ontario Regulation 429/07, passed under the Accessibility for Ontarians with Disabilities Act, requires that every person who deals with members of the public in the provision of goods and services on behalf of a public sector entity must receive training regarding the provision of accessible customer service to the public. Contractors are responsible for meeting this training requirement, and shall ensure that all of their employees who provide goods and services to the public on behalf of Halton Region are adequately trained in the provision of accessible customer service in accordance with Ontario Regulation 429/07. In addition, Contractors shall ensure that all employees who provide goods and services to the public on behalf of Halton Region receive a copy of "Guidelines for Delivery Accessible Customer Service at Halton Region" which can be found on Halton Region's website at www.halton.ca/shop, and that these employees read and understand the contents of this document.

19. PROVISION FOR TRAFFIC CONTROL

The Contractor shall maintain all lanes of traffic in both directions and all existing turn lanes on all streets and roads listed below within peak hours defined as 6 a.m. to 9 a.m. and 3 p.m. to 6 p.m. Monday to Friday.

During non-peak hours (9:00 am to 3:00 pm Monday to Friday) the Contractor is permitted to maintain one lane of traffic in each direction with proper control as per OTM Book 7.

1. **Damage for Late Opening or Early Closing**

   Should the Contractor, from any case, fail to open all lanes of traffic in each direction during peak hours , the Contractor shall pay Halton Region $500 for each 15 minutes of lane closures or part thereof.

2. **Evening Work:** For evening / night time operations, the Contractor shall use TC-12 (flashing arrow boards) with flag persons as required.

3. **Construction Signs:** The Contractor shall supply, place and maintain all barricades, warning signs, delineators and flashing lights necessary for the protection of the public, including warning signs of construction operations maintained at both ends of the Contract, for the duration of the Contract, in accordance with the Ontario Traffic Manual, book 7, Temporary Conditions for all Temporary Traffic Control issues for both short and long term durations.

4. **Traffic Control:** Traffic control in this contract shall be in conformance with the procedure outlined in the pamphlet entitled "Correct Methods for Traffic Control" issued by the Construction Safety Associations of Ontario.

   Traffic control persons must be trained and have current documentation showing data of training and expiry. Each traffic control person shall, while controlling traffic, wear an approved safety vest and an approved hard hat.

5. **Emergency Vehicles:** The Contractor shall comply with Municipal, Fire, Ambulance and Police regulations relating to notification for lane closures that may be used by emergency vehicles.

6. **Emergency Reopening of Lane:** If there is an incident and traffic must be diverted onto project roadways, the Contractor shall immediately reopen any closed lanes, having first made them safe.

7. **Open Excavations:** The Contractor shall schedule their work so that there will be no open excavation adjacent to a lane carrying traffic overnight and on non-working days. Excavations within 5.0 meters of lanes carrying traffic shall be backfilled with the specified material up to

profile grade and compacted prior to closing operations. All other excavations are to be properly fenced during non-working hours.

8. **Delivery and Trucking:** The Contractor shall plan and schedule the routes of vehicles transporting all materials to, from or within the job, so that vehicular movements are accomplished with minimum interference and interruptions to traffic. This will necessitate vehicles to "slip-off" or "slip- on" in the direction of traffic, in order to merge with and thereby avoid crossing traffic lanes.

   The Contractor shall obtain the Engineer's prior approval for the location of any "slip-offs" or "slip-ons". The Engineer reserves the right to alter, reject or close same as considered necessary. Materials shall not be stored within 5.0 m of the travelled portion of any roadway.

   Parking, waiting loading or unloading of construction vehicles within travelled lanes will not be permitted.

20. OTHER CONTRACTORS WITHIN / ADJACENT TO THE LIMITS OF THE CONTRACT

The Contractor is advised that, as other work may be in progress within and adjacent to the limits of this contract, they shall co-operate with other contractors, utility companies and Halton Region and they shall be allowed free access to their work at all times. The Engineer reserves the right to alter the method of operations on this contract to avoid interference with other work.

21. REMOVAL OF ABANDONED UTILITIES

The Contractor shall, as directed by the Engineer, remove abandoned underground utilities which have not been removed by their owners and which interfere with the construction operations. It is the Contractor's responsibility to contact the Municipal Authorities or Utility Companies to verify that the underground utilities are, in fact, abandoned.

All abandoned underground utilities removed by the Contractor shall become the property of the Contractor and shall be disposed of in locations arranged for by the Contractor outside the right-of-way. No separate payment for removal or disposal of abandoned utilities shall be made, as compensation for such work shall be included in the contract prices for the appropriate tender items.

22. WORK OVER OR IN THE VICINITY OF GAS PIPELINES

Work crossing or adjacent to any gas or propane line shall be subject to the following conditions:

1. It is entirely the responsibility of the Contractor to arrange for an inspector of the various pipeline companies to be on site and it is entirely the responsibility of the Contractor to follow the instructions of pipeline company's inspectors.

   Halton Region will bear the cost of the inspector on site but Halton Region does not accept any responsibility for the Contractor's activities in contravention of the pipeline company's directions.

2. For inspection and stakeouts, three working days notice must be given by the Contractor to the pipeline companies prior to commencement of excavation or crossing.

3. No **excavation, grading or operating of heavy equipment is allowed within 30 metres of these pipelines without an Inspector on site.**

4. If excavation is necessary over, under, near or parallel to underground pipelines, extreme caution must be observed.

5. It will be the Contractor's responsibility to provide all labour required to expose the pipelines by hand digging or Hydrovac from existing grade, prior to use of power excavating equipment. Pipeline inspectors will assist in this work with the use of electric equipment and a probing bar. Mechanical excavation is not permitted within 3.0 m of pipelines without pipeline inspector approval. Hand excavation shall be performed when locating or digging within 0.3 m of the pipeline.

6. Equipment moving cross or along pipeline:

   a. Crossing locations for heavy equipment are to be kept to a minimum.
   b. The crossing locations shall be determined between the company's inspector and the Contractor after reviewing the nature of the construction operations, the types and number of equipment involved, as well as the line and depth of the existing gas mam.
   c. Once the crossing locations have been established, heavy equipment shall be restricted to crossing at these locations only. The Contractor shall ensure that all personnel is made aware of these restrictions.
   d. Pipelines shall be protected at crossing locations by constructing berms with a minimum cover of twice the pie diameter of 1.0 m (whichever is greater) has been verified.
   e. Equipment shall be operated at "dead-slow" speeds when crossing pipelines in order to minimize impact loadings.

   f. Heavy equipment may be operated parallel to existing pipelines provided that a minimum offset of 1.0 m is maintained on sizes less than NPs 12, and 2.0 m on NPS 12 and larger lines. These limits shall be clearly staked.
   g. When working directly over existing gas pipelines all equipment movements shall be transverse to the staked location rather than parallel to it.
   h. Hand held compaction equipment shall be used within 1.0 m of the sides or top of all gas pipelines.

7. Support of pipelines is required at all times.

   a. It is the responsibility of the Contractor to ensure that existing underground plant is properly supported.
   b. Precautions must be taken to support underground plant at all times and to prevent damage to gas pipelines due to excavation activities.
   c. When excavation is necessary over, under, near or parallel to underground pipelines, the support is responsibility of the Contractor. The methods of support vary from case to case depending on the characteristics of the excavation, adjacent soil and the pipeline material. Failure to provide proper support will render the Contractor responsible for all consequential damage or loss. ·
   d. Backfilling underneath the exposed pipeline shall be compacted to 95% Standard Proctor Density. Sand padding shall be placed to a minimum of 300 mm above and below the pipe.

8. The Contractor will be responsible for all damages to the pipelines and easements arising in any manner from work performed in connection with the installation.

9. The Contractor shall comply with the instruction of an authorized field representative regarding the procedures to be followed while working in the vicinity of the pipes.

10. The Contractor shall notify the pipeline representative of any contact with the pipeline or its coating.

11. The Contractor is to advise the pipeline company at least 24 hours prior to backfilling.

12. Where permission is suspended by the pipeline company in accordance with subsection 19(1) of

the National Energy Board Pipeline Crossing Regulations Part II, the Contractor shall cease work.

13. The successful Contractor as a condition of entering into a contract for this project with Halton Region will be required to execute an agreement with Halton Region to save harmless Halton Region, Union Gas Ltd., and their Consultant, from any damages caused by the Contractor's work in and around the pipelines crossings.

14. The successful bidder awarded this contract shall obtain from the Project Manager applications for "Permits to Cross". Along with the permit, the Contractor is required to submit to each pipeline company "Proof of Comprehension General Liability Insurance".

23. RESTORATION

The tender prices bid for landscape work shall be full compensation for all labor, equipment and materials to carry out all restoration, as follows:

1. Permanent surface restoration shall be included in the unit price bid for the appropriate tender item.

2. All disturbed areas must be restored to a condition equivalent to, or better than, that which existed prior to commencement of construction as determined by the Contract Administrator.

3. Temporary restoration work must be completed to the satisfaction of the Contract Administrator as work proceeds.

4. All costs associated with restoration shall be deemed to be included in the tendered items. No additional or separate payment shall be made for any restoration work.

5. Should the Contractor be required to re-excavate in an area previously restored to correct defective work, they shall be required to repair all disturbed areas at their expense.

6. All granular base construction and materials shall conform to OPSS 314 and OPSS 1010, respectively. All hot mix asphalt construction and materials shall conform to Region of Halton asphalt specifications.

7. Preparation for restoration of disturbed asphalt driveways, pathways and parking areas shall include:

    a. Saw-cut existing asphalt full depth in neat, straight, parallel lines at the edge of the trench.
    b. Note: Trench width shall be as required by the Occupational Health and Safety Act and Regulations and existing soil conditions.
    c. Where the edge of the asphalt restoration falls within 1.0 m of the existing edge of pavement, remove all asphalt to the said edge of pavement.
    d. Remove existing asphalt full depth within the trench limits.
    e. Cold plane existing asphalt pavement 50 mm depth- a minimum width of 0.3 m.
    f. Proper compaction of granular road base materials to · 100% Standard Proctor Density.
    g. Sweep all saw-cut asphalt edges to ensure a clean vertical face.
    h. Tack coat all asphalt faces with SS-1 emulsion.

8. Asphalt shall be placed using an asphalt paver in lifts of specified depths (maximum 50 mm depth per lift).

9. All disturbed concrete or asphalt sidewalks and concrete curb and gutter are to be restored in kind to the standards of the local area municipality and to match existing sections and joint patterns. Concrete shall conform to OPSS 351 for sidewalks and to OPSS 353 for curb and

gutter.

10. All disturbed areas shall be restored as per landscape drawings. In addition, restore to match existing conditions. Use the seed mix found in **Special Provisions: Landscape and Maintenance - 28-6 Seeding, Appendix B**, and apply as per the application rate and specifications of OPSS 804 Seed and Cover specification.

11. All guide rails removed to permit construction shall be restored by the Contractor at their expense. Roadway protection is to be in place.

12. All tree limbs and roots damaged during construction shall be trimmed by the Contractor at their expense. The Contractor shall take extreme caution not to damage any trees not marked for removal.

13. The Contract Administrator shall reserve the right to withhold sufficient funds from any or all Contractors' payments to cover restoration costs for all areas not permanently restored.

24. APPROVALS

Commencement of work by the Contractor shall be subject to the receipt of all the necessary approvals by Halton Region including Conservation Halton, Credit Valley Conservation, and the Local municipality. The Contractor may be required to reschedule their work until one or more approvals have been obtained. No extra payment will be made for any delay in obtaining the necessary approvals.

SPECIAL PROVISIONS. LANDSCAPE AND MAINTENANCE. 2018

25. LANDSCAPING

1. SCOPE

Work to be included under this specification includes all labour, materials, tools, services and incidentals to do all planting, including the preparation of planting mixes, placing of topsoil, planting mix in plant pits, staking and guying, mulch, watering and all other work required and/or indicated on the Drawings, details and specified herein.

2. REFERENCES

This special provision shall be read in conjunction with the following specifications or publications:

Landscape Ontario/Canadian Nursery Trades Association; "Canadian Standards for Nursery Stock", latest edition.

Canadian Landscape Standard found at, http://www.csla-aapc.ca/standard

OPSS 802 -Topsoil
OPSS 803 - Sodding
OPSS 804 - Seed and Cover

3. MATERIALS

3.1 General

All plant material shall conform to the horticultural standards of the Canadian Nursery Trades Associations with respect to grading and quality and supplied in strict accordance with the Plant List. Substitutes for the specified plants will not be accepted unless approved in writing by the Engineer/Landscape Architect. When applying for substitutions, timely notice, in writing, shall be given to the Engineer/Landscape Architect.

All plant material shall be No. 1 Grade, nursery grown, under proper cultural practices with respect to fertile soil, ample spacing, regular cultivation, weed, pest control, adequate moisture and pruning, in accordance with good horticultural practices as advocated by the Canadian Nursery Trades Association. All such plant material shall have been transplanted and/or root pruned regularly, but not later than nine (9) months prior to arrival on the site. The Contractor shall submit sources of plant material, in writing, if so requested by the Engineer/Landscape Architect.

Nomenclature of specified plants shall conform to the International Code of Nomenclature for Cultivated Plants and shall be in accordance with the approved scientific name given in the latest edition of Standardized Plant Names. The names of varieties not named therein are generally in conformity with the names accepted in the nursery trade.

Plants dug from native stands, wood lots, orchards or neglected nurseries and which have not received proper cultural maintenance as advocated by the Canadian Nursery Trades Association, shall be designated as "collected plants". The supply and planting of "collected plants" will not be permitted.

The use of plant materials which require chemical treatments as ordered by the Canadian Department of Agriculture shall be prohibited.

3.2 Plant Materials

3.2.1 New Plant Materials

Plants shall be in a healthy, vigorous condition at arrival on site. Heeled-in plants or plants from cold storage will **not** be accepted. Whenever practical, trees shall be supplied from nurseries located within the same hardiness zone and having the same soil conditions and types of soils as the area of the project site. Plants specified as "B.R.", shall be moved with bare roots, while in a dormant condition, and kept shaded, cool and moist to prevent root dieback. Plants specified Ball and Burlap "B&B", shall be moved with solid balls, wrapped in burlap, or approved equal. Root balls shall not be cracked or broken at time of planting. Wire basket shall be removed if used on B&B trees.

Container-grown material is acceptable providing plants have been grown in the container for at least one growing season, but not longer than two. Containers must be large enough to permit proper root development. Plant material should not be root bound.

Plants shall be sound, healthy, vigorous, well-branched, and densely foliated when in leaf. They shall be free of disease, insect pests eggs or larvae and shall have healthy, well-developed root systems. All shrubs and trees shall possess all characteristics of the specified kind with all the leaders intact, undamaged and uncut, growing from and unmutilated root system. The stems shall be free from sunscalds, frost cracks, abrasions, fire and crust. All old injuries shall be completely callused over. Pruning wounds must show vigorous bark on all edges and all parts show live, green cambium tissue when cut.

All plants shall conform to the measurements specified in the plant list, except that plants larger than specified may be used if approved by the Engineer/Landscape Architect. Use of such plants shall not increase the contract price. If larger plants are approved, the ball of earth shall be increased in proportion to the size of the plant.

All plants shall be measured when the branches are in their normal position. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to root base or from branch tip to branch tip. Where trees are measured by caliper (cal.) reference is made to the diameter of the trunk measured 150 mm above ground as the tree stands in the nursery for trees up to 100mm·cal. and 300 mm for trees larger than l00 mm cal.

The sizes of root balls for trees shall be as specified below. Ball sizes are minimum and shall be adjusted accordingly to growth habits of plants. At any rate ball sizes shall be sufficiently large to contain at least 75% of the fibrous root system.

Deciduous Trees	
Caliper	*Root Ball Diameter*
45mm	550mm
50mm	700mm
60mm	700mm
70mm	800mm
80mm	900mm
90mm	900mm
100mm	1000mm
125mm	1200mm
150mm	1500mm
175mm	1750mm
200mm	2000mm

Coniferous Trees	
Height	*Root Ball Diameter*
100cm	450mm
125cm	500mm
150cm	600mm
175cm	700mm
200cm	800mm
250cm	900mm
275cm	1000mm
300cm	1220mm
350cm	1270mm

The ball depth-ratio shall be not less than as follows:

- Diameter up to 500 mm depth not less than 75% of diameter.
- Diameter of 500- 1000 mm depth not less than 66 2/3% of diameter.
- Diameter of 1000-1500 mm depth not less than 60% of diameter.
- Diameter of 1500 mm and up depth of not less than 50% of diameter.

Root balls shall be wrapped with Hessian burlap or approved equal. Balls from 457 mm to 762 mm in diameter shall be double burlapped. Root balls 914 mm and larger in diameter shall be double burlapped and drum laced with 6 mm rope at 200 mm spacing.

3.3 Other Planting Materials

Topsoil	As specified in OPSS 802 and this supplemental specification.
Planting Mix	6 parts topsoil (friable, fertile natural loam), 2 parts sand, 1 part well rotted compost, 1 part finely shredded sphagnum peat moss and .58 kg/cubic meter of bone meal.
Compost	Decomposed fibrous or cellular stems of plants and leaves with a texture varying from porous to spongy fibrous with a pH value ranging from 4.5 to 6.0. It shall be free of decomposed colloidal residue, wood, sulphur, and iron, be brown in colour and finely shredded with particles not exceeding 25 mm in size. The use of compost, supplied in bulk, will not be permitted unless approved by the Engineer/Landscape Architect upon submission of sample and location of source and supply
Fertilizer	Inorganic fertilizers complete, commercial fertilizers of approved manufacturer not less than 60% urea-formaldehyde by weight. The following fertilizer requirements have been included for tendering purposes only. The requirements and rates shall be adjusted to conform to soil testing reports and subsequent recommendations from the testing lab. Such adjustments shall be made at no extra cost to the Owner. 10-6-4 @ .9 kg /25 mm tree caliper. 12-6-4 @ 1 kg/1 cu. meter of soil mixture for all planting beds.
Anti-Wash Geojute	Anti-wash geojute erosion control fabric distributed by Verdyol Plant Research Ltd. Cookstown, Ontario
Bone meal	Commercial, raw bone meal, finely ground, and with a minimum analysis of 2% nitrogen and 11% phosphoric acid.
Lime	Lime to be used in all cases where the pH of the soil is less than 6.0: Limestone containing not less than 8% of calcium and magnesium carbonates combined, finely ground to pass a #10 mesh sieve with at least one half passing a # 100 mesh sieve. Rate of application shall be determined after determining the pH of the topsoil.
Wrapping Material For Tree Trunks	First quality heavy waterproof crepe paper
Anchors	Required for the support of large shrubs and trees and stakes for small trees, as detailed: new wood material, 50mm round or square stake. Stakes are to be removed at the end of the warranty period.
Fastening Wires	Wires for fastening to anchors shall be pliable #9 gauge minimum galvanized iron wire for trees 75mm in caliper and over. Wires to be removed with stakes at the end of the warranty period.

Hose	New Arbortie or approved burlap equivalent.
Mulch	Mulch shall be a clean, shredded pine bark, free of sticks and leaves and not greater than 20mm in diameter, for tree saucers and all planting beds.
Weed Barrier	Non-woven, biodegradable geotextile, to be approved by landscape architect.
Rodent Guard	All tree planting c/w white exterior, black interior, plastic spiral rodent guards, 1m high.
Water Bags	Treegator Original and Treegator Jr Pro Contact: Spectrum Products, Inc, Youngsville, NC. Telephone: 1 866 873 3428, Fax: 919 556 9852
Woodland Planting Soil Mix	3 parts friable, fertile natural loam topsoil, 1 part sand, 1 part well rotted compost, 1 part finely shredded sphagnum peat moss, bone meal 0.58 kg/cubic meter of planting soil mixture.
Armour Stone	Approx. .6 m wide x 1.0 – 1.2 m long x .9 m high. Limestone armour stone pieces without cracks, reasonably flat top and fronts for the purposes of retaining earth berms and planting.

4. CONSTRUCTION

4.1 Inspections

The Contractor must ensure that all materials are available for inspection either at the source of supply or upon arrival on the site. Timely notice, in writing, must be provided to the Engineer/Landscape Architect when materials are available for inspection. All plant material shall be clearly identified by labels indicating species, size and supplier.

Approval of plant material at source of supply does not impair the right of the Engineer/Landscape Architect to inspect plants upon arrival on project site or during the course of construction. Such inspections may result in rejection of plant materials which have been damaged or which, in any way, do not conform to the specifications. The Engineer/Landscape Architect reserves the right to reject any plants, whether planted or not, which do not conform to the specifications and/or drawings. All rejected materials must be removed from the site immediately. Completion certificates will only be issued if in the Engineer/Landscape Architect's opinion, plantings are in a healthy growing condition before and after the planting installation.

4.2 Preparation

Stake out all tree/shrub locations and planting beds and obtain approval from Engineer/Landscape Architect before excavating. Cooperate with Engineer/Landscape Architect where minor adjustments to such locations are necessary. Provide adequate time to arrange for review and approval of staked trees and shrub/perennial beds prior to scheduled planting.

The location of trees and planting areas, where shown on drawings, is approximate only and may require adjustment due to site conditions including above and below grade utilities.

The outline of all planting beds shall be staked out on site and finalized to the Engineer/Landscape Architect's approval.

The Contractor is responsible for locating all underground utilities and services prior to digging. Information concerning location and nature of existing underground services must be obtained from the various agencies concerned. Request a locate from ONICall, phone: 1-800-400-2255 or web: www.ONICall.com.

4.3 Excavation

Excavate planting pits for deciduous and coniferous trees to the following diameters unless detailed otherwise:

- Root ball diameter plus 600mm.

Excavate continuous and individual planting beds to the following minimum depths:

- Deciduous and coniferous shrubs 450 mm. minimum
- Ground Covers and Perennials 350 mm minimum
- Lining-out stock/Whips to allow for full root spread/depth

Remove from site all excavated material from planting beds and tree pits and dispose of, unless directed otherwise.

Scarify sub-grade planting beds and tree pits to a minimum depth of 300 mm.

Tree pit augering will not be allowed to avoid glazing.

4.4 Soil Preparation

STANDARD PLANTING SOIL MIX: Backfill tree pits and planting beds with a soil mixture consisting of 6 parts topsoil (friable, fertile natural loam), 2 parts sand, 1 part compost, 1 part finely shredded sphagnum peat moss and .58 kg/cubic meter of bone meal.

WOODLAND PLANTING SOIL MIX: Three (3) parts friable, fertile natural loam soil , one (1) part sand, one (1) part well-rotted compost.

Mix topsoil, compost and other additives thoroughly on the site, not more than two (2) days before backfilling.

Add commercial fertilizers in accordance with soil testing report and recommendations within the report.

Add bone meal to the soil mixture at the rate of .58 kg. per cubic meter.

Do not mix or backfill when topsoil or soil mixture is in a muddy or frozen condition. Backfill to a height above finished grade sufficient to allow for normal, natural settlement. Finished grade, after settlement, shall be as shown on drawings.
Backfill soil mixture in layers not exceeding 150 mm in depth. Tamp each layer firmly before placing subsequent layers.

4.5 Weed Guard

Provide weed guard in woodland and/or naturalization shrub planting beds shown on drawings and details.

After planting of materials in planting beds cover bed areas with weed barrier fabric around each shrub and tree. Provide a fabric 400 mm x 400 mm square of approved filter fabric and slit from one side to the center. Affix or pin weed guard fabric to soil with 3-75 mm long ardox nails to prevent dislodgment.

Prior to mulching, clean weed barrier surface to be free of soil, debris, etc.

4.6 Installation of Plant Material (Trees and Shrubs)

Planting shall be done during periods suitable with respect to weather conditions and locally accepted practice and to the Owner's approval. Plants shall be set plumb in the center of the pit and 50 mm higher than relation to grade as originally grown, after settlement has taken place.

Planting shall be done in a continuous operation, completing total areas, rather than individual

species. Trees and other plant materials shall be faced to give the best appearance or relationship to adjacent structures, and to the approval of the Engineer/Landscape Architect. Set plants in partly filled pits or beds or soil mixture, allowing at least 150 mm of soil mixture under each plant. Top of root balls and potted root mass shall be covered with plant mix to avoid drying out. Remove all ropes and wires and pull burlap away from top of root ball. Constantly tamp soil around root ball to eliminate air pockets. Soak soil mixture thoroughly with water when hole is filled halfway. Fill hole completely, leaving a shallow saucer directly over root ball, slightly smaller in diameter than the excavation. Water trees and planting beds thoroughly, immediately after planting.

4.7 Installation of Planting Accessories

4.7.1 Tree Wrapping

Promptly after planting, wrap all tree trunks with wrap applied spiral with overlap and extending from top of root ball to just above the second branch. Tie wrappings with approved cord or twine to keep wrapping neat and snug in place. Before applying wrapping, spray trunks with approved wettable powder of a long residual insecticide for better protection. Remove tree wrap after the first winter.

4.7.2 Tree Guying

After planting and wrapping deciduous trees, support all trees per the landscape details on drawings. Use Arborties or approved burlap equivalent at points of contact with bark. Keep guy wires taut at all times without subjecting tree to undue strain. Trees not guyed are subject to all requirements of this specification including warranties.

4.8 Pruning

Prune only as necessary to remove dead and broken branches and to compensate for the loss of roots as a result of digging operations in nursery. Refer to International Society of Arboriculture (ISA) pruning standards. Cut back cambium to living tissue where cuts are made and at bruises, scars and other injuries. Shape wood to prevent the retention of water.

4.9 Watering

Keep all plants well-watered from time of planting until completion. Apply sufficient water to saturate root system, but do not over-water.

Watering bags shall be installed on all deciduous and coniferous tree plantings, as per the manufacturer's specifications. The end of the warranty period all water bags shall be turned over to the Local municipality.

4.10 Mulching

Install approved mulch in all tree saucers and planting beds to a depth of 70 mm unless otherwise indicated. Mix with sufficient soil to prevent blowing away. Cultivate soil and remove weeds before placing mulch. Mulch may not touch trunk of tree.

4.11 Clean-up

Immediately after planting remove all debris and excess material from the site, leaving the area neat and tidy. Clean all areas, which are contaminated as a result of planting operations. Do not burn debris and rubbish unless approved by the Engineer/Landscape Architect. Maintain all areas neat and tidy at all times until completion.

4.12 Protection after Completion

The Contractor assumes full responsibility for protection of all planted areas until all project work has been completed, approved and accepted. The Contractor shall erect protective fencing, such as a snow fence, and post signs where necessary and maintain such works until completion and remove same after completion of work, unless otherwise directed.

4.13 Winter Protection after Completion

The Contractor shall protect all evergreen trees with burlap wrap from cold drying winter winds and driving snow as well as salt spray.

4.14 Armour Stone

The Contractor shall install armour stones per the drawings and detail with the pieces of armour stone placed tight end to end to retain planting mix and plants. In the event that voids cannot be closed chinking will be necessary using smaller pieces of limestone to eliminate soil and mulch. Additionally the back side of the armour stones shall have a non-woven filter fabric placed per the detail.

5. WARRANTY

The following warranty period shall apply to all "nursery-grown" plants:

- When Completion of the Contract has been achieved during the period from January 1st to July 15th, plantings shall be warranted until July 15th two (2) years following.
- When Completion of the Contract has been achieved during the period from July 15th to December 31st, plantings shall be warranted for a period of three (2) years from the date of Completion of Contract.
- Regardless when the contract is deemed complete, the Contractor, the client, local municipality staff and the Landscape Architect shall visit all sites for an inspection between May 1st and May 15th to review plant material that has not survived the winter. This plant material shall be replaced by June 15th. Prior to this inspection all winter plant protection shall be removed to make evergreen tree inspection complete.

The Contractor shall make periodic inspection throughout the warranty period and replace all plants which are dead, missing or which are not in a healthy, vigorous growing condition.

The Contractor shall notify the Engineer/Landscape Architect, in writing, of any corrective or preventive measures necessary to safeguard plants prior to treatment.

All replacement plant materials shall be supplied and planted in strict accordance with plans and specifications and warranty replacements as specified.

The warranty period for replacements shall be the same as the warranty period for the original plant material and shall extend from the date of completion of the replacement.

All replacement plantings shall be tagged or marked, in a permanently visible manner, and the Engineer/Landscape Architect shall be notified, in writing, of the date on which the replacements were planted. Include a sketch showing the location of the replaced plants. The Engineer/Landscape Architect shall be notified when replacements are to be planted. All replacement plantings shall be completed at a time which is in accordance with good horticultural practice.

Remove all accessories and cut at grade those trees, which are to be replaced at a later date. Remove plants, which are to be replaced, when found or notified by Engineer/Landscape Architect.

6. MAINTENANCE

The Contractor shall maintain all plant materials and planting areas immediately after plants have been planted and continue such maintenance until the end of the defined maintenance period as noted in SP104. Maintenance shall include all measures necessary to establish and maintain plant materials in a vigorous, healthy, growing condition. Maintenance shall include, but not be limited to:

a. Maintain all plant and tree accessories, such as tree wrappings, tree guys, stakes and tighteners from time of installation until Completion of the Contract.
b. Adjust tighteners to keep guys taut at all times. Repair or replace accessories where necessary.
c. Cultivate and keep planting beds and tree saucers free of weeds at all times. Remove all debris and broken branches and maintain planting beds in a neat condition at all times. Water, when necessary, with sufficient amounts to saturate root system. Fill gator bags twice, monthly, during times of drought (summer).
d. Inspect plants and trees regularly for diseases and insect infestations and take immediate measures necessary to eliminate such diseases and infestations.

e. Use chemicals for weed control, disease and insect control in strict accordance with Pesticides Act and manufacturer's recommendations.
f. Assume full responsibility and repair, replace or remedy otherwise all damage resulting from the use of such chemicals at no extra cost.
g. Tree guys shall be taut and all accessories in good condition as specified. All planting beds and tree saucers shall be freshly cultivated and free of all weeds and debris.

Water bags must be maintained as per the manufacturer's specifications.

At time of final inspection all plants and trees shall be completely free of diseases and/or insect infestations.

7. PRODUCT DELIVERY, STORAGE AND HANDLING

Supply and deliver all materials, such as fertilizers, bone meal and mulches, in standard containers clearly indicating contents, weight, analysis and name of manufacturer. Where such materials are supplied in bulk, written statements shall be submitted to the Engineer/Landscape Architect indicating the same information as if supplied in standard containers.

Protect all plant materials from damage and breakage. Protect all parts of the plant material from drying out from the time of digging until they are installed. Root balls, trunks, branches and leaves shall be protected from sun and wind desiccation. Transporting trees shall be restricted to closed vans or trucks, or trucks covered with mesh tarpaulin or similar material to prevent windburn an desiccation during transit. Plants shall be transported with care taken to prevent damage. Branches shall be carefully tied in such that trunks do not get damaged. Points of contact with equipment shall be padded. Bark should be protected against chafing from chains, cables, equipment, or other trees by a wrapping of cardboard or burlap, especially during transport.

Plants with broken or abraded trunks or branches or with broken or cracked root balls or plants which are strongly desiccated will be subjected to rejection upon arrival on the project site.

All plant materials which cannot be planted immediately upon arrival on the site, shall be properly heeled in or well protected with soil or similar material to prevent drying out and shall be kept moist until commencement of planting.

8. FINAL REVIEW FOR COMPLETION OF CONTRACT

Final review and completion of planting work shall coincide with final review and completion of all work included in the Contract. At time of final review all plants shall be in a healthy vigorous, growing condition, planted in full accordance with drawings and conditions. Planting beds and tree saucers shall be freshly cultivated and free of weeds and debris.

9. QUALIFICATIONS OF CONTRACTOR

Personnel must be experienced and qualified to complete the work and be under the direction and supervision of a qualified arborist. All pesticides personnel shall be licensed. The Contractor must be a member in good standing of Landscape Ontario.

10. BASIS OF PAYMENT

The Contract Unit Price for the various tender items shall be used for full compensation for all labour, equipment and materials to supply and install plant material including the restoration and clean-up of the work site in accordance with the plans and the requirements of the specifications. All work and materials described in this specification is deemed to be included in the contract price for the work.

26. TOPSOIL

The requirements of OPSS 802 shall apply except as modified herein.

1. SCOPE

Work to be included under this specification includes all labour, equipment, material, machines, tools, services and incidentals to ·supply and spread topsoil and fine grade for the purposes seeding and sodding as part of the restoration requirements.

2. REFERENCES

This special provision shall be read in conjunction with the following specifications:

OPSS 802 - Topsoil
OPSS 803 – Sodding
OPSS 804 - Seeding

3. MATERIALS

All topsoil for this work is to be imported topsoil. Alternatively, native topsoil may be utilized if tested to meet the by-volume material percentages listed below.

Topsoil is to be fertile, friable natural loam, and the following:

- Consist of mineral and organic materials, at the following percentages by volume:

Mineral Material consisting of:	
Clay	18%
Silt	28%
Sand	46%
Organic Material	8%

- Be a medium texture sandy loam, well tilled, with good tilth.
- Have an acidity range from pH 6.0 to 7.5.
- Be free of any admixture of subsoil, lumps, stones and rocks over 20 mm dia. and other extraneous matter, and reasonably free of weeds, weed seeds, and rhizomes.
- Be completely free of any toxic chemical (Atrizine)
- Be capable of sustaining vigorous plant growth.

3.1 Quality Assurance

3.1.1 Topsoil Evaluation

An evaluation is required for all organic soils intended for work of this Contract. The Contractor must use an approved independent agricultural soil testing agency, such as:

Agri-Food Laboratories
503 Imperial Road North, Unit 1
Guelph ON NIH 6T9
1-800-265-7175

When organic soil from one source is exhausted and more soil is required, organic soil from a new source shall be evaluated before continuing work.

The Contractor shall test for N, P, K, and minor element value, soluble salt content, organic matter, pH value, and mineral and organic contents of soil as measured by weight when dry.

For example: Agri-Food Laboratories

Topsoil Package - BASIC (Topsoil)
% Sand/Silt/Clay + Toxic Chemicals (Atrizine)

Soil shall be classified by visual procedures for organic soils as defined by the MTC Soil Classification Manual.

Prior to commencing work, the Contractor shall submit the soil evaluation report with recommendations for soil amendments from the testing lab to the Engineer/Landscape Architect for review.

The Contractor shall have an agricultural soil testing agency confirm the suitability of the organic soil for specified plantings and that the soils tested, meet, or can be amended to meet, the requirements specified herein. The Contractor shall conform to recommendations from agricultural soil testing agency with respect to improvement of tested soil. Adjustments to the fertilizer requirements and rates, as well as the addition of other additives, to conform to soil testing recommendation, shall be completed at no extra cost to the Contract.

3.1.2 Contractor Qualifications

All planting and related work shall be done by experienced, qualified personnel, under the direction and supervision of an ISA Certified Arborist or Landscape Architect.

4. CONSTRUCTION

4.1 Site Conditions

Contractor shall visit and examine the sites and soil conditions and be satisfied that the work can be carried out in accordance with the requirements or contract documents. Contractor shall also verify that grades are correct and if discrepancies occur, notify Engineer/Landscape Architect and do not commence work until instructed by the Engineer/Landscape Architect.

4.2 Inspections

The Contractor shall make all materials available for review at source of supply or upon arrival on the site and shall give timely notice, in writing, to the Engineer/Landscape Architect when materials are available for review. The Engineer/Landscape Architect reserves the right to reject any topsoil, whether stockpiled or not, which does not conform to the specifications and/or drawings. All rejected materials must be removed from the site immediately. Prior to the placement of the topsoil, the Contractor shall arrange for review of the subgrade.

4.3 Preparation

The area to be restored shall be prepared by grading the soil, eliminating uneven areas and low spots, ensuring positive drainage. All debris, roots, branches, stones in excess of 10 mm diameter shall be removed and disposed of offsite. The entire area which is to receive topsoil shall be coarse cultivated to a depth of 150 mm. Also cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

4.4 Installation of Topsoil

Once the Engineer/Landscape Architect has accepted the subgrade, then the topsoil shall be placed. The topsoil shall be placed uniformly over unfrozen subgrade, free of standing water.

The Contractor shall notify the Engineer/Landscape Architect in writing if the grades provided by rough grading will not permit proper drainage.

Uniform slopes shall be established between points for which finish grades are indicated or between such points and existing grade. The Contractor shall round and smooth grades 'at the top and toe of slopes and banks. Topsoil shall blend smoothly and flush with existing grades. The topsoil shall be spread evenly over the approved subgrade to a 85% compacted depth of 150 mm. Fine grade with small bulldozer, bobcat with a Harley rake, or by hand if space and slopes do not allow for equipment to access and preform a final acceptable sodding or seeding surface . Clean surface of all stones, rocks, branches, extraneous material etc. larger than 30 mm in diameter and live weeds. Prior to commencement of any subsequent work; the Contractor shall acquire approval by Engineer/Landscape

Architect of the finish grading.

4.5 Protection

The Contractor shall assume full responsibility for the protection of all topsoil areas until acceptance of the work has been received. Protective barriers and signs shall be erected, where necessary, and maintained until acceptable and then removed after. The Contractor shall remedy damages, wash-outs and eroded areas resulting from weather, improper protection, or other causes. The Contractor shall report, in writing, to the Engineer/Landscape Architect, all damages resulting from vandalism or any other causes beyond the Contractor's control not provided by these documents.

5. PRODUCT STORAGE, DELIVERY AND HANDLING

All materials, such as fertilizers, bonemeal and mulches, shall be supplied and delivered in standard containers clearly indicating contents, weight, analysis and name of manufacturer. Where such materials are supplied in bulk, written statements shall be submitted to the Landscape Architect indicating the same information as if supplied in standard containers. Topsoil shall be stockpiled and handled in order that soil texture is preserved and shall be covered, if necessary, to prevent wind or water erosion. The Contractor shall not allow topsoil to be contaminated by mixing with subgrade materials. Contaminated topsoil will be rejected. Refer to **Special Provisions – General – 14-7 – Environmental Considerations – Stockpiles, Appendix B**, for stockpiling specifications.

27. SODDING

The requirements of OPSS 803 for sodding shall apply except as amended or extended herein for restoration purposes or as directed by the contract administrator.

1. MATERIALS

1.1 Sod

Sod shall be a certified No. 1 cultivated turf grass sod as specified in the planting notes and grown by a member in good standing with the Nursery Sod Growers Association of Ontario. Composition of sod shall be of improved proprietary Kentucky Bluegrass varieties. Varieties shall be chosen from top 50% of current Nation Turfgrass Evaluation Program (NTEP) evaluations. At time of delivery it shall have a strong fibrous root system free of stones, burned, or bare spots and contain not more than 1% twitch grass or other weeds. Sod shall be uniform in texture and in good healthy condition with no sign of decay. Sod shall be of sufficient density that no surface soil is visible.

The soil portion of the sod shall be well permeated with roots. It shall be a good mineral type with a thickness of 10 mm minimum and 15 mm maximum. Individual sod pieces shall be of a condition that each may be lifted, rolled, transported and placed without breaking or tearing and without loss of soil under normal handling conditions.

Cut sod shall be a maximum thickness of 78 mm and a minimum thickness of 25 mm, 1 square meter in area.

1.2 Other Materials

Inorganic Fertilizers shall be complete, commercial fertilizers of approved manufacturer, containing not less than 60% urea- formaldehyde by weight. The following fertilizer requirements have been included for tendering purposes only. The requirements and rates shall be adjusted to conform to soil testing report and subsequent recommendations. Such adjustment shall be made at no extra cost to the Owner. 10-10-10 9 kg per 81 square meters and/or 0-20-10 @ 5.4 kg per 81 square meters and/or Superphosphate @ 11 kg per 81 square meters.

Commercial superphosphate finely ground with a minimum analysis of 20% P205.

Lime to be used in cases where the pH of the soil is less than 6.0: Lime containing not less than 85% of calcium and magnesium one half passing, a #100 mesh sieve. Rate of application shall be

determined after determining the pH of the topsoil.

Topsoil
Shall conform to OPSS 802 and supplemental specifications. Depth shall be a minimum of 100 mm.

2. CONSTRUCTION

1.1 Inspections
The Contractor shall make all materials available for review upon arrival on the site, or at source of supply when requested, and shall give timely notice, in writing, to the Engineer/Landscape Architect when materials and sodding work are available for review.

The name of the sod supplier shall be supplied. The Contractor shall arrange for review of finished grade before starting sodding work. The Engineer/Landscape Architect reserves the right to reject sodding work after it has been completed if it does not conform to the specifications and/or drawings. All rejected materials must be removed from the site immediately. Once all sodding work has been completed, the Contractor shall give timely notice, in writing, to the Engineer/Landscape Architect. All sodding work is to be inspected upon completion. Acceptance of Work will be allowed only if, in the Engineer/Landscape Architect's opinion, the grasses specified are well established and in healthy growing condition.

Tolerances for the work included in this item shall be as follows:

- Finish grade:
  - Surface grade tolerance: ± 6 mm of elevations indicated or required
- Drainage swales:
  - Surface grade shall be smooth, true to line and level and free from depressions

1.2 Preparation
Contractor shall visit the site prior to commencement of work and examine the site and soil conditions and be satisfied that work can be carried out in accordance with the requirements of the contract documents.

1.3 Installation of Topsoil
The Contractor shall place the topsoil so that it is approximately 25 mm below finished grade to allow for the thickness of sod. The topsoil shall be fine graded, eliminating rough and low areas to ensure positive drainage. As well, ditches and swales are to be properly graded with adequate falls for draining. The area where sod is to be placed shall be fine graded to a smooth, even, loose-textured surface, free of roots, debris, stone 10mm diameter and larger and to the Engineer/Landscape Architect's approval. Prior to placing sod, mix in lime and fertilizers, as required.

1.4 Placement of Sod
Sod is to be laid as soon as possible upon arrival on the site, no later than 24 hours after delivery and 36 hours after harvest. Sod is to be handled in such a manner to prevent breaking or tearing. Damaged and broken pieces should not be laid, but remove from site. Sod should not be stretched during handling.

The edges of adjacent sod pieces shall be placed closely together in such a manner that no open joints are visible or pieces overlapping. End and side joints of adjacent sod pieces shall be staggered. Blend sod smoothly and uniformly with paved areas as detailed on the drawings. No voids shall be left between the soil portion of the sod and the underlying ground surface. When sodding adjacent to pave areas or curbs, side edges shall be flush with these paved areas and curbs to avoid drying out. When sodding adjacent to existing established sodded areas, cut in as required to ensure a clean flush edge between new and existing sod. Lay sod to a width of three (3) meters in swales and place perpendicular to direction of swales. Sod shall be securely placed across the face of slopes. Stake as required on slopes to prevent movement.

Immediately after the installation of the sod, roll area with 80 kg roller to ensure good bond between sod and soil and to remove minor irregularities. Area shall be watered with sufficient amounts to saturate sod and the upper 100mm. of topsoil. All edges must be tamped to ensure that the root zone is not exposed.

The Contractor shall provide two (2) cuts following installation of sod, prior to turnover to Halton Region and local municipality staff.

1.5 Protection

The Contractor shall assume full responsibility for protection of all sodded areas until the end of the maintenance period and/or acceptance of work. Protective barriers and signs shall be erected, where necessary, and maintained until acceptable and then removed after final review. The Contractor shall remedy damages, wash-outs and eroded areas resulting from weather, improper protection, or other causes. The Contractor shall report, in writing, to the Engineer/Landscape Architect, all damages resulting from vandalism or any other causes beyond Contractor's control not provided for by these documents.

2. WARRANTY

During the warranty period, the Contractor shall replace sod where necessary and make periodic inspections of all sodded areas. The Owner shall be notified, in writing, of any corrective or preventative measure prior to treatment necessary to maintain grass in the specified condition. Replace all sod which has failed to establish into a healthy, vigorously growing condition, as a result of faulty materials, workmanship, and/or erosion.

3. MAINTENANCE

Sodded areas must be maintained from time of installation until acceptance of work, but not less than thirty (30) days after installation and after at least one (2) mowings. Maintenance shall include measures necessary to establish and maintain sodded areas in a healthy, vigorous growing condition, free of thin, poor or burned-out patches, including, but not limited to:

- Mow grass regularly to maintain a maximum height of 80mm.
- Roll sodded areas, where necessary, to remove depressions and irregularities.
- Water, when necessary, with sufficient amounts to saturate the upper 100 mm of topsoil and apply fertilizes when necessary.
- Check sodded areas for diseases and weeds and take immediate measures to eliminate diseases and control weed growth.
- Use chemicals for disease and weed control in strict accordance with the Pesticides Act and manufacturer's recommendations. Assume full responsibility for the use of such chemicals and repair, replace or remedy otherwise damage resulting from the use of such chemicals.
- Get necessary permits.
- Re-sod areas which show deterioration or which are thin, bare or burned-out and repair damages resulting from erosion and washouts or any other causes.

At time of final review, all placed sod shall be healthy, actively growing and green in leaf colour. All placed sod shall be in the same location as originally placed and shall not have moved, eroded, slipped or sloughed. Sod shall show evidence of rooting into the underlying soil. The sod shall be of sufficient density that no surface soil is visible. There shall be no competitive growth from under the sod, at edges or between joints.

If the completed work does not meet performance requirements at the time of the 30-day review, the Contractor shall re-apply the specified materials according to this specification within 14 days of receiving notification: The Contractor shall maintain the site and control erosion until conditions meet application or re-application of sod. All replaced sod shall be subject to a further maintenance period of 30 consecutive days.

The Engineer/Landscape Architect will accept the Work only if areas are properly established (and have rooted) and are free of eroded, bare and dead spots and 98 percent free of weeds.

4. DELIVERY, HANDLING AND STORAGE

The sod must be protected during transportation and delivered to the site in a fresh and healthy condition. The sod shall be laid within 36 hours after harvesting. Any sod not laid within this time period will be found unacceptable. Sod shall be installed immediately upon arrival on site. If this is not possible, then sod must be protected from drying out. Materials, such as fertilizers and similar materials, shall be supplied and delivered in standard containers, clearly marked with contents, weight, analysis and name of manufacturer.

5. BASIS OF PAYMENT

The Contract Unit Price for this item shall be for full compensation for all labour, equipment, material, machines, tools, services and incidentals to supply and spread topsoil, fine grade, supply and install sod and maintain until acceptance. Sod placed beyond the marked limits will be at the contractor cost. Sod placed outside the limits will only be compensated for when directed by the Engineer or Landscape Architect.

28. SEEDING

1. REFERENCES

This special provision shall be read in conjunction with the following specifications or publications of Ontario Provincial Standard Specification (OPSS):

OPSS 804, Construction Specification for Seed and Cover.
OPSS 804.01.01, Performance Measure.

2. SUBMITTALS

Product Data:
Provide product data for annually/mechanically applied seeding and hydraulic seeding:

1. Seed
2. Mulch
3. Tackifier
4. Fertilizer
5. Erosion Control Blanket

Submit in writing seven (7) days prior to commencing work:

1. Volume capacity of hydraulic seeder in litres;
2. Amount of material being used per tank based on volume; and
3. Number of tank loads required per hectare to apply specified slurry mixture per hectare.

3. QUALITY ASSURANCE

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
    1. Seed supplied either as a single seed species or as a seed mix will comply with the provisions of the Canada Seed Act and Regulations and the grade standards for the specific seed species.
3. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

.4 Seed packaging, labelling and storage will be in accordance with OPSS 804.01.01. Make arrangements for inspection and approval of seed mixtures by Landscape Architect prior to installation.

4. SCHEDULING

1. Schedule hydraulic seeding to coincide with preparation of soil surface.
2. For optimum conditions, schedule hydraulic seeding from May 1 to June 15 or from August 15 to October 15.

5. WASTE MANAGEMENT AND DISPOSAL

1. Separate and recycle waste materials.
2. Divert unused fertilizer from landfill to official hazardous material collections site.
3. Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

6. MATERIALS

1. Seed: as listed below.
2. Seeding Rate: 26 kg/hectare.
3. Nurse Crop: 20 kg/hectare.
4. Mulch: Specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with the following properties:
5. Type I mulch:
   - Made from wood cellulose fibre.
   - Organic matter content: 95% ± 0.5%.
   - Value of pH: 6.0.
   - Minimum potential water absorption: 90%.
6. Tackifier: Water dilutable, liquid dispersion.
7. Water: Free of impurities that would inhibit germination and growth.
8. Fertilizer:
   - To Canada “Fertilizers Act” and “Fertilizers Regulations”.
   - Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
9. Erosion Control Blankets:
   - In accordance with OPSS 804.
   - On slopes 3:1 and steeper.
10. Seed shall be No. 1 seed, first quality, mixed and guaranteed by supplier, in accordance with Seeds Act for Canada, as indicated below.

Botanical Name	Common Name	Percentage
Anemone canadensis	Canada Anemone	10%
Calamagrostis canadensis	Blue Joint Grass	10%
Desmodium canadense	Showy Tick-Trefoil	5%
Eupatorium maculatum	Joe Pye Weed	5%
Eupatorium perfoliatum	Boneset	5%
Monarda fistulosa	Wild Bergamont	5%
Oenothera parviflora	Evening Primrose	10%
Penstemon digitalis	Beard-Tongue	5%
Rudbeckia hirta	Black-Eyed Susan	5%
Solidago canadensis	Goldenrod	5%
Symphotrichum ericoides	Heath Aster	10%
Symphotrichum laevis	Smooth Aster	10%
Symphotrichum novae angilae	New England Aster	5%
Thalictrum pubescens	Tall Meadowrue	5%
Verbena hastata	Blue Vervain	5%

*SEED MIX Old Field Meadow to Meadow Marsh Transition Mix – available from:

- OSC, 330 Phillip St. P.O. Box 7, Waterloo, ON, N2J 3Z6. Phone (519) 886-0557
- Pickseed, P.O. Box 304, Lindsay, ON, K9V 4S3. Phone (705) 878-9240
- Prairie Nursery, P.O. Box 306, Westfield, WI, 53694. Phone (608) 296-3679

Seeding rates: 12 kg/ha Old Field Meadow to Meadow Marsh Transition Mix 25 kg/ha Meadow Fescue.

7. WORKMANSHIP

1. Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other surfaces non-intended.
2. Clean-up immediately, material sprayed where not intended.
3. Do not perform work under adverse field conditions such as high winds, frozen ground or ground covered with snow, ice or standing water.
4. Protect seeded areas from trespass until plants are established.

8. PREPARATION OF SURFACES

1. Fine grade areas being seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
2. Cultivated areas identified as requiring cultivation to depth of 25 mm.
3. Ensure areas being seeded are moist to depth of 150 mm before seeding.
4. Obtain Landscape Architect approval of grade and topsoil depth before starting to seed or sod.
5. Placement of topsoil to comply with **SP102** Topsoil.

9. FERTILIZING PROGRAM

1. Supply and install 8-32-16 fertilizer at 350 kg per hectare in accordance with OPSS 804. Contractor to submit the application approach two (2) weeks in advance of application for review and approval by Landscape Architect.

10. PREPARATION OF SLURRY

1. Measure quantities of materials by weight or weight-calibrated volume measurement. Supply equipment required for this work.
2. Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
3. After materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

11. SLURRY APPLICATION

1. Hydraulic seeding equipment:
   - Slurry tank.
   - Agitation system for slurry being capable of operating during charging of tank and during seeding, consisting of recirculation of slurry/mechanical agitation method.
   - Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
   - Tank volume being certified by certifying authority and identified by authorities “Volume Certification Plate”.

2. Slurry mixture applied per hectare
   - Seed: Grass mixture 26 kg
   - Mulch: Type I, 1,250 kg
   - Tackifier: 20 kg
   - Water: Minimum 30,000L
   - Fertilizer: 350kg, ratio 8-32-16

3. Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
   - Using correct nozzle for application.
   - Using hoses for surfaces difficult to reach and to control application.

4. Blend application 300mm into adjacent grass areas, sodded areas and previous applications to form uniform surfaces.

5. Re-apply where application is not uniform.

6. Remove slurry from items and areas not designated for spraying.

7. Protect seeded areas from trespass.

8. Remove protection devices as directed by Landscape Architect.

12. MAINTENANCE DURING ESTABLISHMENT PERIOD

Grass Mixture

- Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
- Fertilize seeded areas ten (10) weeks after germination provided plants have mature true leaves in accordance with fertilizing program. Spread half of required amount of fertilizer in one (1) direction and remainder at right angles.
- Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.

13. ACCEPTANCE

Seeded areas will be accepted by Halton Region provided that:

1. Plants are uniformly established and seeded areas are free of rutted, eroded, bare or dead spots; and
2. Areas have been fertilized.
3. OPSS 804.08.02 Failure to Meet Performance Measure shall be followed as quoted below:

If the completed work does not meet the performance measures of the 30 Day inspection, the Contract Administrator shall document the failed areas, notify the Contractor of those areas, and re-inspect at the 60 Day inspection.

If the completed work does not meet the performance measures of the 60 Day inspection, the Contract Administrator shall notify the Contractor in writing of the failed areas. The Contractor shall reapply the specified material in accordance with this specification within 14 Days of receiving the notification. The Contract Administrator shall re-inspect the seeded area at the 90 Day inspection.

If the completed work does not meet the performance measures of the 90 Day inspection, the Contract Administrator shall notify the Contractor in writing of the failed areas. The Contractor shall reapply the specified material in accordance with this specification within 14 Days of receiving the notification. The Contract Administrator shall re-inspect the seeded area 30 Days after reapplication of material.

Inspections and reapplication of material shall continue, as outlined in the 90 Day inspection clause above, until the seeded area has been accepted. Page 9 Rev. Date: 11/2014 OPSS.PROV804 All replaced seed and cover shall be subject to the Quality Assurance section of this specification.

Areas seeded in fall will achieve final acceptance in following spring, one (1) month after start of growing season provided acceptance conditions are fulfilled.

14. MAINTENANCE DURING WARRANTY PERIOD

Perform following operations from time of acceptance until end of warranty period:
Repair and reseed dead or bare spots to satisfaction of Halton Region; and
Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one (1) direction and remainder at right angles.

29. LANDSCAPE MAINTENANCE

1. DESCRIPTION

The Contractor shall provide maintenance and warranty of all plant materials in accordance with this Special Provision.

2. DURATION

The duration of the maintenance and warranty phase shall be 24 consecutive months from time of project completion.

3. MATERIALS

3.1 Fertilizer

Complete commercial slow release sulphur-coated urea fertilizer of approved manufacturer for April fertilizer application and complete commercial fertilizer for June fertilizer applications. The recommended fertilizer rate is 10-6-4. Water soluble 20-20-20 all-purpose fertilizer in a dilute solution may be used alternately upon written approval by Engineer/Landscape Architect. The Contractor must supply a rate schedule for Engineer/Landscape Architect approval. Micronutrients such as iron and manganese by capsules or foliar spray.

3.2 Disease Control

For trees, shrubs and other plantings, specific diagnosed problems shall be met with current recommended treatments as requested and directed by Engineer/Landscape Architect.

3.3 Mulch

Clean, shredded bark, free of sticks and leaves and not greater than 20mm in diameter, for tree saucers and planting beds. The use of mulch, supplied in bulk, will not be permitted unless approved by the Engineer/Landscape Architect upon submission of sample and locations of source of supply.

3.4 Water

Potable and capable of sustaining plant growth.

4. CONSTRUCTION

4.1 Maintenance Reports

Monthly maintenance reports are to be submitted by the Contractor, to the Engineer/Landscape Architect. Maintenance reports are to include date of work performed, activities performed, personnel on site, notes made during activities and a list of any replacement plant materials. Upon completion of the warranty period, maintenance reporting, at intervals determined by Local and Regional staff, shall be passed from the Contractor to the Local municipality and shall continue to be paid for by Halton Region.

4.2 Maintenance of Trees, Shrubs and Other Plants

The Contractor is to maintain all vegetation within the limit of contract work including both newly planted/young planted materials and well established older trees and shrubs. The Contractor is to instruct, in writing, any corrective or preventative measures necessary to ensure healthy plant growth and report in writing any damage to plant materials, however caused.

4.2.1 *Minimum Landscape Maintenance Schedule*

○ SCHEDULE AS REQUIRED • SPECIFIED SCHEDULE

ACTIVITY	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
Spring Clean Up	•	○						
Fertilizers	•							
Weed Control	••	••	••	••	••	••	••	••
Insect and Disease Control	○			○				
Pruning (Dead Branches)	•	○	○					
Watering			○	•	•	○		•
Mulching	•	○	○	○	○	○	○	○
Accessories	•	○	○	○	○	○	○	○
Removals (Dead Material Only)	○	○	○	○	○	○	○	○
Replacement of Plants		•	•		•	•		
*Winter Preparation and Clean Up							○	•

*includes leaf and litter disposal

4.2.2 *Fertilizer*

In the early spring, the Contractor shall apply a complete fertilizer that is high in nitrogen and potassium but low in phosphorus at the rates indicated below. Shrubs/trees should not be fertilized during summer or early fall.

RECOMMENDED RATE OF FERTILIZER FOR TREES

Tree Trunk Diameter	Quantity of Fertilizer per Tree
50 to 100 mm	0.5 kg.
100 to 150 mm	1.5 kg.
150 to 200 mm	2.0 kg.
Over 200 mm	3.0 kg.

Measure trunk diameter at 1.5m above the ground. Rates are based on a complete fertilizer containing 10% nitrogen. Water thoroughly after fertilizing.

RECOMMENDED RATE OF FERTILIZER FOR SHRUBS

Type of Shrub	Grouped in Beds	Large Specimen
Deciduous	0.5 – 1.0 kg/10 sq.m.	0.25 – 0.5 kg/plant
Broadleaf Evergreen	0.5 – 1.0 kg/10 sq.m.	0.25 kg/plant
Narrowleaf Evergreen	0.5 – 1.0 kg/10 sq.m.	0.25 – 0.5 kg/plant

Rates are based on a complete fertilizer containing 10% nitrogen. Water thoroughly after fertilizing.

The Contractor is to take soil samples for chemical soil tests and leaf samples for foliar analysis for trees and shrubs showing stress or nutrient deficiencies and have the testing done. Based on test results and within the minimum and maximum rates indicated above, Contractor is to adjust fertilization rates to meet plant nutrient requirements. As requested and as directed by the Engineer/Landscape Architect, apply foliar spray or implant capsules to correct chlorosis.

4.2.3 Weed Control

Consists of the prevention and/or removal and disposal of all weeds and grasses in the planting beds and tree wells. Weed as required on a regular basis to keep planting beds and tree wells free of weeds and grasses. Use no herbicides.

In early spring, use appropriate pre-emergent treatment. As required, hoe, cultivate, and pull weeds by hand.

4.2.4 Insect and Disease Control

Effective control of insects and diseases begins with recognition of the problem. Refer to Ontario's **Weed Control Act, R.S.O. 1990, c. W.5.** An ISA Certified Arborist or Landscape Architect is to inspect trees monthly for evidence of malformation, abnormal coloration on surfaces such as dull leaves, buds or flowers and report any problems to the Engineer/Landscape Architect. The Contractor is to provide a copy of the Proposed Pest Management and Monitoring Program for the site. Applications or sprays will be done following authorization by the Engineer/Landscape Architect. The Local Municipality must be notified 24-48 hours prior to application of spraying activity. Include an annual allowance of $2,000.00 in the tender for the above work. Expenditures of this allowance will be authorized by the Owner.

The following insect and disease control shall be completed at the specified times:

- Dormant oil spray in late April/early May and before leaf buds break.
- All-purpose general spray in spring, mid-summer and fall. Meet specific diagnosed problems with current recommended treatments.
- For leaf minor in mid-May and again in early July, use current recommended treatments.
- Meet specific diagnosed problems with current recommended treatments as requested and as directed by the Engineer/Landscape Architect.

4.2.5 Pruning

The Contractor is to remove dead, damaged and diseased plant material. Work shall be supervised or completed by an ISA Certified Arborist.

The Contractor shall prune to encourage a healthy, natural growth pattern for each specific variety. Prune to develop the ultimate and future branching structure. The schedule for pruning should allow for the natural flowering and growth cycle for the specific varieties. Follow accepted and recommended trade/horticultural practices. Use only clean, sharp tools with all cuts clean. Cuts, bruises, or scars on the bark shall be traced back to living tissue and removed. Shape the affected area so as to not retain water.

Deciduous Trees: Do not prune the leaders of deciduous trees. Remove all dead and diseased wood back to healthy wood.
Use hand shears to remove all branches which are under 15 mm in diameter. Use loppers to remove all branches between 15 mm and 25 mm in diameter. Use a saw to remove all branches in excess of 25 mm in diameter. Prune flowering trees after bloom in late June.

Coniferous Trees: Prune in April before growth commences or in July after new growth has matured, only if required.

Deciduous Shrubs:	Prune later flowering shrubs that bloom on new wood in early spring (eg. Hydrangea). Prune early flowering shrubs immediately after they have finished flowering. Remove all dead and diseased wood in shrubs back to healthy wood. Prune to retain the natural shape of the plant material. Prune by thinning the plant, by reducing to various lengths, various branches of the plant. Remove totally some of the heavy, old growth from the interior of the shrub.
Coniferous Shrubs:	Prune all coniferous shrubs i.e. Pinus mugo (mugho pine) in early June, when the candles (new growth) are approximately 5 cm in length. Remove all candles, one half of their length. Prune other coniferous shrubs in late June , or in July after new growth has matured.
Hedges:	Newly planted deciduous hedges which should be cut back to encourage strong root growth and strong branching system from the base. As new growth proceeds, cut hedge back to within a few cm of previous cut. Trim hedge to develop wider base than top.

4.2.6 Cultivation and weed removal

Remove any weeds from the shrub beds of pits and cultivate to a depth of 50 mm.

4.2.7 Accessories

The Contractor shall adjust and repair accessories such as tree wrapping, stakes, guy wires, tension adjusters, etc., as required, and shall eliminate bracing and tree supports at the end of the warranty period after final inspection / acceptance unless directed to leave stakes in place.

4.2.8 Removals

The Contractor shall remove and dispose of dead newly-planted plant materials under supervision of the Engineer/Landscape Architect. Do not include the removal of well- established older trees and shrubs.

4.2.9 Plant Replacements

During the maintenance period, the Contractor shall make periodic inspections and replace all plants which are dead, missing or are not in a vigorous growing condition (see Landscape Maintenance schedule). The Contractor shall notify the Owner, in writing, of any corrective or preventive measures necessary to ensure plant vigor, prior to replacement and supply and plant all replacements in strict accordance with tender documents as specified.

The warranty period for replacements shall be the same as the warranty period for the original plant material and shall extend from the date of completion of the replacement. The Contractor shall tag or mark, in a permanently visible manner, all replacement trees and notify Halton Region, in writing, or the date on which the replacements were planted, including a sketch showing the location of replaced plants. The Contractor shall notify Halton Region when replacements are to be planted. The replacement plants shall be planted at a time which is in accordance with good horticultural practice, as specified in the schedule.

At the trees which are to be replaced at a later date, all accessories shall be removed, and the trees shall be cut at grade and shall be stumped to 60cm to allow for replanting. Plants which are to be replaced shall be removed when found or notified by the Owner or Engineer/Landscape Architect.

4.3 Miscellaneous Maintenance

4.3.1 Leaf Removal

The Contractor shall clean up, remove and dispose of the fall season leaf drop regularly. Exempted are those areas to be left in a natural state (i.e. forest floor). All walking or pedestrian surfaces are to be cleaned-up on a weekly basis.

4.3.2 General Clean-up

The Contractor is to clean up, remove, and dispose of, on a regular basis, all horticultural rubbish and debris such as clippings, limbs, dead plants, leaves, etc. Paper or debris shall not be run over with mowers. While cultivating planting beds the Contractor is to include paper, trash, etc. in the clean-up operation.

The Contractor is to complete Spring Clean Up **prior** to May 15th. This shall include, but not be limited to, the removal and disposal of any litter, or other refuse that has accumulated over the winter, removal any protection burlap from evergreens, examining material for winter damages, removal or repair of any broken branches and removal of any dead material.

4.3.3 Rodent Control

Prior to the first major snow fall, the Contractor shall install a suitable tree guard. The protection shall "be as high as rabbits can reach when standing on deep snow." Bait in traps shall be set at 5.5 to 11 kg/ha, depending on the severity of infestation. The typical rodent guard height for Halton Region is 1m.

4.3.4 Tree Wrap/Protection

The Contractor shall wrap the bark of trees susceptible to sun-scald. Evergreen trees shall be wrapped with burlap. All wrappings shall be removed in early spring.

4.4 Winter Preparation

The Contractor shall ensure that all catch basins and drains are kept clean by removing debris to permit proper runoff of water and all coniferous plant material are watered to a depth of 300mm prior to freeze up.

4.5 Watering

The Contractor shall maintain a watering program (every two weeks for clay soil and every week for sandy soil) for all planting areas to the end of the growing season. A watering program for newly planted trees and established trees shall be maintained for a period of three (2) years following planting; at sufficient quantities and frequencies to keep soil moisture content at an optimum level for plant growth. Foliage shall not be allowed to wilt.

Trees and shrubs shall be watered in sufficient quantity to penetrate soil to a depth at the bottom of the root ball (trees) and root zone (shrubs).

5. INSPECTION

The Contractor shall make all materials available for inspection at source of supply or upon arrival on the site, and shall give timely notice, in writing, to the Engineer/Landscape Architect when work will occur and will be available for inspection. A written schedule of maintenance work shall be provided to the Engineer/Landscape Architect for approval with this tender. A general plant maintenance outline is in Section 4.2. A project specific schedule is to be developed by the Contractor.

Approval of materials at source of supply does not overrule the right of the Engineer/Landscape Architect to inspect materials upon arrival on project site or during the course of work. Such inspection may result in rejection of materials which have been damaged or which, in any way, do not conform to the specification. Utilization of materials, prior to inspection by the Engineer/Landscape Architect will be Contractor's responsibility. The Owner reserves the right to reject any materials whether used or not, which do not conform to the specifications and/or drawings. All rejected materials shall be removed from the site immediately.

The Contractor shall furnish all inspection certificates as the certificates may be required by federal, provincial and other applicable regulations.

The Contract Administrator and the Landscape Architect will review the plantings on or about twelve (12) months and twenty-four (24) months from the date of Completion. At the end of each review, Halton Region will require the repair/replacement of the deficiencies and verification that the Contractor is maintaining the plants. Failure or delay to commence any corrective action may

delay payment.

6. DELIVERY, HANDLING AND STORAGE

All materials, such as fertilizers, bonemeal, mulches, shall be supplied and delivered in standard containers clearly indicating contents, weight, analysis, and name of manufacturer. Where such materials are supplied in bulk, written statements shall be submitted to the Engineer/Landscape Architect indicating the same information as if supplied in standard containers.

7. BASIS OF PAYMENT

Payment at the contract price shall be full compensation for all labour, materials, and services to provide all maintenance to maintain the planted trees, shrubs, groundcovers and beds; and revamp work as allocated on the drawings and specified herein. The Contractor shall be paid in twenty four (24) equal payments, eight (8) per year. Invoice submittal schedule will coincide with the Landscape Maintenance Schedule (refer to Section 4.2.1). Invoices are to be submitted at the end of each month.

30. MOBILIZATION AND DEMOBILIZATION

The work under this item includes, without limitation, the following: Mobilization and Demobilization
The work shall include the cost of mobilizing onto the site, demobilization, and final clean up upon completion of the work. The Contractor shall bear all costs associated with the provision of temporary facilities for construction.

Bonds and Insurance

The Contractor shall bear all costs associated with providing all bonds and insurance in accordance with the contract documents.

Payment

Payment of a lump sum basis for the above work shall be full compensation for all labour, equipment and material required to do the work. Forty percent (40%) of the tendered price will be paid under the first payment certificate. The balance will be paid under subsequent progress certificates in increments proportionate to the value of the work completed relative to the total tendered value of the contract.

31. STREET CLEANING

The Contractor shall for the unit price bid, provide all labour and equipment required to clean mud and dust from roads affected by this contract. The roads will be cleaned on Friday afternoon or more often as directed by the Contract Administrator, using a vacuum street sweeper with mechanical type pickup, followed by a 4 nozzle street flusher to remove the dirt residue. The unit price bid shall also include the disposal of all material collected during the sweeping operation. The water required for cleaning roads shall be the responsibility of the Contractor at no additional cost to the client and be included in this unit price bid item.

This item shall not, in any way, remove the Contractor's responsibility for 'Mud Control' and 'Dust Control' as stated the Special Provisions- General section of these documents, but shall be considered as an added measure over and above these responsibilities.

32. MAINTENANCE OF TRAFFIC

All lane restrictions must be reviewed and approved by the municipal authority prior to their implementation.

This specification shall be read in conjunction with Special Provisions - General Item G18.

The Contractor shall provide good vehicular and pedestrian access at all times to all properties with existing access. Where there is no alternative but to shut off access temporarily to a property, the Contractor shall first notify the persons affected and shall work so as to keep the period of inconvenience to a minimum. Notwithstanding, any closure of access must be approved by the Engineer in writing prior to closing.

All traffic control signs must conform to the M.T.O. Handbook for Construction Signs. It shall be the responsibility of the Contractor to supply traffic control persons and supply, erect and maintain in good condition all barricades, signs, lights and other safety devices for the purpose of informing, directing and safeguarding the public in advance of and within the limits of construction for the duration of the construction. All traffic control persons must follow M.T.O.'s Uniform Traffic Control Manual (Book 7). Costs of these signs, barricades, lights, other safety devices, traffic control persons and paid duty police (if required) shall be included in the unit prices bid for other items of work in the Contract. The Contractor shall provide good vehicle access at all times for anyone who presently has access along the line of construction. Where there is no alternative but to shut off access temporarily to a property, the Contractor shall first notify the persons affected and shall work so as to keep the period of inconvenience to a minimum.

It is of prime importance that the Contractor visits the site prior to submitting a bid to examine the existing pavement widths and allowable space to maintain traffic requirements as described in the preceding paragraph and examine the traffic flow during peak and off peak periods.

33. CONTINGENCY ALLOWANCE

All bidders are to include in their total tender, the lump sum amount shown in the schedule of Quantities and Unit Prices Summary page for Contingency Allowance.
Contractors are advised that payment will be made out of the Contingency Funds only for extra work as may be authorized by the Engineer/Landscape Architect.

34. ENVIRONMENTAL CONTROLS

The Contractor shall provide, install, maintain and remove a 300mm diameter Filltrexx Soxx or approved equivalent as directed by the Contract Administrator, along steep banks as determined by the Landscape Architect, and at all Conservation Halton control areas (box culverts) or when working in proximity of creeks and other waterways. The cost to install shall include staking to keep the filtration sock in place during times of flooding. The Filltrexx Soxx shall remain in place until Project Completion or when authorized by the Contract Administrator for its removal. If the biodegradable Filltrexx Soxx option is selected and filled with appropriate seed mix, the system shall only require a final net-cutting as it settles into the landscape. The Contractor shall also reference the Erosion and Sediment Control Guidelines for Urban Construction (Dec 2006), provided by Conservation Halton.

The Contractor is advised that severe flooding should be anticipated at all locations near creeks (waterways). This normally occurs after heavy downpours. No material or equipment should be stored within the flood plain. No cost adjustment will be permitted for this and this is deemed to have been included in the unit cost. Payment at the contract price shall be full compensation for all labour, materials, and services necessary to maintenance the Filltrexx Soxx or approved equivalent. Fifty percent (50%) of the tendered price will be paid under the first payment certificate. The balance will be paid under subsequent progress certificates in increments proportionate to the value of the work completed relative to the total tendered value of the contract.

APPENDIX C

PLANT LISTS. 2018

*To assist the designer with **Step 1: Plant Material Selection**, of the Regional Right of Way Site Design Framework*

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BOULEVARD PLANTS

Botanical Name	Common Name	Mature Height	Key Attributes		Utilization: Most Suitable Land Use, Enhanced Planting, Top Performer, LID (Low Impact Design), Slopes
Deciduous Trees	*Plant on leeward side of RROW to minimize salt spray				
Acer campestre	Hedge Maple	10m	Corky bark. Upright branching.	Tends to sucker.	Urban / commercial
Acer ginala	Amur Maple	10m	Fast growing.		Urban / commercial
Acer rubrum	Red Maple	15m	Fall colour. Transplants well. Hardy cultivars.	Spring planting. Prefers moist acidic soil.	Enhanced Planting, Top Performer, LID, Any land use
Acer rubrum'Frank Jr.'	Redpoint Maple	15m	Gorgeous fall colour. Transplants well. Hardy cultivars.	Spring planting. Prefers moist acidic soil.	Enhanced Planting, Top Performer, Any land use
Acer saccharum	Sugar Maple	15m	Fall colour. Native		Any land use
Acer saccharinum	Silver Maple	18m	Fast growing. Very hardy.	Aggressive roots. Surface roots tripping hazard. Requires large space. Increased liability with age. Spring planting.	B, Rural / Industrial
* *Carya ovata*	Shagbark Hickory	24m	Straight central leader. Unique bark.	Fruit litter. Slow growth. Not always available in caliper size in nursery trade.	Rural / Industrial
* *Carpinus caroliniana*	American Hornbeam		Native.		
* *Celtis occidentalis*	Hackberry	20m	Very hardy. Interesting bark.	Dense shade. Surface and girdling roots. Pruning for witches' broom. Spring planting. Litter can block	Rural / Industrial

				sewer grates.	
Catalpa speciosa	Norther Catalpa	17m	Salt tolerant	Can be messy.	Any land use
Ginkgo biloba	Maidenhair Tree	16m	Tolerant of drought, salt and high pH	Male only – does not bear fruit. Spring planting.	Top Performer, Urban core
Gleditsia triacanthos var. inermis	Honeylocust (thornless)	16m	Tolerant of wet and dry soil, salt and high pH. Filtered shade.	Overuse in urban monocultures. Defoliation.	Any land use
Gymnoclaudus dioicus	Kentucky Coffee Tree	20m	Deep furrowed bark. Open spreading. Drought and pollution tolerant.	Salt tolerant. Can drop seed pods.	Rural / Industrial
** Amelanchier canadensis Std.*	Serviceberry Tree	8m	Flowers and edible fruit. Transplants easily.	Susceptible to defoliation. Prefers wet sites.	Rural / Industrial
** Quercus alba*	White Oak	20m	Long lived. Large areas.	Acidic soil. Difficult to transplant and establish.	Rural / Industrial
** Quercus bicolor*	Swamp White Oak	20m	Tolerant of wet soils		LID, Rural / Industrial
Quercus macrocarpa	Bur Oak	20m	Very hardy. Corky bark. Wide range of soil.	Prefers acidic soil. Difficult to transplant. Requires large spaces. Spring planting.	Rural / Industrial
Quercus robur	English Oak	20m	Fast growing oak. Fall colour.	Not tolerant of high pH and drought. Difficult to transplant. Spring planting	Enhanced Planting, Top Performer, LID, Any land use
** Quercus rubra*	Red Oak	18m	Fast growing oak. Fall colour.	Not tolerant of high pH / drought. Spring planting	Rural / Industrial
Ptelea trifoliata	Common Hoptree	8m	Winter interest. Showy fruit. Low maintenance. Dense and round.	Tolerates drought and shallow, rocky soil.	Rural / Industrial / Commercial

Pyrus calleryana	Calleryana Pear	13m	Has fruit.		Any land use
Syringa reticulata 'Ivory Silk'	Ivory Silk Tree Lilac	7m	Compact form. Flowers.	Prefers well drained acidic soil.	Urban / Commercial
** Tilia Americana*	Basswood	20m	Varieties for form and urban tolerance	Requires large areas. Suckers from base. Limited use.	Rural / Industrial / Commercial
Coniferous Trees					
Abies concolor	Silver Fir	20m	Dense formal shape.	Large.	Rural / Industrial / Commercial, Top Performer
Juniperus spp.	Juniper	0.5-5m	Spreading or upright form. Slow growing. Many colour varieties.	Dieback in wet soils.	Any land use, Top Performer
Picea glauca	White Spruce	25m	Very hardy. Specimen or mass planting.	Susceptible to winter dehydration.	Rural / Industrial / Commercial, Enhanced Planting, Top Performer
Picea pungens	Colorado Spruce	15m	Blue-green foliage	Spruce gall aphid cause branch tip dieback.	Rural / Industrial / Commercial, Top Performer
Deciduous Shrubs					
Cornus racemosa	Gray Dogwood				Slopes
Cotoneaster	Cotoneaster				Top Performer, Slopes
Physocarpus opulifolius	Common Ninebark				Enhanced Planting
Rhus aromatica	Fragrant Sumac		Slope stabilizer, quick to establish.		Enhanced Planting, Slopes
Rhus aromatica 'Gro-Low'	Fragrant Gro-Low Sumac		Slope stabilizer, quick to establish.		Top Performer, Slopes
Rhus typhina	Staghorn Sumac		Slope stabilizer, quick to establish.		Slopes
Rosa rugosa	Rugosa Rose		Thorny and requires protective gear during maintenance.		Enhanced Planting
Salix amygdaloides	Peach Leaved Willow				LID
Salix candida	Sageleaf Willow				LID

Sambucus canadensis	American Elderberry				Enhanced Planting
Viburnum lentago	Nannyberry				Top Performer
Coniferous Shrubs					
Juniperus chinensis 'Aurea'	Gold Coast Juniper		Gold colour which deepens during winter. Salt tolerant.		Enhanced Planting
Juniperus communus	Common Juniper		Native		Top Performer
Juniperus sabina	Savin Juniper		Very hardy, bushy, semi-upright form.		Top Performer
Perennials and Grasses					
Carex bebbii	Bebb's Sedge		Low maintenance.		LID
Erigeron speciosus	Perennial Fleebane		Low maintenance.		Enhanced Planting
Hemerocallis 'Stella D'Oro'	Daylily (Yellow)		Low maintenance.		Enhanced Planting, Top Performer
Helictotrichon sempervirens	Blue Oat Grass		Blue arching foliage, salt tolerant.		Enhanced Planting
Echinacea purpurea	Purple Coneflower		Low maintenance.		Enhanced Planting, Top Performer
Leucanthemum × superbum	Shasta Daisy		Low maintenance.		Enhanced Planting, Top Performer
Rudbeckia hirta	Black-Eyed Susan		Low maintenance, blooms mid-late summer.		Top Performer
Symphotrichum novae angilae	New England Aster		Late summer blooms		Enhanced Planting, Top Performer
Schizachyrium scoparium	Little Bluestem Grass		Hardy ornamental grass.		Enhanced Planting, Top Performer

Botanical Name	Common Name	Mature Height	Key Attributes		Utilization: Most Suitable Land Use, Enhanced Planting, Top Performer, LID (Low Impact Design), Slopes
Deciduous Trees					
Acer campestre	Hedge Maple	10m	Corky bark. Upright branching.	Tends to sucker.	Urban / commercial
Acer rubrum'Frank Jr.'	Redpoint Maple	15m	Gorgeous fall colour. Transplants well. Hardy cultivars.	Spring planting. Prefers moist acidic soil.	Enhanced Planting, Top Performer, Any land use
Acer rubrum 'Bowhall'	Bowhall Maple	15m	Fall colour. Compact spread, columnar and good for tighter spaces		Any land use
Acer saccharum	Sugar Maple	15m	Fall colour. Native		Any land use
Carpinus betulus `Frans Fontaine`	Frans Fontaine Hornbeam	7m	Drought tolerant. Columnar, retaining shape through maturity. Very attractive.		Urban / commercial, Top Performer
Catalpa speciosa	Norther Catalpa	17m	Salt tolerant		Any land use
Ginkgo biloba	Maidenhair Tree	16m	Tolerant of drought, salt and high pH	Male only – does not bear fruit. Spring planting.	Top Performer, Urban core
Gleditsia triacanthos var. inermis	Honeylocust (thornless)	16m	Tolerant of wet and dry soil, salt and high pH. Filtered shade.	Overuse in urban monocultures. Defoliation.	Any land use
Gymnoclaudus dioicus	Kentucky Coffee Tree	20m	Deep furrowed bark. Open spreading. Drought and pollution tolerant.	Salt tolerant	Rural / Industrial

Quercus robur 'Fastigiata'	Pyramidal English Oak	20m	Fast growing oak. Fall colour.	Not tolerant of high pH and drought. Difficult to transplant. Spring planting	Enhanced Planting, Top Performer, LID, Any land use
Quercus rubrum	Red Oak	20m	Slower growing and slow to establish.		Any land use
Syringa reticulata 'Ivory Silk'	Ivory Silk Tree Lilac	7m	Compact form. Flowers.	Prefers well drained acidic soil.	Urban / Commercial
Perennials and Grasses					
Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass		Low maintenance.		Top Performer
Echinacea purpurea	Purple Coneflower		Low maintenance.		Enhanced Planting, Top Performer
Erigeron speciosus	Perennial Fleebane		Low maintenance.		Enhanced Planting
Hemerocallis	Daylily		Low maintenance.		Top Performer
Helictotrichon sempervirens	Blue Oat Grass		Blue arching foliage, salt tolerant.		Top Performer
Leucanthemum × superbum	Shasta Daisy		Low maintenance.		Enhanced Planting, Top Performer
Rudbeckia hirta	Black-Eyed Susan		Low maintenance, blooms mid-late summer.		Top Performer
Symphotrichum novae angilae	New England Aster		Late summer blooms		Enhanced Planting, Top Performer
Schizachyrium scoparium	Little Bluestem Grass		Hardy ornamental grass.		Enhanced Planting, Top Performer
Eco-Lawn Grass Seed					

ROUNDABOUT PLANTS

Botanical Name	Common Name	Mature Height	Key Attributes		Utilization: Most Suitable Land Use, Enhanced Planting, Top Performer, LID (Low Impact Design), Slopes
Deciduous Trees					
Acer x freemanii 'Autumn Blaze'	Autumn Blaze Maple	16m	Cross between red and silver maple. Fast growing. Fall colour.	Shallow root system. Thin bark. Moderate salt tolerance.	Any land use
Acer rubrum 'Bowhall'	Bowhall Maple	15m	Fall colour. Compact spread, columnar and good for tighter spaces		Any land use
Acer rubrum'Frank Jr.'	Redpoint Maple	15m	Gorgeous fall colour. Transplants well. Hardy cultivars.	Spring planting. Prefers moist acidic soil.	Enhanced Planting, Top Performer, Any land use
Gleditsia triacanthos var. inermis	Honeylocust (thornless)	16m	Tolerant of wet and dry soil, salt and high pH. Filtered shade.	Overuse in urban monocultures. Defoliation.	Any land use
Quercus robur	English Oak	20m	Fast growing oak. Fall colour.	Not tolerant of high pH and drought. Difficult to transplant. Spring planting	Enhanced Planting, Top Performer, LID, Any land use
Syringa reticulata 'Ivory Silk'	Ivory Silk Tree Lilac	7m	Compact form. Flowers.	Prefers well drained acidic soil.	Urban / Commercial
Coniferous Trees					
Abies concolor	Silver Fir	20m	Dense formal shape.	Large.	Top Performer
Picea glauca	White Spruce	25m	Very hardy. Specimen or mass planting.	Susceptible to winter dehydration.	Top Performer

Picea pungens	Colorado Spruce	15m	Blue-green foliage	Spruce gall aphid cause branch tip dieback.	Top Performer
Pinus strobus	White Pine	25m	Dense canopy. Fine texture. Fast growing. Intolerant to soil/air salt so plant near center of roundabout only.	Requires large space.	Top Performer
Deciduous Shrubs					
Cornus stolonifera	Red Osier Dogwood		Tolerates moist soil.		LID
Cotoneaster	Cotoneaster				Top Performer
Physocarpus opulifolius	Common Ninebark				
Rhus aromatica	Fragrant Sumac		Slope stabilizer, quick to establish.		
Rhus aromatica 'Gro-Low'	Fragrant Gro-Low Sumac		Slope stabilizer, quick to establish.		Top Performer
Rosa rugosa	Japanese Rose				
Sambucus canadensis	American Elderberry				LID
Viburnum lentago	Nannyberry				Top Performer, LID
Coniferous Shrubs					
Juniperus chinensis 'Aurea'	Gold Coast Juniper		Gold colour which deepens during winter. Salt tolerant.		
Juniperus sabina	Savin Juniper		Very hardy, bushy, semi-upright form.		Top Performer
Perennials and Grasses					
Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass		Low maintenance.		Top Performer
Helictotrichon sempervirens	Blue Oat Grass		Blue arching foliage, salt tolerant.		Enhanced Planting
Hemerocallis	Daylily		Low maintenance.		Enhanced Planting

Leucanthemum × superbum	Shasta Daisy		Low maintenance.		Enhanced Planting, Top Performer
Rudbeckia hirta	Black-Eyed Susan		Low maintenance, blooms mid-late summer.		Top Performer
Symphotrichum novae angilae	New England Aster		Late summer blooms		Enhanced Planting, Top Performer
Echinacea purpurea	Purple Coneflower		Low maintenance.		Enhanced Planting, Top Performer
Erigeron speciosus	Perennial Fleebane		Low maintenance.		Enhanced Planting
Echinacea pallida	Pale Purple Coneflower		Low maintenance.		Enhanced Planting
Schizachyrium scoparium	Little Bluestem Grass		Hardy ornamental grass.		Enhanced Planting, Top Performer

BLOOM-INTENSIVE NATIVE SEED LIST

Apply as per Appendix B – Special Provisions – 28. Seeding.

Botanical Name	Common Name	Percentage	Bloom Period
Arisaema triphyllum	Jack-in-the-Pulpit	5%	Early
Anemone canadensis	Canada Anemone	5%	Early
Aquilegia canadensis	Wild Columbine	5%	Early
Calamagrostis canadensis	Blue Joint Grass	10%	NA
Desmodium canadense	Showy Tick-Trefoil	5%	Mid-Late
Echinacea pallida	Pale Purple Coneflower	5%	Mid-Late
Eupatorium maculatum	Joe Pye Weed	5%	Mid
Eupatorium perfoliatum	Boneset	5%	Mid
Lupinus perennis	Wild Lupins	5%	Early
Monarda fistulosa	Wild Bergamont	5%	Mid
Oenothera parviflora	Evening Primrose	5%	Mid-Late
Penstemon digitalis	Beard-Tongue	5%	Mid-Late
Rudbeckia hirta	Black-Eyed Susan	5%	Mid-Late
Solidago canadensis	Goldenrod	5%	Late
Symphotrichum ericoides	Heath Aster	5%	Late
Symphotrichum laevis	Smooth Aster	5%	Late
Symphotrichum novae angilae	New England Aster	5%	Late
Thalictrum pubescens	Tall Meadowrue	5%	Early
Verbena hastata	Blue Vervain	5%	Mid-Late

Bloom Period: Early (April/May – June), Mid (June – August), Late (August – October).

ENHANCED SWALE SEED LIST

Apply as per Appendix B – Special Provisions – 28. Seeding.

Botanical Name	Common Name	Percentage
Andropogon gerardii	Big Bluestem	10%
Bromus latiglumis	Ear-leaved Brome	5%
Carex crinita	Fringed Sedge	10%
Carex grayi	Gray's Sedge	10%
Carex hystericina	Bottlebrush Sedge	10%
Carex pensylvanica	Pennsylvania Sedge	8%
Carex vulpinoidea	American Fox-Sedge	5%
Calamagrostis canadensis	Blue Joint Grass	5%
Danthonia spicata	Poverty Oatgrass	10%
Elymus canadensis	Canada Wild Rye	5%
Elymus riparius	Riverbank Wild Rye	5%
Festuca spp.(non-native)	Fescues	5%
Pennisetum hamelin (non-native)	Fountain Grass	5%
Sorghastrum nutans	Yellow Indian Grass	7%

APPENDIX D

TYPICAL LANDSCAPES. 2018

*To assist the designer with **Step 2: Layout Design**, of the Regional Right of Way Site Design Framework*

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Halton Region
Transportation Master Plan (2031) – *The Road to Change*

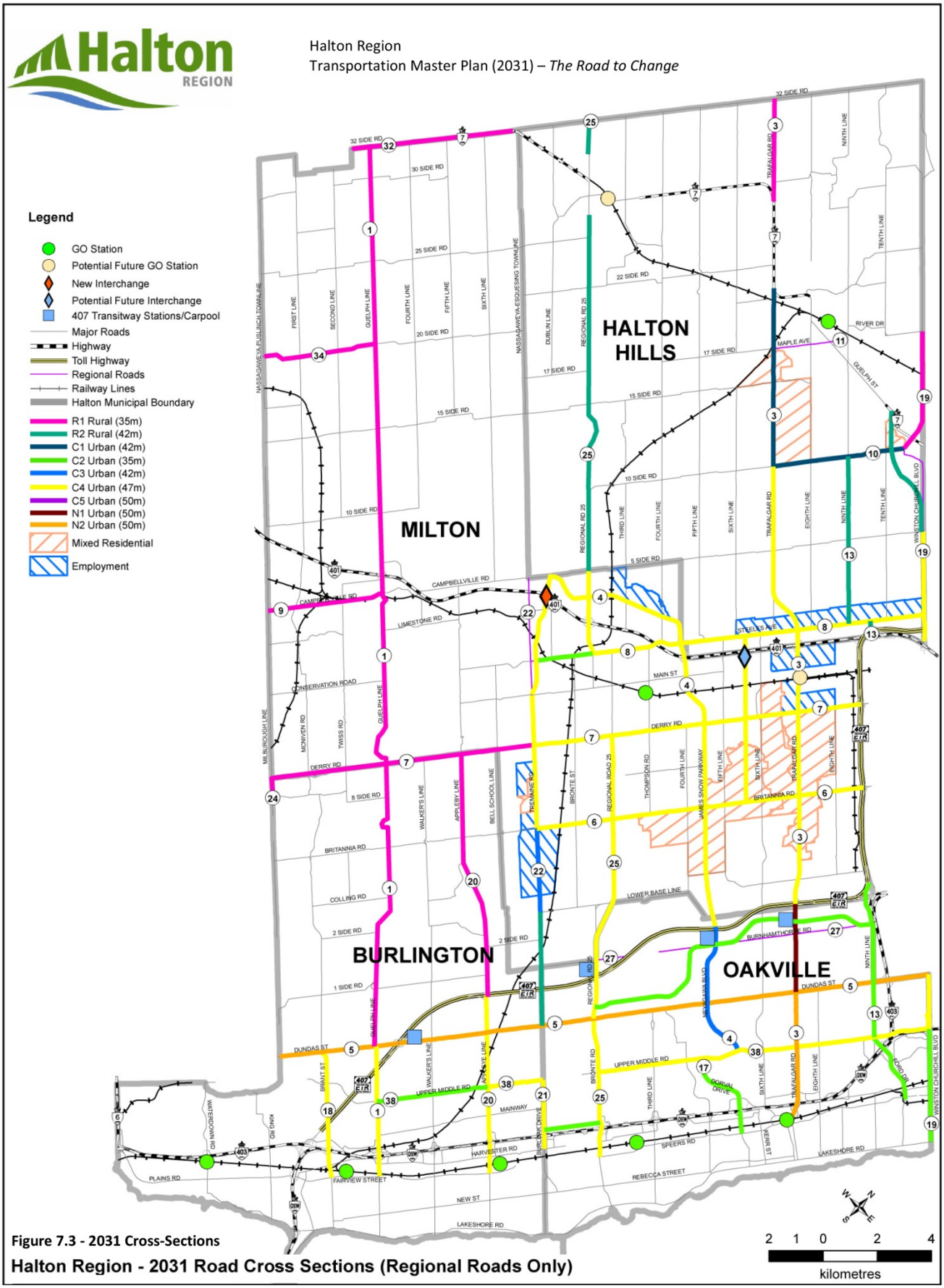


Figure 7.3 - 2031 Cross-Sections

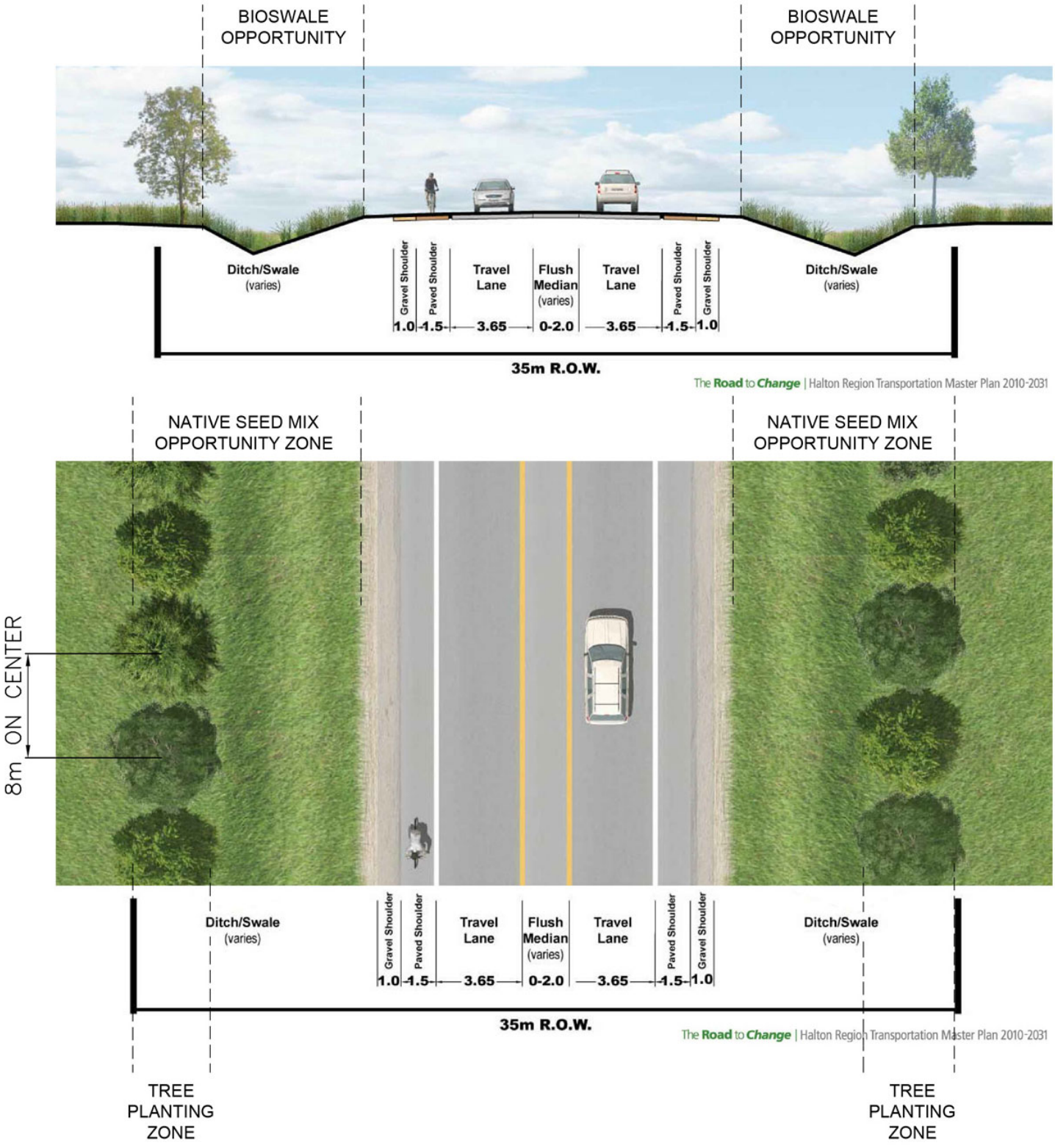
Halton Region - 2031 Road Cross Sections (Regional Roads Only)

	RIGHT-OF-WAY CATEGORY		
DESIGN ELEMENT	**Rural / NHS** 	**Corridor**  Employment  Mixed-use	**Node** 
paved shoulder	yes	n/a	n/a
ditch / swale	yes	n/a	n/a
transit facility	n/a	variable (transit priority / HOV / RBL / transitway)	variable (transit priority / HOV / RBL / transitway)
pedestrian facility	n/a	sidewalk / multi-use path	sidewalk
bicycle facility	paved shoulder	variable (multi-use path / wide curb lane / bicycle lane)	variable (wide curb lane and / or bicycle lane)
parking	n/a	n/a	off-peak (optional)*
trees in boulevard	n/a	yes	yes (potentially in tree pits)
pedestrian scale lighting	n/a	near transit stops, support services & higher density areas	yes
building setback	n/a	variable	minimized

The **Road** to ***Change*** | Halton Region Transportation Master Plan 2010-2031

RIGHT OF WAY CATEGORIES

TYPE R1 REGIONAL RIGHT OF WAY LAYOUT AND SECTION



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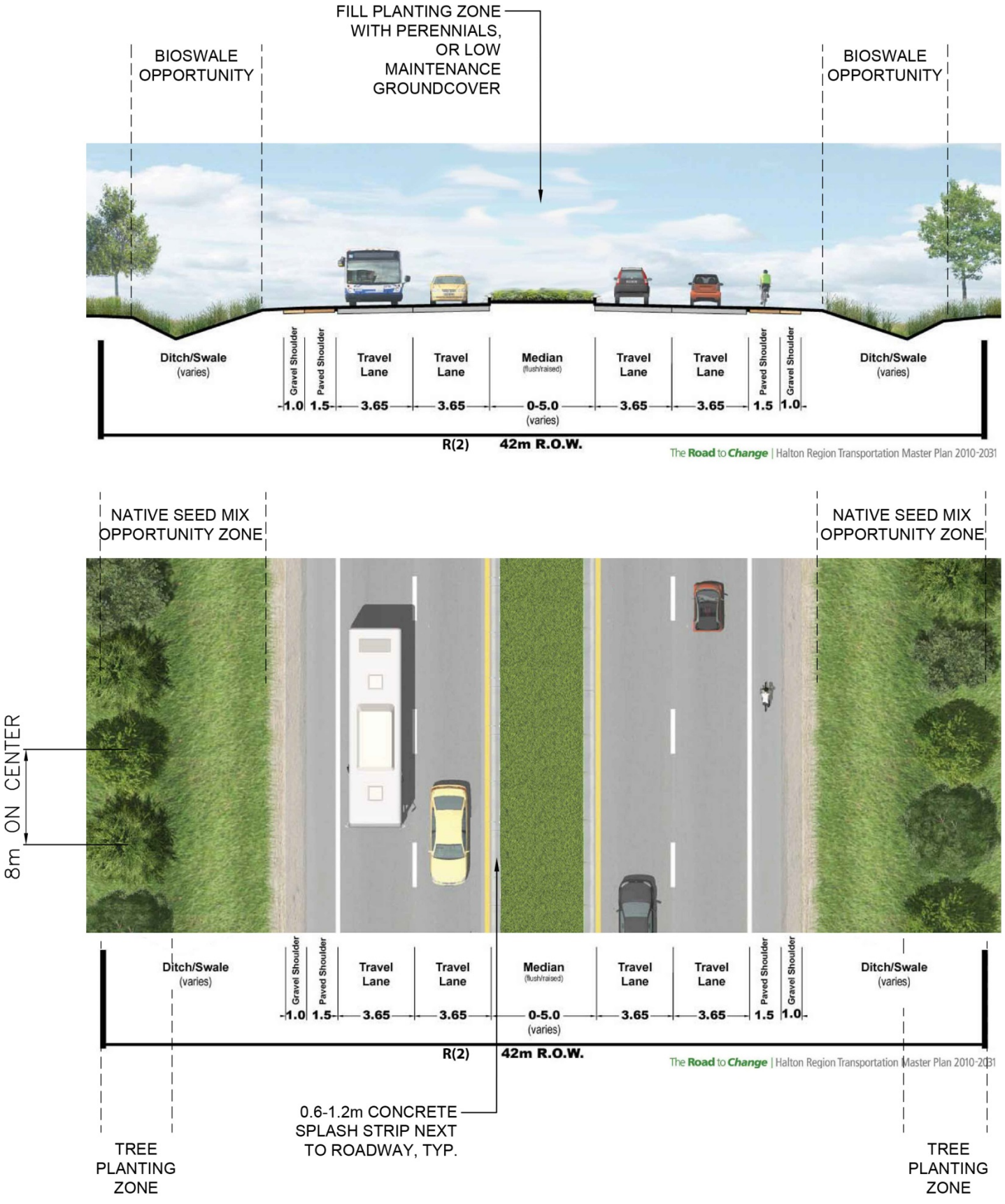


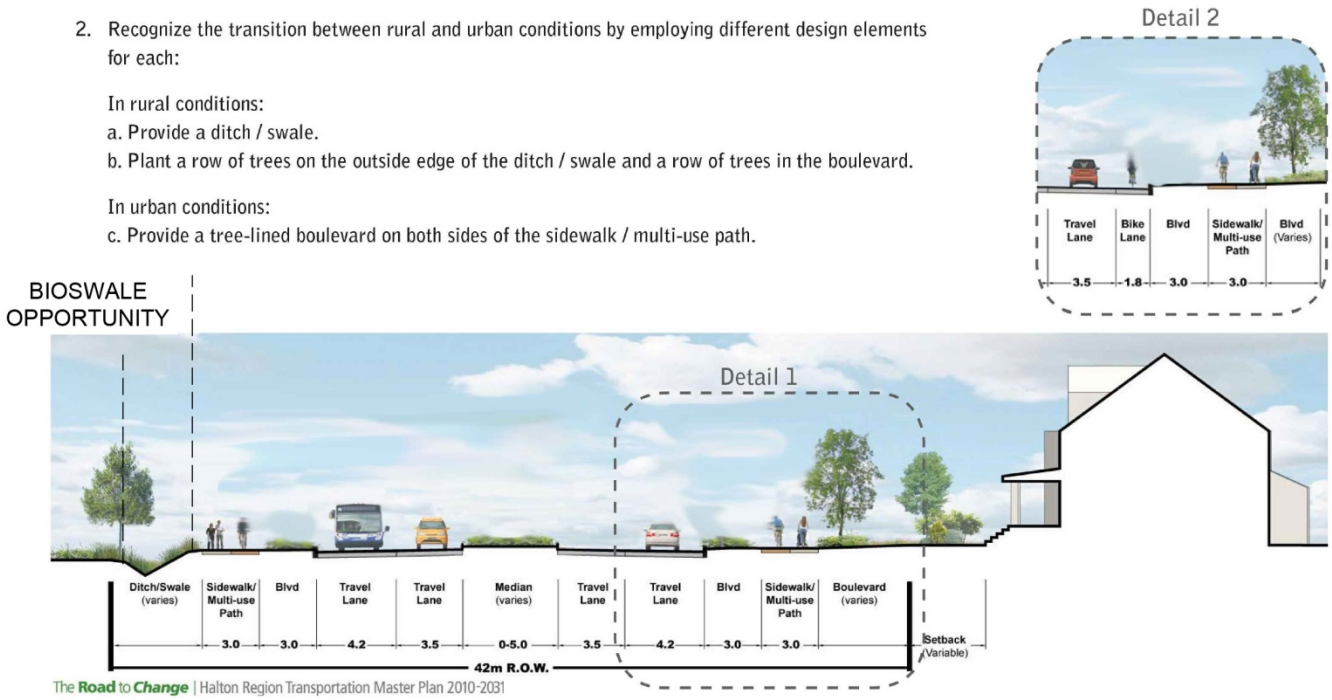
TYPE C1 REGIONAL RIGHT OF WAY LAYOUT AND SECTION

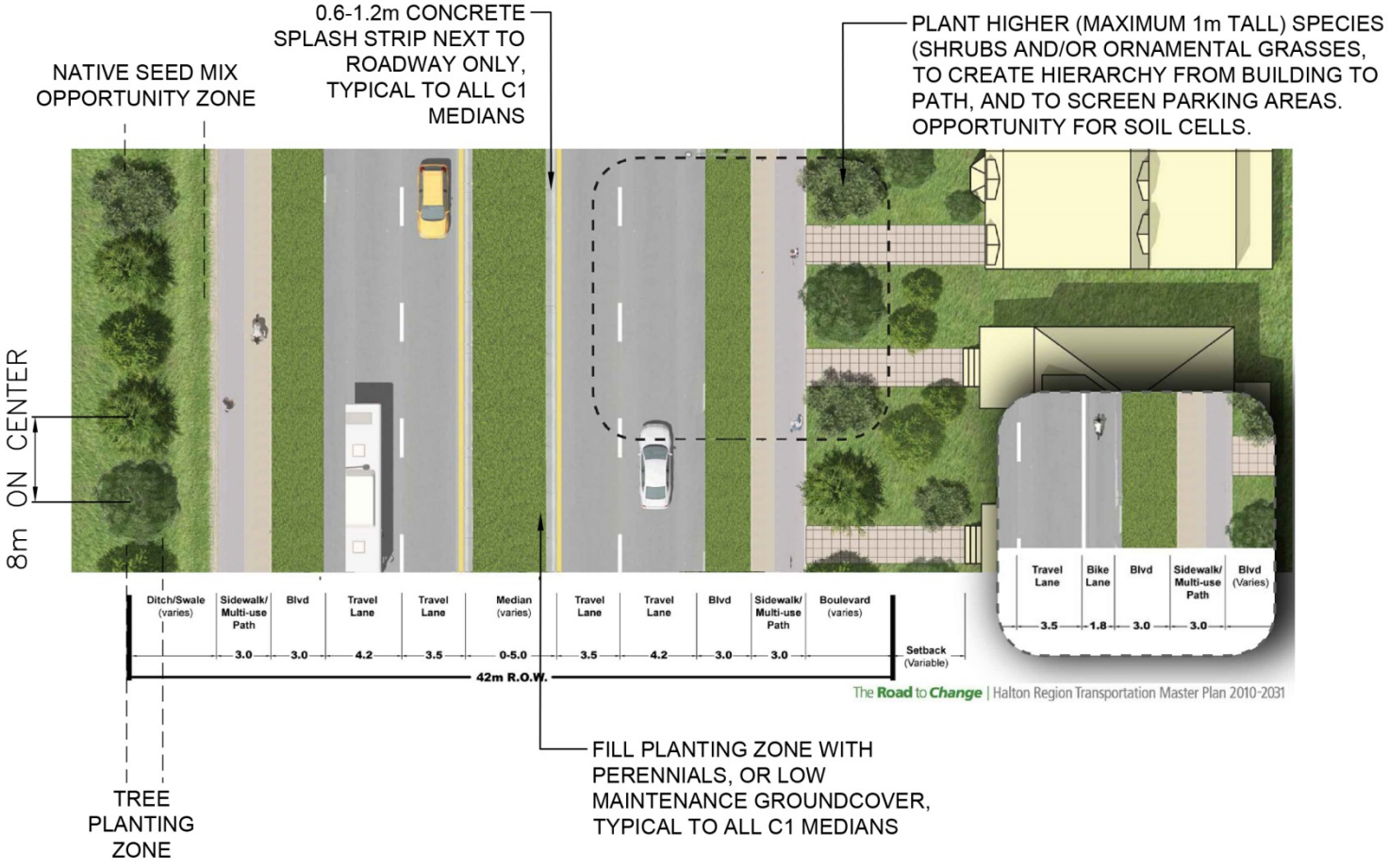
In addition to the general Corridor (C) policy, on C(1) roads the following will be considered:

1. Provide a variable centre median.
2. Recognize the transition between rural and urban conditions by employing different design elements for each:

   In rural conditions:
   a. Provide a ditch / swale.
   b. Plant a row of trees on the outside edge of the ditch / swale and a row of trees in the boulevard.

   In urban conditions:
   c. Provide a tree-lined boulevard on both sides of the sidewalk / multi-use path.





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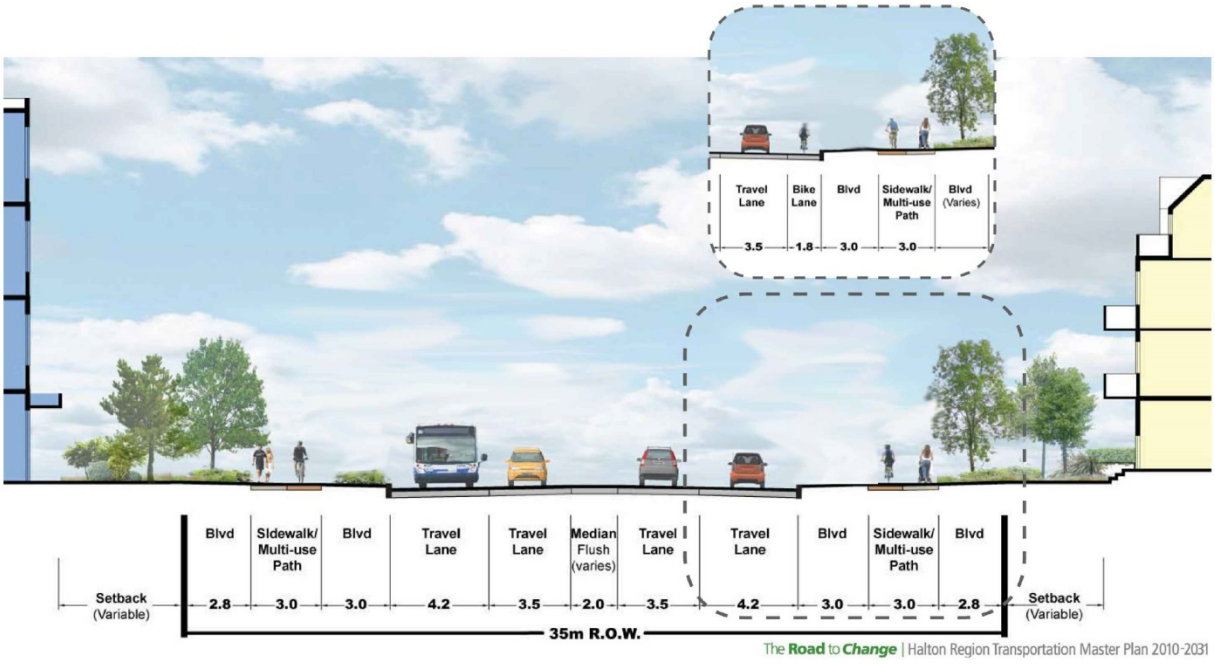

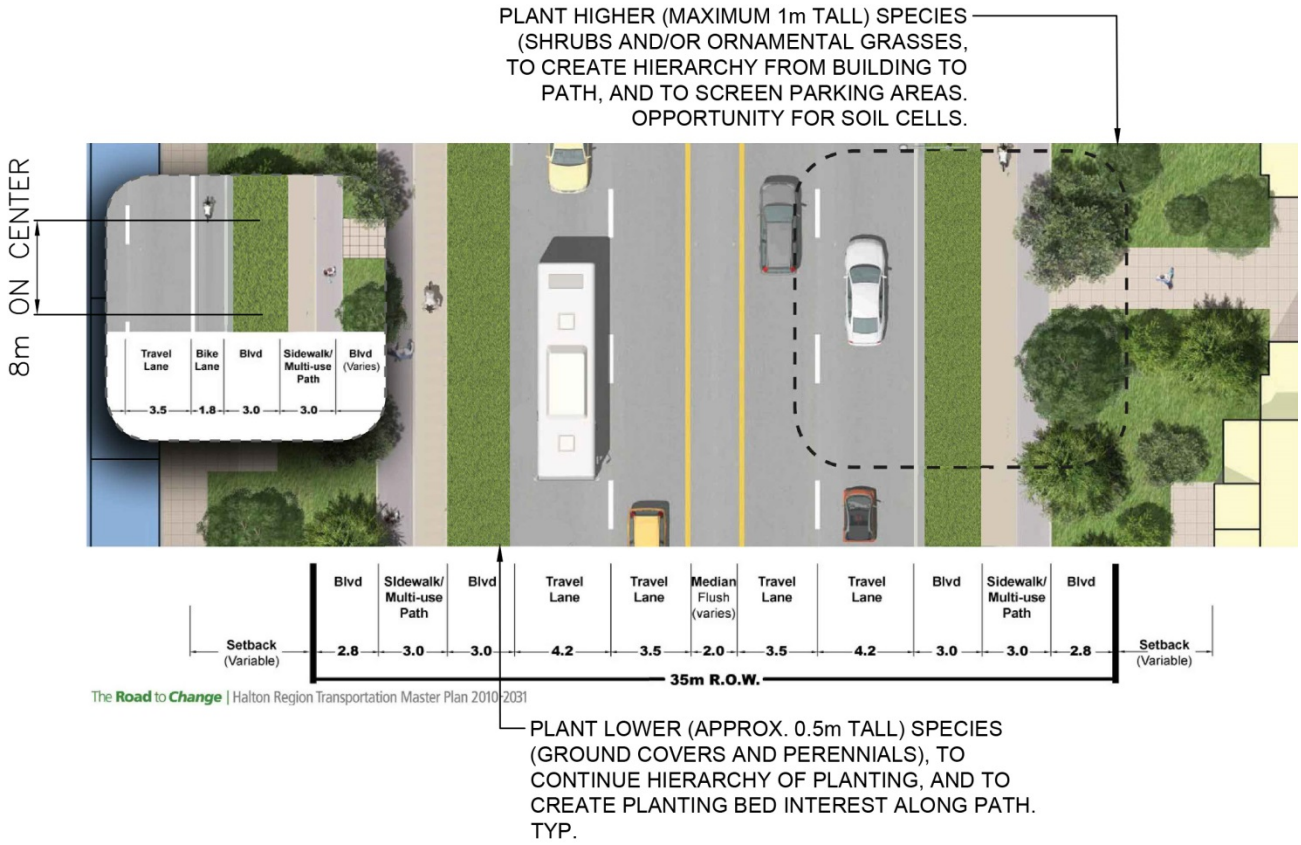

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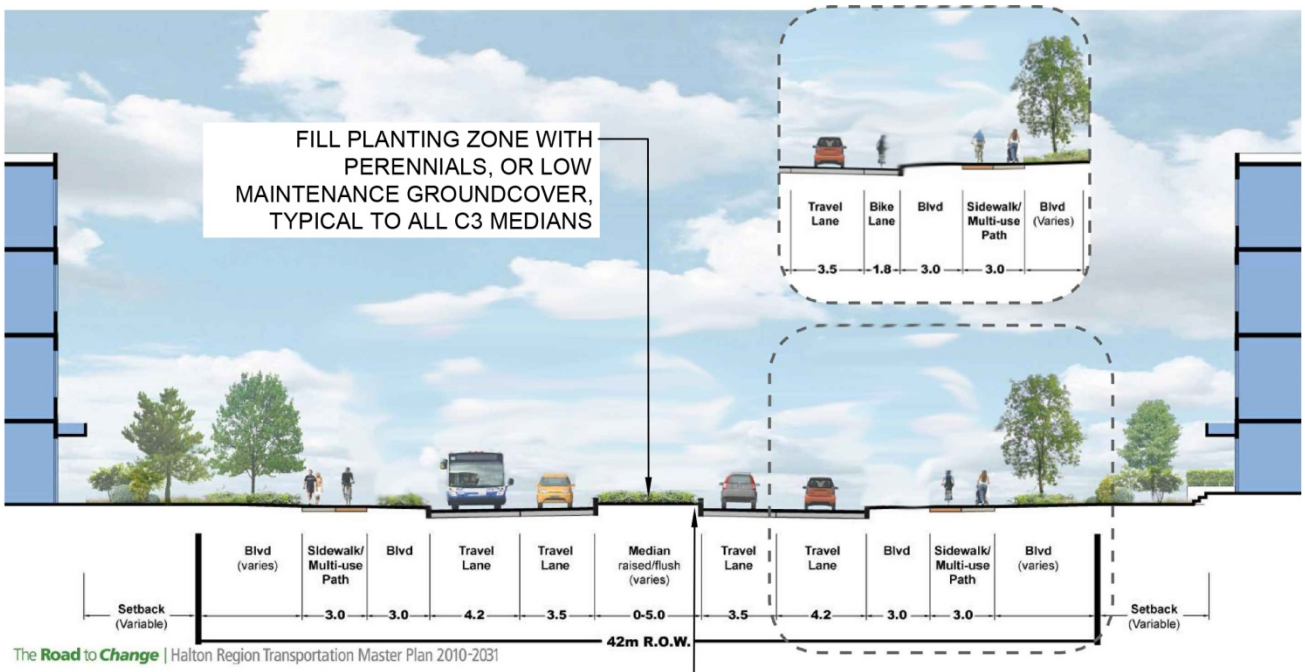

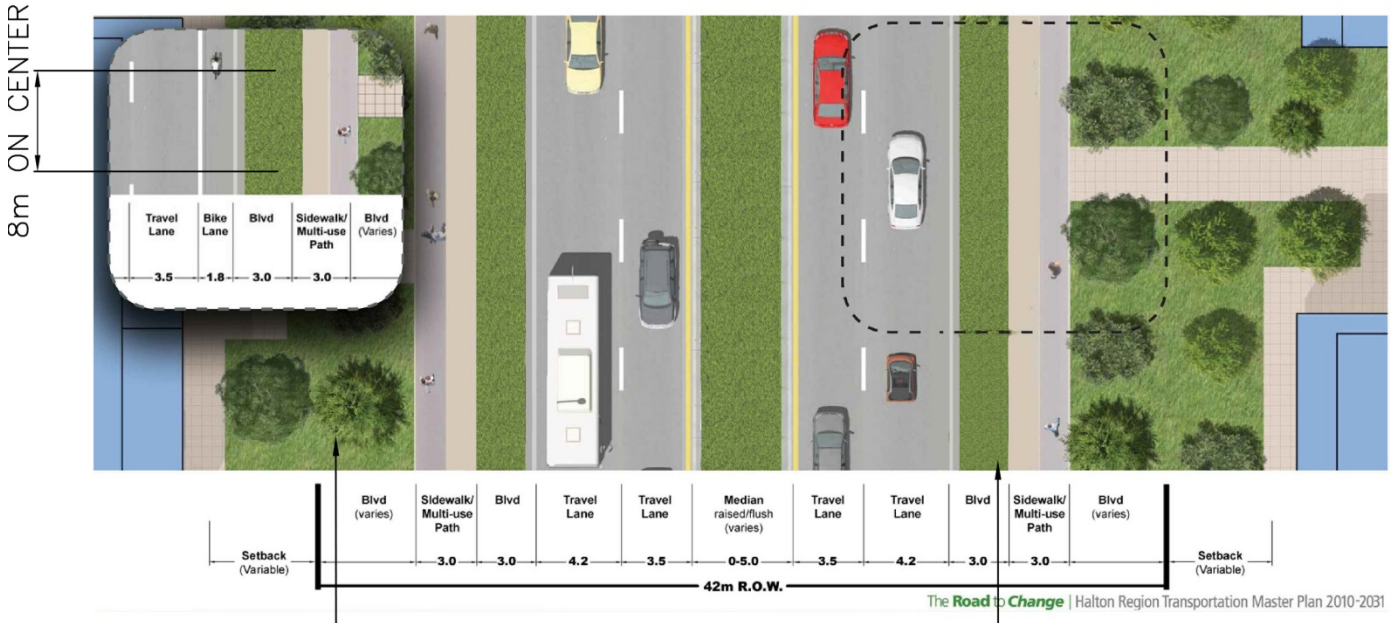

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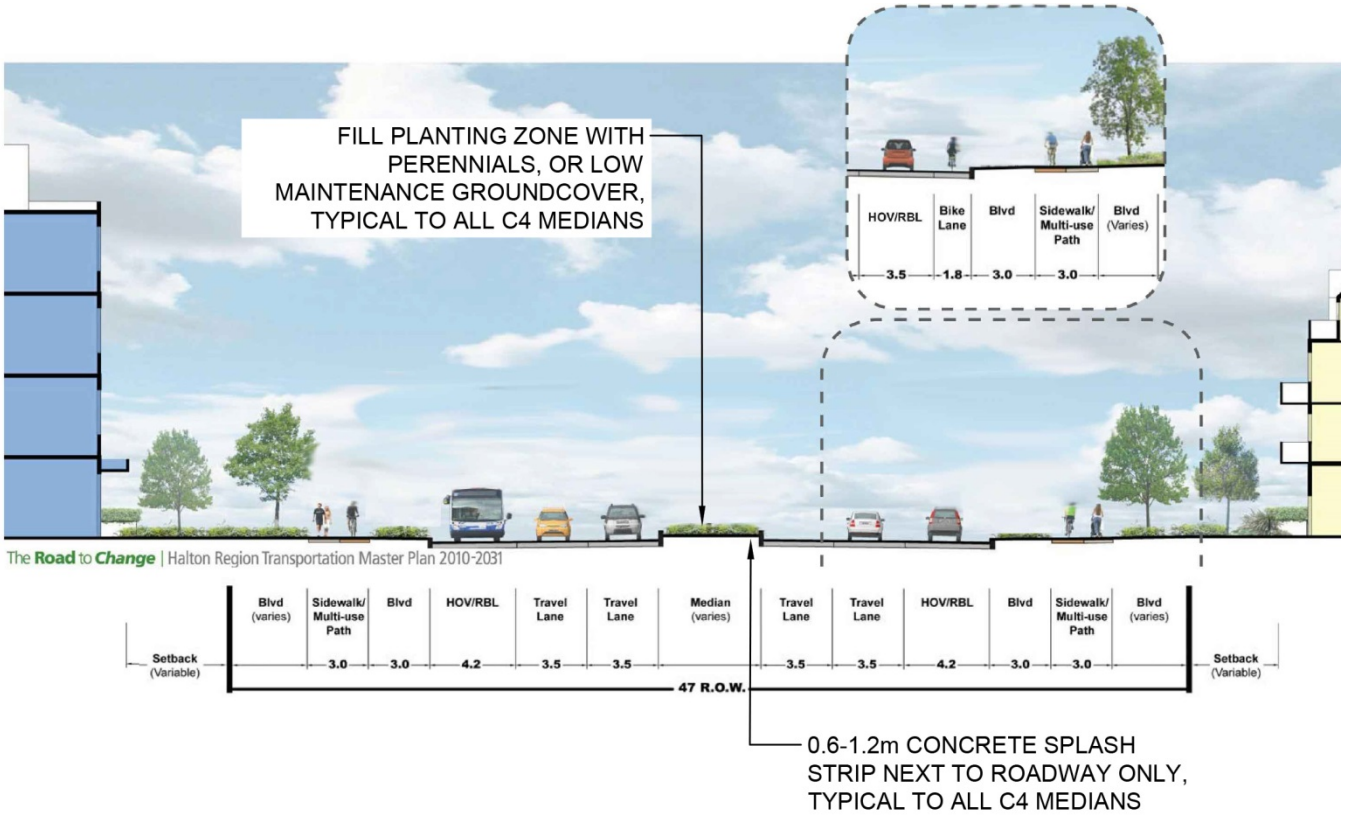

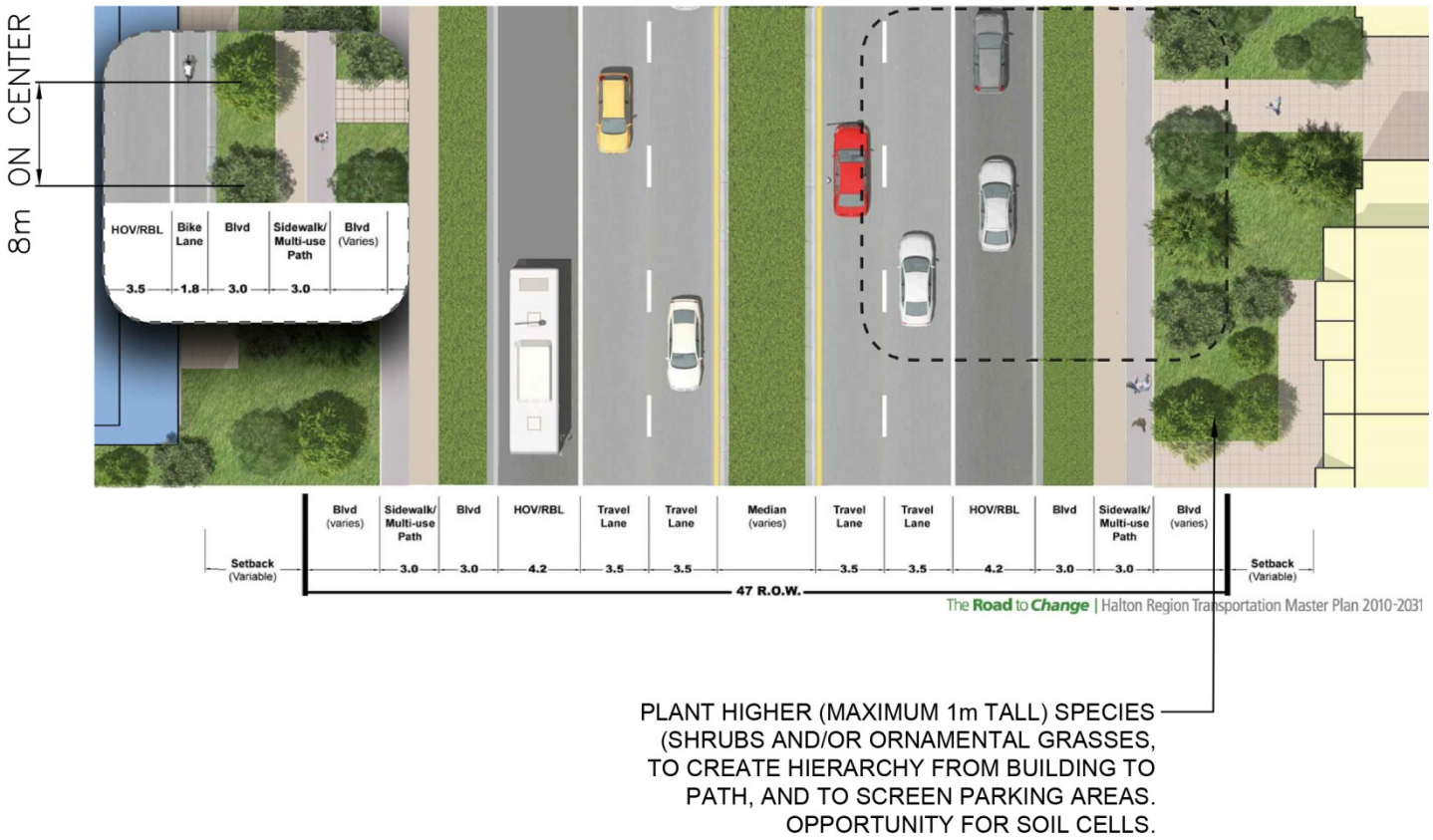

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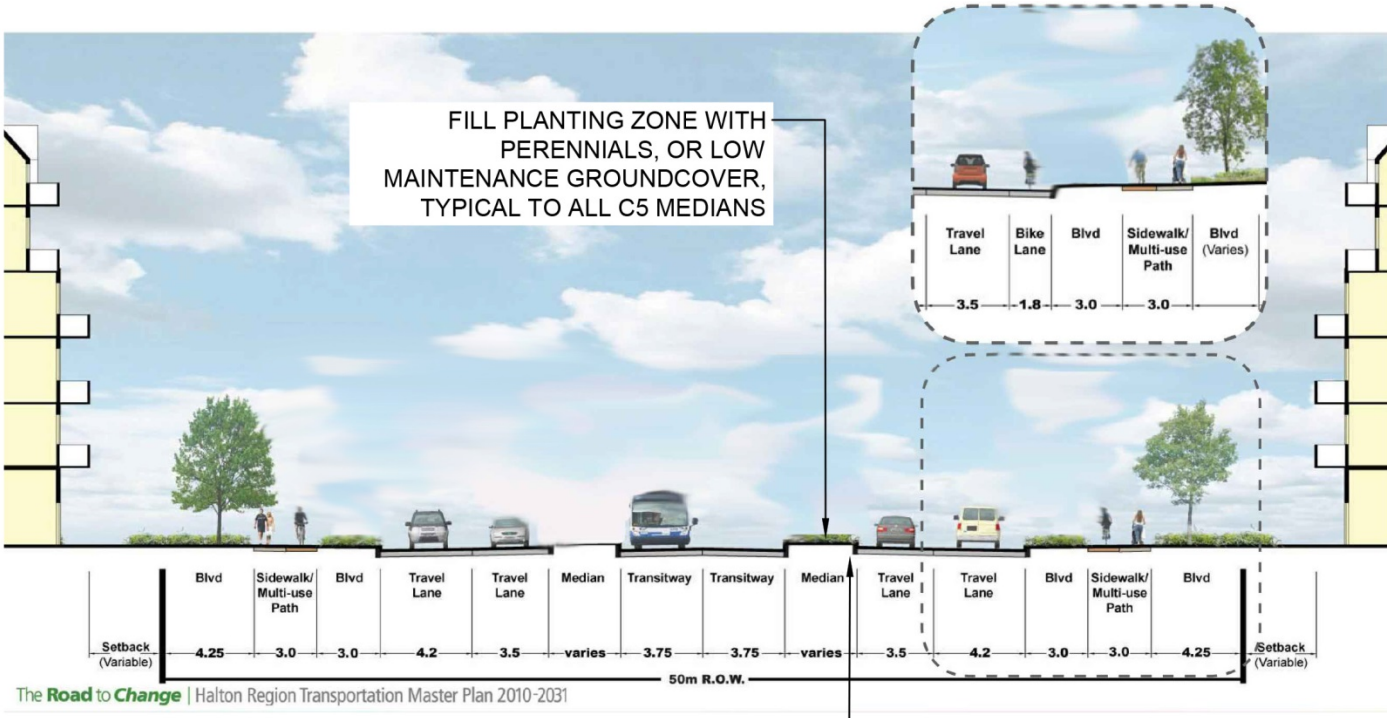
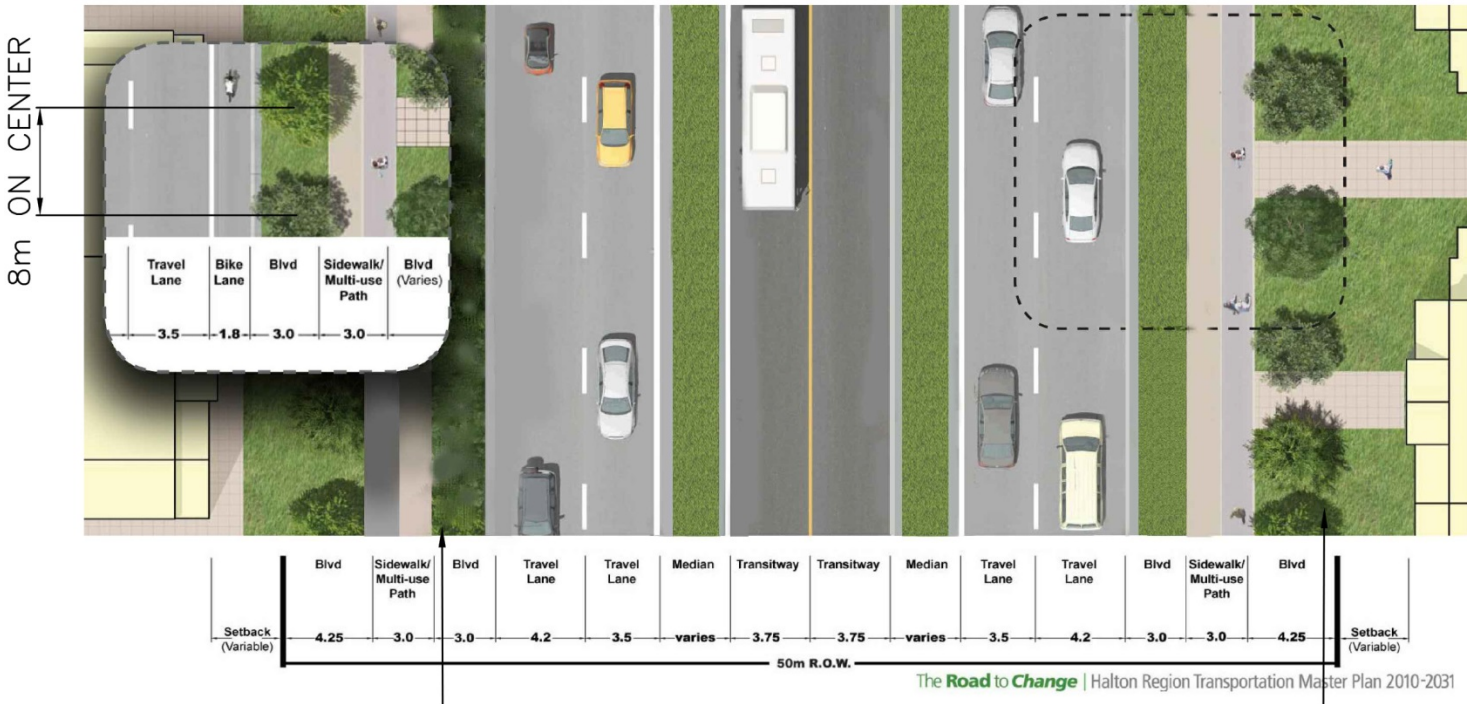
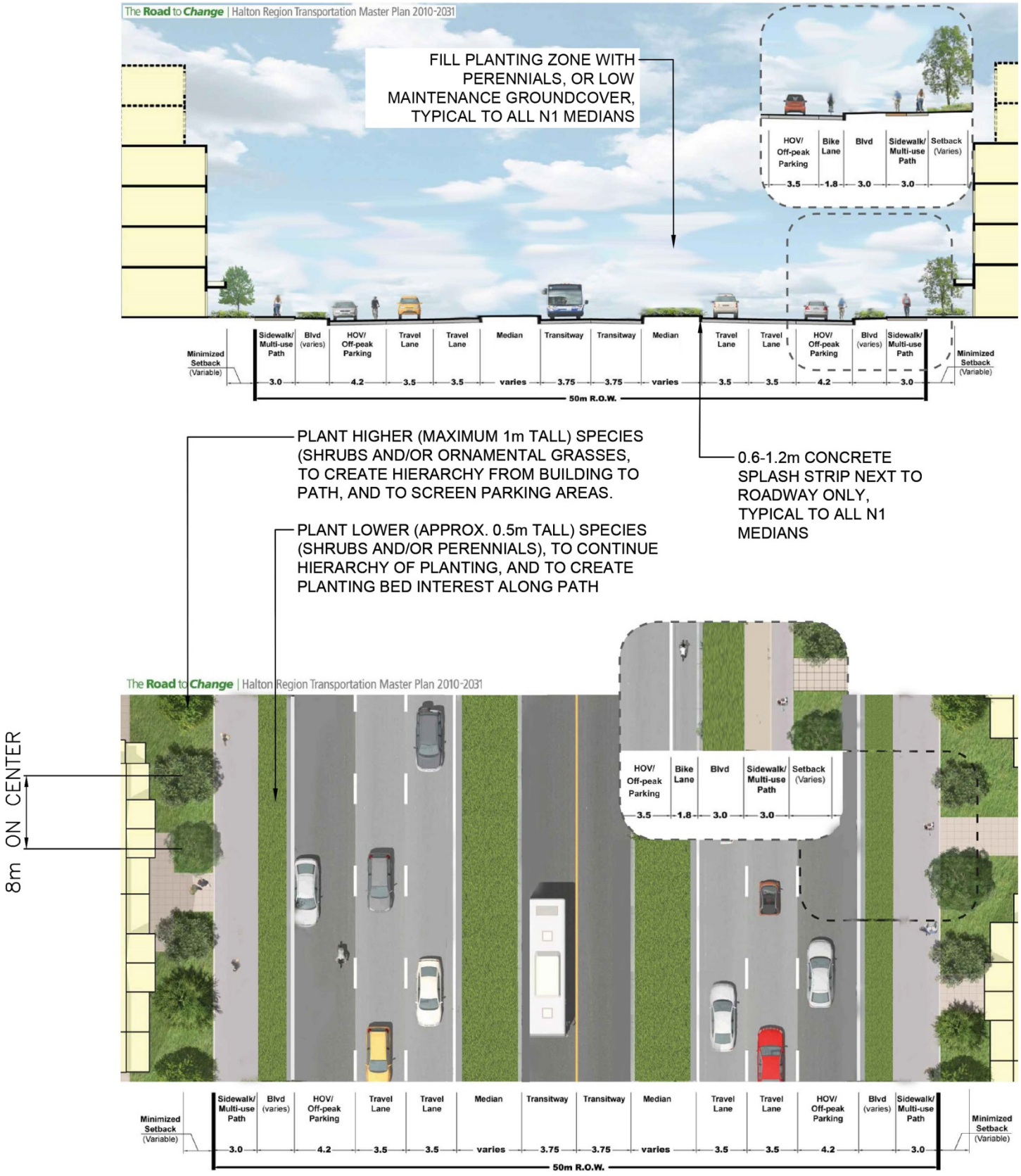
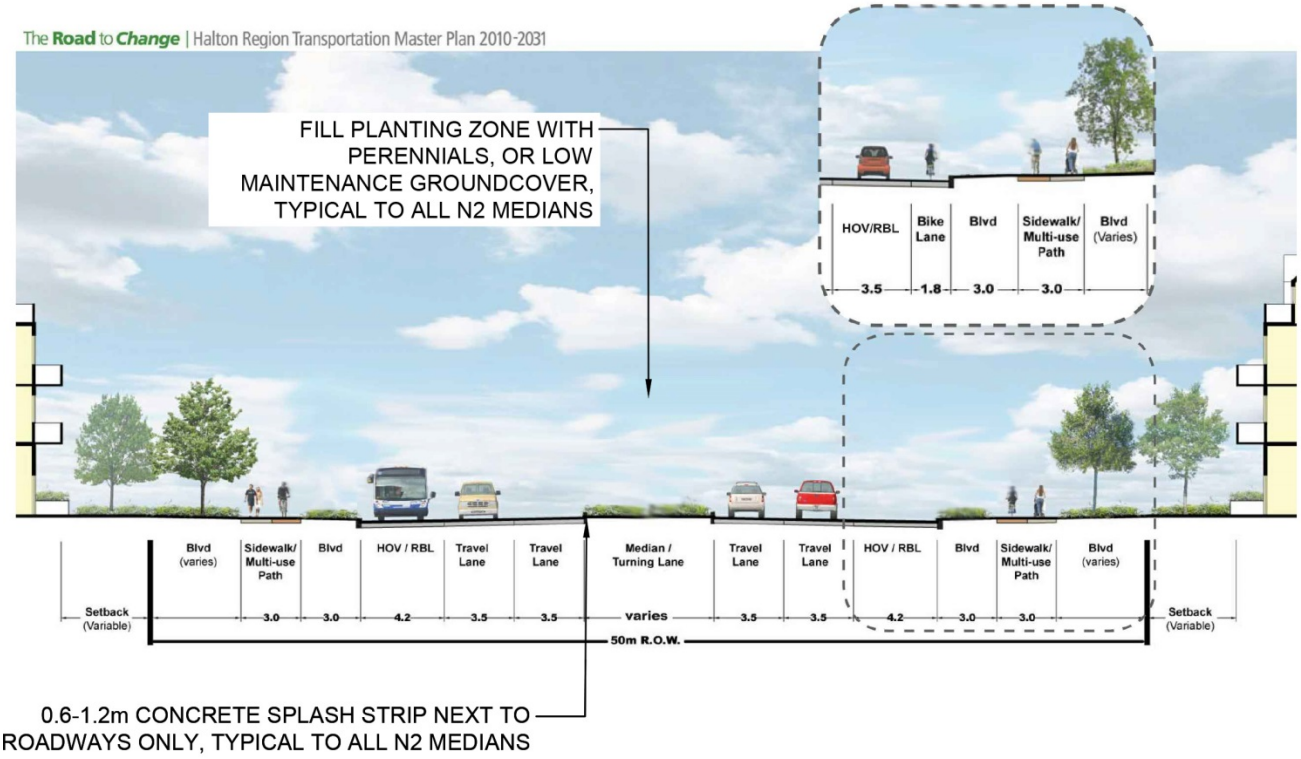


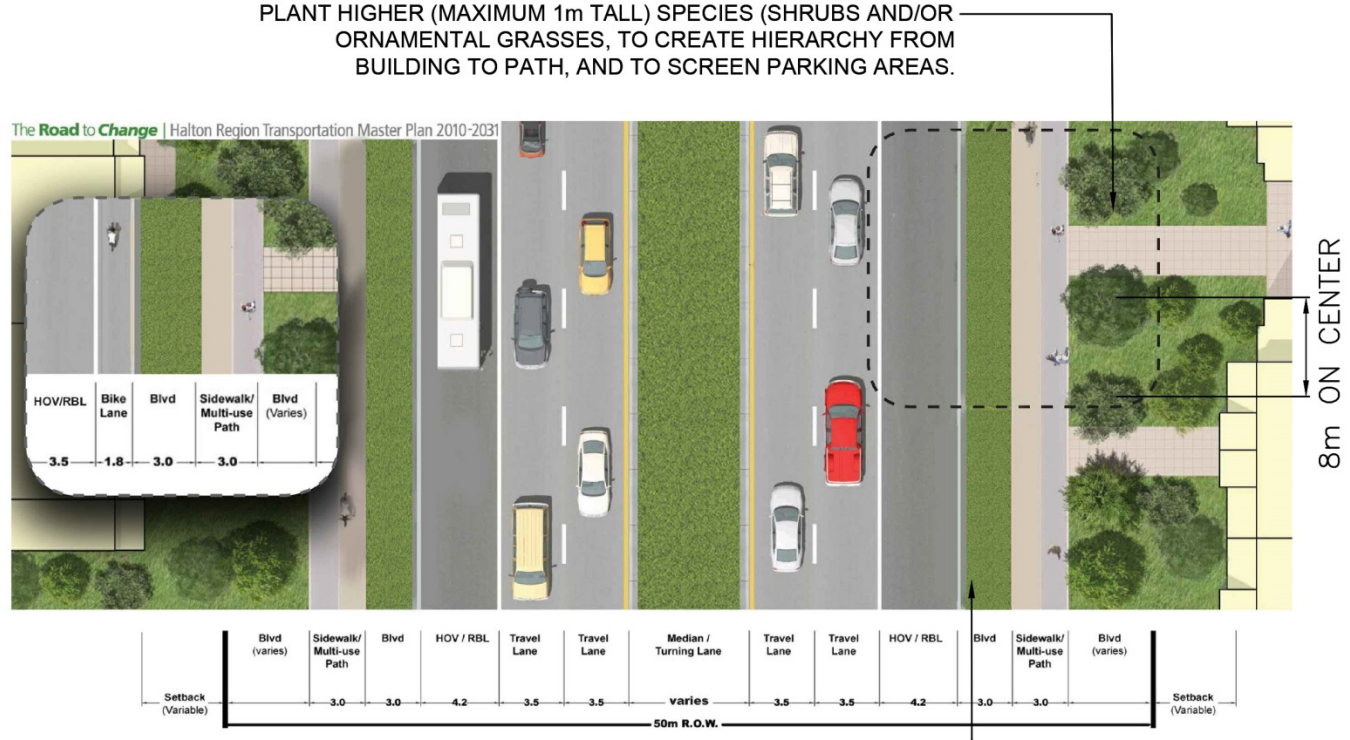


TYPE N1 REGIONAL RIGHT OF WAY LAYOUT AND SECTION

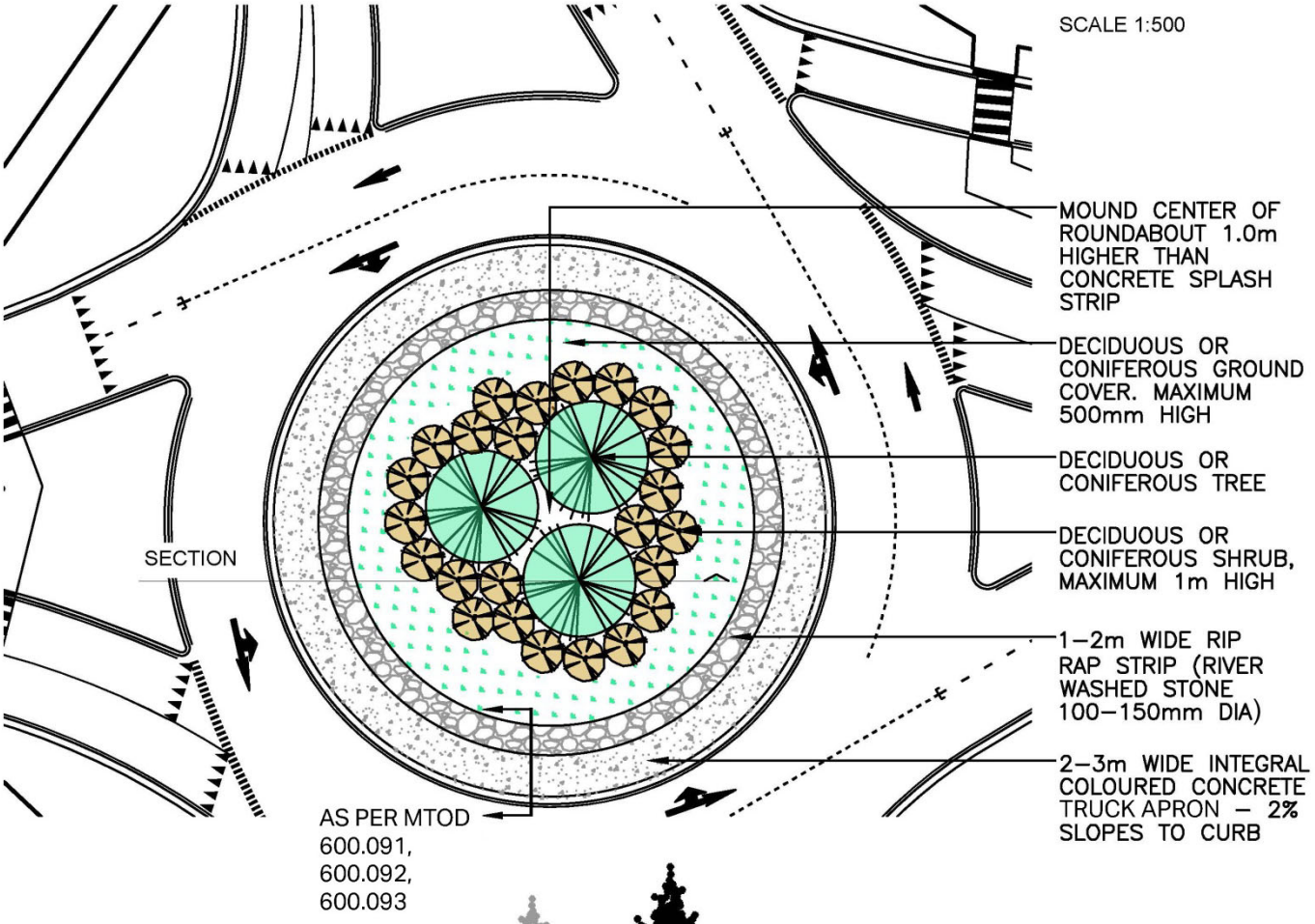


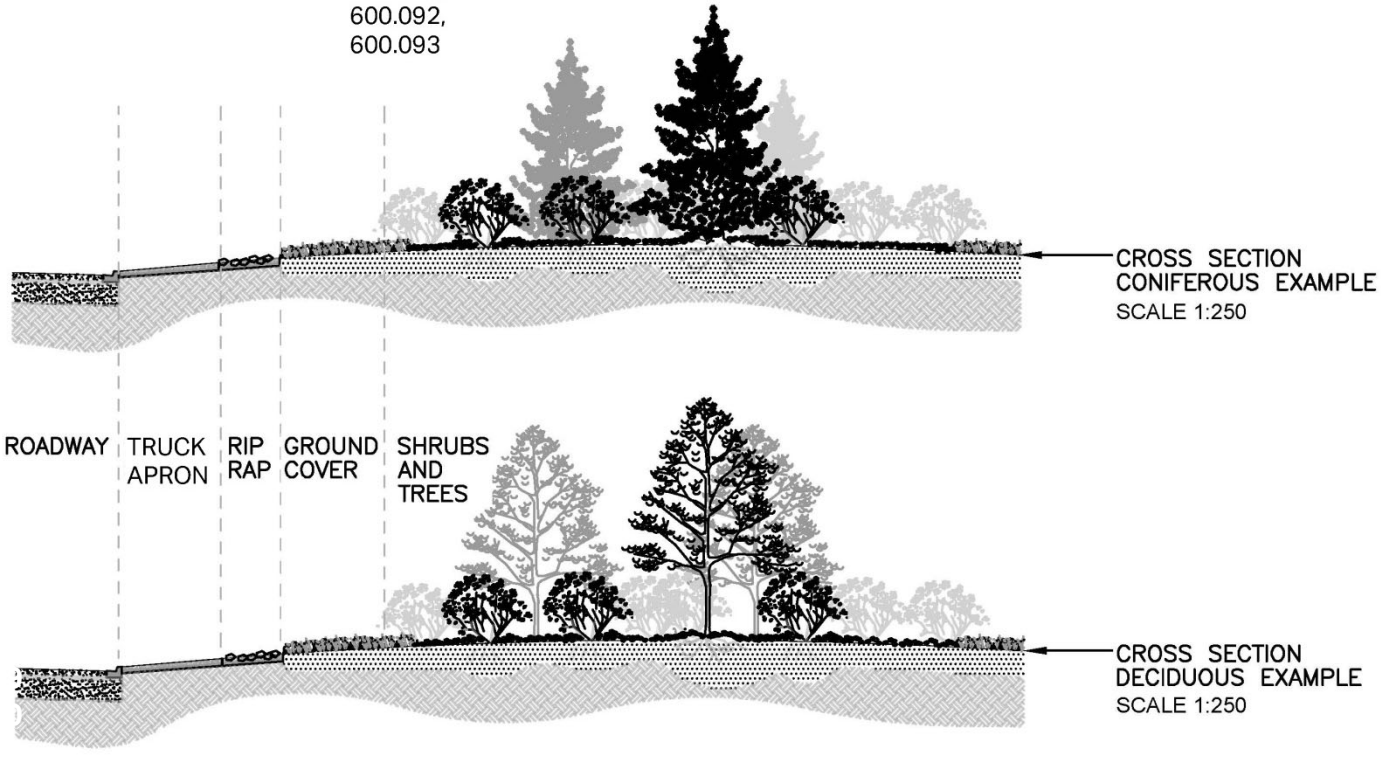
TYPE N2 REGIONAL RIGHT OF WAY LAYOUT AND SECTION





TYPICAL REGIONAL ROAD ROUNDABOUT PLANTING PLAN LAYOUT





APPENDIX E

DETAILS. 2018

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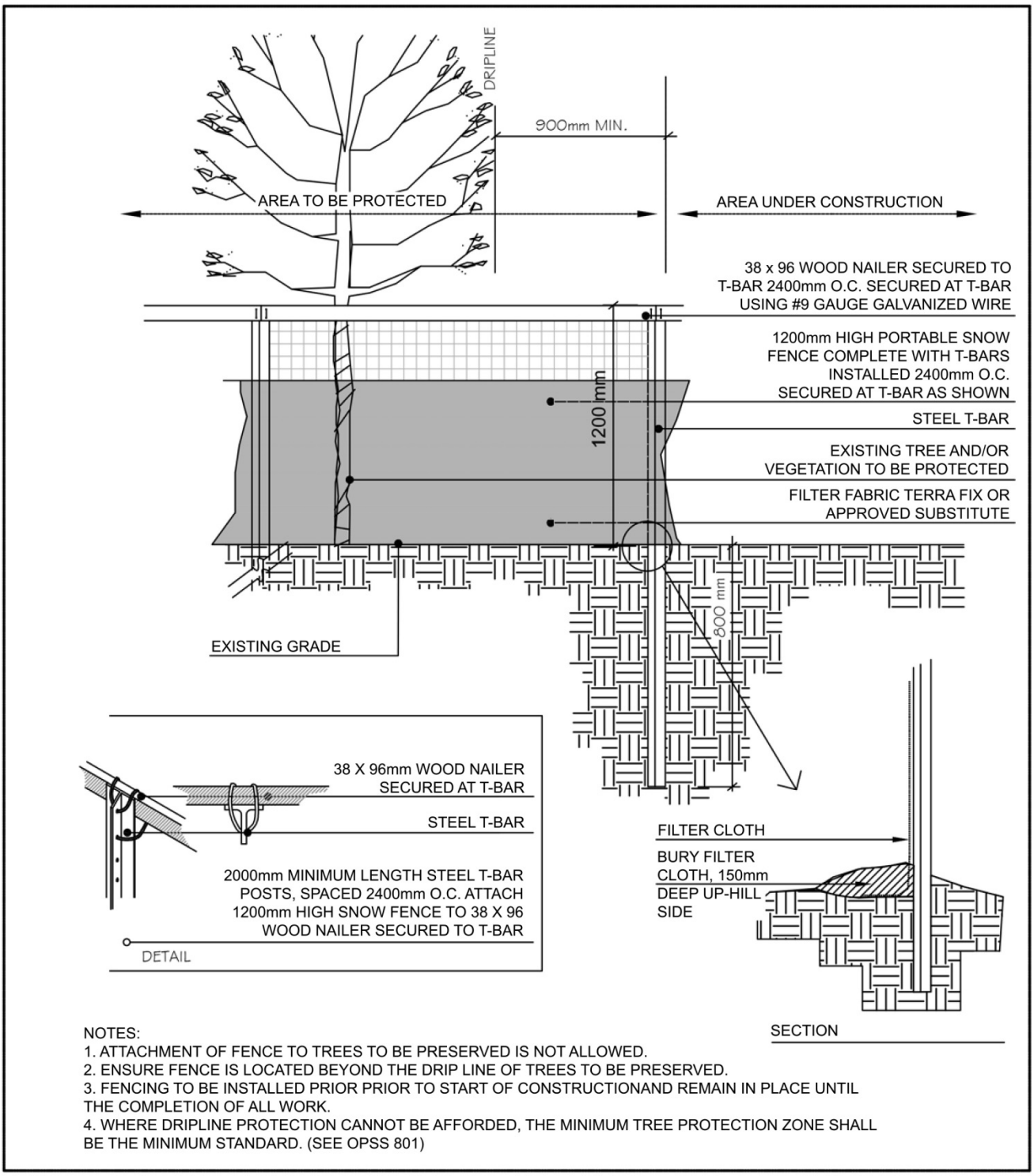


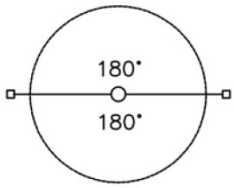
D1

TYPICAL TREE PROTECTION DETAIL

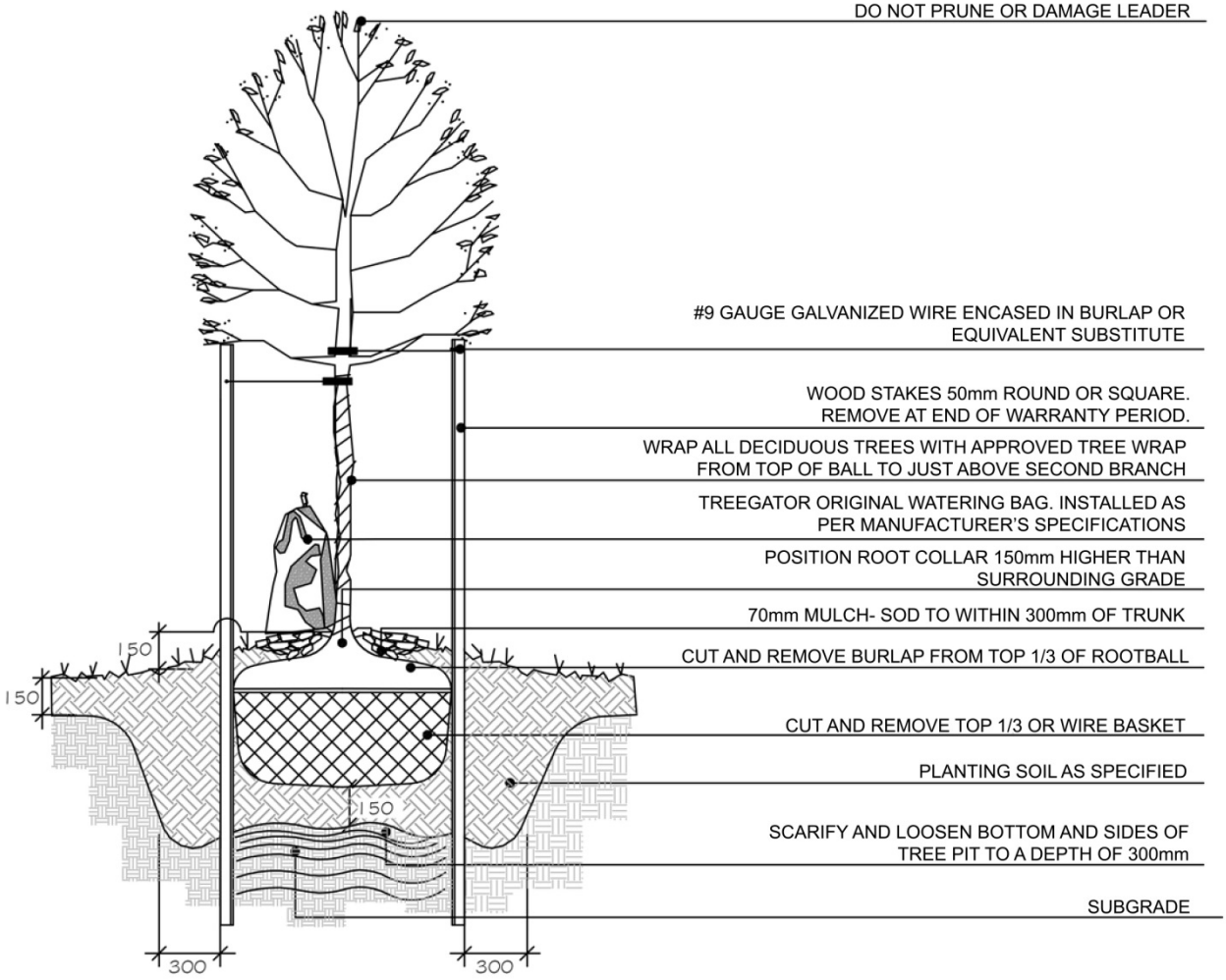
WITH HEAVY DUTY SILTATION FENCE

NTS

NOTE:
1. REMOVE ANCHORS (T-BARS) AT THE END OF THE WARRANTY PERIOD.
2. REMOVE TREE WRAP AT THE END OF THE FIRST WINTER.

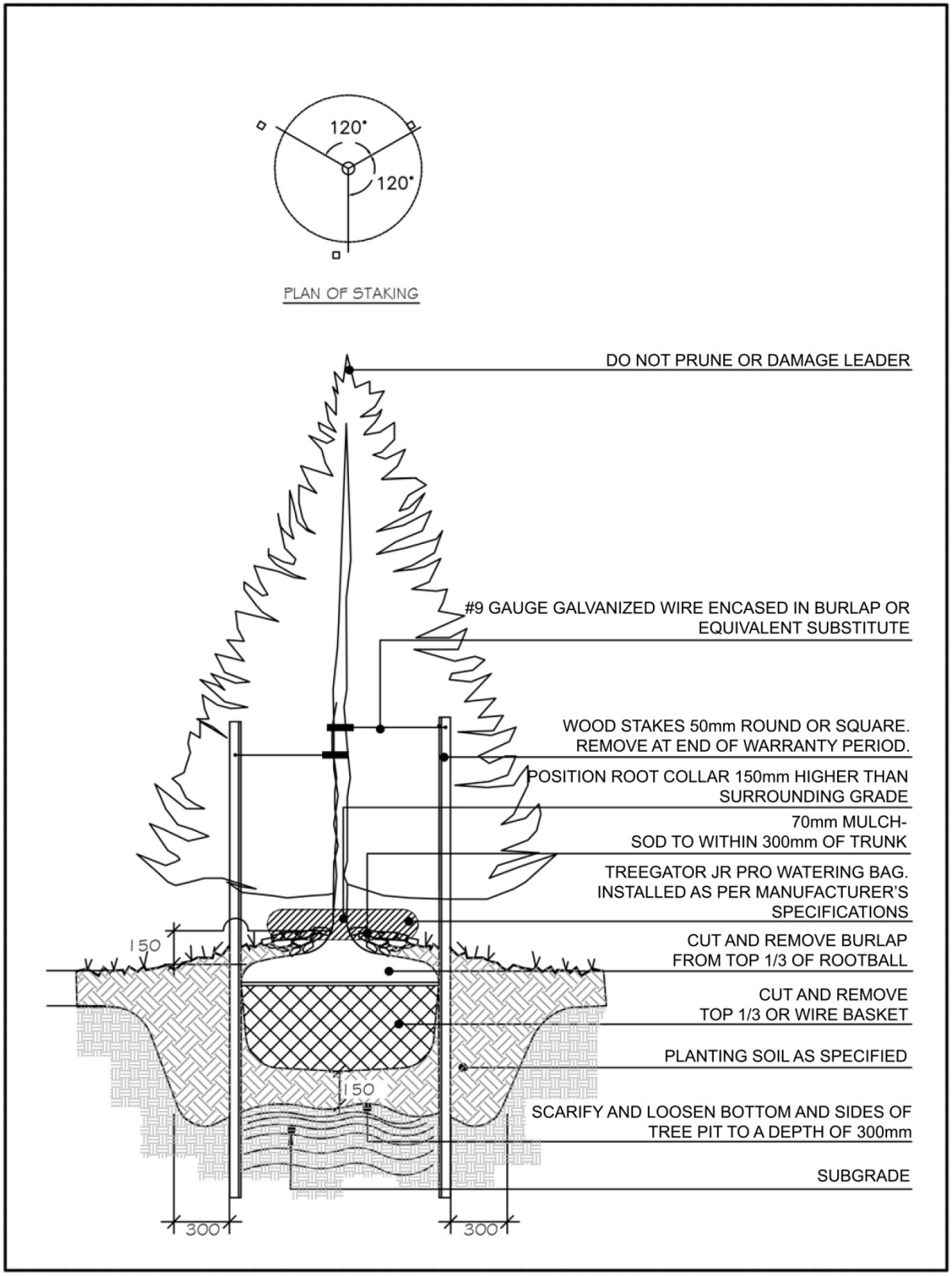


PLAN OF STAKING



D2 TYPICAL DECIDUOUS TREE PLANTING

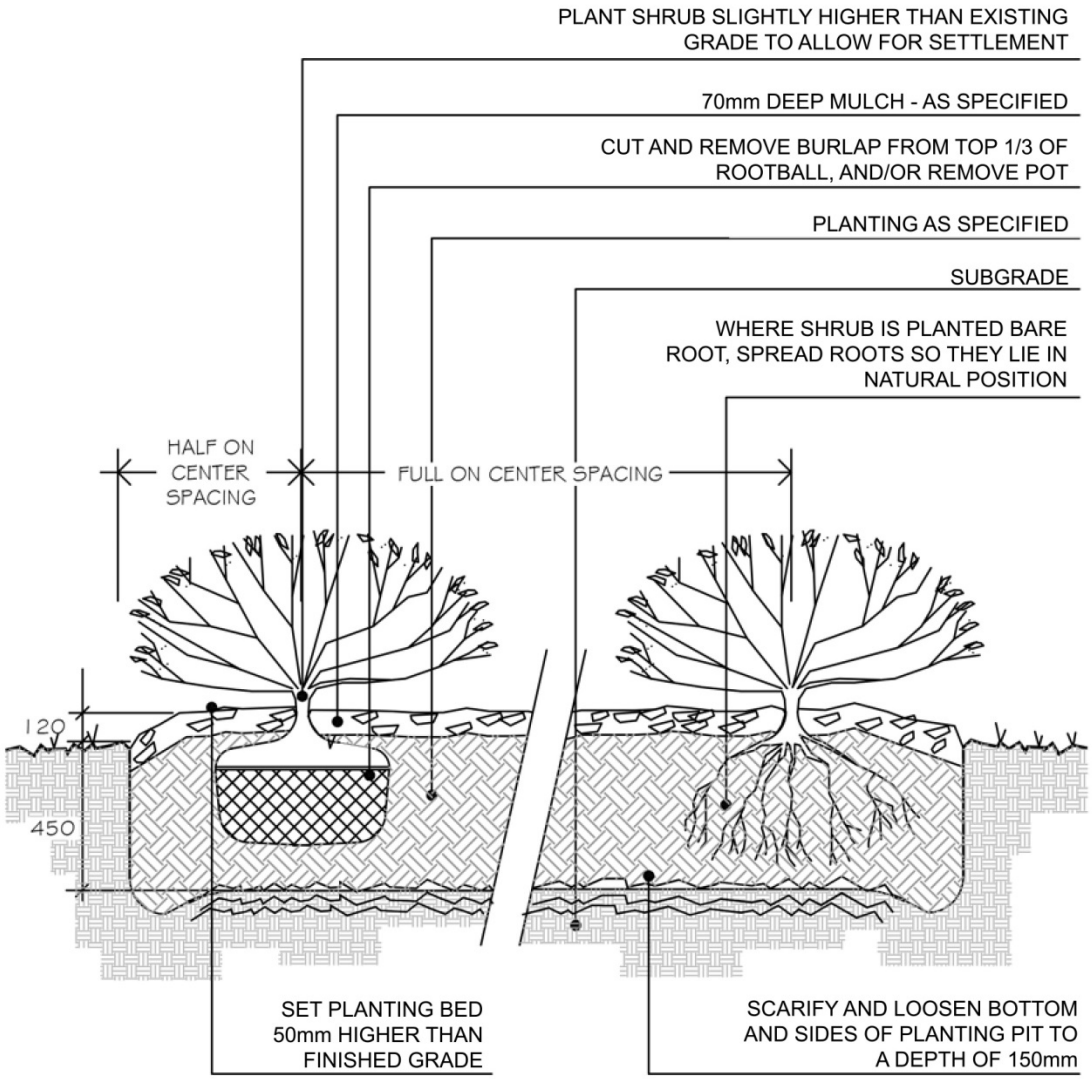
NTS



D3

TYPICAL CONIFEROUS TREE PLANTING

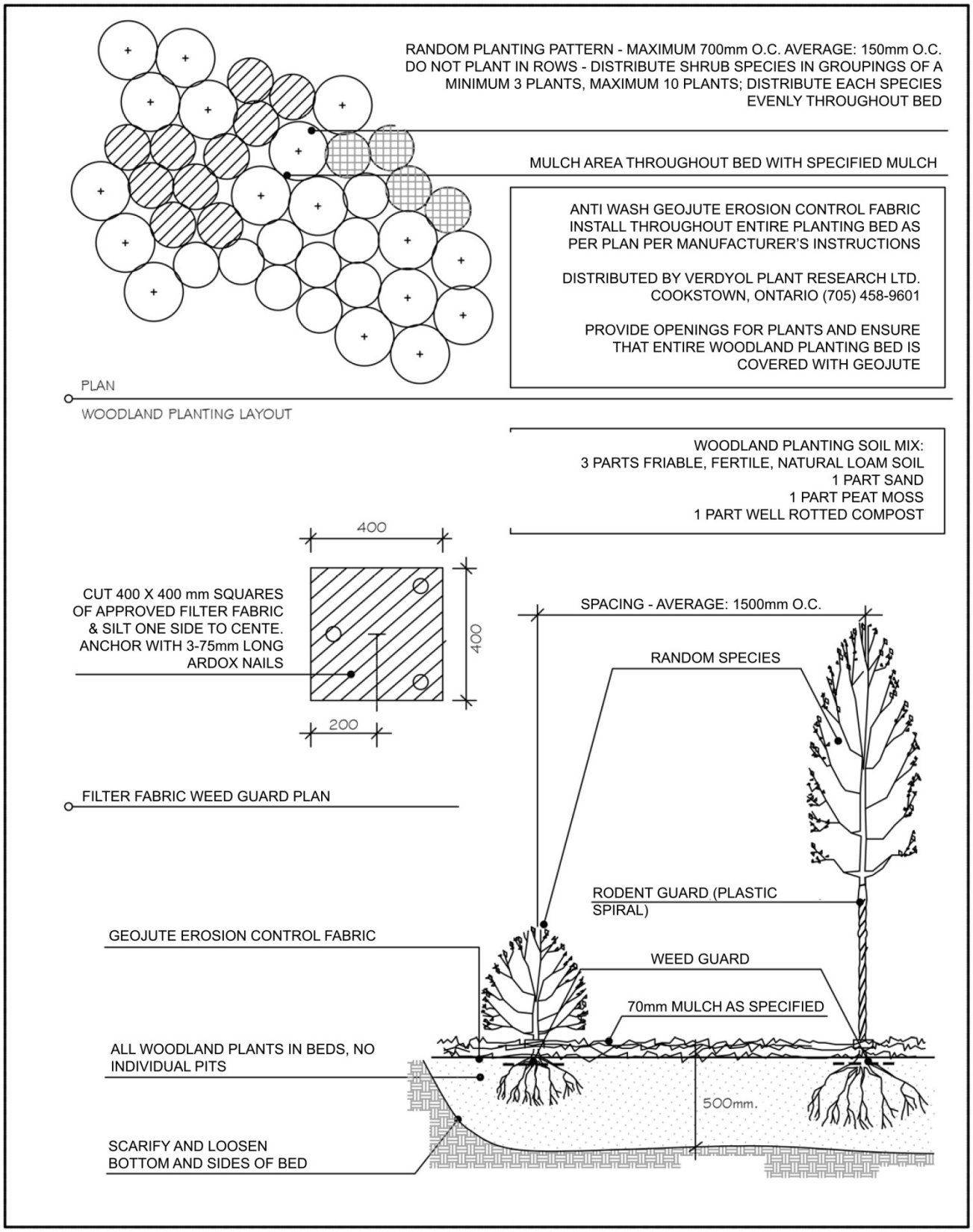
NTS



NOTES:
1. SHRUBS SHALL BEAR SAME RELATION TO FINSIHED GRADE AS THEY BORE TO PREVIOUS EXISTING GRADE.

D4 TYPICAL SHRUB PLANTING

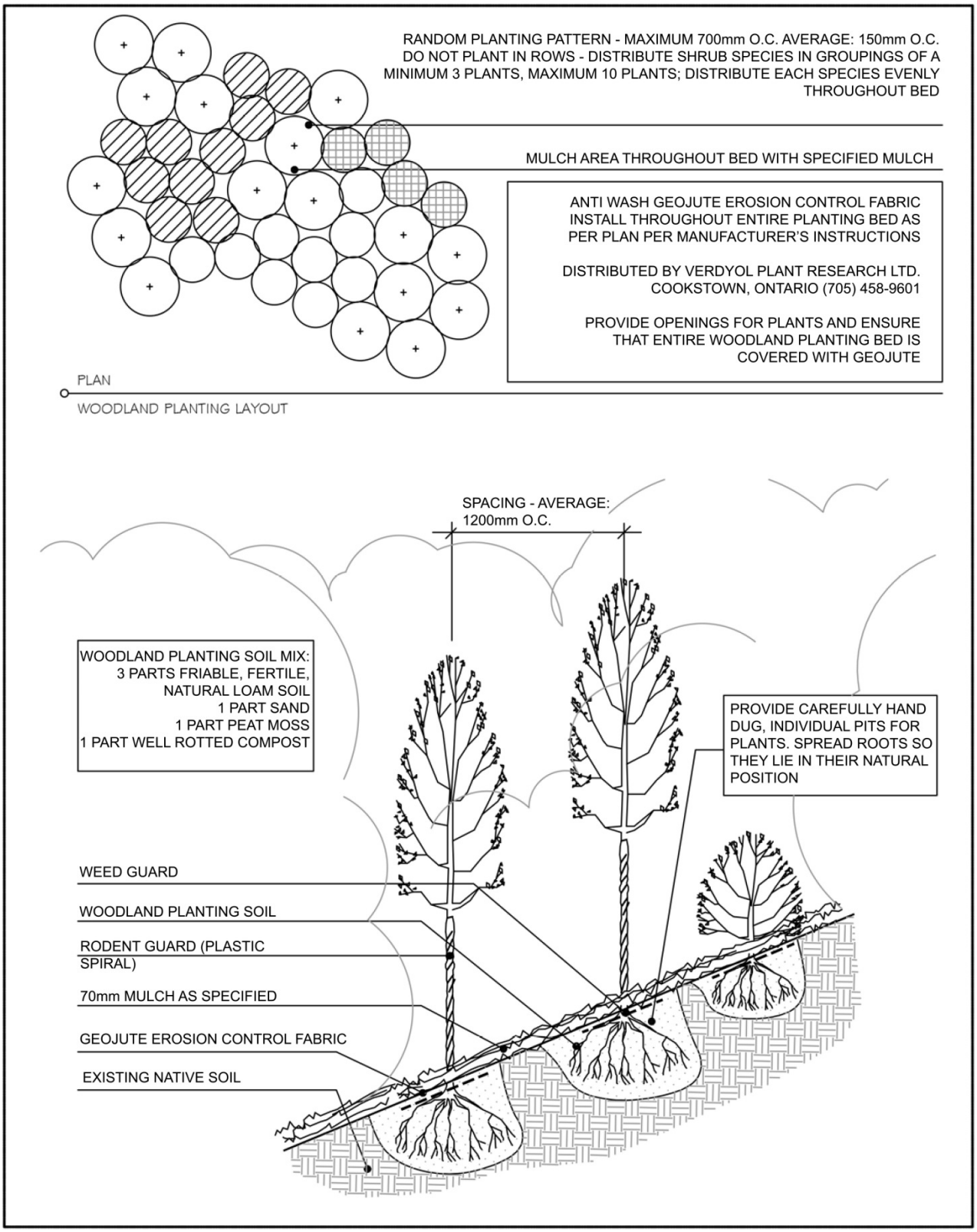
NTS



D5

TYPICAL WOODLAND PLANTING

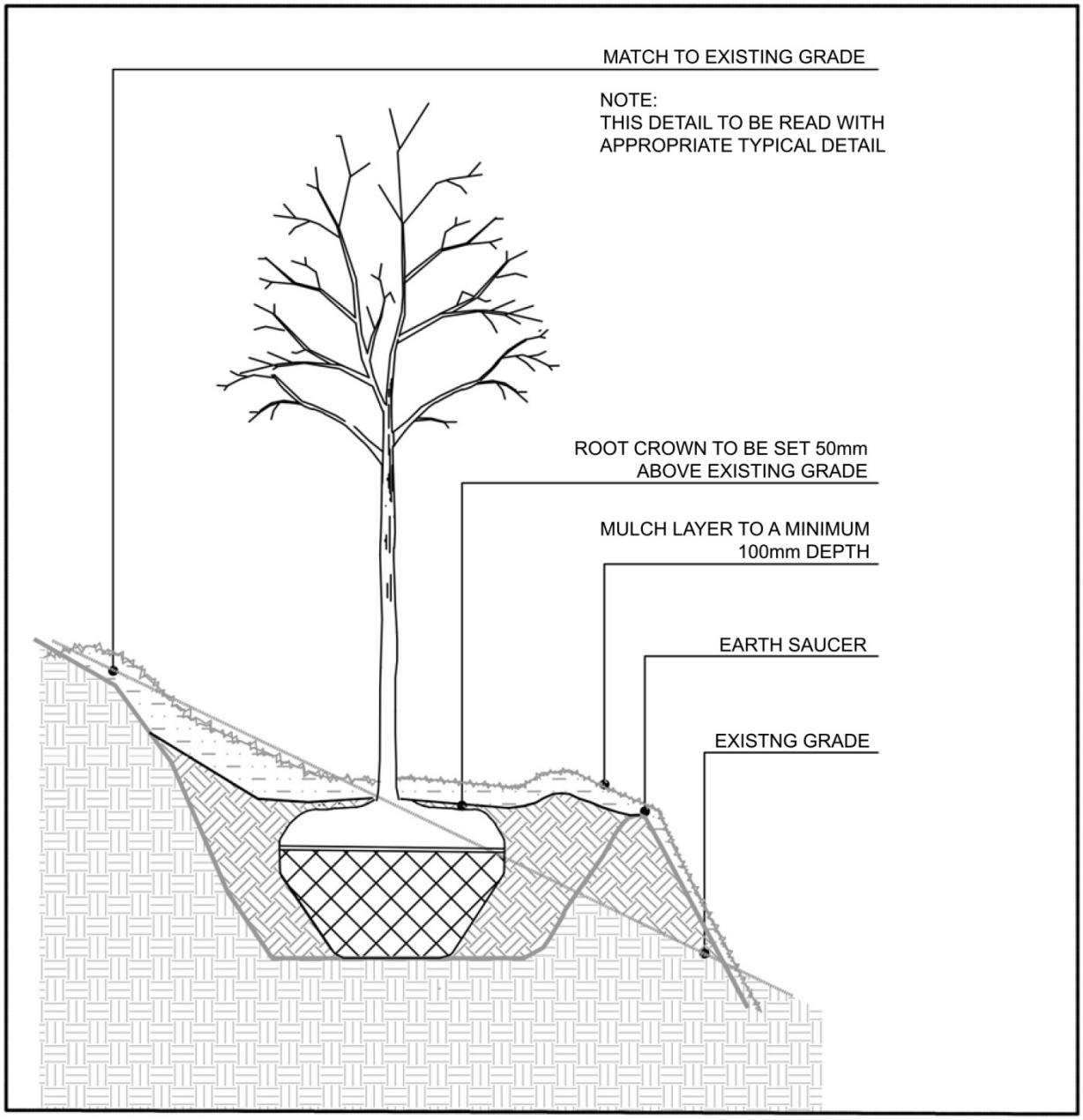
NTS



D6

TYPICALWOODLAND PLANTING ON SLOPE

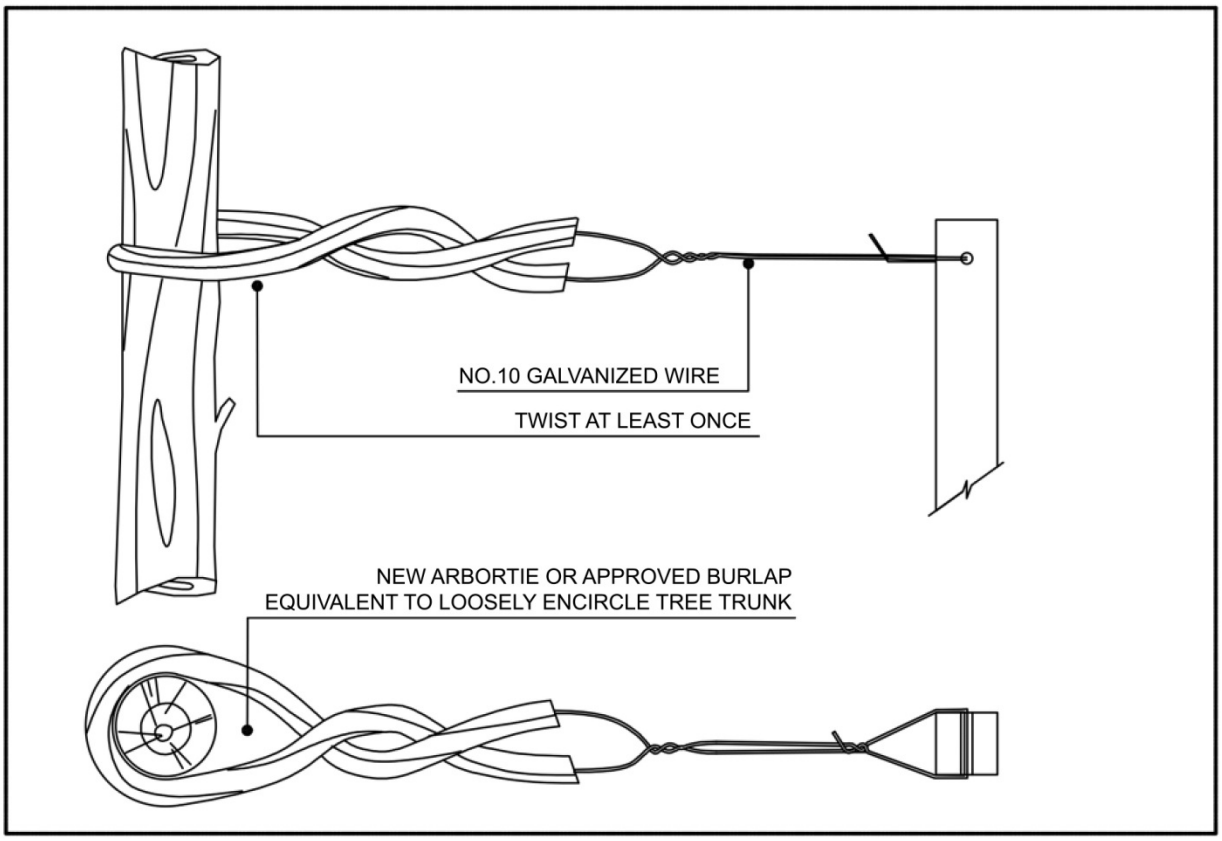
NTS



D7

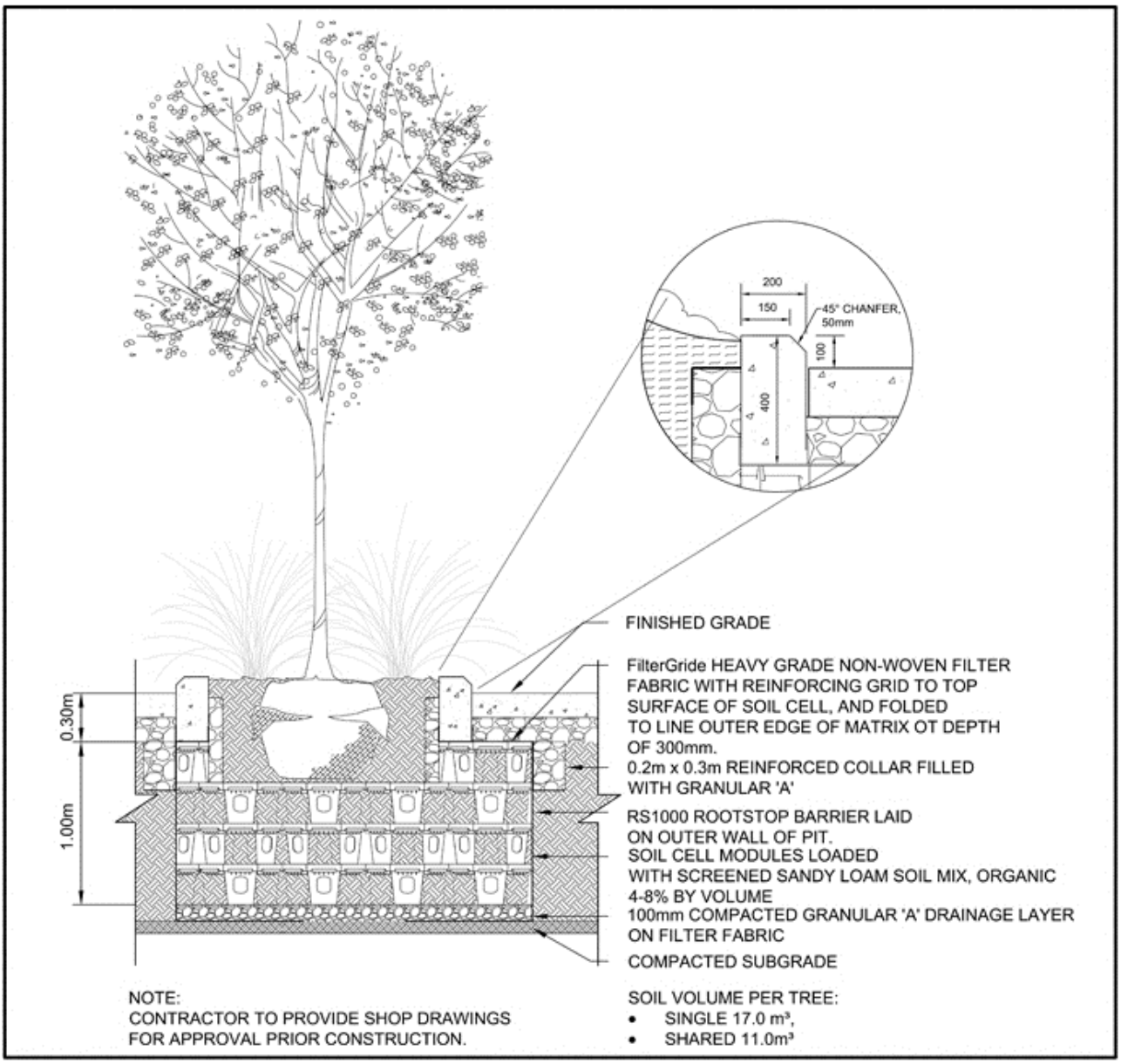
TYPICAL TREE/SHRUB SLOPE PLANTING

NTS



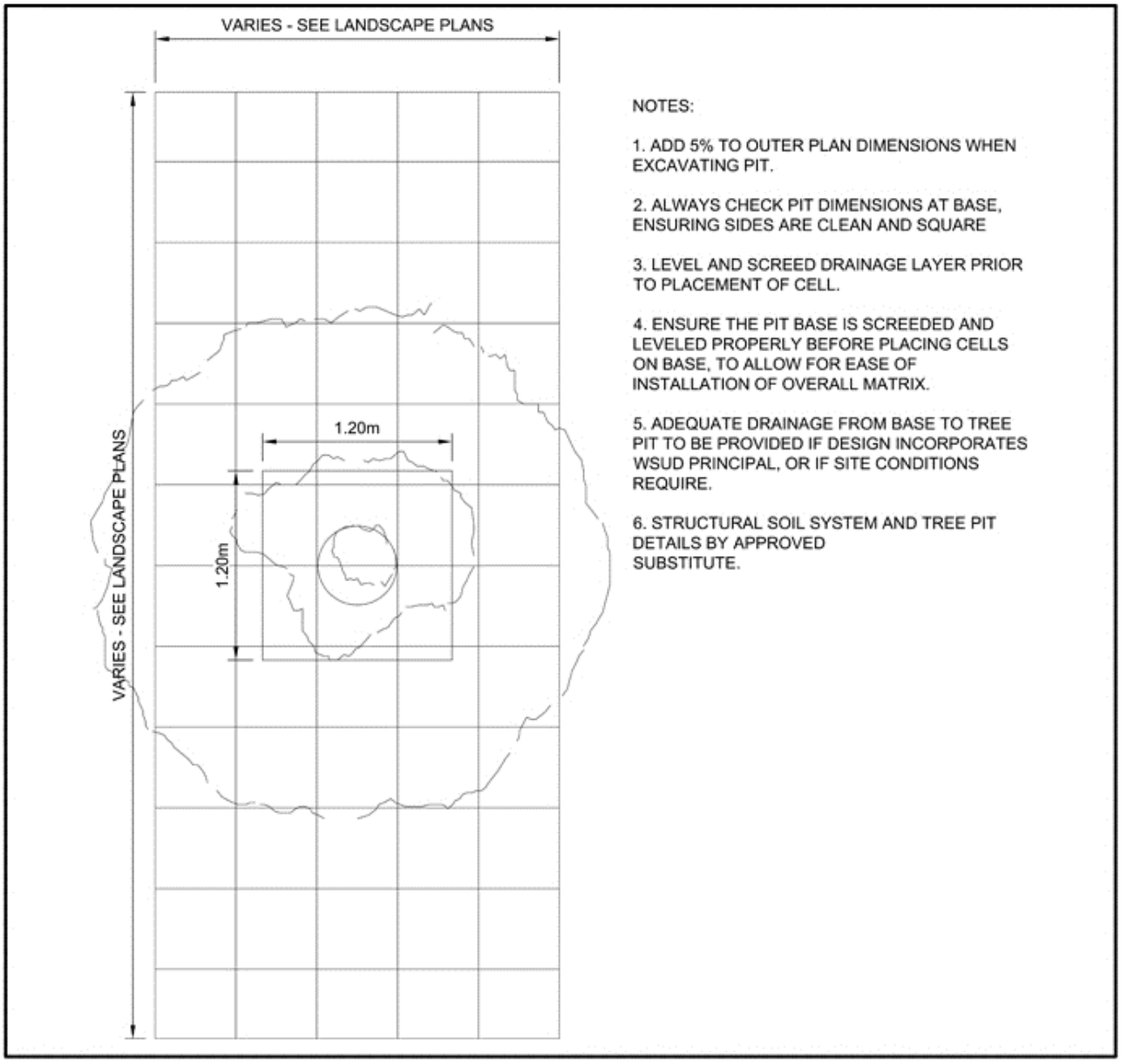
D8 TYPICAL SUPPORT WIRE/HOSE DETAIL

NTS



D9 TYPICAL SOIL CELL PLANTING

NTS



NOTES:

1. ADD 5% TO OUTER PLAN DIMENSIONS WHEN EXCAVATING PIT.

2. ALWAYS CHECK PIT DIMENSIONS AT BASE, ENSURING SIDES ARE CLEAN AND SQUARE

3. LEVEL AND SCREED DRAINAGE LAYER PRIOR TO PLACEMENT OF CELL.

4. ENSURE THE PIT BASE IS SCREEDED AND LEVELED PROPERLY BEFORE PLACING CELLS ON BASE, TO ALLOW FOR EASE OF INSTALLATION OF OVERALL MATRIX.

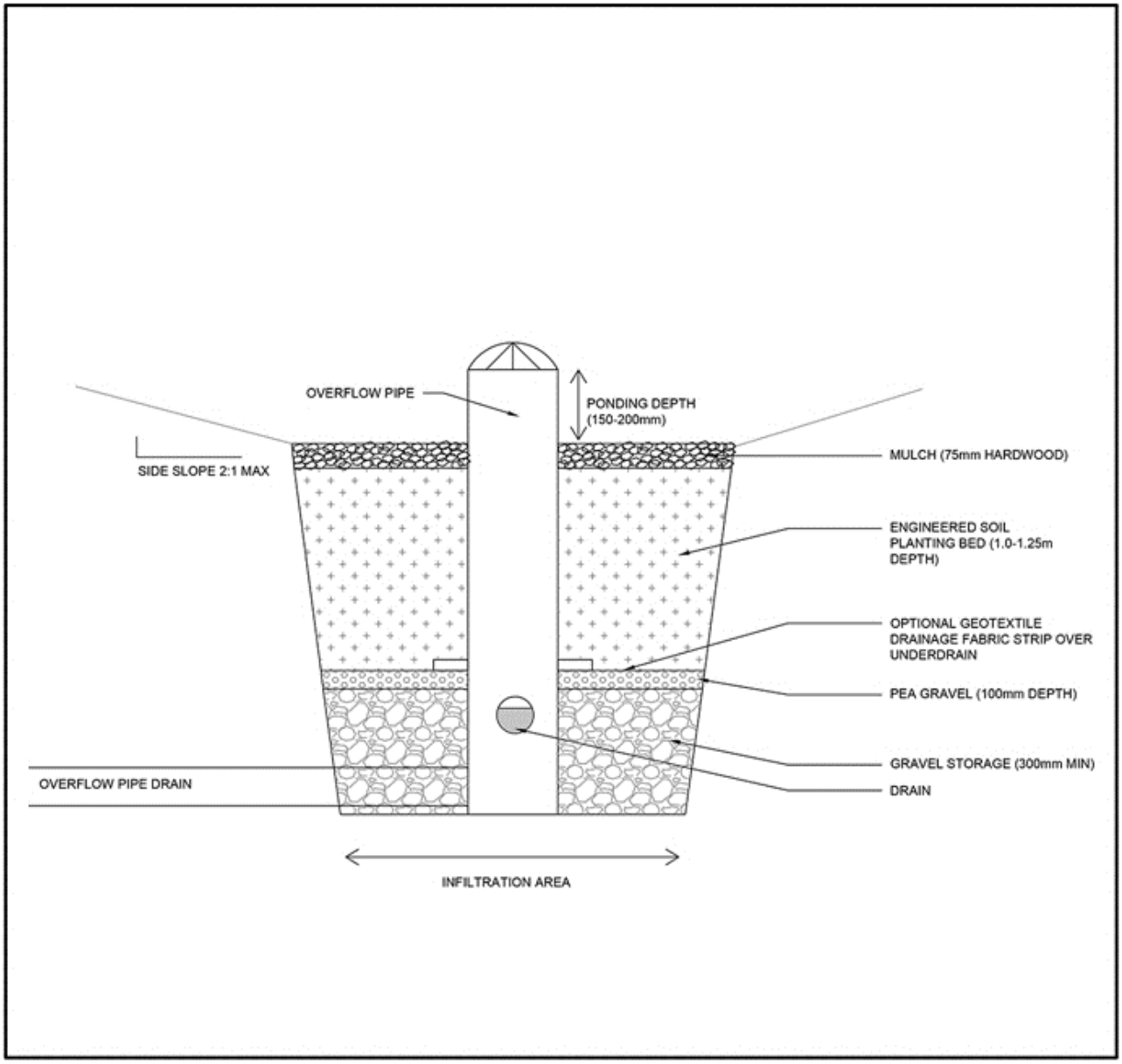
5. ADEQUATE DRAINAGE FROM BASE TO TREE PIT TO BE PROVIDED IF DESIGN INCORPORATES WSUD PRINCIPAL, OR IF SITE CONDITIONS REQUIRE.

6. STRUCTURAL SOIL SYSTEM AND TREE PIT DETAILS BY APPROVED SUBSTITUTE.

D9

TYPICAL SOIL CELL PLANTING

NTS



D10 TYPICAL SOIL CELL PLANTING

NTS

TYPICAL PLANTING NOTES

TREE PRESERVATION NOTES:

1. NO WORK IS TO BE DONE WITHIN TREE PROTECTION AREAS WITHOUT WRITTEN AUTHORIZATON OF THE MUNICIPALITY.
2. TREE PROTECTION STANDARDS WILL BE ENFORCED THROUGHOUT THE DURATION OF CONSTRUCTION.
3. DO NOT STORE MATERIALS, PLACE EQUIPMENT, OR MOVE EQUIPMENT OVER ROOT SYSTEM OR THROUGH SET BACK PROTECTION AREA.
4. DO NO BURN WASTE NEAR TREES.
5. AREAS WHERE ROOT SYSTEMS ARE DIRECTLY EXPOSED SHALL HAVE ROOTS PRUNED AND THEN BACK FILLED WITH GOOD NATIVE LOAM SOIL. ALL OF THE TREES TO BE PRESERVED SHOULD BE PRUNED OF DEAD AND HAZARDOUS LIMBS. THE STRUCTURAL INTEGRITY OF THE UPPER CANOPIES WILL BE EVALUATED DURING THE CLIMBING PROCEDURE. ADDITIONAL RECOMMENDATIONS MAY BE MADE AT THAT TIME.
6. DAMAGED TREES MUST BE IMMEDIATELY REPAIRED AT CONTRACTOR'S EXPENSE. COMPOSTED WOOD CHIP MULCH SHALL BE APPLIED ON THE ROOT ZONES INSIDE THE HOARDING TO HELP MINIMIZE DRYING AND TO HELP SUPPLY NATURAL NUTRIENTS.

GENERAL PLANTING NOTES:

1. MINIMUM SIZES FOR PLANT MATERIAL ARE MINIMUM ONLY TO MAIN BODY OF PLANT.
2. MULCH ON ALL PLANTING: SHREDDED BARK. MULCH AT DEPTHS AS PER DETAIL.
3. STANDARD PLANTING SOIL MIXTURE:
   - 6 PARTS TOPSOIL (FRIABLE, FERTILE NATURAL LOAM)
   - 2 PARTS SAND
   - 1 PART COMPOST
   - 1 PART FINELY SHREDDED SPHAGNUM PEAT MOSS BONE MEAL 0.58 KG / CUBIC METER OF PLANTING SOIL MIXTURE.
4. FERTILIZER: SHRUBS: TWO 21 GRAM AGRIFORM TABLETS OR APPROVED SUBSTITUTE FOR EACH 25mm CALIPER OF TREE.
5. THE WARRANTY PERIOD IS 2 YEARS. ALL PLANT MATERIAL WHICH IS NOT IN SATISFACTORY GROWING CONDITION SHALL BE REPLACED TO THE SATISFACTION OF THE REGION.
6. FOLLOWING CONSTRUCTION, REMOVE ALL PROTECTIVE MATERIAL. COMMENCE WITH MAINTENANCE.

APPENDIX F

CERTIFCATE OF COMPLETION. TEMPLATE

Date

Address:

Attention:

RE: Certificate of Completion
Project File Number
Address
Reference Name/Developer

Inspection Date:

Attendees:

Weather Conditions:

Changes: Please attach written approval from the Region regarding any changes

Deficiencies: If necessary, provide an additional sheet attached for deficiencies

---

I certify that the landscape design for XXXX is complete in accordance with approved plans dated XXXXX and approved XXXXXX.

Sincerely,

Landscape Architect, provide stamp and sign

APPENDIX G

RECORD OF SITE OBSERVATION AND INSPECTION REPORT. TEMPLATE

Period Start: **Period End:** xxxxx	**Halton Region No:** xx	**Project No:** **xx**	**Report No. xx**
Total days since Mob.: xx	**Working days this week:** xx	**Total Working:** xx	**Inclement weather days:** xx
Period work: xx am to xxpm	**Reported by:** xxxx		

(*Adjusted for Stat holidays)

General contractor:

- xxxx

Scope of work:

- xxx

Weather summary for reporting period:

- xx

Issues:

- xx

Number and Class of personnel on site:

		Sub-Contractors	

Contractor's Major Equipment on site (Can change on a daily basis):

▪	▪
▪	▪
▪	▪
▪	▪
▪	▪
▪	▪
▪	▪

Major deliveries:

▪

Weekly construction summary:

▪

Daily Summary

Day	Date	Work Description	Photo No.
		▪	
		▪	
		▪	
		▪	
		▪	

VISITORS:

- ▪
- ▪
- ▪
- ▪

To:		
		Per: XXX

Site Photographs:

INSERT PICTURE

Photograph No. 1; Add description

APPENDIX H

RECORD OF MAINTENANCE REPORT. TEMPLATE

Date

Address:

Attention:

RE: Maintenance and Inspection Report
2 Year Warranty Period
Project File Number
Address
Reference Name/Developer

Year 1

Inspection Dates:

Inspector and any other Attendees:

Weather Conditions:

Watering Dates:

Weeding Dates:

Deficiencies: Note any deficiencies at the time of the inspection. If necessary attach an additional sheet for deficiencies. Include the timing for replacement and warranty for replacement trees. Note timing and completion of stake removal.

Year 2

Inspection Dates:

Inspector and any other attendees:

Weather Conditions:

Watering Dates:

Weeding Dates:

Deficiencies: Note any deficiencies at the time of the inspection. If necessary attach an additional sheet for deficiencies. Include the timing for replacement and warranty for replacement trees. Note timing and completion of stake removal.

I certify that the above noted inspections and maintenance have been completed over the 2 year warranty period for XXXX project and request the scheduling of a final inspection.
Sincerely,

Landscape Architect, provide stamp and sign

APPENDIX I

POST OCCUPANCY EVALUATION FORM. TEMPLATE

POST OCCUPANCY EVALUATION FORM

Date

Address:

Attention:

RE: Post Occupancy Evaluation Report
Reporting Period: (month/year – month/year)
Project File Number
Address
Reference Name/Developer

First report to be completed at the time of Local municipality project takeover, post-warranty period.

To be completed annually, by a Landscape Architect.

Landscape Inspector and any other Attendees:

Weather Conditions:

LANDSCAPE COMPONENTS

Plant Material	
Percentage Survival	
Overall Health (*are plants growing with very little dieback?*)	
Tree Success (*report on health of each species with attention to location on site, ex., closer to roadway, set further back*)	
Shrubs Success (*see above*)	
Perennial and Grasses Success (*see above*)	
Groundcover Success (*see above*)	
Native or Enhanced Swale Seed Mix (*any overseeding required?*)	
Overall Aesthetics / Appearance	
Maintenance Successes and Challenges	
Watering Schedule and Task	
Weeding	
Pruning of Plant Material	
Mowing of Grass	
Re-mulching	
Site Hazards / Suggested Improvements	

Report on any other successes and challenges observed on site, including safety observations and lessons learned.

Landscape Architect to provide stamp and signature.