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PART 1 - GENERAL

- 1.1 Work Included
- .1 This section specifies requirements for planting of trees, shrubs and groundcover. Work includes:
- .1 Developing and managing planting plans, weekly schedules, and digital planting inventories;
- .2 Supply and installation of planting soil mix or soil amendments;
- .3 Supply and planting of trees, shrubs and groundcover complete with all related components and accessories.
- 1.2 Related Sections
- .1 Environmental Protection Section 01 57 00
- .2 Clearing and Grubbing Section 31 10 00
- .3 Earthwork Section 31 20 00
- .4 Protection of Existing Trees Section 32 91 10
- .5 Topsoiling and Finish Grading Section 32 91 19
- .6 Seeding and Sodding Section 32 92 00
- 1.3 References
- .1 Canadian Nursery Landscape Association (CNLA), Standards Canadian Standards for Nursery Stock. Canadian Landscape Standard (CLS), 2<sup>nd</sup> edition
- 1.4 Quality Control
- .1 Obtain approval of plant material prior to planting.
- .2 Supply necessary permits and import licenses in compliance with federal and provincial regulations for imported plant material.
- .3 HRM Urban Forestry and/or HRM's Landscape Architect may review all plants subject to approval of size, health, quality, character, etc.
- Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant quality changes or defects become apparent.
- .4 HRM Urban Forestry and/or HRM's Landscape Architect reserves the right to select and observe all plants prior to planting and to reject plants that do not meet specifications.

	.5	The contractor shall be responsible for documenting the locations of all plantings on an as-built drawing complete with an accompanying plant schedule and key.
	.6	All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no additional cost.
<u>1.5 Delivery, Storage and Protection</u>	.1	Protect plant material from damage during transportation. Use an enclosed vehicle or other approved method.
	.2	Immediately store and protect plant material which will not be installed within 1 hour after arrival at site in an approved storage location.
	.3	Protect plant material from frost, excessive heat, wind, and sun during and after delivery as follows: <ol style="list-style-type: none"> <li>.1 For pots and containers, maintain moisture level in containers.</li> <li>.2 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain adequate moisture level in root zones.</li> <li>.3 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in approved moisture-retaining medium and watering to full depth of root zone.</li> </ol>
<u>1.6 Samples</u>	.1	Submit samples in accordance with Section 01 10 00 for items listed in Supplementary Specifications.
<u>1.7 Warranty</u>	.1	Notwithstanding GC 12.3 - WARRANTY, warrant that plant material provided will be maintained to remain healthy and free of defects for two (2) years from the date of final acceptance or as specified in the Project Documents, subject to sub-section 3.9.
	.2	Extend warranty period an additional one (1) year for plant materials if leaf development and growth is not sufficient at the end of the original warranty period to ensure future survival as determined by the Engineer or designated consultant.
<u>1.8 Definitions</u>	.1	Defective Plant: Any plant that fails to meet the plant quality requirement of this specification.
 <u>PART 2 - PRODUCTS</u>		
<u>2.1 Plant Materials</u>	.1	Type of root preparation, sizing, grading and quality: comply with Canadian Nursery Landscape Association (CNLA) Standards. All trees to be Canada #1 Nursery Grown.
	.2	Plant material: free of disease, insects, pests, defects or injuries, structurally sound with strong fibrous root system, of excellent vigor and condition, and with the roots pruned regularly.

- .3 Trees: with straight trunks, well and characteristically branched for species except where specified otherwise, straight stem, full crown and main leader.
- .4 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.
- .5 Collected native stock not acceptable unless otherwise approved.
- .6 No substitutions shall be permitted without the written approval of the Engineer and/or HRM Urban Forestry.
- .7 The Contractor shall provide plants of quality, size, genus, species, and variety or cultivars as shown and scheduled in the Project Documents or as specified in HRM's Municipal Design Guidelines or as approved by the Urban Forester.
- .8 Unless otherwise stipulated all conifer shall be 150cm W.B. stock balled and burlapped and all other trees shall be 60mm caliper balled and burlapped.
- .9 All trees shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by genus, species, variety and cultivar.
- .10 Tags bearing species and genus information shall be retained on individual trees until approved by HRM Urban Forestry or designate.
- .11 All balled and burlapped plants shall be field grown, and the root ball packaged in a burlap and twine and /or burlap and wire basket package.
- .12 Trees shall be harvested with a tree spade within the same calendar year that they will be planted.
- .13 The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girding ties, or lesions (mechanical injury).
- .14 Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar.
- .15 Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.

- .16 All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line. The root collar shall be within the upper 5 (five) cm of the substrate/soil.

2.2 Species  
Selection

- .1 The following species have been approved for use within the HRM Right-of-Way. In addition to the presence of overhead utilities (see note below), species selection should include consideration of tree canopy space and shadows, especially when planting trees near tall buildings. Additional species may be considered, subject to the approval of the Urban Forester.

Small

- *Acer campstre* (Hedge Maple) \*<sup>3</sup>
- *Cercidiphyllum japonicum* (Katsura) \*<sup>3</sup>
- *Corylus cournu* (Turkish Hazel/Turkish Filbert)
- *Maackia amurensis* (Amur Maackia) \*<sup>3</sup>
- *Ostrya virginiana* (Ironwood) \*<sup>3</sup>
- *Pyrus calleryana* 'Bradford' (Brandford Ornamental Pear) \*<sup>3</sup>
- *Pyrus calleryana* 'Redspire' (Redspire Ornamental Pear) \*<sup>3</sup>
- *Syringa reticulata* 'Ivory Silk' (Ivory Silk Lilac) \*<sup>3</sup>

Medium

- *Acer rubrum* (Red Maple) \*<sup>2</sup>
- *Acer x freemanii* 'Celzam' (Celebration Autumn Blaze Maple) \*<sup>2</sup>
- *Betula nigra* (River Birch)
- *Catalpa speciose* (Umbrella Tree)
- *Ginkgo biloba* (Ginkgo Biloba - male only) \*<sup>3</sup>
- *Tilia cordata* (Little Leaf Linden)

Large

- *Celtis occidentalis* (Common Hackberry) \*<sup>2</sup>
- *Fagus sylvatica* (*Eurpoean Beech – tree form only*) \*<sup>2</sup>
- *Gymnocladus dioicus* (Kentucky Coffee Tree) \*<sup>2</sup>
- *Juglans nigra* (Black Walnut)
- *Liriodendron tulipifera* (Tuliptree) \*<sup>2</sup>
- *Quercua macrocarpa* (Burr Oak) \*<sup>3</sup>
- *Quercus palustris* (Pin Oak) \*<sup>2</sup>
- *Quercus rubra* (Red Oak) \*<sup>3</sup>
- *Tilia americana* (Basswood)
- *Ulmus americana* 'Princeton' (Princeton Elm) \*

\*, \*<sup>2</sup>, \*<sup>3</sup> Planting Under Utility Lines

- When replacing a mature tree removed due to construction, species indicated with \*<sup>2</sup> are acceptable for planting under single, 2-phase and 3-phase single circuit distribution lines. Species indicated with \*<sup>3</sup> are acceptable for planting under 3-phase single

and 3-phase double circuit distribution lines. Urban Forester to confirm selection.

- When planting a tree where no tree existed previously, species indicated with \*3 are acceptable for planting under distribution lines.

Note: Any species of Fraxinus (ash) are currently considered unacceptable for planting in HRM due to the influx of the Emerald Ash Borer pest.

### 2.3 Water

- .1 Free of impurities that would inhibit plant growth.

### 2.4 Tree Support

- .1 Stakes: wood, regular or treated, 25 x 40 x 2400 mm long, or as detailed in Project Documents.
- .2 Turnbuckle: galvanized steel, 9 mm diameter with 250 mm open length. Painted fluorescent orange.
- .3 Guying wire: galvanized steel, 3 mm wire or 3 mm diameter multi-wire steel cable.
- .4 Anchors:
- .1 Wood: 50 mm x 50 mm x 600 mm.
- .2 Steel: T-bar, 600 mm.
- .5 Guying collar: tube, plastic 13 mm diameter nylon reinforced, rubber hose or approved commercial equivalent or as detailed in Project Documents.

### 2.5 Mulch

- .1 Organic:
- .1 Bark Mulch: Aged, shredded, bark and wood from coniferous trees or approved commercial bark nugget. Maximum length of any individual component to be 50 mm and a minimum of 75% of the mulch will pass through a 25 mm screen. Mulch to be free of growth or germination-inhibiting ingredients. Mulch to have characteristics of retaining moisture, forming a mat not susceptible to spreading by wind or rain, and providing a good growth medium for plants. Shredded bark may contain up to 50% shredded wood material. Wood chips are not acceptable. Bark mulch containing shredded wood to be aged for one (1) year minimum prior to installation.
- .2 Inorganic:
- .1 Washed River Rock: To be 25 mm to 76 mm washed river rock, uniform in size. All fines shall be screened from the aggregate within a 6mm tolerance. Rock mulch to be composed of round stones or pebbles that may be varied in colour. The material must be free of organic and inorganic debris and litter.

### 2.6 Fertilizer

- .1 Slow release, inorganic granular fertilizer; as determined by soil test.

2.7 Anti-Desiccant .1 A waxy or polymer spray providing a protective coating to evergreen foliage and reducing the amount of water that escapes.

2.8 Flagging Tape .1 Fluorescent, colour choice optional.

PART 3 - EXECUTION3.1 General

- .1 Qualifications
  - .1 The Contractor and its crews shall have at least two (2) years of successful experience of a scope similar to that required for the work, including the handling and planting of large specimen trees in urban areas.
  - .2 The planting crew shall employ at least one (1) person who is a member in good standing of Landscape Nova Scotia.
- .2 Planting Season
  - .1 Planting shall only be performed when weather and soil conditions are suitable for planting the materials specified in accordance with locally accepted practice.
  - .2 Install plants during the planting time as described above unless otherwise approved in writing by HRM Urban Forestry.
  - .3 In the event that the Contractor requests planting outside the dates of the planting season, approval of the request does not change the requirements of the warranty.
- .3 Site Examination
  - .1 Examine the surface grades and soil conditions. Placement of trees to be verified in field; do not place trees over gas, sewer, or water laterals or within proximity to Halifax Water infrastructure such as catch basins, manholes or fire hydrants. For manholes and catch basins, the offset guideline from centre of the infrastructure is 1.5 metres, or as much as possible. However, where no other suitable locations exist, trees may be located closer with the approval of the Engineer or Urban Forestry.
  - .2 Notify HRM Urban Forestry in writing of any unsatisfactory conditions.
  - .3 It is the responsibility of the Contractor to visit the planting sites and assess all requirements.
- .4 Delivery, Storage and Handling
  - .1 Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of hot and cold temperatures.
  - .2 Plants and trees are to be planted the day they arrive on site. If planting is delayed more than 24 hours after delivery, set plants in a location protected from sun and wind.
  - .3 Provide adequate water to the root ball package during the shipping and storage period.
  - .4 Do not deliver more plants to the site that there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.
  - .5 Provide protective covering over all plants during transporting.



- .6 Provide protective covering on equipment that will cause bark damage during transportation, such as tailgate padding, etc.
- .7 Trees are to be handled, transported and planted in a manner that does not cause damage or injury to trunk/crown or root ball.
- .8 Trees shall be lifted by the root ball and not by the trunk when being moved or set into the planting hole.
- .9 Root systems of balled specimens shall be handled with sufficient care so that root balls shall not be broken. Broken balls or balls consisting of loose soil will not be accepted and shall be replaced.

### 3.2 Pre-planting Operations

- .1 Observe each plant after delivery and prior to installation for damage or other characteristics that may cause rejection of the plant. Notify the Urban Forester of any adverse condition observed.
- .2 Prune and remove damaged roots and branches from plant material using proper pruning cuts.
- .3 Apply anti-desiccant to conifers and deciduous trees in accordance with manufacturer's directions. Apply anti-desiccant when material is dug out of recommended season for protection, during extreme temperatures and such other conditions deemed necessary by the Engineer or designated consultant.

### 3.3 Preparation of Planting Beds and Pits

- .1 Obtain approval of plant materials prior to use.
- .2 Excavate to depth and width as indicated. Excavated planting holes shall not be left overnight.
- .3 Excavate the planting hole to the depth of the root ball, measured after any root ball modification. The hole shall be wide enough to allow for working around the root ball, or to the size indicated on the drawing or as noted.
- .4 In the event that ground conditions and/or excessive rock does not allow for section (.3) to be achieved, the contractor shall report to the Urban Forester.
- .5 Remove damaged roots and branches from plant material.

### 3.4 Planting

- .1 For bare root stock, place 50 mm planting mixture in bottom of pit. Plant trees and shrubs with roots placed straight in pit.
- .2 For jute or biodegradable burlapped root balls, untie and fold back top one third to one half of wrapping, remove the top layer of the wire basket, and fold down remaining protruding wire sections without damaging root ball. Do not pull burlap or rope from under root ball. The wire basket should not be removed entirely as doing so may destroy the integrity of the root ball, particularly if the tree was dug in sandy or dry soil.

- .3 For container stock or root balls in non- degradable wrapping, water plants and then remove entire container or wrapping without damaging root ball. Under no circumstances should non-biodegradable burlap or cloth material be allowed to remain around the soil ball after planting.

All plant material in containers shall be checked to ensure that there are no encircling or girdling roots. If encircling roots are present, use a sharp knife to make two vertical cuts opposite each other on the sides of the root ball through the encircling roots.

- .4 Plant plumb in locations indicated. Orient plant material to give best appearance in relation to structure, roads and walks.

- .5 The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality. The Contractor shall undertake at the time of planting all modifications to the root system required by HRM Urban Forestry to meet these quality standards.

- .6 For trees and shrubs:

.1 Backfill planting mixture in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into planting mixture, backfill to finish grade. Confirm that the final grade of the soil ball and the tree trunk portion or root collar of the tree is at least 50 mm higher to allow for settlement. For trees that have been budded or grafted, the visible joint area of the collar is be 50 mm above the finished granular bed level.

.2 Construct a soil ring around the edge of the planting pit to contain and direct water towards the root ball. The root ball shall be thoroughly saturated with water at the time of planting.

- .7 For groundcovers, backfill soil evenly to finish grade and tamp to eliminate air pockets.

- .8 Water plant material thoroughly after planting operations are complete.

- .9 After soil settlement has occurred, fill with soil to finish grade.

- .10 A qualified person shall conduct a structural prune as required to the satisfaction of the Urban Forester at the time of planting.

- .11 Dispose of burlap, wire and container material off site.

### 3.5 Tree Supports

- .1 Install tree supports unless indicated otherwise.

- .2 For deciduous trees 50 mm and over:

.1 Use double tree support.

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- .2 For trees planted within the right of way, place one (1) stake in the direction of travel and the second opposite or as directed by the Engineer. For all other trees place one (1) stake on the prevailing wind side of the tree and second opposite or as directed by the Engineer. Both stakes are to be 800 mm minimum for trunk and should be placed on either side of the root ball. Where trees are planted next to driveways or walkways, place one (1) stake between the tree trunk and driveway or walkway.
  - .3 Drive stakes minimum 300 mm into undisturbed soil beneath root ball. Confirm stakes are secure, vertical and un-split.
  - .4 Install two (2) guying collars above lowest branch crotch a minimum 500 mm above grade.
  - .5 Thread guying wire through collar tube. Twist wire to form collar and secure firmly to stake. Cut off excess wire. Confirm collar is minimum 25mm diameter larger than tree.
  - .6 For trees larger than 100 mm in caliper, support trees with three-way guy wires and stakes positioned in the ground equidistant around the perimeter of the tree. Some larger trees will require additional guy wires for added support. The use of turnbuckles to maintain taut support on the support wires is recommended.
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- .3 For evergreens, use three (3) guy wires:
    - .1 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens. Collar mounting height not to exceed 1000 mm above grade.
    - .2 Guying collars to be of sufficient length to encircle tree plus 500 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.
    - .3 Install anchors at equal intervals about tree and away from trunk so that guy wire will form 45-degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.
    - .4 Attach guy wire to anchors. Tension wire and secure by multi-wraps.
    - .5 Install wire tightner such that guys are secure and leave room for slight movements of tree.
    - .6 Saw tops off anchors, which extend in excess of 100mm above grade or as directed.
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- .4 After tree supports have been installed, prune and remove broken branches with clean, sharp tools.
  - .5 Staking and tethering shall be carried out as per the following requirements:
    1. Plants shall stand plumb after staking.
    2. The stems shall be attached loosely to the stakes to allow flexibility.

3. Stakes (wood or metal) shall be driven firmly into the ground at a minimum of 40 cm depth.
4. Place the stake into the outer edge of the planting hole, away from the root system but within the mulched planting area.
5. Always use two stakes. If on the roadway, place stakes with the direction of travel.
6. Tree tethers shall utilize the tree staking and tethering materials specified as follows:
  - i. All stakes shall be tethered to trees using means that allow for expansion of the tree and reducing the impacts of girdling and shall not be made of wire.
  - ii. Material in contact with the stem shall have a broad, smooth surface.
  - iii. Tethers shall be placed 2/3 the distance from the ground up to the first set of branches.

3.6 Straightening

- .1 If straightening is required during the warranty period, it shall be carried out as per the following requirements:
  - .1 Straighten all trees that move out of plumb position. Trees to be straightened should be in good health.
  - .2 If the tree cannot be straightened immediately, the root system shall be kept moist with irrigation and mulch.
  - .3 Before straightening occurs, the soil shall be moist.
  - .4 Trees to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled. Thoroughly water the tree and mulch the entire rooting area.
  - .5 Do not straighten trees by pulling the trunk.

3.6 Mulching

- .1 Correct soil settlement prior to mulching.
- .2 Water plant material thoroughly prior to spreading mulch as indicated.
- .3 After installation of tree, shrub and groundcover plantings has been approved by the Engineer, place mulch around plants and spread to a depth of 75 mm for bark mulch and 115 mm for washed river rock mulch. Use weed-free fabrics below mulch only upon approval by Engineer.
- .4 Mulching for trees shall be carried out as per the following requirements:
  - .1 Bark mulch will be supplied by the contractor and shall be comprised of aged, shredded bark and wood chips or an acceptable industry alternative agreed upon by the Urban Forester.
  - .2 Bark mulch containing shredded wood shall be aged for one year minimum prior to installation.
  - .3 There must be sufficient mulch to cover the planting pit, flush with the surface of the ground.
  - .4 Mulch shall not be mounded/volcanoed at the base of the tree. Apply 5-10 cm of mulch before the mulch settles, covering the entire planting bed area.

3.7 Maintenance  
During Establishment  
Period

- .1 Perform following maintenance operations from time of planting to acceptance:
  - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
  - .2 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
  - .3 Remove weeds monthly.
  - .4 Replace or re-spread damaged, missing, or disturbed mulch.
  - .5 Apply pesticides in accordance with federal, provincial and municipal regulations as and when required to control insects, fungus, and disease.
  - .6 Prune and remove dead or broken branches from plant material using proper pruning techniques.
  - .7 Keep stakes and guy wires in proper repair and adjustment.
  - .8 Apply fertilizer in early spring at manufacturer's suggested rate and as required by planting material.
  - .9 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
  - .10 Where Municipal or Provincial Regulations prohibit the use of Federally and/or Provincially approved pesticides, and the available (alternative) non-pesticide controls are not acceptable to the Contractor, the application of pesticides to control insects, fungus and disease shall be deemed to be removed from this Section.
- .2 Watering for trees shall be carried out as per following requirements:
  - .1 At the time of planting, the soil around each tree shall be thoroughly saturated with water. Water shall be free from oil and shall be free from impurities injurious to trees.
  - .2 All newly planted trees will be watered once per calendar week between spring (June 1) continuing through to the end of August for the first year unless greater than 20 mm of rain is received or forecast within that calendar week. With the Municipalities approval, adjustments may be made in watering frequency depending on soil type, weather, drainage, tree species, and weekly amounts of rainfall.
  - .3 The area in and around the planting site shall be watered slowly to allow enough time for the water to penetrate the soil to a depth of 15 to 30 cm and in such a fashion to ensure that water does not run away from the root zone.
  - .4 Water shall not be applied in a manner which damages trees, stakes, or adjacent areas.
  - .5 Proper watering shall not cause uprooting or exposure of tree's roots to the air.

- 3.8 Acceptance
- .1 Plant material will be accepted after planting operation is completed provided that plant material exhibits healthy growing conditions and is free from disease, insects and fungal organisms.
  - .2 Plant material installed in fall will be accepted in following spring, one month after start of growing season, provided acceptance conditions outlined in 3.9 below are fulfilled. The acceptance date, for material planted in the fall and accepted in the spring, will be deemed to be the date of the completion of fall planting operations.
- 3.9 Maintenance During Warranty Period
- .1 This maintenance will be the sole source of maintenance of the work during this period and is wholly the Contractor's responsibility. Should maintenance of the Work be removed from the Contract, warranty will cease following final acceptance at project completion.
  - .2 From time of acceptance to end of warranty period, perform following maintenance operations:
    - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
    - .2 For evergreen plant material: water thoroughly in late fall prior to freeze-up to saturate soil around root system.
    - .3 Re-form damaged soil and mulch ring.
    - .4 Remove weeds monthly.
    - .5 For non-mulched areas, cultivate monthly to keep top layer of soil friable.
    - .6 Apply pesticides where permitted in accordance with federal, provincial and municipal regulations as and when required to control insects, fungus and disease.
    - .7 Apply fertilizer in early spring at manufacturer's suggested rate and as required by plant material.
    - .8 Remove dead, broken or hazardous branches from plant material.
    - .9 Keep stakes and guy wires in proper repair and adjustment.
    - .10 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
    - .11 Notify Engineer or designated consultant when warranty period is completed to arrange inspection and transfer of maintenance responsibility to Owner.
    - .12 Remove tree supports at end of warranty period unless otherwise requested by the Engineer or Urban Forestry.
- 3.10 Clean Up
- .1 Remove surplus materials at no additional cost to the contract.