

**Partie 1      General**

**1.1            SUMMARY**

- .1      Section Includes:
  - .1      Materials and installation for preserving root systems of plants affected by changing grades or excavation.

**1.2            RELATED REQUIREMENTS**

- .1      The list of Work in this division is indicative but non-limiting. It does not exclude Work described in other specification divisions shown on the drawings or required for full execution of the Work as intended on the drawings.
- .2      Section 32 91 19.13 – Topsoil Placement and Grading.
- .3      Grading, excavation: see engineering sections.

**1.3            REFERENCES**

- .1      Department of Justice Canada (Jus).
  - .1      Canadian Environmental Protection Act, 1999, ch. 33.
  - .2      Fertilizers Act (R.S. 1985, c. F-10).
  - .3      Fertilizers Regulations (C.R.C., c. 666).
  - .4      Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .2      Health Canada - Pest Management Regulatory Agency (PMRA).
  - .1      National Standard for Pesticide Education, Training and Certification in Canada (1995).
- .3      Good practice standards of the Société internationale d'arboriculture Québec (SIAQ).

**1.4            QUALITY ASSURANCE**

- .1      Take necessary construction occupational health and safety measures.
- .2      The Contractor must be a commercial member in good standing of the SIAQ (Société internationale d'arboriculture Québec).

**1.5            SCHEDULING**

- .1      Obtain approval from Departmental Representative of schedule indicating beginning of Work.

**1.6            IDENTIFICATION**

- .1      The Contractor and Departmental Representative must identify the plantings on site to be preserved and protected. The Contractor must apply measures in accordance with the Departmental Representative's instructions.

**1.7            PROTECTION**

- .1      Do not damage plantings, site features, markers, existing buildings, public utility services that must remain in place. Repair damage.

- .2 The following is not allowed without written consent from the Departmental Representative.
  - .1 Removal, pulverization, fertilization, pruning, above or below ground, disturbance or modification of trees.
  - .2 Objects or materials interfering with supply of water, air or nutrients to root systems.
  - .3 Marking, puncture or removal of tree bark, including any action likely to damage the tree bark.
  - .4 Attaching objects to trees.
  - .5 Attaching devices to protect or support.
  - .6 Exposing trees to toxic or hazardous substances in gas, liquid or solid form.
  - .7 Exposing trees to heat from fire or other source.
  - .8 Changing slopes and drainage, creating obstacles to water, air and nutrient supply to trees.
  - .9 Attaching materials to trees and leaning materials on trees while executing work in their vicinity.
  - .10 Removing or displacing tree protection.
  - .11 Interfering with openings in tree protection, creating obstacles to water, air and nutrient supply to trees.
  - .12 Excavating, disturbing or compacting soil inside drip line of trees.
  - .13 Depositing construction, excavation materials and debris inside drip line.
  - .14 Digging ditches, tunnels or trenches, building or covering walkways inside drip line, or at a distance from a tree's trunk equal to 10 times its diameter, measured at 1.40 metres from the ground with a minimal distance of 100 cm.
- .3 Meet with Departmental Representative prior to carrying out work near trees to avoid items listed in 1.3.2. A procedure will be provided at the meeting specifying the work methods to be used near the trees and protective measures.

The procedure will be issued before and during the contract's execution and will be automatically integrated into the contract with now additional financial compensation.

**Partie 2      Product**

**2.1            MATERIALS**

- .1      Materials
  - .1      High density polyethylene fencing, 1,200 mm high, orange.
  - .2      Steel T stake, 2,500 mm.
  - .3      Wood to protect tree trunks: softwood (spruce, pine or balsam), utility grade, 38 x 65 x 1,830 mm.
  - .4      Metal straps as needed and approved by Departmental Representative.
  - .5      White geotextile.
  - .6      Steel rod or stake, 600 mm.
  - .7      Soil: refer to specifications under Section 32 91 19.13 – Topsoil Placement and Grading.
- .2      Peatmoss:
  - .1      Derived from partially decomposed species of Sphagnum Mosses.
  - .2      Elastic and homogeneous.
  - .3      Free of wood and deleterious material which could prohibit growth.
  - .4      Shredded minimum particle size: 5 mm.
- .3      Fertilizer:
  - .1      To Canada Fertilizer Act and Fertilizers Regulations.
  - .2      Complete, commercial, slow release with 35% of nitrogen content in water-insoluble form.
- .4      Anti-desiccant: commercial, wax-like emulsion.
- .5      Filter Cloth:
  - .1      Type 1: 100% non-woven needle punched polyester, 2.75 mm thick, 240 g/m<sup>2</sup> mass.
  - .2      Type 2: biodegradable burlap.
- .6      Welded wire fabric (WWF): 100 x 100mm, to CSA G30.5.
- .7      Wood posts: 38 x 89 x 2400 mm length.
- .8      Fill:
  - .1      Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.

**2.1 MATERIALS (cont'd)**

- .2 Type (B): excavated, pervious soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc). Excavated material shall be approved by Departmental Representative before use as fill.
- .9 Coarse washed stones: 35-75 mm diameter clean round hard stone.

**Partie 3 Execution**

**3.1 IDENTIFICATION AND PROTECTION**

- .1 Take necessary construction occupational health and safety measures.
- .2 Identify with Departmental Representative plantings to be preserved and protected. Apply measures as indicated by Departmental Representative.
- .3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by Departmental Representative.
- .4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an arborist or Canadian Certified Horticultural Technician (CCHT) as approved by Departmental Representative.
- .5 Departmental Representative must inspect Contractor's protective measures prior to beginning work. If necessary the Departmental Representative will request to have branches over work zone trimmed by specialized personnel. Trimming must be supervised based on guidelines provided to the workers.
- .6 Protective measures must be applied during the construction period for work exceeding two days.

Contractor must install construction fence 1.2 metres high and 3 metres minimum distance from trunk, wooded area, tree or trees and shrubs to be preserved, as indicated by Departmental Representative. Fencing may also be located outside drip line, as specified by Consultant. Fencing (high density polyethylene 35 KN) must be attached to steel stakes spaced every two metres.

### **3.1 IDENTIFICATION AND PROTECTION (CONT'D)**

Where fencing cannot be installed, trees identified by the supervisor with 1.8 metre planks around the trunks. Secure planks with plastic or steel straps cushioned with rubber such as tire rubber.

If trees are damaged during work, the Contractor shall take full responsibility including financial compensation for the loss of value of the damaged trees based on the method used by the Société internationale d'arboriculture – Québec inc. (resolution CE-86-1682). Repairs are at the Contractor's expenses. The Departmental Representative shall determine the cost without recourse.

Remove tree and shrub roots exposed or damaged by excavation or removal of existing structures by specialized personnel and as indicated by Departmental Representative. Use clean cuts or tree surgery.

### **3.2 PROTECTIVE FENCING**

- .1 Use fence to identify tree protection zone. Mobile fencing is allowed inside work zone provided root systems are protected inside drip line.
- .2 Orange plastic snow fence, approximately 1,200 mm high supported by steel stakes. Maintain throughout work.

### **3.3 TRUNK PROTECTION**

- .1 Prior to work carried out near trees and as indicated by Departmental Representative, protect tree trunks from ground level to tree limbs using planks installed around trunk and secured with metal straps.

### **3.4 ROOT CURTAIN SYSTEM**

- .1 Identify limits for required construction excavation as approved by Departmental Representative.
- .2 Prior to construction excavation, 500 mm wide x 1500 mm deep, along perimeter of excavation limits.
- .3 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.
- .4 Install wooden posts and welded wire fabric against construction edge of trench.
- .5 Securely attach Type 2 filter fabric on plant side of wire mesh.

**3.54 ROOT CURTAIN SYSTEM (cont'd)**

- .6 Prepare homogeneous mixture of fertilizer, parent material and organic matter.
  - .1 Add organic matter to mixture to achieve 7-9% organic matter content by weight.
  - .2 Incorporate with mixture grade 2:12:8 ratio fertilizer (dry) at rate of 1.5]kg/m<sup>3</sup>.
- .7 Backfill with homogeneous mixture between curtain wall and plants to be preserved in layers not exceeding 150 mm in depth. Compact each layer to 85% Standard Proctor Density.
- .8 Protect root curtain from damage during construction operations.
- .9 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.
- .10 Protect root curtain before and during backfill operations.

**3.5 TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES**

- .1 Centre line location and limits of trench/tunnel excavation to be approved by Departmental Representative prior to excavation.
- .2 Excavate manually within zone of root system. Do not sever roots greater than 40 mm diameter except at greater than 500 mm below existing grade. Protect roots, and cut roots cleanly with sharp disinfected tools.
- .3 Backfill for tunnel and trench to 85% Standard Proctor Density. Avoid damage to trunk and roots of tree.
- .4 Complete tunnelling and backfilling at tree within 2 weeks of beginning Work.

**3.6 LOWERING GRADE AROUND EXISTING TREES**

- .1 Begin Work in accordance with schedule approved by Departmental Representative.
- .2 Cut slope not less than 500 mm from tree trunk to new grade level or retaining wall.
- .3 Excavate to depths as indicated. Protect from damage root zone which is to remain.
- .4 When severing roots at excavation level, cut roots with sharp tools. Cleanly prune roots exposed and damaged by excavation and removal of existing structures, by specialized personnel and as indicated by Departmental Representative.

### **3.6 LOWERING GRADE AROUND EXISTING TREES (cont'd)**

- .5 Prepare homogeneous soil mixture consisting by volume of:
  - .1 60% excavated soil cleaned of roots, plant matter, stones, debris.
  - .2 25% coarse, clean sterile sand.
  - .3 15% organic matter.
  - .4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m<sup>3</sup>.
- .6 Place soil mixture over area of excavation to finished grade level. Compact to 85% Standard Proctor Density.
- .7 Water entire root zone to optimum soil moisture level.
- .8 Install surface cover of sodding in accordance with Section 32 92 23 - Sodding.

### **3.7 PRUNING**

- .1 Remove branches interfering with machinery and likely to be damaged as indicated on site by Departmental Representative.
- .2 Remove branches prior to machinery work following thinning procedure defined under standard NQ 0630-100.
- .3 Prune crown to compensate for root loss while maintaining general form and character of plant. Dispose of debris through ecological disposal, composting and mulching.
- .4 Remove dead, weakened, sick or deteriorated branches from trees identified by Departmental Representative. Prune, trim, thin and clean crown to promote healthy growth.
- .5 Remove live branches:
  - .1 Interfering with healthy vigorous tree growth, including branches interfering or rubbing against main branches.
  - .2 Indicating weakness, particularly forked branches.
  - .3 Interfering with growth of main branches.
  - .4 That are broken.
- .6 Cut living branches to re-establish natural shape of tree, particularly:
  - .1 One or more shoots.
  - .2 Multiple shoots caused by prior trimming.
  - .3 branches that don't correspond to natural shape.
  - .4 Undesirable shoots.
- .7 Remove cut branches and twigs and other debris from tree.

**3.7 PRUNING (CONT'D)**

- .8 Hanging vines.
- .9 Branches under 50 mm in diameter.
  - .1 Locate branch bark ridge and make smooth cut outside branch collar at symmetrical angle to branch bark ridge and trunk.
  - .2 Remove dead branches using clean cuts adjacent to branch bark ridge without damaging it.
  - .3 Do not cut main branches unless requested by Departmental Representative.
- .10 Branches over 50 mm in diameter.
  - .1 Under branch, 300 mm from trunk, first cut one third through branch.
  - .2 On top of branch, 500 mm from trunk, make a second cut through until branch falls away.
  - .3 Make last cut close to branch.
- .11 Do not damage bark or branch collar during pruning.
  - .1 Repair damaged parts and remove at nearest branch collar.
- .12 Remove extraneous shoots as indicated by Departmental Representative.

**3.8 WATERING**

- .1 Water root system to prevent soil from drying along excavated areas.
- .2 Water root systems of trees as indicated by supervisor if weather conditions dry soil too quickly.
- .3 Water inside drip line minimum 15 cm deep, in stages until water has penetrated soil, to minimize run-off.
- .4 Water root systems two times per week during construction period or excavation when roots systems have been exposed. Water each tree 250 litres.

**END OF SECTION**