CORPORATION OF THE CITY OF BURLINGTON
SPECIFICATIONS
INDEX FOR
Tree Protection and Preservation
(SPEC NO. SS12)

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1. Scope

This specification describes the measures required to protect trees (not designated for removal) for all works by the City of Burlington Engineering Department within the City of Burlington's road right-of-way.

2. Definitions

For the purpose of this specification, the following definitions apply:

a) Project Arborist
An arborist certified by the International Society of Arboriculture (ISA) who has a diploma (minimum) in arboriculture or urban forestry or equivalent with minimum job experience of 6 years in tree protection and mitigation.
b) Barrier
A fence placed around a single tree or group of trees to protect them from removal and injury.
c) Dripline
The location on the ground surface directly beneath the theoretical vertical line from the tips of the outermost branches of the trees.

3. Application of Policy

a) Tree protection measures are required for City trees and other trees protected by City Tree by-law 19-1975 (as amended) and are recommended for all trees which may be impacted by construction activities.
b) All trees situated on City property are protected under provisions of the City Tree by-law 19-1975. Some trees situated on private property are also protected by the City Tree bylaw or as conditions of approvals granted by the City under site plan approval or subdivision agreements.
c) Trees protected by the City Tree by-law may not be removed, injured or destroyed in any way without authorization from the Contractor Administrator in consultation with the City Arborist. Note that the term "tree" refers to all parts of the tree, including all roots.
d) The specifications set out in this policy shall be the standard specifications for tree protection measures during construction whenever tree protection measures are required by the City and in every instance where construction activities may result in damage to trees.
e) Higher standards of tree protection may be imposed where warranted in the opinion of the Contract Administrator and Project Arborist, with regard to the size, variety, location, and health of the tree and any circumstances surrounding the construction which may pose a particular hazard to the tree.
f) Lesser standards of tree protection shall only be permitted on the recommendation of the Project Arborist (as defined in this policy) and with the written consent of the Contract Administrator granted in consultation with the Project Arborist.
g) Anyone failing to adhere to the tree protection policies and specifications outlined below will be financially responsible for any resulting damage to trees in addition to any fines or penalties that may be imposed in accordance with Section 10 of this specification.

4. General Policy

Construction activities near trees may result in injury to the trunk, limbs or roots of trees causing damage or death of the tree. In order to prevent such damage:

a) Trees within or adjacent to a construction area must be protected during construction by means of a barrier surrounding the Minimum Tree Protection Zone (MTPZ) as outlined in Sections 5 & 6 of this standard specification.
b) Activities which are likely to injure or destroy the tree are not permitted within the MTPZ. Equipment or vehicles shall not be operated, parked, repaired or refueled within the dripline of trees.

c) Tree pruning or root cutting of City owned trees is to be done in accordance with Section 8 of this specification.
d) No objects may be attached to trees protected by the City Tree by-law without written authorization by the City. Construction material, supplies, or equipment and earth shall not be stockpiled within the dripline of any tree.
e) No City tree or tree protected by the City Tree by-law may be removed without the written permission of the Contract Administrator.
f) Exposed roots from excavation must be covered with soil, mulch or burlap and watered within 24 hours of exposure to prevent drying out.

5. The Minimum Tree Protection Zone (MTPZ)

The following is a chart showing minimum required distances for determining a tree protection zone. Some trees and some site conditions may require a larger Minimum Tree Protection Zone at the discretion of the City.

Table 1 – Minimum Tree Protection Zones

Trunk Diameter (DBH)[2]	Minimum Tree Protection Zone (MTPZ) Protection Distances Required[3]	Critical Root Zone (CRZ) Distances Required [3&4]
<10 cm	1.8 m	1.8 m
11 – 40 cm	2.4 m	4.0 m
41 – 50 cm	3.0 m	5.0 m
51 – 60 cm	3.6 m	6.0 m
61 – 70 cm	4.2 m	7.0 m
71 – 80 cm	4.8 m	8.0 m
81 – 90 cm	5.4 m	9.0 m
91 – 100+cm	6.0 m	10.0 m

NOTES:

[1]The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the drip line.
[2]Diameter at breast height (DBH) measurement of tree trunk taken at 1.4 meters above ground.
[3]Minimum Tree Protection Zone and Critical Root Zone distances are to be measured from the outside edge of the tree base towards the drip line and may be limited by an existing paved surface, provided the existing paved surface remains intact throughout the construction work and is subject to Section 6 of this specification.
[4]Where work is being performed beyond the Minimum Tree Protection Zone but within the Critical Root Zone the works are subject to Section 8 of this specification.

6. Tree Protection Barriers

Trees within Minimum Tree Protection Zones shall be protected by means of a "tree protection barrier" meeting the following specifications:

a) The required barrier is a 1.2 meter (4 ft) high orange plastic web snow fencing on 2" x 4" frame should be used. See Detail TP-1 (attached as an appendix) for further information. Where orange plastic web snow fencing creates a restriction to sightlines, page wire fencing with reflective tape will be used.
b) A Modu-Loc fence (or approved equivalent) will be acceptable as an alternative to the above if there are issues with underground utilities. Fence must be secured by Modu-Loc pins to the ground. Fence is to be properly braced and maintained for the duration of the project. In areas where the Modu-loc fence cannot cover the Minimum Tree Protection Zone, extensions will be put in place and the ends will connect with other approved barrier in place as approved by the Project Arborist in consultation with the Project Administrator.
c) Tree protection barriers are to be erected prior to the commencement of any construction or grading

activities on the site and are to remain in place throughout the entire duration of the project. The barriers shall be maintained erect and in good repair throughout the duration of construction operations with breaks and unsupported sections repaired as soon as possible, and shall be removed upon completion of the work.

d) All supports and bracing used to safely secure the barrier should be located outside the MTPZ. All supports and bracing should minimize damage to roots.
e) Where some fill or excavated material must be temporarily located near a MTPZ, a wooden barrier or Modu-Loc Fence must be used to ensure no material enters the MTPZ.
f) Measurement and payment shall be in linear metres measured along the length of the barrier. Overlaps shall not be measured. Progress payments shall be based on the following percentage of the contract price:
    - 60% for supply and erection
    - 25% for maintenance
    - 15% for removal
g) Once all tree/site protection measures have been installed, the Project Arborist must be notified for inspection and approval. Upon acceptance, the Project Arborist will send written approval to the Contract Administrator.

7. Tree Removal and Relocation

Any requests for removal, cutting, pruning or relocating a tree must be made in writing to the City. If approval is granted for removal of a tree, the contractor will assume all costs involved. In most instances tree replacement or compensation will be required.

8. Infrastructure Renewal and Construction

It is recognized that there are cases where trees are growing overtop existing utilities or beside infrastructure proposed for renewal. While the guidelines in this standard specification still apply, in these cases some modification to Table 1 in addition to pre-construction pruning may be required where work within or near the MTPZ is approved. The objective is to avoid severance of anchor roots and or major branches and minimize damage to the tree(s) and to keep the natural form of the crown.

a) Above ground clearance for overhanging branches in the work zone must be anticipated. The contractor is required to have a City approved tree service raise the crown of all branches to provide adequate clearance for construction equipment. The cost of above ground pre-construction pruning is to be included in the cost of the works.
b) When the works of the contract are outside the limits of the MTPZ but within the limits of the CRZ and have the potential to damage tree roots, root pruning by use of hydro vacuum unit or supersonic air excavation techniques is acceptable provided it is operated by a qualified arborist or under an arborist's supervision to the depth and set back approved by the Project Arborist. In general, roots are to be cut a maximum of 150 mm from the edge of excavation (grading or removals). The limit of excavation, grading or removals is to be minimized to the greatest extent possible and is to include the use of excavation shoring, smaller excavation equipment or rubber tired machines. See Detail TP-2 (attached as an appendix) for further information. Measurement and payment shall be in linear meters measured along the length of the cut.
c) When turf repairs are required, no machinery is allowed within the Minimum Tree Protection Zone. This work is to be done by hand only.

9. Tree Repair

Trees damaged by construction operations shall be repaired as follows, with five days of the damage:

a) Branches 25mm or greater in diameter that are broken shall be cut back cleanly on the tree side of the break or to within 10mm of their base, if a substantial portion of the branch is damaged.
b) Bark that is damaged shall be neatly trimmed back to the uninjured bark without causing further injury to the tree.

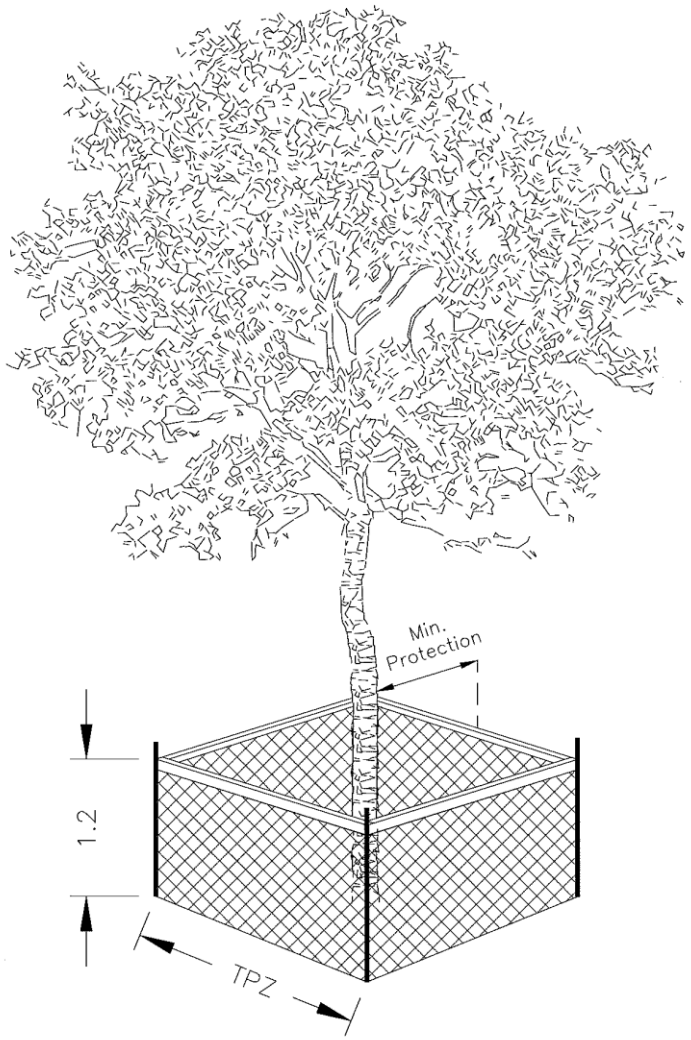
c) Root Pruning within the **Minimum Tree Protection Zone** of any tree requires root exploration via supersonic air tool or hydro vacuum unit to first remove the soil and expose the roots.
d) Roots less than 2cm in diameter can be pruned using a sharpened tool such as hand pruners or a sharpened spade under the supervision of the construction inspector.
e) Roots between 2cm and 8cm in diameter can be pruned by the arborist using a sharp tool, such as a handsaw, hand pruner or loppers and under the supervision of the construction inspector and the advisement of the Project Arborist.
f) All roots over 8cm in diameter must be assessed by the Project Arborist prior to pruning unless the arborist on-site can confidently assess the effect of the removal of the root as not detrimental to the tree.
Root Pruning within the **Critical Root Zone** and outside of the MTPZ typically requires the use of a sharpened garden spade, cutting a line to a depth of about 30 cm **by the on-site arborist and the advisement of the Project Arborist if needed.** However, the same pruning protocol for the size of roots encountered (in the MTPZ) applies to the roots found within this area.
Trenches are typically backfilled with the same excavated soil or new topsoil or compost and hoarding should be installed along this trench to protect the remaining roots.

10. Securities for Non-Compliance

Where in the opinion of the Contract Administrator and City Arborist, trees have been damaged through non-compliance with the Tree Protection and Preservation Specification, a security for tree preservation or replacement may be held by the City for up to two (2) years from the date of the final inspection of the construction project. Securities may be released prior to the expiry of the two year period provided the City is satisfied that the tree has not been damaged. Applicants for the early release or reduction of securities shall submit a report from a certified arborist approved by the Contract Administrator in consultation with the City Arborist that the trees are in a state of vigorous health and has not been injured or destroyed as a result of the construction activities.

Where in the opinion of the Contract Administrator and City Arborist, tree(s) have been severely damaged and are deemed to require removal; securities shall be in the form of a letter of a Letter of Credit in an amount equal to the total value for the damaged tree(s) as determined by the City Arborist using the Aggregate Caliper Formula, or the CTLA method (Council of Tree and Landscape Assessors).

Detail TP-1 – Tree Protection Detail



Trunk Diameter (DBH) [2]	Minimum Tree Protection Zone (TPZ) Distances Required [3]	Critical Root Zone (CRZ) Distances Required [3&4]
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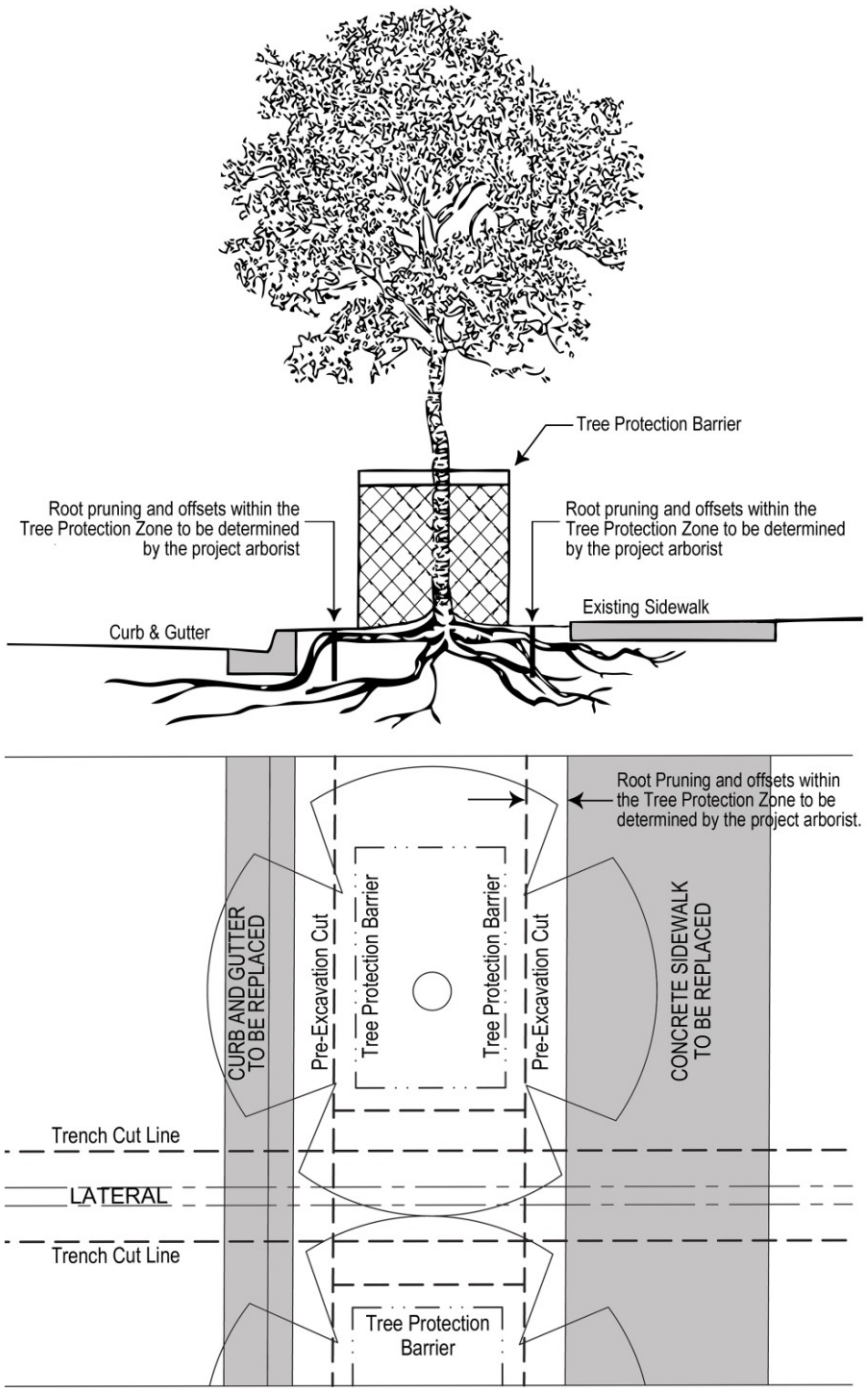
NOTES:

[1] The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the drip line.
[2] Diameter at breast height (DBH) is the measurement of tree trunk taken at 1.4 metres above ground.
[3] Minimum Tree Protection Zone and Critical Root Zone distances are to be measured from the outside edge of the tree base towards the drip line and may be limited by an existing paved surface, provided the existing paved surface remains intact throughout the construction work and is subject to Section 6 of this specification.
[4] Where work is being performed beyond the Minimum Tree Protection Zone but within the Critical Root Zone the works are subject to Section 8 of this specification.

TREE PROTECTION BARRIER

1. Tree protection barriers for trees situated on the City road allowance where visibility must be maintained can be 1.2m high and consist of orange plastic web snow fencing on a wood frame of 2”x4”s, supported on metal “T” bars, 2.0m O/C max. Where orange plastic web snow fencing creates restriction to sightlines, page wire fencing shall be used.
2. All supports and bracing used to safely secure the barrier should be located outside the TPZ. All supports and bracing should minimize damage to roots.
3. Where some fill or excavated material must be temporarily located near a TPZ, a wooden barrier with silt fencing must be used to ensure no material enters the TPZ.
4. No materials or fill may be stored within the TPZ.
5. Equipment or vehicles shall not be operated, parked, repaired, or refueled within the TPZ.
6. No construction activity, grade changes, surface treatment or excavations of any kind is permitted within the TPZ without written authorization from the City Arborist.

Detail TP-2 – Root Pruning Detail



NOTE:
For excavations perpendicular to to the curbing (ie. sidewalk, curbing, water or sewer laterals renewal)

(a) The contractor is to use a trench box to minimize the width of the open cut.
(b) When the lateral replacement is within the Tree Protection Zone of a tree, the contractor is to complete the works using trenchless technologies.