

City of Burlington, Vermont DPW Water Resources Division Tree Maintenance Plan

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1. Tree Maintenance Specification

INTRODUCTION

The City of Burlington Department of Public Works Water Resources Division (WRD) is responsible for the maintenance of roughly 149 miles of both sanitary sewer and stormwater piping, 120 miles of water distribution system piping, 270 stormwater outfalls, three wastewater treatment facilities, a water treatment facility, water supply reservoir, 40 bioretention systems, 20 sub-surface infiltration systems, wet-ponds, and 25 sewage pump stations (hereinafter referred to as "Facilities").

The majority of the Facilities fall within public ROW or on City Property which provides sufficient space to service, repair, or replace infrastructure without impacts to the Urban Forest. However, a portion of these Facilities are not bound within the public ROW and run "cross country" within forested areas, or are located on City owned property. Many of these Facilities fall within easements, expressed or implied. WRDs ability to access and maintain these Facilities is limited by Article 5 of the City's Comprehensive Development Ordinance (CDO), Citywide General Regulations Section 5.5.4 Tree Removal.

The zoning ordinance reads:

"Tree removal involving six (6) or more trees, each of ten (10) inches or greater in caliper or the removal of ten (10) or more trees, each of which is three (3) inches or greater in caliper during any consecutive twelve (12) month period may be permitted for any of the following reasons:

- A. Removal of dead, diseased, or infested trees
- B. Thinning of trees for the health of remaining trees according to recognized accepted forestry practices
- C. Removal of trees that are a danger to life or property; or
- D. As part of a development with an approved zoning permit"

The Ordinance provides for an exemption from the requirement to obtain a permit for individual tree projects with the approval by the Development Review Board of a Tree Maintenance Plan prepared by a certified arborist.

The WRD has drafted this Tree Maintenance Plan in consultation with the City Arborist. The City Arborist has noted that his designee can act on his behalf to make decisions regarding Tree Maintenance Plans in his absence. The designee will be a Certified Arborist approved by the City Arborist. For this plan the "City Arborist or designee" will hereinafter be referred to as "City Arborist".

PURPOSE OF TREE MAINTENANCE PLAN

The WRD Tree Maintenance Plan addresses the need to access and maintain WRD Facilities throughout the City in a comprehensive way that considers the maintenance and care of urban trees. The WRD routinely maintains its properties and cross country easements during maintenance projects and larger capital construction projects in order to construct, repair, maintain, stabilize, and replace these assets. This includes the ability to cut down, trim, remove and keep cleared such trees, roots, underbrush, or parts thereof growing within, under, or overhanging the area as may interfere with or endanger the efficient operation and use of the infrastructure. All tree work completed by the WRD to access and maintain Facilities will be completed in accordance with the techniques prescribed in the City of Burlington Urban Forestry Master Plan. It is the policy of WRD to minimize the removal or pruning of trees where possible, as the urban forest is important to maintaining water quality.

For the purposes of the WRD Tree Maintenance Plan, projects will either be considered a construction related or a maintenance related effort.

All projects with tree removal will be reviewed against the thresholds established in CDO 5.5.4 tree removal involving six (6) or more trees, each of ten (10) inches or greater in caliper or the removal of ten (10) or more trees, each of which is three (3) inches or greater in caliper. All projects that trigger this threshold will require some oversight from the City Arborist but, depending on the nature and extent of the project and consultation with the City Arborist, may not require the development of a written tree maintenance plan.

Emergency Repair/Replacement projects: Projects that may involve construction, but are deemed to be an emergency by the Director of Public Works, require a site visit and consultation with the City Arborist, but will not require a written project specific tree maintenance plan unless required by the City Arborist.

Maintenance Projects: require a site visit and consultation with the City Arborist, but will not require a written project specific tree maintenance plan unless required by the City Arborist.

Planned Construction Projects: require the review and approval of a tree maintenance plan by the City Arborist.

When the development of a tree maintenance plan is required based on the categories above the City Arborist oversight will continue throughout the assessment and implementation phase to insure that the techniques recommended in the Urban Forestry Master Plan are implemented. This oversight shall include review of a project specific Tree Maintenance Plan (hereinafter referred to as "the Plan") and site visit by the City Arborist prior to any tree removal operations.

Any recommended changes by the City Arborist will be incorporated in the Plan. During implementation of the Plan, the City Arborist will periodically inspect the work as necessary to verify all work is accomplished in accordance with the Plan and the techniques referenced in the City of Burlington Urban Forestry Master Plan.

If a formal tree maintenance plan is not required, WRD will still continue to follow the protocols of assessment and implementation in accordance with techniques in the Urban Forestry Master Plan.

INITIAL ASSESSMENTS

Coordination with the City Arborist will be an integral part of the WRDs effort to manage trees that obstruct the ability to access and maintain Facilities, address emergencies or repair or renew existing facilities. Prior to any tree pruning or removal an Initial Assessment will be performed by a WRD representative and include the City Arborist when required by the project threshold. Depending on the nature of the work (maintenance, emergency or planned construction) and extent of tree removal and the final determination of the City Arborist, a project specific Tree Maintenance Plan will be developed by the WRD. The Plan will depict the limits of work, specific trees to be pruned, cut, and protected.

Goals of these assessments are as follows:

- Identify and delineate dimensions of the easement and any additional land requirements required to access surface or subsurface infrastructure.
- Determine whether alternative construction techniques or access may be better suited to a particular site in order to avoid tree conflicts.
- Determine best possible vehicle and equipment access, which limits the overall area of disturbance.
- Physically indicate which trees require removal, pruning, or other tree maintenance.
- Plan for site restoration based on the State of Vermont Low Risk Site Handbook for Erosion Prevention and Sediment Control and any additional stabilization as required by WRD staff and the City Arborist.

PUBLIC OUTREACH

When applicable by State statute, prior to any tree removal, adjacent property owners shall be notified of trees that are scheduled for removal. This policy is in accordance with the current Vermont Tree Warden Statutes (Amended 1969, No. 238 (Adj. Sess.), § 6.)

IMPLEMENTATION

Tree Pruning

Where applicable, tree pruning will be performed by a Certified Arborist which the City Arborist would approve for project pruning. Pruning will be in accordance with the techniques referenced in the Urban Forestry Master Plan.

Tree Removal

Tree removal will be performed by DPW and, if required by the project threshold, under the supervision of the City Arborist or by an approved contractor. Removal will be in accordance with the techniques referenced in the Urban Forestry Master Plan.

Future Access

The WRD shall determine whether there is a need for continual access to the Facilities to meet routine maintenance schedules. If continual access is necessary, a stabilized construction entrance, consistent with the State of Vermont Low Risk Site Handbook for Erosion Prevention and Sediment Control, shall be installed.

Construction Project Specifications

All construction projects bid out by the WRD that impact trees that would otherwise be subject to the City's Tree Removal zoning ordinance will include a Tree Protection Plan Specification that implements the Tree Maintenance Plan. The detailed specification is in Attachment 1.

Maintenance Project Specifications

All maintenance projects will be reviewed by the City Arborist to determine if a Tree Maintenance Plan, is or is not required. In all cases, basic tree protection and marking requirements will be implemented.

Emergency Projects

For projects that are being performed on an emergency basis, as determined by the Director of Public Works, project consultation with the City Arborist can be performed in lieu of submittal of a Tree Maintenance Plan. Tree protection requirements, as identified through consultation with the City Arborist, shall be incorporated to the maximum extent practicable into the emergency project's scope of work and executed accordingly.

ATTACHMENT 1

SPECIAL PROVISION ITEM #900.645

Tree Protection Plan

Description: The purpose of this item is to prevent damage to branches, trunks, and root systems of existing individual trees to remain and to ensure their survival. Provisions under this item include steps to minimize soil and root disturbance, and to construct protection measures for trees and shrubs close to construction areas that are labeled on the Plans as either “save”, “protect” or “transplant”. The Contractor shall install barrier fence labeled as Tree Protection Zone (TPZ) on the Plans adjacent to existing trees and, prior to any earth disturbance. Barrier fence shall not be removed until the final project inspection. There will be no activity within the TPZ except watering or installation of erosion prevention or sediment control measures where required. Tree protection methods and schedule of work shall be approved by the Engineer.

The Contractor shall hire a Certified Arborist, certified by the ISA, International Society of Arboriculture or equivalent, before construction to assist with tree protection measures as part of the Tree Protection Plan and site inspection. The Certified Arborist shall be approved by the City Arborist.

A continuous level of protection shall be provided for trees marked “Save”, “Protect” or “Transplant”. At the direction of the City or the Engineer, the Certified Arborist shall inspect damage to trees and recommend mitigation treatment and replacement if damaged trees are determined to need replacement.

Fenced, Tree Protection Zone: No construction may occur within the fenced Tree Protection Zone (TPZ) unless pre-approved. In locations where construction needs to occur within the TPZ due to the proximity of existing trees to the proposed sidewalk, construction may be approved on a case by case basis. Placement of protective, temporary fencing called barrier fence shall extend to the TPZ. The Contractor is prohibited from the following practices within the tree protection zone (fenced area):

Breaking of branches, scraping of bark, or unauthorized cutting, nailing or bolting into trunks; use of plants as temporary support (i.e. cables, leaning equipment). No unauthorized filling, excavating, trenching or auguring within "root zone". Compaction/driving over the "root zone" caused by heavy equipment or concentrated foot traffic which may significantly alter the soil conditions prior to construction. Storage of any materials or vehicles within the "root zone". Dumping of construction waste or materials (including liquids). Unauthorized removal or relocation of woody plants.

Execution or pre-emption of pre-determined Consulting Arborist responsibilities.

Removal of tree protection barricades or construction fencing prior to completion of project.

Construction shall be conducted so as to minimize impacts on the existing tree root structure. Excavation within the drip-line of the tree itself shall be completed using hand tools only to excavate to depth of base material and design elevation as shown on project cross-sections and typical details.

Barrier Fence shall be used as shown on the plans and as directed by the Engineer for the protection of trees and other landscape features for the delineation of areas as shown on the Plans.

Prior to Construction, site work may not commence until the contractor meets on-site with the Engineer and the Certified Arborist to complete a pre-construction walk through to review and map all construction and work

procedures, access routes, storage and tree protection areas relating to the protection of trees marked “Save” or “Protect”. Excavation measures beyond the protective fencing but within the drip-line area or TPZ shall be resolved.

All underground utilities and drain or irrigation lines shall be routed outside the Tree Protection Zone. If lines must traverse the protection area, they shall be tunneled or bored under the tree.

Prior to construction, unless otherwise directed by the Engineer, the Contractor shall install physical barrier to remain until all site work has been completed that will consist of:

1. Installation of barrier fencing as detailed on the plans.
2. Installation of weather proof signage, minimum size of 8-1/2” x 11”, which reads: “Trees are being protected. No unauthorized trespass is allowed.”
3. Fences shall not be relocated or removed without the written permission of the Engineer.
4. The Contractor shall assign an individual on site responsible to oversee continuous maintenance of protective fencing, signs, and to follow tree protection plan
5. If the fenced, tree protection zones are breached by the contractor or subcontractor, a cash fine shall be charged for each violation resulting in damage (this amount shall be determined by the Engineer.)
6. Monitor the water needs of the trees during and after construction.

BRANCH PRUNING - Pruning should be performed to provide adequate clearance for the new sidewalk and for equipment and construction. Clearance during construction shall be identified in advance and approved by the Engineer and the Certified Arborist. All pruning shall be in accordance with the International Society of arboriculture’s Best Management Practices for tree pruning and the ANSI A300 Pruning Standard (American National Standard for Tree Care Operations) and adhere to the most recent edition of ANSI Z133.1.

ROOT PRUNING - The Certified Arborist and the Engineer shall first inspect each tree marked “Save” or “Protect” to determine if the plant may tolerate root pruning considering tree species, age, crown size, site exposure, existing defects, vigor, and severity of necessary root pruning. Root pruning shall occur between the months of March and May. If possible, roots shall first be pruned to sever them cleanly since soil excavation equipment may pull, rip or shatters roots, causing unnecessary damage for some distance towards the tree.

Root pruning shall be completed by root pruning equipment specifically designed for that purpose including large circular saws used to cut concrete and rock saws. The saws must cut through the wood roots to the depth of the required excavation. Root pruning equipment designed primarily for curb and sidewalk repair may cut only 8 to 12 inches deep. Where excavation must occur very close to trees, digging the soil away with a shovel may be necessary, and then cut the exposed root with a saw. Before grading, excavation for gravel base, or trenching, trees (as indicated on plan) shall be root pruned 1 foot outside the tree protection zone by cutting all roots cleanly to a depth of 24 inches, or to a depth of base material indicated on cross-sections or the typical details for the project. Roots shall be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, a narrow trencher with short blades, or other approved root-pruning equipment.

The following procedure is recommended.

1. Stake the edge of excavation.

2. Root pruning shall be done with a stump grinder where possible. Do not use trenchers or backhoes, which may rip the roots closer to the root collar than the intended cut. If a stump grinder cannot be used, roots shall be exposed by hand excavation. All roots 1" or greater in diameter shall be cut with a hand saw or chain saw. Cuts shall be made clean with no tearing of the roots.
3. If it is determined by the Engineer and the Certified Arborist that root pruning equipment cannot be used, dig a trench along the staked line. Equipment such as a backhoe can be used until roots larger than 1 inch in diameter are encountered. Then, dig with a shovel.
4. When a root is encountered, expose it by removing soil by hand, and cut it cleanly with a saw at the outside edge of the trench (towards the tree). Do not paint the cut root end.
5. Replace soil in the trench.
6. Depth of root pruning is typically the same as the depth of excavation, up to 24" depth.

CONSTRUCTION PHASE

When excavation is to be performed near trees or shrubs labeled "Save" or "Protect" on the plans, then the following root protection procedure shall be observed. Contractor shall immediately contact the Engineer or Certified Arborist, should roots larger than 1" be exposed, for inspection and root pruning. Failure to communicate promptly could result in 100% damage assessment of fines.

1. All roots 4" or greater in diameter shall be left intact and trenches shall be completed by excavating under the root, unless otherwise directed by the Engineer or Certified Arborist.
2. All roots 1" or greater in diameter shall be cut with a hand saw or chain saw. Cuts shall be made clean with no tearing of the roots.
3. All trees affected by construction activity and marked "Save" or "Protect" shall be irrigated on a schedule to be determined by the Engineer and the Certified Arborist. Each watering shall wet the soil within the tree protection zone to a depth of 8 inches unless otherwise directed by the Engineer.
4. Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw.
5. Care shall be taken to avoid breaking tree limbs and branches with construction equipment.
6. If a tree is damaged and not repairable (as determined by the Engineer with assistance from the Certified Arborist) due to the Contractor's negligence, then the Contractor shall replace (at the Contractor's expense) the tree with the same tree of equal value, or two or more trees with a total value equal to that of the damaged tree.
7. If a tree is damaged and repairable, a determination shall be made by the consulting arborist. The tree(s) will be repaired by a Certified Arborist at the contractor's expense. Liquidated damages for trees damaged by construction operations shall be the equivalent of the replacement cost for the damaged tree or shrub plus \$100.00 each to cover administrative costs.
8. If encroachment causes the destruction of a tree(s), as determined by the Engineer and Certified Arborist, the Contractor shall replace the tree(s) with trees of equal trunk diameter. For example, if a 10" diameter tree is destroyed, it shall be replaced with two 5" diameter trees or five 2" diameter trees, etc. The owner may elect to receive a settlement equal to the value of these trees in lieu of planting.

9. The Diameter Breast High (DBH) or Caliper of trees removed shall be the guide for the number of trees to be planted. For example if the total DBH removed is 30" then ten (10) 3" caliper trees shall be planted. A settlement equal to the value of the trees in lieu of planting may be an option for replacement.

10. Any grading, construction, demolition, or other work expected to encounter tree roots shall be monitored by the Certified Arborist as recommended by the Engineer.

METHOD OF MEASUREMENT. The quantity of Tree Protection to be measured for payment will be on a lump sum basis in the complete and accepted work.

BASIS OF PAYMENT. The accepted quantity of Tree Protection will be paid for at the Contract lump sum price. Payment will be compensation for all tree protection measures including providing and installing barrier fence, branch and root pruning, watering, and all incidentals necessary to complete the work. Partial payments will be made as follows:

(a) The first payment of 25 percent of the lump sum price will be paid upon installation of all required barrier fence;

(b) The second payment of 50 percent of the lump sum price will be paid upon completion of 50 percent of the work under the Contract;

(c) The third payment of 25 percent of the lump sum price will be paid upon removal of all barrier fence.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.645 Special Provision (Tree Protection)	Lump Sum