

PRESERVATION OF ROADSIDE GROWTH

(Supplementing Subsection 8.08)

The Contractor shall consult with the Town Tree Warden, Watertown or Belmont depending on the location of the tree, prior to removing any tree not designated on the plans to be removed or to disturb the grade underneath the canopy of trees along the project.

It shall be the Contractor's responsibility to provide adequate protection of trees within the work site through the full duration of the construction period. Maintenance and protection responsibilities shall include all portions of the tree and shrub, both above and below ground.

The Contractor shall take all measures to avoid grading within the drip line of existing trees to remain. Because some work will require disturbance within the drip line of many trees, the Contractor shall provide the services of a Massachusetts Certified Arborist, approved by the Engineer, during excavation work to provide root pruning and other services required to ensure the continued health of the trees. The cost of the Certified Arborist shall be incidental to the Tree Protection and Pruning Items of these Special Provisions.

The Contractor shall take all necessary care when excavating or working in the vicinity of existing trees so that the root systems, trunks, and branches are not damaged. All precautions shall be taken to insure that heavy equipment does not damage any roots, including those that lie below the limits of excavation

If damage occurs to an existing tree designated for protection during execution of the work, the Contractor's arborist shall review the damage and recommend repair procedures to the Engineer. The Contractor's Arborist shall be responsible for a detailed diary of all concerns or issues pertaining to tree injury, root injury, root excavation, limb removal, or the like.

Tree paint shall not be used.

For trees designated for protection, which as a result of damage, are determined by the Engineer to be unsafe and/or non-recoverable, the Contractor shall be required to replace the damaged tree(s), at no additional cost. Unless stipulated by the Engineer, the replacement trees shall measure, at a minimum, 2- inch to 2.5- inch caliper size, and shall replicate in the aggregate the equivalent caliper inches of the damaged tree(s) removed. Tree replacement, as required, shall include the furnishing of all labor, materials, equipment, tools, and transportation required to perform all operations required to complete tree replacement. The work shall include, but is not limited to: removal and disposal of all damaged tree material including stumps as applicable, installation of replacement trees, one year bonded guarantee, and maintenance.

Individual trees close to construction may be protected using individual tree protection as specified under Item 102.51.

PRESERVATION OF ROADSIDE GROWTH (Continued)

Do not store equipment or stockpile materials within drip line of trees or in areas enclosed by tree protection fencing.

Avoid any direct soil contamination in root zone area by petroleum, petroleum products or solvents, salts or any other pollutant during construction.

All cutting or trimming of trees to be preserved shall be performed by a Massachusetts Certified Arborist. The Contractor shall provide the Engineer with a copy of the certification prior to any work on trees.

PROVISIONS FOR TRAVEL

Before starting any work under this Contract, the Contractor shall develop a Schedule of Operations as provided in Subsection 8.02. The work schedule shall include a plan of construction procedures and the safety measures that shall be used during the prosecution of the work as set forth in Section 850 of the Standard Specifications for Highways and Bridges.

As required by the Engineer, uniformed traffic police shall be employed for the protection and maintenance of traffic. Reasonable facilities shall be provided by the Contractor for the convenient and safe passage of pedestrians and vehicles through the project, and also to and from properties abutting the site of improvement. The prosecution of work on any roadway which would interfere with the existing flow of traffic shall be limited to approximately one-half the roadway width at any one time. At least one lane in each direction shall be kept open at all times. One lane, two-way traffic shall require prior written approval by the Engineer. In such instances, two police officers will be required to control traffic. No detouring of traffic shall be allowed without the Engineer's permission.

MATERIAL TO BE STACKED

The Contractor shall carefully remove, transport and stack such materials at the following location: Traffic Signal Equipment – On site to be picked up by the Belmont Municipal Light Department

Signs – On site to be picked up by the Belmont Public Works Department.

Catenary Poles – To be delivered to the MBTA at 500 Arborway, Jamaica Plain, or Alford Street in Charlestown, per MBTA direction.

Street Furniture – On site to be picked up by the Belmont Department of Public Works

The Contractor shall request from the Town and the MBTA a receipt for all materials received. A copy of the list of materials to be stacked shall be given to the Engineer.

ITEM 102.4**HAND EXCAVATION ROOT ZONE****SQUARE YARD**

The purpose of this item is to prevent damage root damage and to ensure the survival of all trees along the project site.

The work under this item include hand excavation and construction of protective measures for major roots, and shall conform to the relevant provisions of Sections 101, 102, and 771 of the Standard Specifications and the following:

It shall be the responsibility of the Contractor and the Contractor's arborist to examine the relationship between existing root zones and the proposed site improvement areas to determine whether a tree will be significantly impacted. Any areas of impact shall be reported to the Engineer. Root zones identified as at risk shall receive protective measures outlined here in.

Prior to start of work, the Contractor shall submit to the Engineer the name and certification number of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to this work shall be incidental to this item.

All excavation within 6 feet of the trunks of trees identified as being possibly effected shall be executed using hand tools or other noninvasive methods. Where excavation occurs within 6 feet of the trunk of a tree, major roots (those greater than 3 inches) will be identified, excavated, treated with hydrogel, covered with geotextile and protected.

Where major tree roots 3 inches or greater are to be retained within the profile of base or subgrade to be replaced roots shall be treated with hydro-gel and covered with geotextile prior to backfilling. Hydro jell shall be a synthetic, non-toxic acrylic polyacrylamide or natural soluble plant extract. Application rates shall be per manufacturer's recommendations. Major Roots shall be thoroughly coated with hydro jell and covered prior to backfilling. The geotextile shall be nonwoven geotextile M9.50.0, AASHTO M288, US 120NW or equivalent.

Under no circumstances shall tree roots measuring 3 inches or greater be cut without prior approval of the Engineer & Arborist.

Refer to item 102.51 Individualroa Tree Protection for general requirements for root pruning.

Method of Measurement and Basis of Payment

Item 102.4 Hand Excavation Root Zone will be measured for payment per square yard as called out on the plans, complete in place.

Item 102.4 Hand Excavation Root Zone will be paid for at the contract unit price per square yard, which price shall include all labor, material, excavation, equipment and incidental costs required to complete the work.

No separate payment shall be made for certified arborist, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 102.51**INDIVIDUAL TREE PROTECTION****EACH**

The work under this item shall conform to the relevant provisions of Sections 101, 644 and 771 and the following:

The purpose of this item is to prevent damage to branches, stems and root systems of existing individual trees as well as shrubs and other quality vegetation to remain, and to ensure their survival. To the extent possible, to avoid soil compaction within the root zone, construction activities including, but not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment shall not occur underneath the canopy (drip line) of trees to remain. Where these activities will occur within 10 feet (3 meters) of the canopy of trees or where directed, the Contractor shall take the appropriate protective measures specified herein.

This item shall be used when construction activities are likely to occur within the canopy of individual trees or where there may be any risk of damage to trees.

The Contractor shall be solely responsible for judging the full extent of the work requirements, including, but not necessarily limited to any equipment and materials necessary for providing tree protection.

Incidental to the cost of this item, the Contractor shall retain the services of a certified arborist, who shall make recommendations as to the specific appropriate treatment of trees within or near the work zone.

Prior to any construction activities, the Contractor and Arborist shall walk the site with the Engineer and Town Tree Warden to identify which trees will require protection and to determine approved measures. The Arborist shall make recommendations as to appropriate methods to protect trees. The Engineer will have final decision as to trees and methods.

The Contractor is responsible for the protection of all existing trees and plants within and immediately adjacent to the construction area that are not designated to be removed for the length of the construction period.

Incidental to this item, the Contractor shall provide to the Engineer one (1) copy American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance, Part 1: Pruning. These references shall be kept by the Engineer at his office for the length of the Contract.

Prior to start of work, the Contractor shall submit to the Engineer the name and certification number of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to this Item shall be incidental to this item.

ITEM 102.51 (Continued)

Fencing for individual plants shall be polyethylene fencing or chain link fence (new or used).

Staking for individual tree protection fencing shall be steel posts or 2x4 lumber as directed and approved by the Engineer.

Wood chips shall conform to provisions of Wood Chip Mulch under Materials Section M6.04.3.

Trunk protection shall be 2x4 cladding, at least 8 feet (2.4 meters) in length, clad together with wire. Alternative materials shall be at the approval of the Engineer. Alternative materials shall provide adequate protection from anticipated construction activities and shall not injure or scar trunk. Trunk protection shall include burlap to separate trunk cladding from bark.

Incidental to this item, the Contractor shall provide water for maintaining plants in the construction area that will have exposed root systems for any period during construction.

To the extent possible, to avoid soil compaction within the root zone, construction activities including, but not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment shall not occur underneath the canopy (drip line) of trees to remain. Where these activities will occur within 10 feet (3 meters) of the canopy of trees, the Contractor shall provide Individual Tree Protection as specified herein.

For individual tree protection, the Contractor shall set posts and fencing at the limits of the tree canopy. Where construction activities closer to the trees is unavoidable, the contractor shall tie branches out of the way and place wood chips to a depth of 6 inches (150 mm) on the ground to protect the root systems. The Contractor shall wrap the area of the trunk of the tree with burlap prior to armoring with 2x4 cladding. Cladding for tree trunks shall extend from the base of the tree to at least 8 feet (2.4 meters) from the base.

Where excavation within canopy is unavoidable, the Contractor shall use equipment and methods that shall minimize damage to the tree roots, per recommendations of the Certified Arborist. Such methods may require root pruning prior to, as well as during, any excavation activities.

All fencing, trunk protection, branch protection, and woodchips shall be maintained throughout the duration of the contract. Protective fencing shall be repaired and woodchip mulch replaced as necessary during the duration of the contract at no additional cost.

ITEM 102.51 (Continued)**Cutting and Pruning**

Some pruning of roots and branches may be a necessary part of construction. Pruning will be performed on the same side of the tree that roots have been severed.

The Contractor shall retain the services of a Massachusetts State Certified Arborist to perform any cutting of limbs, stem or roots of existing trees. All cuts shall be clean and executed with an approved tool. Under no circumstances shall excavation in the tree protection area be made with mechanical equipment that might damage the existing root systems.

Any tree root area exposed by construction shall be covered and watered immediately. Exposed tree roots shall be protected by dampened burlap at all times until they can be covered with soil.

Watering

Water each tree within the construction area where work is in progress twice per week until the surrounding soil of each tree is saturated for the duration of construction activities.

Removal of Protection

After all other construction activities are complete, but prior to final seeding, wood chips, fencing, branch protection, and trunk protection materials shall be removed and disposed off site by the Contractor at no additional cost.

Tree Damage

The Contractor shall be held responsible for the health and survival of the existing trees in the immediate vicinity of the of the construction area. Damage that, in the Engineer's opinion, can be remedied by corrective measures shall be repaired immediately. Broken limbs shall be pruned according to industry standards. Wounds shall not be painted. Trees or shrubs that are damaged irreparably shall, at the Engineer's discretion, be replaced per the requirements of Division I of these Special Provisions. Cost of replacement trees shall be borne by the Contractor.

ITEM 102.51 (Continued)**Method of Measurement and Basis of Payment**

Where the plans show specific, individual trees to remain and where grading or other disturbance is shown within the drip line of these trees or where the Engineer determines that an individual tree must be protected, these trees shall be protected and paid for under Item 102.51 Individual Tree Protection per each tree protected.

Payment under this item shall be scheduled throughout the length of contract: 30 percent of value shall be paid upon installation, 30 percent approximately halfway through the contract, and the remainder to be paid at the end of the contract after completion of construction operations that would disturb plants and after the protection materials have been removed and properly disposed of off-site by the Contractor.

Compensation for Individual Tree Protection will be paid for at the contract unit price per each under Item 102.51. This item shall include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work, including the services of a certified arborist, water and fertilizer, and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

Cost of wood chips, as required, shall be incidental to this item