

## SECTION 02910

### TREE PLANTING

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

###### A. General:

1. Work shall consist of furnishing all labor, materials, equipment and transportation required to complete all the planting preparation work in strict accordance with these specifications and applicable drawings. Work shall include, but not be limited to:
  - a. Submitting samples of materials and analyses for approval.
  - b. Securing necessary permits and approvals.
  - c. Installing structural planting medium
  - d. Back filling with planting soil within tree planting area.
  - e. Installing Mulch in tree planting area
2. The City of Cambridge reserves the right to work with its own work force or other Contractor(s) to install the tree plantings.
3. The tree planting preparation will be performed by the requirements of the Contract Documents.

##### 1.02 - 1.03 (NOT USED)

##### 1.04 DEFINITIONS

###### A. Whenever used in any of the Contract Documents, the following meanings shall be given to the terms herein defined:

1. The term "Contract" means the agreement executed by the Owner and the Contractor, consisting of these Contract Documents.
2. The term "Owner" means the City of Cambridge acting through its authorized representative, the Commissioner of Public Works, whose responsibility it shall be to coordinate review and approval by City, State and Federal departments and agencies which have jurisdiction over the various types of work to be carried out under this Contract.
3. The term "Public Works Department (PWD)" means those persons employed by the Commissioner of Public Works for the purpose of directing or having charge of the work of this Contract or a portion thereof, limited by the particular duties entrusted to that person.
4. The term "Local Public Agency" means the Public Works Department.
5. The term "Awarding Authority" means the Public Works Department.
6. The term "Contractor" means the person, firm or corporation entering into the Contract with the Owner to construct and install improvements embraced in this Contract.
7. The term "Contract Documents" means and shall include the following: Invitation to Bid; Bid Requirements; Contract Forms; Bonds and Certificates; Conditions of Contract; Addenda; if any; Technical Specifications; and Drawings.

8. The words "required", "permitted", "ordered", "designated", "prescribed", or words of like import shall mean the direction, requirement, permission, order, designation, prescription, etc. of the Owner or the Owner's representatives, and similarly, the words "approved", "acceptable", "satisfactory", or words of like import, shall mean approved by, or acceptable or satisfactory to the Owner's authorized representative, subject in each case to the final determination of the Owner unless otherwise expressly stated.
9. The terms "City" means the City of Cambridge, Massachusetts, within which the work of this Contract is to be carried out.
10. The term "MHD Standard Specifications" or "Standard Specifications" refers to the latest edition of the Massachusetts Highway Department Standard Specifications for Highways and Bridges, including supplements and amendments.
11. Occupational Safety & Health Administration- (OSHA) is the Federal agency responsible for insuring worker safety.

#### 1.05 SAMPLES AND SUBMITTALS

- A. Upon award of the contract and at least thirty (30) days prior to intended use, the Contractor shall provide the following samples and submittals for approval. Do not order materials until Contract Supervisor's approval of submittal has been obtained. Delivered materials shall closely match the approved samples. Should the source of supply be changed within the course of the contract, the Contractor shall submit new samples or submittals for approval per the original submission.
- B. Soils and Soil Management: Contractor shall make the following submittals and perform the following testing program on all on-site soils to be reused as backfill and on all off site borrow soils and material placed on the project. The cost of all submittals and testing stated below shall be incidental to the work and paid for by the Contractor.
  1. Independent Laboratory and Testing Company. Submit 4 weeks prior to start of excavation, evidence that the Laboratory/testing company is:
    - a. accredited by the American Associates of the State Highway and Transportation Officials (AASHTO)
    - b. Has minimum 3 years' experience in sampling, testing and analysis of soil and aggregates, and monitoring field compaction operations.
    - c. Able to provide 3 references from previous work.
  2. Submit to the City and the Engineer grain size analysis curve (ASTM D422) and compaction test results (ASTM D1557) for each proposed source of backfill including suitable on-site soil to be reused as backfill, for review two weeks prior to use of the material. Grain size analysis shall indicate that the backfill material conforms to the gradation requirements specified.
  3. Contaminant analysis for off-site borrow materials used. Each material imported shall be accompanied by a certification statement and analytical results. At a minimum, the certification shall state that the point of origin and that the material is free of contaminants. The certification shall include representative sample analysis from each point of origin of backfill to be used on the site. The samples shall be analyzed by a certified laboratory for total metals (EPA priority pollutant metals), volatile organic compounds (EPA Method 8270), petroleum hydrocarbons (EPA method 418.1), and Total

PCB's and pesticides (EPA Method 8081 and 8082). On site soils designated as suitable for reuse can be reused as backfill without providing certification required above.

- C. Planting soil: At least 30 days prior to ordering materials, the Contractor shall submit to the Owner's Representative representative samples, certifications, manufacturer's literature and certified test results for proposed planting soil.
- D. Structural Planting Medium: At least 30 days prior to ordering materials, the Contractor shall submit to the Owner's Representative representative samples, certifications, manufacturer's literature and certified test results for proposed structural planting medium.

1.06 (NOT USED)

## PART 2 – PRODUCTS

### 2.01 PLANTING SOILS

- A. Contractor shall provide all planting soil required to complete the planting operation. Planting soil shall be a natural, fertile, friable loam typical of cultivated planting soil of the locality, containing at least 10% and not more than 20% decayed organic matter (humus). Planting soil shall be free of subsoil, stones greater than one and one-quarter inches, earth clods, sticks, stumps, clay lumps, roots, or other objectionable, extraneous matter or debris. Planting soil shall not be by test either excessively acid or alkaline nor contain toxic substances. Planting soil shall not be delivered or used for planting while in a frozen or muddy condition.
- B. Soil for planting trees shall be one of the following sandy loams; “course sandy loam “, “sandy loam”, and “fine sandy loam”: determined by mechanical analysis (ASTM D 422) and based on the "USDA Classification System" and as defined in this Section. It shall be of uniform composition, without admixture of subsoil. Planting soil for trees shall have the following grain size distribution for material passing the #10 sieve:

<u>Millimeter</u>	<u>Percent Passing by Weight</u>	
	<u>Maximum</u>	<u>Minimum</u>
2	-----	100
1	100	80
0.5	87	67
0.25	78	48
0.10	68	30
0.05	55	22
0.002	7	2

- 1. Maximum size shall be one and one quarter inches largest dimension. The maximum retained on the #10 sieve shall be 25% by weight of the total sample.
- 2. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 6.0 or less. ( $D_{80}/D_{30} < 6.0$ )

- C. Name of planting soil supplier and sample to be approved by the City Arborist.

## 2.02 STRUCTURAL PLANTING MEDIUM (“SPM”)

- A. In specific areas designated in the Contract Documents the soil underlying the pavement cross section and the granular base material will be replaced with a material designed to structurally support the pavement slab and promote the root growth of street trees. This soil will be called Structural Planting Medium in this Section and shall be a mixture of Sand, Base Loam and Compost. Structural Planting Medium shall be the manufactured product of a commercial processing facility specializing in the production of manufactured soils and loam borrow. Structural Planting Medium shall be manufactured from sands, loams and compost, in accordance with the requirements of this Section. Structural Planting Medium shall be manufactured outside the Project limits and transported onto the Project for placement.
- B. The Structural Planting Medium shall consist of a blend of four parts by volume of Sand, one part by volume of Planting Soil and one part by volume of Compost. Blending of the components shall be carried out with earth moving equipment prior to placement. The components shall be blended to create a uniform mixture as determined by the Owner's Representative.
- C. Structural Planting Medium gradation shall be determined by the Soil and Plant Tissue Laboratory, University of Massachusetts, Amherst, using H<sub>2</sub>O<sub>2</sub> to destroy organic matter. Structural Planting Medium shall conform to the following grain size distribution for material passing the #4 sieve:

<u>U.S. Sieve No.</u>	<u>Percent Passing by Weight</u>	
	Maximum	Minimum
#4	----	100
#10	81	100
#20	57	88
#40	27	57
#100	11	24
#200	08	12
.002mm	01	02

- D. Structural Planting Medium shall not contain less than 1.5 percent nor more than 3.0 percent organic matter as determined by the loss on ignition of oven-dried samples passing #10 sieve (Muffle furnace temperature: 450 +/- 10 degrees C for 8 hours).
- E. The acidity range of the Structural Planting Medium shall be pH 5.5 to 6.5. Structural Planting Medium shall have a starting pH of no lower than 5.0 at the manufacturing site.
- F. Structural planting medium shall be pH adjusted as required for planting of trees and shall be adjusted prior to delivery to the Project sites in accordance with recommendations by UMASS Soil & Plant Tissue Laboratory.
1. When pH of loam borrow is equal to or greater than 7 use aluminum sulfate to adjust pH downward to required levels.
  2. When pH of loam borrow is less than 7 use either sulphur or ferrous sulfate to adjust pH downward to required levels.
  3. When pH of loam borrow must be raised to the required levels use limestone.

4. Regardless of amendment Contractor chooses to use, Contractor, not the Owner, shall be responsible for obtaining specified pH by planting time.
- G. Structural Planting Medium shall be free of debris and other extraneous matter. It shall be uncontaminated by salt water, foreign matter and substances harmful to plant growth. The electrical conductivity (EC2) of a 1:2 soil-water suspension shall be equal to or less than 1.0 millimhos/cm. (Test minus sieve Number 10 material). Soil shall not have levels of Aluminum greater than 200 parts per million.
- H. No Structural Planting Medium shall be delivered to the site until the review and approval of soil test results and recommendations by the Owner's Representative, but such approval shall not constitute final acceptance. The Owner's Representative will reject any material delivered to the site which, after on-site, post-delivery testing, does not meet these specifications.

## 2.03 – 2.04 (NOT USED)

## 2.05 MULCH

- A. Mulch shall be high quality, shredded or double-ground, premium bark mulch consisting of clean, organic plant material.
- B. Shall be uniform in color, a good brown color. The composition of the shredded pine bark material shall not exhibit a noticeable degree of any color change characteristics when wet.
- C. The mulch must be free of dirt, insects, disease and extraneous debris that would be harmful to all trees being installed.
- D. The shredded pine bark mulch material shall not have an unpleasant odor.
- E. Bark Mulch shall be a well-graded material conforming to the following:
  1. pH between 4.0 – 8.0
  2. Particle size 100% passing a 50mm (2 inch) screen
  3. Soluble salt content < 4.0 mmhos/cm
- F. Prior to the Contractor ordering shredded pine bark mulch material, the Contractor shall submit to the City Arborist, at the Contractor's expense, one cubic foot sample of the shredded pine bark mulch material. The Contractor shall not order any delivery of the shredded pine bark mulch material until the Contractor's sample has been inspected and approved by the City Arborist.
- G. If the City Arborist disapproves of the sample submitted by the Contractor, then the Contractor shall continue at no expense to the City, to obtain other sources of pine bark mulch material as specified until the Contractor's sample of such material, meets with the City Arborist's approval.

## PART 3- EXECUTION

### 3.01 – 3.02 (NOT USED)

### 3.03 STRUCTURAL PLANTING MEDIUM: EXCAVATION, FILLING AND COMPACTION

- A. Perform percolation tests on existing subsoils or placed fill prior to placing and spreading Structural Planting Medium:
1. Perform percolation testing of subsoil or placed fills to determine whether or not the subgrade will drain properly. Perform percolation tests in accordance with the requirements for percolation testing for each lift of SPM described in Section 3.04.
  2. In the event that percolation testing indicates that the subsoil, placed fills or ordinary borrow has been over compacted and will not drain, the Contractor shall loosen up the top 36 inches of the subsoil, ordinary borrow, special borrow or gravel borrow by ripping or other mechanical means. Re-compact the borrow by driving a small, tracked bulldozer over the area at low speeds so that the tracks of the bulldozer pass over the affected area and the soil is compacted to a density that will percolate in accordance with this Section.
  3. Perform sufficient percolation tests in areas of poorly draining or compacted subsoil or compacted placed fills as directed by the Owner's Representative to ensure that these underlying soils do not drain. Likewise, perform sufficient percolation tests after ripping and loosening to ensure that the soils are no longer too compact to drain.
- B. Excavate or fill subsoil or ordinary borrow as required by the Owner's Representative to achieve the elevations of the proposed subgrade. Maintain all required angles of repose of the adjacent materials as shown on the Contract Documents. Do not over excavate compacted subgrades of adjacent pavement or structures.
- C. Confirm that the subgrade is at the proper elevation and that no further earthwork is required to bring the subgrade to proper elevations. Subgrade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the Contract Documents. Provide a written report to the Owner's Representative and the Owner's Representative that the subgrade has been placed to the required elevations and that the subgrade drains water in accordance with the required percolation tests. Perform no work of placing and spreading Structural Planting Medium until elevations have been confirmed and written report has been accepted by the Owner's Representative.
- D. Clear the subgrade of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout or other material harmful to plants have been spilled into the subgrade material, excavate the soil sufficiently to remove the harmful material. Such construction debris, trash, rubble and foreign material shall be removed from the site and disposed of in a legal manner. Fill any over excavation with approved fill and compact to the required subgrade compaction levels.
- E. Do not proceed with the installation of Structural Planting Medium until all utility work in the area has been installed.
- F. Protect adjacent walls, walks and utilities from damage or staining by the Structural Planting

Medium. Use one-half inch plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work. Clean up all trash and any soil or dirt spilled on any paved surface no later than the end of each working day.

### 3.04 STRUCTURAL PLANTING MEDIUM: PLACEMENT

- A. Immediately prior to placing and spreading the Structural Planting Medium, the subgrade shall be cleaned of all stones greater than 2 inches and all debris or rubbish. Such material shall be removed from the site, not raked to the edges and buried. Notify the Owner's Representative that the subsoil has been cleaned and request his/her attendance on site to review and approve subgrade conditions prior to spreading Structural Planting Medium.
- B. Structural Planting Medium delivered to the site shall be protected from erosion at all times. Materials shall be spread immediately. Otherwise, materials that remain on site for more than 24 hours shall be covered with tarpaulin or other soil erosion system acceptable to the Owner's Representative and surrounded by silt fence installed in accordance with the Division 1 Section 01560, TEMPORARY ENVIRONMENTAL CONTROLS, of this Specification.
- C. Structural Planting Medium shall be sampled and tested in accordance with the requirements of this Section to verify application and incorporation of limestone, fertilizer and other soil amendments.
- D. Soil additives shall be spread and thoroughly incorporated into the layer of Structural Planting Medium by harrowing or other methods reviewed by the Owner's Representative.
- E. No Structural Planting Medium shall be handled or installed in any way if it is in a wet or frozen condition. A moist Structural Planting Medium is desirable.
- F. Sufficient grade stakes shall be set for checking the finished grades. Deviation from indicated elevations that are greater than one-tenth of a foot shall not be permitted. Connect contours and spot elevations with an even slope. Finish grades shall be smooth and continuous with no abrupt changes at the top or bottom of slopes.
- G. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional Structural Planting Medium and the surface shall be re-graded and rolled until presenting a smooth and even finish corresponding to the required grades.
- H. Structural Planting Medium shall be spread in lifts not greater than 6 inches and compacted with a minimum of 2 passes of vibratory compaction equipment to a density between 92 and 94 percent Modified Proctor Maximum Dry Density in accordance with compaction standards of ASTM D1557 Method D. During the compaction process, all depressions caused by settlement or compaction shall be filled with additional Structural Planting Medium and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades.
- I. Phase the installation of the Structural Planting Medium such that wheeled equipment does not have

to travel over already installed soil. If it is determined by the Owner's Representative that equipment must travel over already installed Structural Planting Medium, provide one inch thick steel plate ballast over the length and width of travel to cover Structural Planting Medium and protect it from compaction.

- J. Compact each lift sufficiently to reduce settling but not enough to prevent the movement of water and feeder roots through the soil. The Structural Planting Medium in each lift should feel firm to the foot in all areas and make only slight heel prints. At completion of the Structural Planting Medium installation, it should offer a firm, even resistance when a soil sampling tube is inserted from lift to lift. After the placement of each lift, perform percolation tests to determine if the soil has been over compacted. Perform the following percolation test procedure:

1. Dig a hole in the installed soil that is a minimum of 4 inches in diameter, 4 inches deep. Do not penetrate through the lift being tested.
2. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
3. In the event that the water drains at a rate less than one inch per hour, till the Structural Planting Medium to a depth required to break the over compaction.
4. Perform a minimum of one percolation test per location as directed by the Owner's Representative.

### 3.05 – 3.11 (NOT USED)

### 3.12 PLANTING HOLE PREPARATION

- A. Planting holes shall be filled with approved planting soil to required grades. Planting of trees will be by others under a separate City Planting Contract.
- B. Surplus excavation and unsuitable material from the planting holes shall be removed from the site and either reused (if approved) or disposed of per the requirements of the Contract Documents.
- C. Planting pits will require a minimum of 4' of walking space for sidewalk pedestrian traffic.
- D. Tree wells shall be at least 16 square feet, 8'x2' or as directed by the City Arborist.

### 3.13 to 3.18 (NOT USED)

### 3.19 MULCHING

- A. Apply a three inch layer of mulch (after settlement) within new tree pits and tree planting areas.
- B. Place mulch immediately after preparation of tree pit.
- C. Existing street trees and planting beds shall receive 3" layer of mulch. The Contractor is to remove all existing unwanted vegetation (i.e. weeds) and debris prior to installation of mulch.



PART 4 – COMPENSATION

**2902.1                                      STRUCTURAL PLANTING MEDIUM                                      CUBIC YARD**

**METHOD OF MEASUREMENT:**

Measurement for Payment shall be based on the cubic yardage of Structural Planting Medium installed by the Contractor as shown on the Contract Drawings and as directed by the Engineer, complete and in place. Structural Planting Medium shall have a standard section as shown on the Contract Drawings.

**BASIS OF PAYMENT:**

Payment for Structural Planting Medium shall be based on the unit price bid for this item in the proposal. Under the unit price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for the complete installation of Structural Planting Medium as shown on the Contract Drawings or at the direction of the Engineer. The work includes, but is not limited to the following; testing, furnishing and installing Structural Planting Medium; and all incidental work not included for payment elsewhere required to furnish and install Structural Planting Medium whether included here or not.

**EXCLUSIONS AND SPECIAL NOTES:**

Payment for tree planting and walks shall not be paid for under this item and are paid for elsewhere.

**2902.2                                      PLANTING SOIL                                      CUBIC YARD**

**METHOD OF MEASUREMENT:**

Measurement for Payment shall be based on the cubic yardage of Planting Soil installed by the Contractor as shown on the Contract Drawings and as directed by the Engineer, complete and in place as required to establish finish grades for the planting areas.

**BASIS OF PAYMENT:**

Payment for Planting Soils shall be based on the unit price bid for this item in the proposal. Under the unit price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for the complete installation of Planting Soil as shown on the Contract Drawings or at the direction of the Engineer. The work includes, but is not limited to the following; testing, furnishing and installing Planting Soil; and all incidental work not included for payment elsewhere required to furnish and install Planting Soil whether included here or not.

**2902.3                                      MULCH                                      CUBIC YARD**

**METHOD OF MEASUREMENT:**

Measurement for Payment shall be based on the cubic yardage of Mulch installed by the Contractor as shown on the Contract Drawings and as directed by the Engineer, complete and in place.

**BASIS OF PAYMENT:**

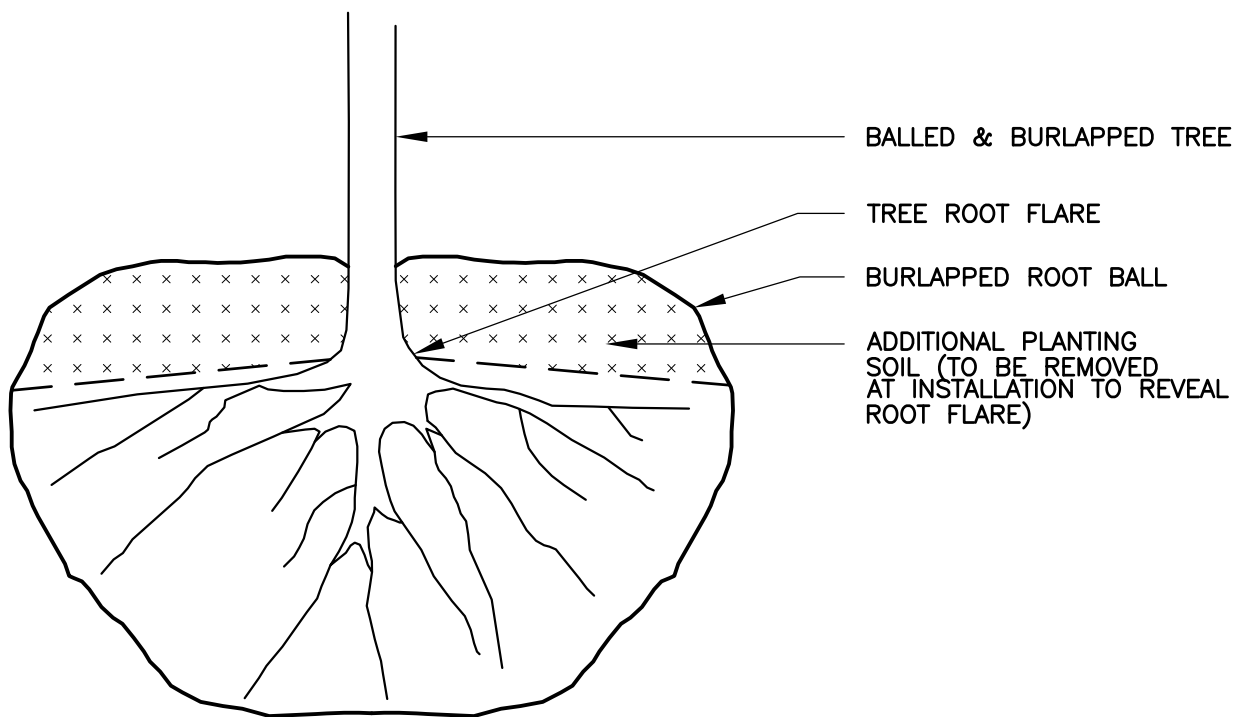
Payment for Mulch shall be based on the unit price bid for this item in the proposal. Under the unit price for this item, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals required for the complete installation of Mulch as shown on the Contract Drawings or at the direction of the

Engineer. The work includes, but is not limited to the following; testing, furnishing and installing Mulch; and all incidental work not included for payment elsewhere required to furnish and install Mulch whether included here or not.

END OF SECTION 02910

## REQUIRED TREE PLANTING SETBACKS

Requirement	Cambridge, MA
Minimum Tree Pit Size	2' x 8'
Minimum Distance from Street Intersections	20'
Minimum Distance from Street Lights	10' min. varies with species
Minimum Distance from Underground Utility Lines	3' from edge of tree well
Minimum Distance from Driveways	3' from edge of tree well
Minimum Distance from Fire Hydrants	3' from edge of tree well
Minimum Distance from Adjacent Trees	15'-40' (varies with species)
Minimum Distance from Utility Poles	3' from edge of tree well
Minimum Distance from Stop Sign	20' from edge of tree well
Minimum Distance from Traffic Signs	Coordinate with TP&T, depends on sightline requirements
Suggested Distance from Parking Meters	outside tree well
Minimum Distance from Gas or Water Valve	2' from edge of tree well
Minimum Distance from Oil Fill Pipe	2' from edge of tree well
Minimum Distance from Coal Chute	2' to edge of tree well
Minimum Distance from edge of pit to any opposite obstructions	36" for existing tree, 48" for new tree
Minimum passage for ADA considerations	36" for existing tree, 48" for new tree



NOTE:  
TREE TO BE PLANTED WITH EXPOSED ROOT FLARE 1" ABOVE GRADE AT CURB



LOCATING THE ROOT FLARE

(NOT USED)

CITY OF CAMBRIDGE STANDARD SPECIFICATIONS AND DETAILS

SCALE: NTS

DATE OF ISSUE: MARCH 2016

SPEC. SECTION REF#: 02910

# 1 OF 6

TREE CROWN AND TRUNK  
SHALL BE FREE OF DEFECTS  
AND TRUE TO FORM

# NOTES:

- 4'-0" MIN. SIDEWALK WIDTH IS A REQUIREMENT OF THE CITY OF CAMBRIDGE
- TREES SHALL NOT BE PLANTED:
  - WITHIN 20' FROM THE CORNER OF INTERSECTING STREETS
  - WITHIN 10' FROM A LIGHT POLE
  - WITHIN 20' FROM STOP SIGNS
  - WITHIN 3' FROM UTILITIES
  - WITHIN 3' FROM HYDRANTS
  - WITHIN 3' FROM DRIVEWAYS
- \* SEE SPECIFICATIONS FOR COMPLETE LIST

TIE STRAPS LOOSELY  
AROUND TRUNK

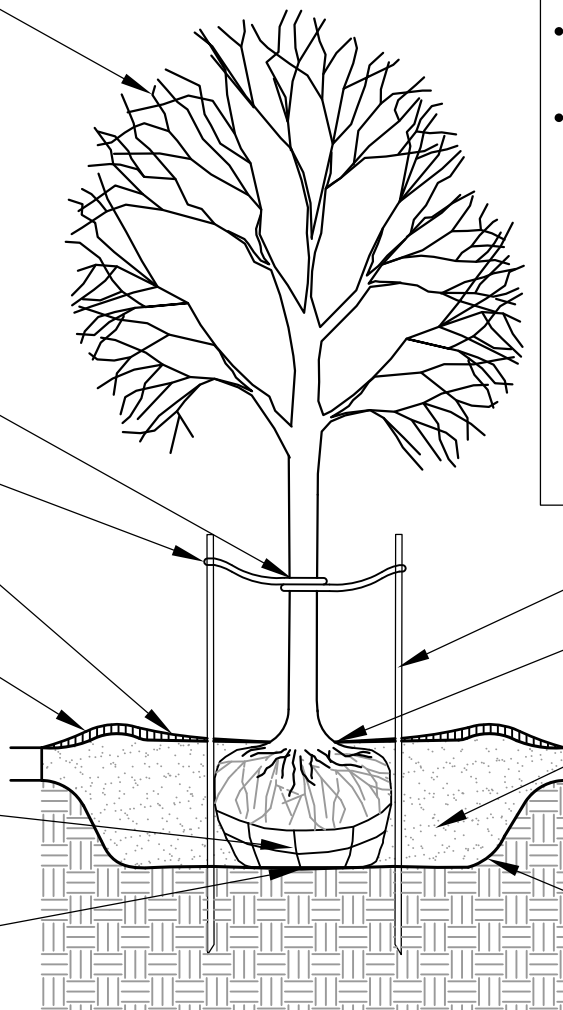
ARBOR TIE OR OTHER  
WIDE, NON-ABRASIVE  
BELT STRAPPING

MULCH 3" DEPTH  
TAPER TO 0" DEPTH  
AT ROOT FLARE

BUILD MULCH SAUCER  
AT EDGE OF PLANTING  
HOLE

CUT AND REMOVE TOP  
2/3 OF BURLAP  
AND WIRE BASKET,  
SUBMIT BASKET FOR PAYMENT

PLACE ROOT BALL  
ON COMPACTED OR  
UNDISTURBED SOIL



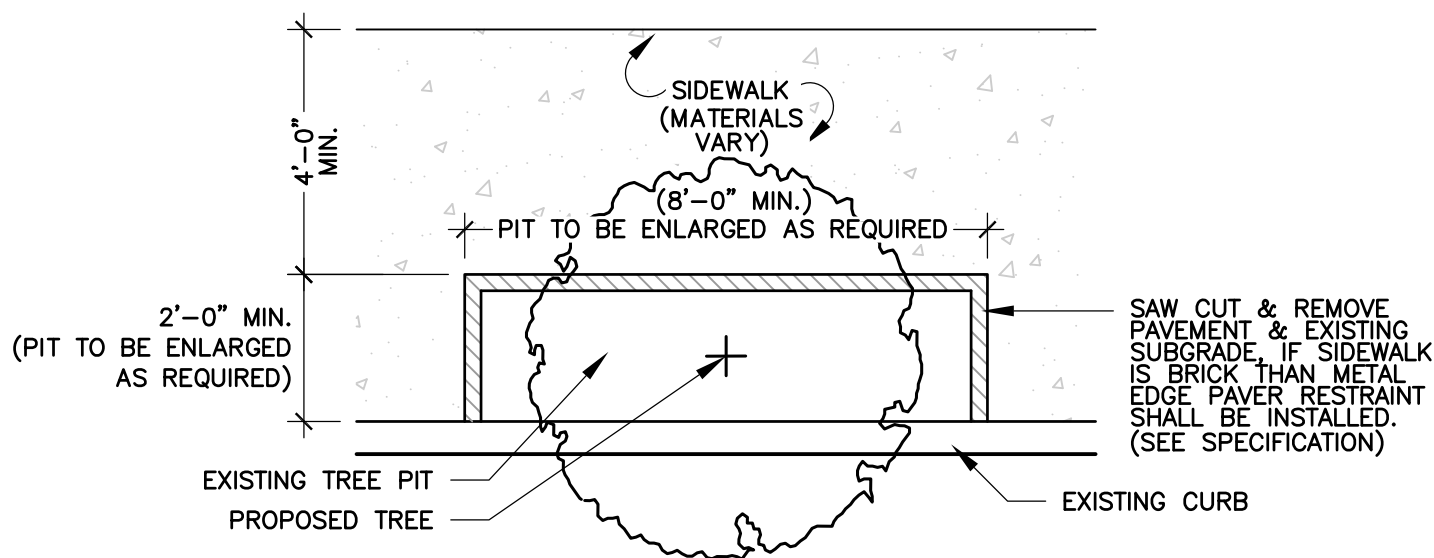
(2) 10'X2"X3" WOOD STAKES

PLANT TREE WITH  
EXPOSED ROOT FLARE  
1" ABOVE GRADE AT CURB  
(SEE DETAIL #1 OF 6)

BACKFILL WITH  
APPROVED PLANTING SOIL  
(SEE SPECIFICATION)

SCARIFY & ROUGHEN  
PIT WALLS PRIOR TO  
PLANTING

## SECTION



## PLAN



## TREE PLANTING DETAIL (REPLACEMENT AT EXISTING TREE PIT)

(NOT USED)

CITY OF CAMBRIDGE STANDARD SPECIFICATIONS AND DETAILS

SCALE: NTS

DATE: MARCH  
OF ISSUE: 2016

SPEC. SECTION REF#: 02910

# 2 OF 6

TREE CROWN AND TRUNK  
SHALL BE FREE OF DEFECTS  
AND TRUE TO FORM

TIE STRAPS LOOSELY  
AROUND TRUNK

ARBOR TIE OR OTHER  
WIDE, NON-ABRASIVE  
BELT STRAPPING

MULCH 3" DEPTH  
TAPER TO 0" DEPTH  
AT ROOT FLARE

BUILD MULCH SAUCER  
AT EDGE OF PLANTING  
HOLE

CUT AND REMOVE TOP  
2/3 OF BURLAP  
AND WIRE BASKET,  
SUBMIT BASKET FOR PAYMENT

PLACE ROOT BALL  
ON COMPACTED OR  
UNDISTURBED SOIL

#### NOTES:

- 4'-0" MIN. SIDEWALK WIDTH IS A REQUIREMENT OF THE CITY OF CAMBRIDGE
- TREES SHALL NOT BE PLANTED:
  - WITHIN 20' FROM THE CORNER OF INTERSECTING STREETS
  - WITHIN 10' FROM A LIGHT POLE
  - WITHIN 20' FROM STOP SIGNS
  - WITHIN 3' FROM UTILITIES
  - WITHIN 3' FROM HYDRANTS
  - WITHIN 3' FROM DRIVEWAYS
- \* SEE SPECIFICATIONS FOR COMPLETE LIST

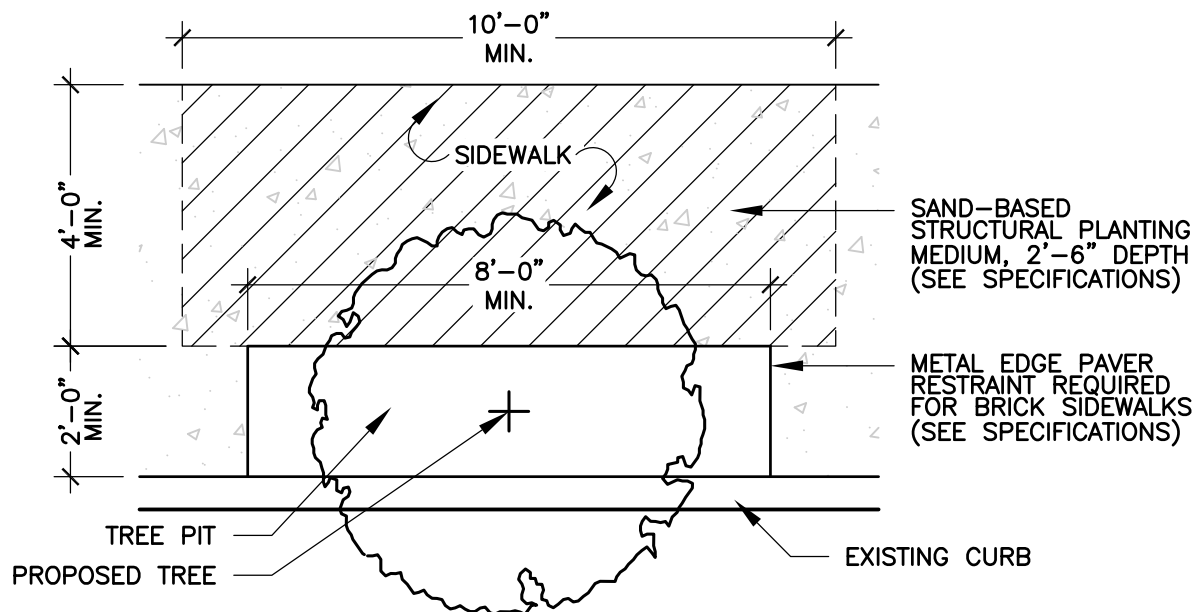
(2) 10'X2"X3" WOOD STAKES

PLANT TREE WITH  
EXPOSED ROOT FLARE  
1" ABOVE GRADE AT CURB  
(SEE DETAIL #1 OF 6)

BACKFILL WITH  
APPROVED PLANTING SOIL  
(SEE SPECIFICATION)

SCARIFY & ROUGHEN  
PIT WALLS PRIOR TO  
PLANTING

#### SECTION



#### PLAN



#### TREE PLANTING DETAIL (6' SIDEWALK WIDTH)

CITY OF CAMBRIDGE STANDARD SPECIFICATIONS AND DETAILS

SCALE: NTS

DATE: MARCH 2016  
OF ISSUE:

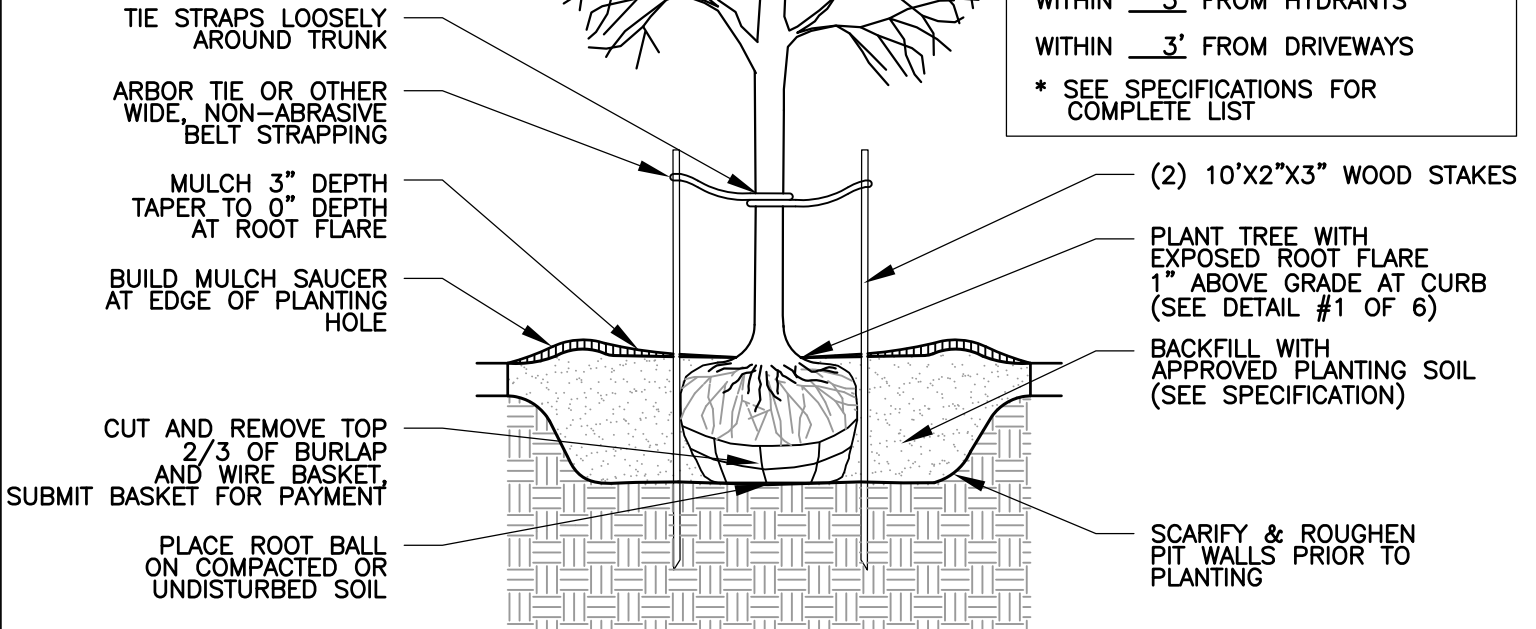
SPEC. SECTION REF#: 02910

# 3 OF 6

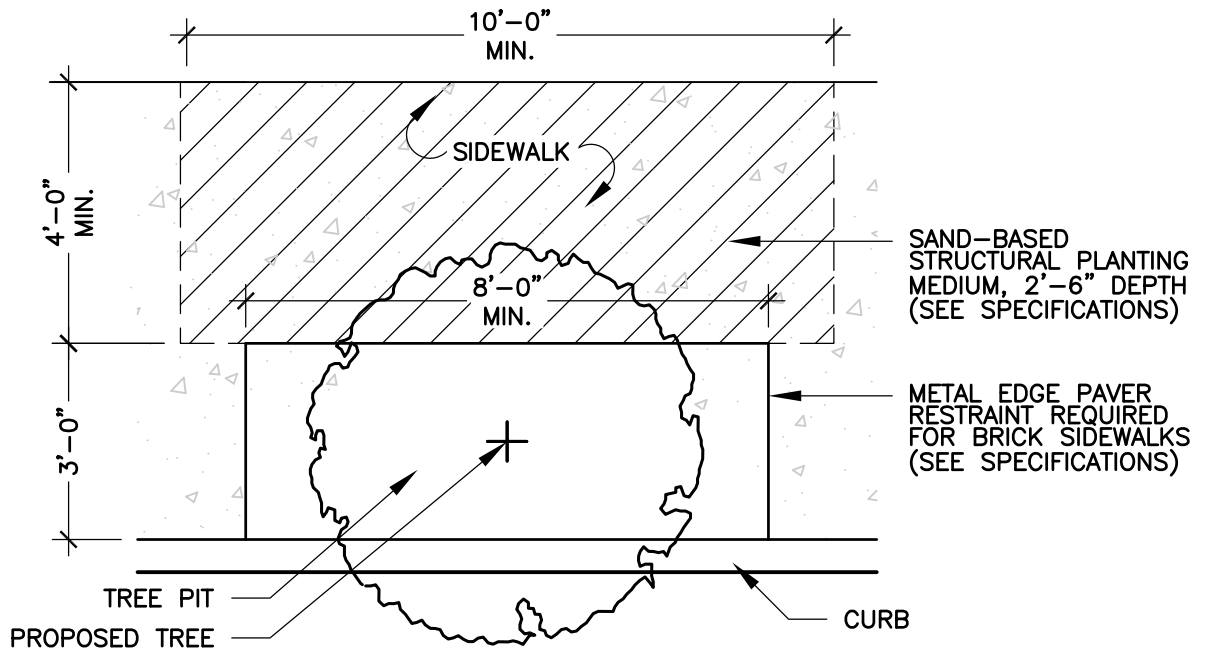
TREE CROWN AND TRUNK  
SHALL BE FREE OF DEFECTS  
AND TRUE TO FORM

**NOTES:**

- 4'-0" MIN. SIDEWALK WIDTH IS A REQUIREMENT OF THE CITY OF CAMBRIDGE
- TREES SHALL NOT BE PLANTED:
  - WITHIN 20' FROM THE CORNER OF INTERSECTING STREETS
  - WITHIN 10' FROM A LIGHT POLE
  - WITHIN 20' FROM STOP SIGNS
  - WITHIN 3' FROM UTILITIES
  - WITHIN 3' FROM HYDRANTS
  - WITHIN 3' FROM DRIVEWAYS
- \* SEE SPECIFICATIONS FOR COMPLETE LIST



**SECTION**



**PLAN**



TREE PLANTING DETAIL  
(7' SIDEWALK WIDTH)

CITY OF CAMBRIDGE STANDARD SPECIFICATIONS AND DETAILS

SCALE: NTS

DATE: MARCH 2016  
OF ISSUE:

SPEC. SECTION REF#: 02910

# 4 OF 6

TREE CROWN AND TRUNK  
SHALL BE FREE OF DEFECTS  
AND TRUE TO FORM

# NOTES:

- 4'-0" MIN. SIDEWALK WIDTH IS A REQUIREMENT OF THE CITY OF CAMBRIDGE
- TREES SHALL NOT BE PLANTED:
  - WITHIN 20' FROM THE CORNER OF INTERSECTING STREETS
  - WITHIN 10' FROM A LIGHT POLE
  - WITHIN 20' FROM STOP SIGNS
  - WITHIN 3' FROM UTILITIES
  - WITHIN 3' FROM HYDRANTS
  - WITHIN 3' FROM DRIVEWAYS
- \* SEE SPECIFICATIONS FOR COMPLETE LIST

TIE STRAPS LOOSELY  
AROUND TRUNK

ARBOR TIE OR OTHER  
WIDE, NON-ABRASIVE  
BELT STRAPPING

MULCH 3" DEPTH  
TAPER TO 0" DEPTH  
AT ROOT FLARE

BUILD MULCH SAUCER  
AT EDGE OF PLANTING  
HOLE

CUT AND REMOVE TOP  
2/3 OF BURLAP  
AND WIRE BASKET,  
SUBMIT BASKET FOR PAYMENT

PLACE ROOT BALL  
ON COMPACTED OR  
UNDISTURBED SOIL

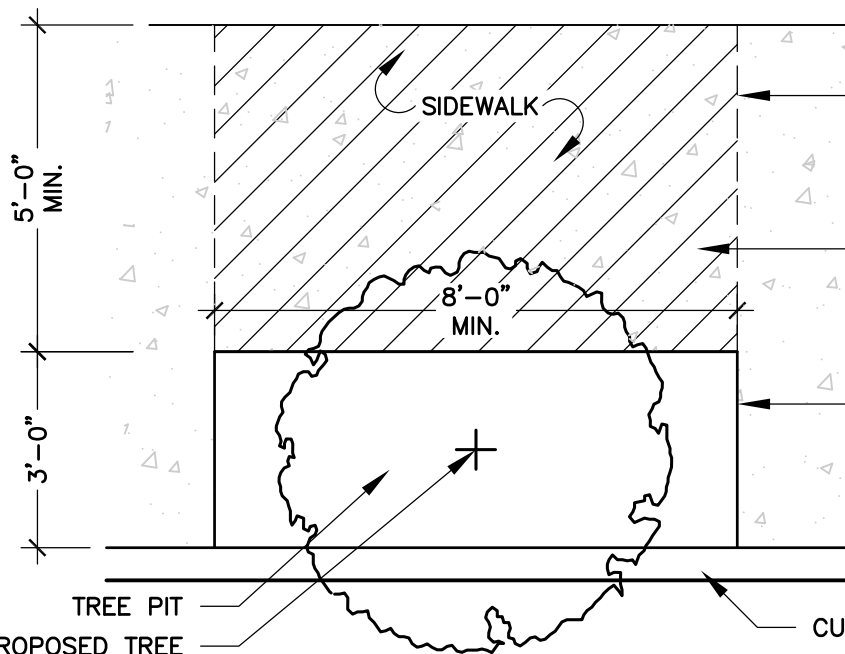
(2) 10'X2"X3"  
WOOD STAKES

PLANT TREE WITH  
EXPOSED ROOT FLARE  
1" ABOVE GRADE AT CURB  
(SEE DETAIL #1 OF 6)

BACKFILL WITH  
APPROVED PLANTING SOIL  
(SEE SPECIFICATION)

SCARIFY & ROUGHEN  
PIT WALLS PRIOR TO  
PLANTING

## SECTION



LIMITS OF STRUCTURAL  
PLANTING MEDIUM  
ALIGNED WITH EDGES  
OF TREE PIT

SAND-BASED  
STRUCTURAL PLANTING  
MEDIUM, 2'-6" DEPTH  
(SEE SPECIFICATIONS)

METAL EDGE PAVER  
RESTRAINT REQUIRED  
FOR BRICK SIDEWALK  
(SEE SPECIFICATIONS)

## PLAN



## TREE PLANTING DETAIL (8' SIDEWALK WIDTH)

CITY OF CAMBRIDGE STANDARD SPECIFICATIONS AND DETAILS

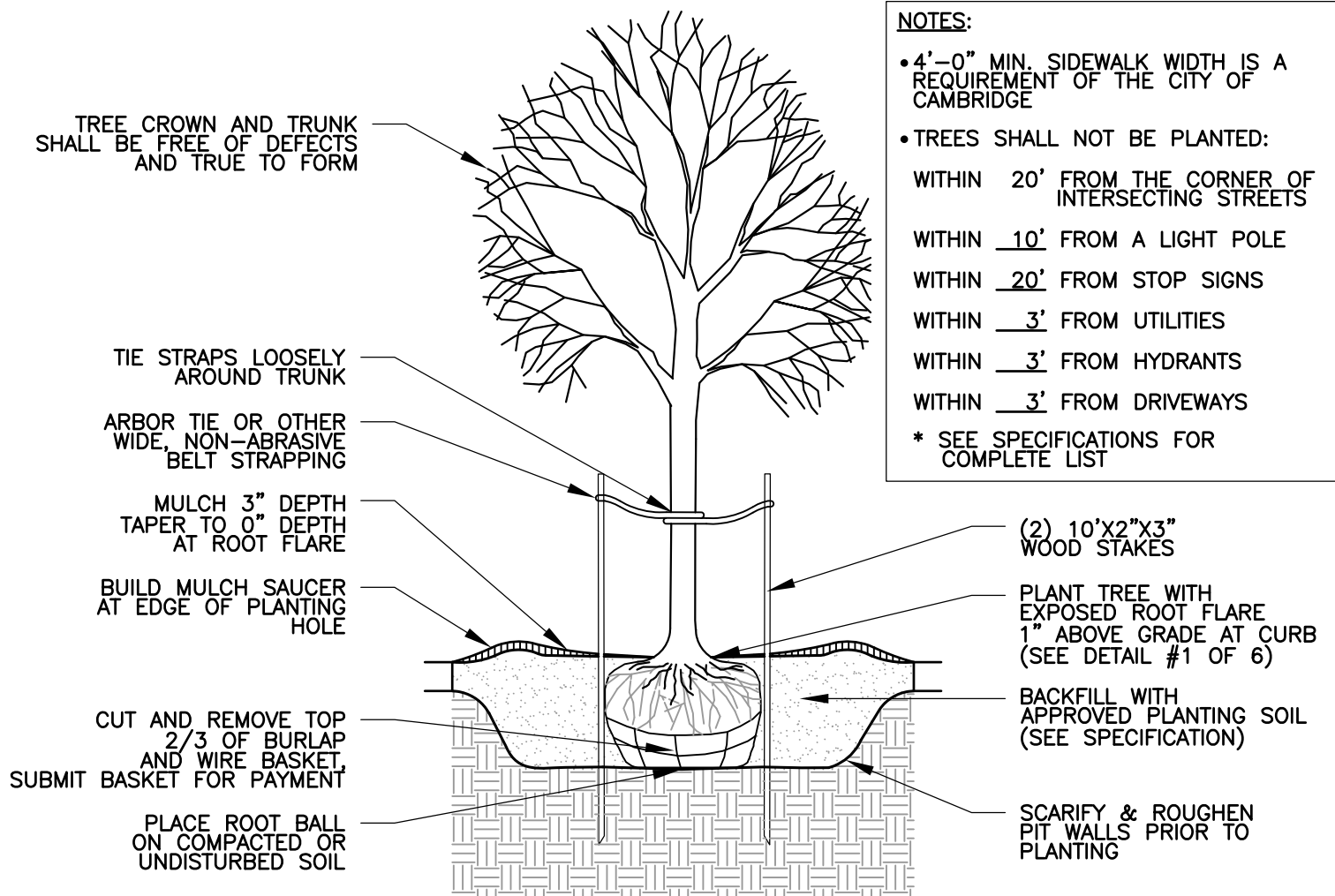
SCALE: NTS

DATE: MARCH  
OF ISSUE: 2016

SPEC. SECTION REF#: 02910

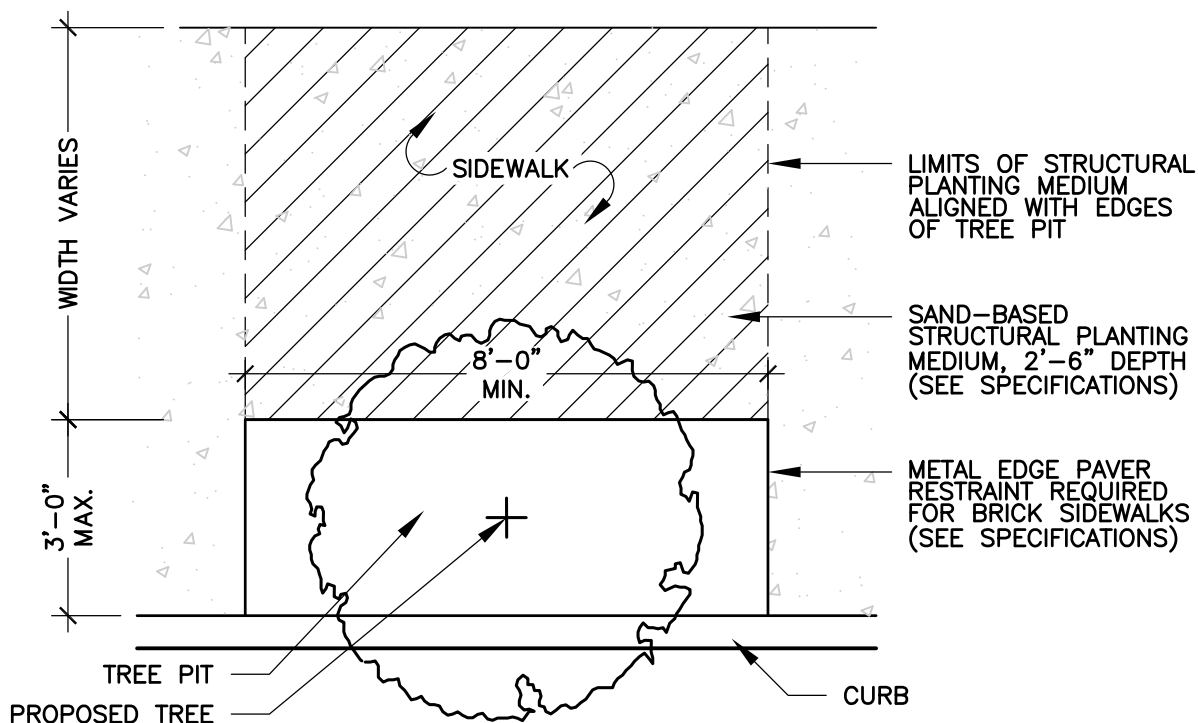
# 5 OF 6





**SECTION**

**PLAN**



# TREE PLANTING DETAIL (>8' SIDEWALK WIDTH)

CITY OF CAMBRIDGE STANDARD SPECIFICATIONS AND DETAILS

SCALE: NTS

DATE OF ISSUE: MARCH 2016

SPEC. SECTION REF#: 02910

# 6 OF 6

City of Cambridge Department of Public Works  
Division of Urban Forestry

Tree Protection during Construction

Public trees are protected by Massachusetts state law, Chapter 87. Section 12 states that a fine of up to five hundred dollars, (\$500.00) per incident of damage to public shade trees can be levied. Each branch broken or improperly pruned, each improper wounding of the trunks of the trees, and each root improperly pruned shall constitute an infraction. Section 12 further provides that anyone who negligently or willfully damages a tree will be liable to the City for all damages.

During all construction projects, the utmost care shall be taken by the contractor to avoid unauthorized, unnecessary or improper wounding of public or private shade trees. Prior to construction, the contractor shall provide a tree protection plan and work schedule. A Massachusetts or International Certified Arborist shall be sub-contracted by the contractor to provide a protection plan and perform specified work. ***All plans and schedules shall be subject to review and approval by the City Tree Warden. Infraction of Massachusetts state law Chapter 87 or failure to provide a protection plan and work schedule will result in fines or the immediate cancellation of the contract.***

Pre-construction tree protection measures shall include the following:

1. Wrapping the trunks of trees with a diameter at breast height (DBH) of 6" or greater with a durable material such as two by four lumber sufficient to protect tree trunks from mechanical damage. Removal of protective wrapping shall be done by the contractor after construction is complete.
2. The proper pruning (raise pruning) of low branches to a height no greater than fourteen feet (14") above the roadway and eight feet (8") above the sidewalk. This includes trees endangered by traffic re-routing as the result of construction operations.
3. Traffic control plans shall be designed in such a way as to direct traffic away from tree trunks and branches.
4. Tunneling shall be the preferred method of excavation adjacent to tree roots to avoid root pruning. If root pruning is unavoidable, certified personnel shall execute the operation with sufficiently sharpened hand tools and in such a fashion as to have minimum negative impact on tree health and safety.
5. Trucks and heavy equipment shall not pass over or park on roots of public shade trees. A protection zone shall be established by erecting a ridged fence outside the perimeter of the dripline of the tree. For occasional or one time access over roots, ½' plywood overlapped may be used. Permeable materials such as gravel or wood chips shall be placed over root systems of trees which are not covered by hardscape and over which

trucks and heavy equipment must travel during construction operations, when such travel is unavoidable, to prevent soil compaction and root damage. Material shall be replaced as needed.

6. All tree protection measures and operations shall be subject to review, approval or change by the City Tree Warden.