611 TREES, SHRUBS, VINES AND GROUND COVER

611.01 REMOVE TREE AND/OR STUMP

(A) DESCRIPTION. This work shall consist of removing trees and/or their stumps designated on the plans or by the Chief Engineer/Arborist and shall include cutting such trees, removing their stumps and roots from the ground, and properly disposing of the material.

(B) CONSTRUCTION REQUIREMENTS. All trees designated on the plans or by the Chief Engineer shall be cut in sections from the top down without danger to traffic or injury to property, public or private. All work shall conform to ANSI Standard – A 300, "Tree, Shrub and Other Woody Plant Maintenance – Standard Practice (Pruning)".

All stumps and roots shall be removed to a depth of at least 2 feet below subgrade. Proper precaution shall be taken to protect underground utilities when removing stumps. "Miss Utility" must be contacted to verify if subsurface utilities are at the project location.

All trees, stumps, roots, and debris shall be properly disposed of by the Contractor.

When Elm trees and/or stumps are removed, it is mandatory that the complete grinding of all parts of the tree are taken to a location determined by the Chief Engineer as a preventive measure to help halt the spread of Dutch Elm Disease. No separate or additional compensation will be allowed for disposal.

(C) MEASURE. The unit of measure for Remove Tree, Remove Tree and Stump and Remove Tree Stump will be each. The number of trees will be the actual number of the various sizes of trees, as listed in the Schedule of Prices, which are removed.

The size of trees shall be the true diameter measured at a point on the tree trunk 4-1/2 feet above the ground line (DBH, Diameter-Breast-Height).

Trees with multiple trunks growing from a single base shall be measured for payment as a single tree. The sum total of all stems shall determine tree size.

(D) PAYMENT. The number of the various sizes of trees, trees and stumps and tree stumps removed, as measured above, will be paid for at the contract unit price per each, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

611.02 PLANTS AND PLANTING

(A) DESCRIPTION. Work consists of furnishing, delivering, planting and/or transplanting trees, shrubs, vines and ground cover, plants of types and sizes indicated on the plans and as directed, including all excavation and planting operations, plant establishment operations, disposal of waste and other incidentals needed to complete planting work.

This work shall be performed by a qualified landscape contractor who shall be approved by the Chief Engineer prior to start of work under this item.

All work done under this item shall be inspected by the Chief Engineer.

(B) MATERIALS. The following apply:

Plants – Plants are defined as trees, shrubs, vines, and plants of all descriptions.

(1) QUALITY. All plants shall be first-class representatives of their normal species or varieties unless otherwise specified. Unless otherwise specified, all plants shall be nursery grown stock that have been transplanted or root-trimmed 2 or more times, according to the kind and size of plants. Furnished plant materials shall be certified by State or Federal Department of Agriculture to be free from disease or infestation.

The branch system shall be normal development and free from disfiguring knots, sun-scald, injuries, abrasions of the bark, dead or dry wood, broken terminal growth, insect eggs and infestations, or other objectionable disfigurements.

Trees shall have reasonably straight stems and shall be well branched and symmetrical per their natural habits of growth.

Minimum tree size shall be 2 to 2-1/2 inch caliper, 6 to 8 feet in height.

Specimen shall mean an exceptionally heavy, symmetrical tightly knit plant, so trained and favored in its development and appearance, as to be unquestionably superior in form, number of branches, compactness and symmetry.

(2) PLANT NAMES. All scientific and common plant names shall be per "Standardized Plant Names", as adopted by the American joint Committee on Horticultural Nomenclature.

All plants delivered shall be true to name and legibly tagged with the names and sizes of materials.

(3) GRADING STANDARDS. Grading of plants, including Balled and Burlapped Specifications, Bare Root Specifications, Nursery, Collected, Container Grown and Seedling Stock shall be per "USA Standard for Nursery Stock", as approved by the American Association of Nursery-men, Inc., latest edition (ANSI Z60.1).

(4) BALLED AND BURLAPPED PLANTS. Balled and burlapped (B&B) plants shall be dug so as to retain as many fibrous roots as practicable, and shall come from soil which will form a firm ball. The soil in the ball shall be the original and undisturbed soil in which the plant has been grown. The plant shall be dug, wrapped, transported, and handled in such manner that the soil in the ball will not be loosened to cause stripping of the small and fine feeding roots, or cause the soil to drop away from such roots.

(5) PLANTING SOIL MIX. Mix shall be 5 parts top-soil per 823.01 by volume thoroughly mixed with 4 pounds of granular 5-10-10 fertilizer with trace elements such as iron, manganese, boron, zinc, molybdenum, and copper added per cubic yard of mix. Ingredients shall be delivered separately and thoroughly mixed before use.

Thoroughly composted and processed leaf mold organic matter may be added, if available, and approved by the Chief Engineer/Arborist.

(6) PEAT MOSS. 823.06(A)

(7) STAKES. 822.12(D). Malleable iron, arrow-shaped anchors, or oak stakes, as approved by the Chief Engineer, may be used. Chain loc must be attached to the top

of stakes that have been driven into the ground and will provide protection for the tree.

(8) ANTIDESICCANT. Antidesiccant, for retarding excessive loss of plant moisture and inhibiting wilt, shall be an approved emulsion which will provide a film over plant surfaces permeable enough to permit transpiration. Antidesiccant shall be used only after approval.

(9) TANBARK, HARDWOOD, AND ROOTBARK MULCH. Mulch shall be medium grade and free of matter injurious to plant growth.

(10) MICROPORE FERTILIZER RELEASE PACKETS. Micropore fertilizer release packets shall be used during the planting in accordance with packet manufacturer's instructions, or as specified. Each packet shall be sealed in a polyethylene laminated envelope and shall contain a minimum soluable fertilizer analysis of 16 percent nitrogen, 8 percent phosphorus and 16 percent potash. Packets shall be 4 ounces, 8 year release packages as approved by the Chief Engineer.

(11) HERBICIDES. Herbicide shall be approved for type and rate of application by the Chief Engineer before use.

(C) CONSTRUCTION REQUIREMENTS.

(1) PLANTING SEASONS. Unless otherwise directed in writing, planting shall be done during the following seasons:

Deciduous Plants – October 15 to May 1

Evergreen Plants – March 15 to June 1 and September 15 to December 1

Planting and plant establishment periods for Spring Planting Season and Fall Planting Season are shown on Schedules 611.02-1 and 611.02-2 respectively.

No planting shall be done in frozen or snow covered ground or when the soil is in an unsatisfactory condition for planting.

(2) DELIVERY AND INSPECTION. The Contractor shall notify the Chief Engineer not less than 2 days in advance of plant delivery. All plants shall be available for inspection before being dug. The Contractor shall furnish the Chief Engineer complete information concerning plant source of supply. At the option of the Chief Engineer, a certified Arborist will accompany the inspector.

Only trees from the District Department of Transportation's street tree list shall be selected.

All trees and a representative sample of shrubs shall be sealed. Transportation for inspection and sealing shall be furnished by the Contractor as part of work. All plants shall comply with state and federal laws controlling inspection for plant diseases and insect infestations, and the Contractor shall deliver to the Chief Engineer all required inspection certificates. All shipments shall include a plant list giving detailed descriptions of the plants and the date of shipment.

(3) SUBSTITUTIONS. When specified plants are not available at time of planting, the Contractor shall submit written evidence from at least 3 competent sources that specified plants are unavailable. If substitution is approved, plant items in the contract which are similar in size and type and which will perform the intended

function shall be used at the respective contract price. If existing plant items are not appropriate and if the Chief Engineer and Contractor can mutually agree on a suitable substitution at the same contract unit price or less, the substitution will be approved.

(4) PROTECTION AND TEMPORARY STORAGE. The Contractor shall keep all plants moist and protected from drying out. Protection shall include the time when plants are in transit, in temporary storage or on the project awaiting planting. Plants will be inspected by the Chief Engineer at the project site and approved prior to planting.

Plants failing to meet specifications, showing signs of improper handling or arriving with broken seals, broken or loose balls, inadequate protection for tops or roots, shriveled, dry or with damaged roots will be rejected. Rejected plants shall be immediately removed from the site and replaced.

Care shall be taken in handling plants to prevent injury to branches or roots. The solidity of balled and burlapped plants shall be carefully preserved.

Plants delivered but not scheduled for immediate planting shall be protected as follows:

Bare root plants shall be separated, roots properly spread and puddled in with moist topsoil into a heeling-in trench.

Balled and burlapped (B&B) plants shall have the earth balls covered with sawdust, wood chips or other suitable material and kept in a moist condition.

(5) LAYOUT. Plant locations and beds shall be staked on the project site by the Contractor. Stakes shall be provided by the Contractor, driven at least 6 inches into the ground and shall remain until all work in the area is complete. The Chief Engineer may adjust plant locations to meet field conditions.

(6) PLANT PIT AND BED EXCAVATION. Prior to excavating for plant pits and beds, locations shall be approved. Each plant shall be placed in a individual pit unless otherwise shown on the plans.

Plant beds on slopes 3 to 1 and flatter shall be prepared by removing all soil, weeds, roots and other objectionable material unsuitable for backfill.

The bed shall then be cultivated by either rototilling, backhoeing, or picking to a depth of 6 inches for ground covers, or to the proper depth for shrubs, as shown on the Plans.

Ground cover planting holes shall be dug through the mulch with one of the following; hand trowel, shovel, bulb planter or hoe. Before planting, non-biodegradable pots shall be removed. Root systems of all potted plants shall be split or crumbled.

The ground cover (either potted or bare root) shall be planted so that the roots are surrounded by soil below the mulch. Potted plants shall be set so that the top of the pot is even with the existing grade. Bare root plants shall be covered up to the crown of the plant or the soil level.

On slopes steeper than 3 to 1, plants shall be planted in individual pits within the bed area. Existing grass or other soil stabilizing growth between pits shall be cut to a height of 2 inches and the entire bed area mulched to a depth of 4 inches.

Pits shall be excavated to sizes shown on plans with vertical sides and horizontal bottom surfaces. Excavated material shall be removed from the site.

Where trees are to be installed contiguous to underground utility lines, the Contractor shall have a representative from each applicable utility company stake-out in the field the exact location of the utility conduits and appurtenances before the pits are dug.

The Contractor shall not excavate any closer than 8 inches to the backface of curbs. Excess PCC foundation for PCC or stone curb or PCC sidewalk which protrudes into planting pit shall be carefully chipped and removed by the Contractor to allow proper placement of tree ball. No additional compensation will be allowed.

Plant pits directed to be abandoned after excavation is started, due to unsuitable conditions, shall be backfilled with borrow embankment fill and compacted to specifications of AASHTO T-180, Method D, in 6 inch layers to subgrade.

The area shall then be seeded or sodded as directed. Payment for this fill and seed or sod will be made under respective pay items.

(7) SETTING PLANTS. All plants shall be set plumb. The tree and shrub pits shall be deep enough to allow 1/8 of the ball to be above the existing grade. The top of ball shall not be covered with soil and the root flare shall be visible. Facing and/or orientation of plants shall be as directed.

Plants pits shall be promptly backfilled and tamped. Under no condition shall any pit remain open at night unless it is properly barricaded.

Planting of trees and shrubs may be done with approved mechanical equipment. When this method is used the planting pit must be twice the size and of the same shape as the earth ball on the plant to be moved; planting soil mix backfill will be required. The depth of the hole must be equal to the depth of the root ball.

Micropore fertilizer packets shall be placed next to the root zone of the plant ball, 6-8 inches deep, before the plant pit is backfilled with the planting soil mix.

The following schedule shall be followed unless otherwise specified in the manufacturer's instructions:

Trees – 1 packet per 1 inch of caliper.

Shrubs – I packet for shrubs 12 to 18 inches in height and 2 packets for shrubs 19 inches to 4 feet in height.

Planting soil mix shall then be carefully worked around and over the roots and thoroughly and properly settled by firming or tamping. Thorough watering or puddling shall accompany backfill around plants. Earth saucers or water basins at least 4 inches deep for trees, and 3 inches deep for shrubs, shall be formed about individual plants with a diameter equal to that of the plant pit.

Balled and burlapped (B&B) plants shall be carefully placed in the prepared pits so as to rest in a firm, upright position. Plants shall be handled and moved only by the

ball. Planting soil mix shall then be filled in around the plant ball to half the depth of the ball, then tamped and thoroughly watered. The burlap and wire basket shall then be cut away and removed from the upper half of the ball, after which the remainder of the planting soil mix shall be placed. Earth saucers or water basins shall then be provided and the plant thoroughly watered.

Container grown stock shall be removed from the container before planting.

Seedling pines shall be planted in 6 inch by 6 inch by 8 inch deep pits.

Plant beds shall be neatly edged. Plant beds on slopes steeper than 3 to 1 shall be constructed with a 3 inch shoulder around the lower edge.

Groundcover plants may be planted after the mulch has been placed.

(8) FERTILIZING. During the next planting season following spring or fall planting, all plants shall be fertilized once at the rate specified by the manufacturer for the size of plant.

(9) WATERING. All plants shall be thoroughly watered during and immediately after planting and at such intervals during the plant establishment period as needed. Water shall not contain elements toxic to plant life. At each watering the soil around the plants shall be thoroughly saturated.

(10) STAKING. No guying of trees will be permitted. Staking must be installed with chain loc attached to the stakes.

(11) PRUNING. Pruning shall be done before or immediately after planting to remove damaged or broken branches. All pruning shall be done by experienced personnel with properly conditioned equipment and in keeping with accepted horticultural practice. Trees with pruned terminal leaders will be rejected.

(12) MULCHING. Mulch shall be placed over all pit and saucer areas of individual trees, shrubs and over the entire area of plant beds to 2 to 3 inch depth within 3 days after planting. Mulch shall not touch the bark of the tree.

(13) RESTORATION AND CLEAN-UP. Excess and waste material shall be removed daily. When planting in an area has been completed, the area shall be thoroughly cleaned up. Where existing grass areas have been damaged or scarred during planting operations, the Contractor shall restore disturbed areas to their original condition as directed as part of work. The Contractor shall clean up all debris and leave the project in an acceptable condition.

(14) GUARANTEE PERIOD & REPLACEMENTS. The acceptability of plants furnished and planted will be determined at the end of a two (2) year guarantee period during which the Contractor shall employ all practicable means to preserve the plants in a healthy growing condition. Care during this period shall include watering, cultivating, pruning, repair and adjustment of stakes, and other standard proper care as directed. Plants, saucers, and beds shall be kept weed free. Remulch as necessary to maintain mulch depth as shown.The Contractor shall be responsible for removal of stakes and chain locs at the end of the 2 year guarantee period.

Dead and unsatisfactory plants as directed shall be promptly removed from the project. An inspection by the Contractor and the Chief Engineer will be held 30 days before the start of the planting season to determine plant acceptability and number

of replacements. During the next planting season following completion of actual spring or fall planting, all dead and unsatisfactory plants shall be replaced in kind and size with live healthy plants installed per specifications at the Contractor's expense.

Alternate or substituted varieties of plants shall be used only if approved. A final inspection of all plants will be held after the replacement planting has been completed.

If the Contractor fails within 10 days to satisfactorily care for and replace plants as needed or ordered, the District may proceed with labor, equipment, and material to perform the work, with the cost of such work charged to the Contractor.

The Contractor will not be responsible for theft or damage to plants by vehicles or vandalism following completion and approval of the construction portion of planting.

(D) MEASURE AND PAYMENT. The unit of measure for plants wiII be per each. Payment for Plantings will be made at the contract unit price per each, which payment will include furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work.

On the planting construction completion date, the Contractor may receive up to 85 percent of plant pay item contract prices for accepted plants. The balance will be paid prorated as required work is performed during the plant establishment period. Final payment will be made at the end of the contract and upon removal of stakes and chain locs.

611.03 TRANSPLANTS AND TRANSPLANTING

(A) DESCRIPTION. Work includes:

1. Digging up and heeling-in plantings in the areas specified.

2. Replanting these plants.

This work shall be performed by a qualified Landscape Contractor who shall be approved by the Chief Engineer prior to start of work under this item.

All work done under this item shall be inspected by the Chief Engineer.

Upon request from the Chief Engineer, the Contractor shall furnish the unit prices for transplantings from which he arrived at contract lump sum price. These unit prices will be used in case of "adds" or "deducts".

(B) MATERIALS. Transplanting materials shall meet the following requirements:

Topsoil – 823.01

Planting Soil Mix – 611.02(B)(5)

Peat Moss – 823.06(A)

Peat Humus – 823.06(B)

Stable Manure – 823.02(C)

Stakes – 822.12(D)

Antidesiccant – 611.02(B)(8)

Tanbark, Hardwood, and Rootbark Mulch – 611.02(B) (9)

Chain loc – as per contract documents

(C) CONSTRUCTION REQUIREMENTS.

(1) TRANSPLANT PREPARATION. Care shall be exercised in preparing plants for movement to assure that they are dug with skill and moved to their new locations in good condition. Transplantings shall be sprayed with a wilt preventive antidesiccant spray material before digging.

Transplantings shall be dug, balled and burlapped and plat-formed if directed. Size of ball shall be at least one-fourth larger than that specified for that size planting in the A.A.N. Standards for Nursery Stock. Work shall be performed in accordance with best horticultural practice.

Transplantings shall be moved to a temporary location to be designated by the Chief Engineer where the plant material shall be heeled-in. Plants shall be heeled-in in moist soil or peat moss.

The Contractor shall provide all necessary care for plant material while they are heeled-in including watering.

Upon completion of construction, the plants shall be installed in locations as shown on plans or as directed by the Chief Engineer.

(2) EXCAVATION. All pits shall be excavated to sizes detailed, with vertical sides and horizontal bottom surfaces.

Where trees are to be installed contiguous to underground utility lines, the Contractor shall have a representative from each applicable utility company stake-out in the field the exact location of the utility conduits and appurtenances before tree pits are dug.

The Contractor shall not excavate any closer than 8 inches to the backface of curbs. Excess PCC foundation for PCC or stone curb or PCC sidewalk which protrudes into planting pit shall be carefully chipped and removed by the Contractor to allow proper placement of tree ball. No additional compensation will be allowed.

Excavated material shall be removed from planting areas. All backfilling for the plants and the forming of plant saucers shall be done with planting soil mix only.

Plant pits shall be backfilled immediately with planting soil mix specified herein. Ingredients shall be delivered separately to approve mixing site and mixed completely before backfilling. Under no circumstances shall any plant pit remain open overnight unless it is properly barricaded. Backfill shall be firmly tamped throughout the entire pit area so that excessive settling will not occur.

Any damage to existing grass areas shall be acceptably repaired, as required by the Chief Engineer, and at no expense to the District.

(3) PLANTING. Planting will not be permitted when ground is frozen or wet.

All seals and tags shall be removed before final inspection.

All trees and shrub pits shall be deep enough to allow 1/8 of the ball to be above the existing grade. Top of the ball shall not be covered with soil. Root flare must be evident just above ground level.

Bare root plants obtained from collected areas shall be set at such a level so that after settlement the depth will be the same as it was in the field or native stands.

All plants shall be set vertically and the soil mix shall then be filled in around the plant balls to half the depth of the balls and tamped. The remaining burlap around the top half of the plant balls shall be loosened cut away and removed. The remainder of the pit shall then be filled with the soil mix tamped and watered, all within the same planting day. Roots of bare root plants shall be properly spread out and the soil mix carefully worked in around them. Soil mix shall be thoroughly tamped into placed and watered, all within the same day of planting. Plants shall be removed from pots before planting.

Care shall be taken during backfilling, tamping, and watering to avoid damage to roots and to prohibit air pockets. Any root bruised or broken before or during planting shall be pruned immediately to sound tissue with a clean cut.

Watering shall mean full and thorough saturation of all backfill in the pits on the day the plants are planted. Water shall be applied only by open end hose at very low pressure. In no case shall hoses from tank trucks be laid across ramps, roadways, or other pavements.

Upon completion of planting, outline of plant beds shall be neatly edged. A 3 inch shoulder of planting soil mix or excavated top soil shall be placed at the lower edge of plant beds on slopes. individual plant pits shall be furnished with a shoulder of soil placed outside of rim of the pits to form a saucer over the entire area of the pits. In shrub beds, the soil shoulder around individual shrubs or trees shall consist of plant soil mix as detailed on plans.

(4) MULCHING. All plant areas and pits shall be mulched. Mulch shall be spread to the thickness specified on the plans over the entire area of the pits and plant areas. Mulch shall be raked to an even surface to within 3-4 inches of the tree trunk. All mulch shall be applied within 4 days after planting.

(5) STAKING. All stakes shall be installed within 24 hours of the day the trees are planted. Stakes shall be neat and secure with chain locs.

(6) CHAIN LOCS. Chain locs shall be attached to the top of three five (5) foot stakes which are placed in a triangular formation two (2) feet away from the tree, and not attached to the tree.

(7) PRUNING. Broken or badly bruised branches shall be removed with a clean cut. Pruning shall be done by skilled technicians in accordance with standard horticulture practice. Pruning of terminal leaders will not be permitted.

(8) CLEANUP. During the course of planting, excess and waste materials shall be removed daily. Areas shall be kept clean and all reasonable precautions taken to avoid damage to existing structures, plants, and grasses. When planting in an area has been completed, the area shall be thoroughly cleaned up. Existing grass areas

which have been injured by the work shall be re-graded and seeded according to 610.01, and the entire areas when completed shall be neat and clean.

The Contractor will not be responsible for the transplantings once they have been transplanted and the Chief Engineer records them as acceptable.

The Contractor will be liable at his expense for replacement of any transplanting which dies or becomes unsatisfactory due to the Contractor's negligence.

(D) MEASURE AND PAYMENT. The unit of measure for Transplants and Transplanting will be the job. Payment will be made at the contract lump sum price, which payment will include furnishing all labor, tools, equipment, materials and incidentals needed to complete the work.

611. 04 PRUNING TREES

(A) GENERAL. Work under these items includes pruning of trees in the project area as specified in the contract documents or as directed by the Chief Engineer and designated representatives of the Urban Forestry Administration to facilitate performance of construction activities.

(B) CONSTRUCTION METHODS. Pruning shall be done by a certified Arborist or Professional Horticulturist in accordance with accepted standard horticultural practice. Prior to performing any work, the Contractor shall submit the qualifications of the workers or subcontractors to the Chief Engineer for approval. Included shall be descriptions of similar work sufficient to satisfy the Chief Engineer and the Urban Forestry Administration that the workers possess sufficient experience to properly perform the work.

The selection of trees and subsequent pruning shall be directed by the Chief Engineer in coordination with an arborist of the Urban Forestry Administration. The trees shall be pruned using hand pruners, lopping shears, pruning saws or chain saws. Each designated tree shall be pruned with due regard for the natural form and growth characteristics of the species. Pruning shall be kept to a minimum with only that amount removed to allow the specified work to be accomplished.

Trees shall be pruned with a clean cut. The main leader shall not be cut. If side branches are cut to balance the tree, all cuts shall be made outside the branch collar to encourage the healing callus to develop. All accumulated plant material shall be removed daily from the project and disposed properly.

(C) MEASURE AND PAYMENT. The unit of measure will be per each designated tree pruned. Payment for these items will be made at the contract unit price per each, which payment will include careful pruning of the tree and proper disposal of removal plant material and all labor, tools, equipment, materials and incidentals required to satisfactorily complete the specified work.

611.05 TREE BOX DRAINAGE-AERATION

(A) DESCRIPTION. Work includes the preparation for and installation of various components for drainage and aeration for tree boxes as described herein and as detailed on the plans.

(B) MATERIALS.

(1) Gravel shall meet the requirements of 803.02 for Grading No. 57 or 67

(2) Filter Screen shall be fiberglass mat of long, strong textile-type glass fibers, bound together with permanent thermosetting resin, and shall meet the requirements of MIL 1 22033, Type 1, Class 2, and shall be ¼ inch to ½ inch maximum thickness. Consistency of the mat shall be such as to prevent soil from passing through but allow the free flow of water.

(3) Perforated Fiber Pipe shall meet the requirements of AASHTO M 177 and shall be 4 inches in diameter and a minimum of 2.5 feet in length.

(4) Sand, if used for filter or for placement under plants, shall be as per 805.02.

(C) CONSTRUCTION METHODS. Vertical sump holes in the bottom of the tree pits shall be made with a post hole digger or power auger. These shall be 8 inches in diameter and 3 feet in depth. Sump holes and the bottom 8 inches of the tree pit shall be backfilled with gravel, then level.

The fiberglass filter screen shall be placed on top of and completely cover the gravel.

During placement of backfill around plants in tree pit, perforated fiber pipe shall be positioned vertically at proper locations and elevation and filled with gravel.

(D) MEASURE AND PAYMENT. The unit of measure for Tree Box Drainage-Aeration will be per each. Payment will be made at the contract unit price per each, which payment will include furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work.

611.06 TREE GUARDS

(A) DESCRIPTION. This work consists of furnishing and installing protective tree guards of the rigid steel mesh type as indicated in the contract documents or as directed by the Chief Engineer.

(B) MATERIALS. Perforated Steel Mesh – Perforated steel mesh shall be one inch square holes, 3/16 inch bar, 18 gauge, 71 percent open area.

Steel straps – Steel straps shall be 1 inch x 3/16 inch and shall conform to the shape and length as shown on the plans.

Steel Channel – Steel channel shall be as per 815.01(A) and shall be 1 inch x 2 inches x 1/8 inch carbon steel. (See plans for details).

Bolts – Bolts shall be ¼ inch diameter hex head 1-1/4 inch long with ¼ inch nut.

Paint – Primer shall meet the requirements of 811.03(A); enamel shall be gloss black alkyd.

Touch up will be required in field as directed by the Chief Engineer to repair damage to painted areas during construction.

(C) CONSTRUCTION REQUIREMENTS.

RIGID STEEL MESH TREE GUARD. Tree guard units as detailed in the contract documents shall be completely fabricated in the shop. Steel mesh shall be tack welded to the steel straps every 3 inches.

Mesh, steel straps and channels shall be given one prime coat and two (2) coats of alkyd enamel in the shop. All surfaces shall be dry before shipment.

The prefabricated sections shall be installed in the field around trees as directed by the Chief Engineer.

(D) MEASURE AND PAYMENT. The unit of measure for Rigid Steel Mesh Guards will be per each. Payment will be made at the contract unit price per each, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

611.07 TREE PROTECTION AND REPLACEMENT

(A) DESCRIPTION. Work under this item includes providing protection for existing trees within the project limits during construction operations.

The Contractor is liable for replacement and repair of trees or compensation for trees damaged or killed through neglect or failure to apply tree protection during construction operations.

Failure of the Contractor to implement tree conservation measures or tree replacement, as directed by the Chief Engineer, will result in compensation or liquidated damages to the District according to the schedule of payment contained herein.

(B) METHODS AND MATERIALS. Protection from damage caused by the Contractor's equipment or carelessness shall consist of the following methods and measures:

(1) All trees to be preserved shall be protected against damage during construction operations by fencing. The tree protection fencing shall be placed before any excavation or grading has commenced. Details of the minimum acceptable tree protection are shown in the contract documents.

(2) No equipment, trailers or materials may be placed within the drip line of existing trees to be retained within the project limits with the exception of paved areas or areas to be paved.

(3) Any damage done to existing tree crowns or root systems shall be repaired immediately by the Contractor under the direction of an arborist from the District's Urban Forestry Administration.

(4) If any trees not designated to be removed are severely injured or killed by the Contractor's operations for any reason, they shall be replaced in kind by the Contractor at no additional cost to the District, or by payment in liquidated damages according to the following schedule:

2 to 6 Inch DBH	$ 90.00 per DBH Inch
Over 6 to 12 Inch DBH	$100.00 per DBH Inch
Over 12 Inch DBH	$110.00 per DBH Inch

The diameter of the tree trunk shall be measured breast high (4 to 5 feet) above the ground. Replacement shall be done on a DBH inch per DBH inch basis (one DBH inch of replacement trees per DBH inch of damaged trees). Trees replaced in kind shall be planted in accordance with 611.02. The Chief Engineer, shall be solely responsible for determining whether or not a given injury is sufficient to warrant repair, replacement or monetary compensation by the Contractor.

(C) MEASURE AND PAYMENT. The unit of measure will be the job. No direct measure will be taken. Payment for Tree Protection and Replacement will be made at the contract lump sum price for tree protection, which payment will include all labor, tools, materials, equipment and incidentals needed to complete the required work.

No payment will be made for repair and replacement in kind for trees damaged or killed due to the Contractor's operations. This work will be performed at the sole expense of the Contractor.

611.08 TREE ROOT PROTECTION

(A) DESCRIPTION. This work includes precautions to be taken while performing utility trenching, roadway work, sidewalk and curb installation. Work also includes furnishing and placement of prepared planting soil mix and fertilizer backfill around exposed and disturbed roots, and the disposal of excess materials, branches and debris.

(B) CONSTRUCTION METHODS. Construction operations adjacent to existing trees shall be performed as carefully as possible to prevent trunk, crown and root damage. Tree roots shall not be cut unless specifically authorized by the Department of Transportation's Urban Forestry Administration.. If authorized, pruning shall be performed under their supervision in accordance with 107.12 and 609.01(E)(3), or by a certified arborist meeting their approval. When authorized by the Chief Engineer, the Contractor may cut minor roots (less than 2 inches in diameter) with his own forces. When trenching or when old curb, gutter or sidewalk is removed, damp burlap shall be placed over exposed roots and kept damp at all times until the new work is placed. Exposed or cut roots shall be backfilled with prepared fertilizer-enriched planting soil mix to encourage root growth.

In all operations involving utility trenching, the work shall be performed as per 207.03. Whenever possible, root cutting shall be avoided; no part of the root ball shall be trenched. Utility trenching shall not be allowed if tree roots are within the trench area. These excavations shall be augured or tunneled, as necessary, to prevent root cutting.

In curb installations, it is recommended that curbing be bridged across the length of the tree space, without a dry mix backing block, in order to avoid any trenching excavation in the vicinity of the roots. The length of curbing placed adjacent to the length of the tree space shall then be dowelled or pinned to the standard curb construction outside the tree space.

Trees located adjacent to construction work shall be watered at ten (10) day intervals throughout the growing season. No equipment, trailers or material shall be placed within twenty (20) feet or within the driplines of any tree to be saved, whichever is greater.

Any damage done to existing tree trunks, crowns or root systems shall be repaired immediately by the Contractor, at his expense, under the direction of an arborist from the Department of Transportation's Urban Firestry Administration..

(C) MEASURE AND PAYMENT. No measure will be taken for this work. No direct payment will be made. This work is considered incidental to the work being performed, the cost of which shall be considered when preparing bids for work in these areas.