

SECTION 619 - PLANTING AND TRANSPLANTING

619.01 Description. This work includes furnishing and planting trees, shrubs, and vines at specified locations according to the contract. *

This work also includes transplanting certain designated trees to new locations according to the contract. *

619.02 Materials. Materials shall conform to the following: *

Planting Soil	712.17
Commercial Fertilizer	712.18(A)
Manure	712.18(B)
Stakes, Guy Wires, Turnbuckles and Markers	712.19
Mulch and Soil Amendments	712.45

The species and size of trees, shrubs, and vines will be the type shown in the contract or as ordered. *

(A) Plant Names. Trees, shrubs, and vines furnished under this item shall be true to name. The trees, shrubs, and vines shall follow standard names as adopted by the American Joint Committee on Horticultural Nomenclature and Special Publication No. 50, "In Gardens of Hawaii," published by the B. P. Bishop Museum. *

(B) Form and Shape of Plants. Trees, shrubs, and vines shall be nursery grown stock, strong, healthy, clean, well grown, and free from insects, diseases or rodents. The trees, shrubs, and vines shall have average or normal, well-developed branch systems, with vigorous root systems. Plants shall be free from disfiguring knots and abrasions of bark or other objectionable disfigurements. The Engineer will not permit thin, weak plants. *

(C) Collected Stock. If the contract specifies "collected", the collected stock shall not be nursery grown. They shall have grown under natural conditions at secured locations. *

(D) Ball and Burlap. If the contract specifies "B&B", the Contractor shall ball and burlap the plants according to the contract. The Contractor shall wrap the ball carefully and firmly. If the contract uses a figure in parentheses following "B&B", this confirms the diameter of the minimum sized ball that the Engineer will accept. The Contractor shall handle these plants by the ball only and not by the plant itself. The slightest indication of manufactured earth balls or handling of the plant itself will be cause for rejection of the plants. *

(E) **Size of Plants.** The figures shown in the proposal are the minimum *| and maximum heights of the plants. When the contract uses such figures *| with the spread, the figures then are the minimum and maximum spreads of *| the plants. *|

The height of plant shall be the vertical measurement of plant from *| the ground upward as the species stand in its natural position in the *| nursery. The measurements shall not include the fine or slender terminal *| leader, twig, or branch growth. They shall stop where the main parts of *| the plant ends. The measurements of leggy plants shall be between and including the smallest and greatest dimension specified.

The spread, when specified, shall be the horizontal measurement of *| the plant as the species stands in its natural position in the nursery. *| The measurements shall not include the fine or slender terminal shoots. *| The Contractor shall measure each plant both in its smallest and greatest *| dimension and averaged. The smallest dimension shall not be less than *| sixty (60) percent of the greatest dimension.

619.03 Construction Requirements.

(A) **Advanced Preparation of Planting Areas.** Upon written notice from the Engineer, the Contractor shall prepare the planting areas. The *| Contractor shall clear the area within a five (5) foot radius of each *| tree, shrub or vine that the Contractor will plant of weeds, brush, rocks *| or other objectionable materials. Clearing of weeds and brush includes removing of the unwanted plants roots systems. The Contractor shall *| grade the planting areas to plan elevation before the Contractor plants. *|

The Contractor shall add a two (2) inch layer of soil amendment for *| shrubs, vines and ground cover planting areas. The Contractor shall till *| the soil amendment into the soil to a depth of not less than six (6) *| inches until the soil is loose and fine textured. The soil shall be free from stones greater than a half (1/2) inch in diameter.

The Engineer may eliminate soil amendment for slopes steeper than *| 3:1 if the Engineer decides the slope is steep to till. *|

(B) **Planting Time.** The Contractor shall not plant if the weather or *| other conditions does not permit. *|

(C) **Plant and Tree Holes.** The diameter of each hole shall be at least *| four (4) feet larger than the trunk of the tree at ground level. The *| trunk of the tree need not be greater than the dimensions of the root system plus one (1) foot. The depth of the hole shall be large enough to contain the ball of the root system plus specified planting soil and manure. In subsoil condition, the Contractor shall increase the tree or *| plant hole diameter and depth according to the contract. Such increase *| will not be more than one (1) foot of the required diameter and depth. *|

If encountered, the Contractor shall break up coral, rock, or hard pan to a depth of not less than twelve (12) inches below the normal depth of the hole. *

(D) Planting.

(1) General. The Contractor shall not order the materials until after the Contractor excavates and prepares the tree or plant holes. The actual planting operations shall proceed without delay to avoid undue evaporation and drying of roots while exposed to the air. *

The Contractor shall prune bruised or broken roots with a clean cut at the time of planting. *

Trees shall stand about three (3) to four (4) inches deeper and shrubs and vines shall stand about two (2) inches deeper than the plants stood in the nursery or collecting field after settlement of the backfill. *

The Contractor shall plant trees and shrubs plumb. Only experienced workers shall plant and transplant. *

After the Contractor plants the trees and shrubs, the Contractor shall spade or till a two (2) feet wide area outside the pit eight (8) inches deep around the plants. The Contractor shall keep the planting soil separate from subsoil. Before backfilling, the Contractor shall render the planting soil loose and friable. Backfill mix for trees and shrubs includes one (1) part soil amendment, one (1) part manure and three (3) parts soil by volume. *

Planting shall be complete by the end of contract time.

The Contractor shall form earth saucers or water basins at least four (4) inches in depth below the existing ground and equal in diameter to the plant pit around individual plants. If the Contractor plants in prepared shrub beds, the Contractor shall form the earth saucers or water basins around the perimeter of each shrub bed. *

(2) Plants in Containers. Before removing trees, shrubs, and vine from containers and before the Contractor plants, the Contractor shall place the trees, shrubs, and vines in their relative positions shown in the contract. Upon acceptance, the Contractor shall then plant the trees, shrubs, and vines in their permanent positions. The Contractor shall carefully remove the plants from the containers so as not to disturb the root systems. *

(3) Plants with Exposed Roots. After the Contractor firms the soil in the bottom of the hole and the Contractor places the plant in the proper position, the Contractor shall work the loose, friable planting soil around the roots and firm thoroughly at intervals during the process of backfilling. The Contractor shall not bruise or break the roots when tamping or firming the soil about the plants.

The Contractor shall not include sticks, sod, clods, or other material that would form large air pockets in the soil in the backfill. The Contractor may use sod near the bottom of the pit or excavation if thoroughly broken into small pieces when the Contractor places the plant or tree.

(4) Balled and Burlapped Plants. The Contractor shall handle and place balled and burlapped plants in the holes so that the Contractor shall not loosen the soil of the ball. After the Contractor partly backfills the hole and firms the soil thoroughly under and around the ball, the Contractor shall cut the burlap away from the upper half of the ball and roll back. The Contractor shall adjust the remaining burlap to prevent the formation of air pockets. The Contractor shall then complete backfilling and tamping to avoid loosening the soil in the root ball.

(5) Pruning of Plants. The Contractor shall prune the plants according to the contract.

Shade trees with heavy tops shall have about one-third (1/3) to half (1/2) of the growth removed by accepted methods. The Contractor shall prune to preserve the natural character of the plant. The Contractor shall remove broken or badly bruised branches with a clean cut. The Contractor shall paint cut surfaces over two (2) inches in diameter with an accepted standard pruning compound.

-- An experienced pruner shall prune the material properly and systematically after the Contractor plants the stock. The Contractor shall prune by the process of thinning to maintain and preserve the characteristic shape or natural form of the material. The Contractor shall dispose of the material removed by pruning according to the contract.

(6) Surplus Excavated Material. The Contractor shall scatter and level off surplus material from subsoil excavations made for tree pits and holes for shrubs and vines. The Contractor shall break up lumps fine to leave a neat, smooth appearance. If the subsoil cannot blend readily with the surface soil of the planting areas, the Contractor shall remove and dispose of the material within the highway right-of-way as ordered.

(7) Watering. The Contractor shall water the plants the same day *|
of planting. The Contractor shall apply water in a moderate stream *|
until the Contractor saturates the backfill soil around and below *|
the roots or ball of earth around the roots of each plant *|
thoroughly. After the first watering, the Contractor shall water *|
the plants as often and in sufficient amount as conditions may *|
require. *|

If the Contractor installs a sprinkler system, the Contractor *|
may use and operate such system. The Contractor shall maintain the *|
system and pay for the water used during the period of maintenance. *|

Watering equipment shall be of a type that will not cause *|
damage to the planted area or its surroundings. The Contractor *|
shall correct the water systems that cause erosion or runoff and *|
deemed unacceptable. If the planted area or its surrounding erodes *|
due to the watering method, the Contractor shall immediately remove *|
the runoff material and restore the area to the original grade and *|
condition. *|

(8) Planting Period. The Contractor shall replace plants that *|
fail to develop a healthy growth or destroyed during a ninety (90) *|
day planting period. *|

The Contractor shall water, cultivate, weed, prune, and apply *|
pesticide, if required, to the plants for not less than ninety (90) *|
days after completion of planting in designated areas. *|

Weeding is when the contractor removes undesirable plants and *|
their root systems, except nut grass. *|

The Contractor shall apply fertilizer at the following rates *|
at the time of planting and again at forty (40) to fifty (50) days *|
after planting: *|

(a) Trees - quarter (1/4) pound per inch diameter of trunk.

(b) Shrubs and vines - quarter (1/4) pound per plant.

The Contractor shall place: *|

(a) mulch material over pit or saucer areas of individual *|
trees or shrubs *|

(b) over the entire area of shrub beds *|

(c) to a depth of at least four (4) inches and *|

(d) within two (2) weeks after planting. *|

If the Contractor attains satisfactory growth before ninety *|
 (90) days, the Contractor may submit a written request to the *|
 Engineer requesting for an earlier end to the planting period. |

(9) Staking and Guying. The Contractor shall guy the trees over *|
 six (6) feet high securely in three (3) directions with zinc-coated *|
 steel wire of the gage specified. The Contractor shall prevent the *|
 guy wires from cutting into the trunk by placing lumber or other *|
 non-cutting material around the trunk before fastening the guy wires *|
 to the tree. The Contractor shall drive wood stakes eighteen (18) *|
 inches into firm ground. The Contractor shall drive iron pipe or *|
 reinforcing steel stakes thirty (30) inches into firm ground. The *|
 Contractor shall keep guy wires and supports in place until the tree *|
 can support itself. *|

(10) Windbreaks. The Contractor shall the build windbreaks for *|
 trees less than eight (8) feet high. The Contractor shall place *|
 windbreaks on the side of the tree toward the prevailing wind and *|
 make as slightly as possible. Windbreaks include a wooden frame *|
 forming two (2) panels at right angles to each other with the angle *|
 projecting into the wind. The Contractor shall drive the uprights of *|
 these frames securely into the ground. The Contractor shall then *|
 cover the frame with a protective material such as palm leaves or *|
 sacking. *|

Each frame includes three (3) wood posts approximately two (2) |
 inches by three (3) inches in size and eight (8) feet long. The *|
 Contractor shall drive the frame so the windbreak shall be *|
 approximately six (6) feet high and each panel shall be four (4) *|
 feet wide. The Contractor shall fasten the posts with horizontal *|
 wooden battens, one inch by three (3) inches in size. The Contractor *|
 shall fasten the posts at the top of the posts and near the ground. *|
 Lumber need not be new, but shall be sound and free of objectionable |
 color. |

(11) Cleaning After Planting. The Contractor shall remove empty *|
 containers and debris accumulating from planting from the project *|
 when the Contractor completes the planting. *|

(12) Transplanting Existing Trees. The contract will designate *|
 existing trees that the Contractor will transplant. The Contractor *|
 shall remove and dispose of trees not designated for transplanting *|
 or not left in place according to Section 201 - Clearing and *|
 Grubbing. *|

The applicable requirements for planting shall also apply to
 transplanting.

The Contractor shall remove a tree with a ball of soil at the roots at least two (2) feet larger than the trunk of the tree on each side at ground level. The trunk of the tree need not be greater than the dimensions of the root system plus one (1) foot.

The Contractor shall transplant trees immediately into holes large enough to contain the root system of the tree plus specified planting soil and manure.

The Contractor shall coat the cut section of exposed roots with a moist paste of a standard, acceptable hormone for the stimulation of new root growth before the Contractor removes the tree. The Contractor shall place a mixture half (1/2) manure to half (1/2) topsoil in the bottom of each hole except coconut trees. The Contractor shall sprinkle the holes for coconut trees evenly with Chilean nitrate potash or an equal formula at the rate of four (4) to five (5) pounds per tree.

(E) Plant Establishment. Only State and Federal projects require a plant establishment period. A plant establishment period is when the Contractor takes care of the planted area for nine (9) acceptable months from the accepted completion date of the planting period. If provided for in the contract, this period may be shorter or longer depending on the type of plant or unusual conditions.

During the plant establishment period, the Contractor shall water, fertilize, cultivate, weed, prune, and apply pesticide, if required. If the Contractor injures, damages, destroys, or fails to develop healthy plants, the Contractor shall replace those plants. The Contractor shall remove dead or unsatisfactory plants promptly from the project. The Contractor shall complete replacement within two (2) weeks after notice that the plant is not acceptable.

Besides the applications during the planting period, the Contractor shall apply fertilizer at least three (3) times during the plant establishment period at intervals not closer than two and a half (2-1/2) months at the rate of:

- (a) Trees - one-third (1/3) pound per inch diameter of trunk
- (b) Shrubs and vines - one-third (1/3) pound per plant.

The Contractor shall remove and dispose of surplus earth, papers, trash and debris that accumulates in the planted areas. The Contractor shall care for the planted areas so to present a neat and clean condition.

The Engineer will credit the Contractor plant establishment days when the Contractor does the planted area according to the contract even if the Contractor does not work daily.

The Engineer will not credit the Contractor plant establishment days *|
when the Contractor fails to do plant establishment work adequately *|
according to the contract. *

(F) **Acceptance.** The Engineer will decide the acceptability of the *|
plant material furnished and planted as specified when the establishment *|
or planting period ends, whichever is later. The Contractor shall employ *|
means to preserve the plants in a healthy growing condition. The Engineer *|
will hold a semi-final inspection to decide the acceptability of the *|
plant material ninety (90) days before the end of the plant establishment *|
period.

When there is no plant establishment period, the Engineer will hold *|
a final inspection when the planting period ends. The Contractor shall *|
replace dead and unsatisfactory plants in kind or quantity and size with *|
live healthy plants installed as originally specified. The Contractor *|
shall use alternate or substitute varieties of plants only if accepted by *|
the Engineer.

For projects with a plant establishment period, the Engineer will *|
hold a final inspection of plant material ninety (90) days after the *|
Contractor completes the replacement planting. *

619.04 Method of Measurement. The Engineer will measure trees, shrubs, and *|
vines per each or square foot as specified in the proposal complete in place. *

Planting and transplanting of trees, shrubs and vines will not be |
measured for when contracted on a lump sum basis. |

619.05 Basis of Payment. The Engineer will pay for the accepted quantities *|
of trees, shrubs and vines at the contract unit price per each or on a lump *|
sum basis and of the various species and sizes.

The price shall be full compensation for clearing and grading the *|
planting areas, preparing the planting areas, watering, planting and *|
transplanting, adding soil amendments, furnishing plants, placing and/or *|
planting materials, plant establishment, furnishing equipment, materials, *|
tools, labor, and incidentals necessary to complete this work. *

The Engineer will make payment under: *

Pay Item	Pay Unit
Planting Trees, (Species), ___ Inches High	Each
Planting Trees, (Species), ___ Inches High (___ Each)	Lump Sum
Planting Shrubs, (Species), ___ Inches High	Each
Planting Shrubs, (Species), ___ Inches High (___ Each)	Lump Sum

Planting Vines, (Species), ___ Inches Long	Each
Planting Vines, (Species), ___ Inches Long	Square Foot
Planting Vines, (Species), ___ Inches Long (___ Each)	Lump Sum
Transplanting (Species)	Each
Transplanting (Species) (___ Each)	Lump Sum

(A) Partial Payment Schedule For Planting Period Only: |

(1) forty (40) percent of the contract bid price upon completion of planting; |

(2) sixty (60) percent of the contract bid price upon completion of the planting period; |

(B) Partial Payment Schedule For Planting Period With Plant Establishment Period; |

(1) sixty (60) percent of the contract bid price upon completion of planting; |

(2) fifteen (15) percent of the contract bid price in three (3) monthly payments of five (5) percent for satisfactory progress during the planting period; |

(3) twenty (20) percent of the contract bid price in eight (8) monthly payments of two and a half (2-1/2) percent for satisfactory progress during the plant establishment period; |

(4) five (5) percent of the contract bid price at final acceptance of the plant establishment period. |

The Engineer will pay for planting soil according to Section 617 - *|
Planting Soil. *

When not specified in the proposal, the Engineer will not pay for *|
planting and transplanting of trees, shrubs and vines separately. The *|
Engineer will consider planting and transplanting of trees, shrubs and vines *|
incidental to the various items of the contract. *