A300 (Part 6)-20xx Revision *Planting and Transplanting*

Tree, Shrub, and Other Woody Plant Management – Standard Practices (*Planting and Transplanting*)

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Tree, Shrub, and Other Woody Plant Management – Standard Practices (Planting and Transplanting)

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Foreword (If approved, this foreword will not be part of the American National Standard A300 Part 6-20xx)

ANSI A300 Standards are divided into multiple parts, each focusing on a specific aspect of woody plant management (e.g. Pruning, Soil Management, Supplemental Support Systems, etc).

These standards are used to develop written specifications for work assignments. They are not intended to be used as specifications in and of themselves. Management objectives may differ considerably and therefore must be specifically defined by the user. Specifications are then written to meet the established objectives and must include measurable criteria.

ANSI A300 standards apply to professionals who provide for, or supervise the management of, trees, shrubs, and other woody landscape plants. Intended users include businesses, government agencies, property owners, property managers, and utilities. The standard does not apply to agriculture, horticultural production, or silviculture, except where explicitly noted otherwise.

ANSI A300 standards are developed by the Tree Care Industry Association (TCIA), an ANSI-accredited Standards Developing Organization (SDO). TCIA is secretariat of the ANSI A300 standards, and develops standards using procedures accredited by the American National Standards Institute (ANSI).

Consensus for standards writing is developed by the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Management Operations – Standard Practices, A300 (ASC A300).

Prior to 1991, various industry associations and practitioners developed their own standards and recommendations for tree care practices. Recognizing the need for a standardized, scientific approach, green industry associations, government agencies and tree care companies agreed to develop consensus for an official American National Standard.

The results – ANSI A300 standards – unify and take authoritative precedence over all previously existing tree care industry standards. ANSI requires that approved standards be developed according to accepted principles, and that they be reviewed and, if necessary, revised every five years.

TCIA was accredited as a standards developing organization with ASC A300 as the consensus body on June 28, 1991. ASC A300 meets regularly to write new, and review and revise existing, ANSI A300 standards. The committee includes industry representatives with broad knowledge and technical expertise from residential and commercial tree care, utility, municipal and federal sectors, landscape and nursery industries, and other interested organizations.

The public review period for this draft runs from August 5, 2011 through September 19, 2011. This draft is not approved for trial use. After the public review period the Part 6 draft may be submitted to ANSI by TCIA and the ANSI-accredited Standards Committee A300 (ASC A300). Committee approval of the standard will not necessarily imply that all committee members voted for its approval.

ASC A300 mission statement:

Mission: To develop consensus performance standards based on current research and sound practice for writing specifications to manage trees, shrubs, and other woody plants.
Part 6 – Standard Practices *(Planting and Transplanting)*

1.1 Scope

ANSI A300 performance standards cover the care and management of trees, shrubs, palms, and other woody landscape plants.

1.2 Purpose

**ANSI A300 standards** are intended for the development of work practices, written **specifications**, best practices, regulations and other measures of performance.

1.2.1 These standards may be excerpted or incorporated by reference; however, they are not intended to be adopted in their entirety into laws and regulations or as work specifications without additional information and clarification.

1.3 Application

ANSI A300 standards shall apply to any person or entity engaged in the management of trees, shrubs, palms, or other woody plants, including federal, state or local agencies, utilities, **arborists**, consultants, arboricultural or landscape firms, and managers or owners of property.

1.3.1 ANSI A300 standards shall not apply to commercial agricultural, horticultural production, or silviculture unless this standard, or a portion thereof, is expressly referenced in other standards or specifications.

60 Part 6 – Planting and Transplanting standards

60.1 Purpose

The purpose of this document is to provide standards for developing specifications for **planting** and **transplanting** trees, shrubs, palms, and other woody landscape plants.

60.2 Reasons

Planting and transplanting are performed to relocate landscape plants to meet specific objectives.

60.3 Implementation

60.3.1 Specifications for planting and transplanting should be written and administered by an arborist or other qualified professional.

60.3.2 The location of utilities and other obstructions both below and above ground shall be considered prior to planting and transplanting operations. Utilities and other obstructions include, but are not limited to, gas, electric, communications, sewer, drainage, water supply, irrigation, and signage.

60.4 Safety

60.4.1 This performance standard shall not take precedence over applicable industry safe work practices.

60.4.2 Performance shall comply with applicable federal Occupational Safety and Health Administration (OSHA) standards, ANSI Z133, and state and local laws and regulations as they apply.

61 Normative references

The following standards and/or laws contain provisions that, through reference in this text, constitute
provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards and/or laws are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent edition of the standards and/or laws indicated below.

ANSI Z60.1, Nursery stock⁴

ANSI Z117.1, Safety Requirements for Confined Spaces²

ANSI Z133, Safety Requirements for Arboricultural Operations³


29 CFR 1910, General Industry⁴

29 CFR 1910.146, Permit-required Confined Spaces (PRCS)⁴

29 CFR 1910.268, Telecommunications⁴

29 CFR 1910.269, Electric Power Generation & Distribution⁴

29 CFR 1910.331-335, Electrical Safety⁴

⁴ Available from U.S. Department of Labor, 200 Constitution Ave., NW, Washington, DC 20210.

62 Objectives

62.1 Planting and/or transplanting objectives shall be established prior to beginning operations. The objective is to have the plant(s) become established and provide benefits including but not limited to:

- Aesthetics;
- Ecosystem services;
  - Air pollution mitigation;
  - Carbon sequestration;
  - Erosion mitigation;
  - Habitat;
  - Public health;
  - Shade/energy conservation; and
  - Water management;
- Meet regulatory requirements;
- Preservation;
- Resolve conflicts with planned use or existing infrastructure.
- Screening;
- Sentimentality/commemoration; and
- Site restoration.

63 Tree and site assessment

63.1 A site inspection visit shall be conducted to develop a suitability and feasibility assessment.

63.2 Trees to be transplanted shall be inspected by an arborist or other qualified professional to develop the suitability and feasibility assessment.
63.3 The suitability and feasibility assessment should include:

- An evaluation of potential hazards and conflict with utilities (overhead and underground), lines of sight, buildings, and other infrastructure;
- Species characteristics and requirements;
- Site characteristics (ANSI A300 Part 2 – Soil Management standard);
- An evaluation of invasiveness;
- Existing plant(s) size, health, and root issues; and
- Protection needs of other plants on the site (ANSI A300 Part 5 – Management of Trees and Shrubs During Site Planning, Site Development, and Construction standard).

63.4 Specifications for planting and transplanting shall be based on the site and species suitability and feasibility assessment.

63.5 Species, specimen, and site should be compatible.

64 Specifications

64.1 Written specifications for planting and transplanting should include:

- Objective(s) (62);
- Identification of species, quality, and number of plants to be planted or location of the specimen(s) to be transplanted;
- Location of planting site(s);
- Type of suitability and feasibility assessment report (i.e., written, verbal, plan sheet, 63.2);
- **Planting/transplanting system** and stock: bare root, ball and burlap, container, or tree spade;
- **Root ball** dimensions (e.g., diameter and height)/container size (65.4);
- Excavating and lifting methods (65.7);
- Moving and storage methods (65.8);
- Plant and site preparation requirements (e.g., root pruning, irrigation, turf removal, 65.9);
- Installation requirements (65.10-65.12):
  - Planting hole dimensions (i.e., shape, width/diameter, and depth);
  - Removal of root ball support materials;
  - Initial watering requirements;
  - **Mulch** type, depth, and area; and
  - Support system.
- Plant acceptance criteria and timing of acceptance inspection (64.2.1);
- Start and completion dates; and
- Post planting care - duration and activities (65.13).

64.1.1 Written plant acceptance criteria should include:

- Species and cultivar as ordered;
- Compliance with regulatory requirements for insect and disease;
- Meets specified quality;
- Plant height and/or trunk diameter;
- Root ball dimensions (i.e., shape, width/diameter, height);
- Condition (i.e., health, structure, and form);
- **Root collar** (or root initiation zone) visibility (e.g., height above grade, soil depth over root collar);
- Root ball moisture requirement;
- Presence of existing or potential stem girdling roots; and
- Other issues impacting potential of survival.

64.1.2 Trees that do not meet the acceptance criteria should be rejected.

65 Practices
65.1 Inspection

65.1.1 A qualified professional should conduct a visual inspection of the plant(s) and site to identify conditions that would affect completion of the work.

65.1.2 Conditions identified shall be reported to a supervisor or to the client, owner, or owner’s agent.

65.2 Tools and equipment

65.2.1 Tools shall be appropriate for the job.

65.2.2 Digging and root cutting tools shall be sharp to cleanly cut without breaking, crushing, or tearing living tissue.

65.2.3 Work practices that damage living tissue, other plants, or property beyond the scope of normal work practices shall be avoided.

65.3 Timing

65.3.1 Season and phenology shall be considered.

65.4 Root ball size (general)

65.4.1 The objective and plant species, size, and condition should be considered when determining the root ball size.

65.4.2 The root ball shall be large enough to ensure establishment. Considerations for root ball size should include:
  - Species transplant tolerance;
  - Plant health;
  - Soil characteristics;
  - Climate and environmental conditions (e.g., wind, moisture, temperature);
  - Tree size (height and trunk diameter);
  - Tree anchoring requirements;
  - Handling and access limitations;
  - Planting space limitations; and
  - Planting hole parameters.

65.5 Root ball size (except palms)

65.5.1 Trunk diameter shall be measured at 6 inches (15 cm) above the base of the root collar for trees up to 4-inch (10 cm) diameter at that height. Trees greater than 4 inches (10 cm) caliper at 6 inches (15 cm) above the base of the root collar shall be measured at 12 inches (30 cm) above the base of the root collar. Trees greater than 8-inch (20 cm) caliper at 12 inches (30 cm) above the base of the root collar shall be measured at 54 inches (diameter at breast height [DBH], 137 cm) above the base of the root collar (soil grade).

65.5.2 Trees and shrubs with a trunk diameter less than or equal to 8 inches (20 cm) shall meet the minimum root ball size presented in the ANSI Z60.1 American Standard for Nursery Stock.

65.5.3 Trees larger than 8 inches (20 cm) trunk diameter should have a minimum root ball width (diameter) of 10 inches (25 cm) for every inch (2.54 cm) of trunk diameter.

65.5.4 Trees larger than 16 inches (40 cm) trunk diameter should have a minimum root ball width (diameter) of 8 inches (20 cm) for every inch (2.54 cm) of trunk diameter.
65.5.5 The height of the root ball shall be measured from the base of the root collar to the bottom of the ball. If the root collar is not visible, excess materials (e.g., soil, mulch) shall be removed.

Figure 65.5.5: Root collar location (also called root-stem transition zone or trunk flare)

65.6 Root ball size (palms)

65.6.1 Trunk diameter shall be measured immediately above the root initiation zone for single-trunked palms and should exclude persistent leaf bases.

65.6.2 Root ball width (diameter) shall be specified based on species and tolerance.

65.6.3 The minimum root ball width (diameter) shall equal the measurement of the trunk diameter plus 6 to 24 inches (15 cm to 61 cm) based on species and tolerance.

65.7 Excavating and lifting the plant

65.7.1 Utility locations shall be considered prior to excavation.

65.7.2 Pneumatic and hydraulic excavation methods should be considered.

65.7.3 Excavation operations should not intrude into the final root ball.

65.7.4 The trunk should be centered in the root ball.

65.7.5 Adjustments shall be made for differences between slope gradients of the current and planned site.

65.7.6 Plant(s) should be lifted by the root ball unless bare root.

65.8 Moving and storing

65.8.1 Storage and moving conditions should be favorable for maintaining plant health. Consideration should be given to:
   - humidity,
   - dormancy,
   - temperature,
- light exposure,
- covering and supporting during transportation,
- root ball moisture, and
- other factors, as necessary.

65.8.2 Desiccation and physical injury to the plant(s) shall be minimized.

65.9 Site preparation

65.9.1 Soil and site modifications determined in the suitability and feasibility assessment should be made prior to or in conjunction with planting.

65.9.2 Planting hole depth shall result in the base of the root collar being at, or slightly above, final grade.

65.9.3 The soil directly beneath the root ball should be undisturbed or prepared to minimize settling.

65.9.4 The planting hole width shall be based on soil density, texture, and structure at the site as determined in the feasibility and suitability assessment.

65.9.5 Installation of a soil drainage system should be considered (ANSI A300 Part 2).

65.9.6 On sites with high quality soil, the planting hole width should be large enough to facilitate planting.

65.9.7 On sites with poor quality soil (e.g., compacted, poorly drained), the planting hole width should be increased as necessary to encourage plant establishment, survival, and longevity.

65.9.8 The sides of the planting hole should be scarified when necessary.

Figure 65.9.8: A properly prepared planting hole.
65.10 Installation

65.10.1 Circling, girdling, and kinked roots should be pruned or redirected away from the trunk.

65.10.2 Excess soil or other material over the root collar shall be removed.

65.10.3 The base of the root collar shall be at, or slightly above, the final grade.

65.10.4 Root ball support materials should be removed in their entirety prior to backfilling.

65.10.5 Non-biodegradable fabric and plastic containers shall be removed from the root ball.

65.10.6 Single-stemmed plants should be vertical unless otherwise specified.

65.10.7 Bare root plants should be installed so root systems are distributed throughout the backfill.

65.10.8 Containers shall not be removed by pulling or leveraging the trunk of the tree.

65.11 Backfill and mulch

65.11.1 Backfill should consist of the excavated soil, similar soil, or amended soil to meet a specific requirement.

65.11.2 The addition of soil amendments should be based on the feasibility and suitability assessment.

65.11.3 Backfill should be installed to the finished grade.
65.11.4 Backfill should be compacted sufficiently to limit root ball movement and settling but not to a density that inhibits root growth.

65.11.5 Water shall be applied to saturate the backfill and root ball at the time of planting.

65.11.6 Organic mulch should be applied to the perimeter of the planting hole, but not touching the root collar or trunk.

65.11.7 Mulch depth should not inhibit water infiltration or tree growth.

65.12 Support systems

65.12.1 Support systems should be installed only when needed.

65.12.2 Systems should include one or more of the following configuration types:

- Prop
- Guy
- Stake
- Root ball anchor

65.12.3 Temporary systems shall be preferred.

65.12.4 Guys should be attached at or above a point one-half the height of the tree.

65.12.5 Guys should be visually identified, marked, and/or protected.

65.12.6 Supports shall be attached using a method that minimizes damage to the tree.

65.12.7 A minimum of two guys or props should be installed at an angle sufficient to support the tree.

65.12.8 For trees with a trunk diameter over 10-inches, guys should be installed in accordance with subclause 39.

65.12.9 Supports shall be secured to ground anchors sufficient to achieve the objective.

65.12.10 Stakes and guy anchor stakes should be installed vertically.

65.12.11 Supports shall be removed when they are no longer needed.

65.13 Post-planting care

65.13.1 The client, owner, or owner’s agent shall be notified of the need for post-planting care. It shall be the responsibility of the client, owner, or owner’s agent to provide post-planting care.

65.13.2 Post-planting care should be specified for an appropriate period of time based on the region, site conditions, and species.

65.13.3 Post-planting care should consist of, but is not limited to:

- soil moisture management (ANSI A300 Part 2 – Soil Management standard);
- mulching (ANSI A300 Part 2 – Soil Management standard);
- protection from mechanical injury, animals, competing vegetation, or other causes (ANSI A300 Part 10 – Integrated Pest Management standard and ANSI A300 Part 5 – Management of Trees and Shrubs During Site Planning, Site Development, and Construction standard);
- integrated pest management (ANSI A300 Part 10 – Integrated Pest Management standard);
- pruning (ANSI A300 Part 1 – Pruning standard); and
• maintenance/removal of tree support systems (ANSI A300 Part 3 – Supplemental Support Systems standard) and trunk protection.

66 Definitions

66.1 arborist: An individual engaged in the profession of arboriculture who, through experience, education and related training, possesses the competence to provide for, or supervise the management of, trees and other woody plants.

66.2 backfill: Media (e.g., excavated soil, amended soil, soil mix) used to fill the remainder of the planting hole after the root ball is installed.

66.3 ball and burlap: Plants prepared for relocation by digging around the root ball and then wrapping and securing the root ball in burlap or other material.

66.4 bare root: Plants prepared for relocation by digging around the root ball and removing most of the soil or growing media from the root ball.

66.5 burlap: A loose-weave fabric that is used to protect plant parts and/or add support to root balls during planting and transplanting operations. May be natural (untreated and biodegradable), chemically treated with preservatives, combined with synthetic fibers, or made entirely of synthetic fibers (not biodegradable).

66.6 caliper: Stem width (diameter) measured at a specified height.

66.7 circling root: A root that encircles all or a portion of a trunk or root ball but does not contact the trunk.

66.8 client, owner, or owner’s agent: A person, corporation, or other entity who has hired the qualified professional.

66.9 container: A flat, pot, tub, box, bag, basket, or other enclosure, usually made of plastic, fiber, wood, ceramic, or metal, used to grow or hold one or more plants, or plants that have been grown, moved, or stored in a container.

66.10 diameter at breast height (DBH): A measurement of trunk diameter taken at 4-1/2 feet (1.37 m) from the base of the root collar.

66.11 grade: Ground level.

66.12 tree spade: Digging equipment used to transplant large trees employing large, steel spades driven by hydraulics, or plants dug employing large, steel spades driven by hydraulics.

66.13 mulch: Material applied to the soil surface to protect the soil surface, deter erosion, moderate soil temperature, conserve moisture, inhibit weeds, and improve soil structure.

66.14 planting: The process of installing plants into the landscape.

66.15 planting/transplanting system: The process used in producing trees in the nursery or digging them in the field, resulting in bare root, ball and burlap, container (e.g., pot, box, wire basket), or tree spade plants.

66.16 root ball: The root mass retained with the plant after digging or removal from a container. It may or may not contain soil or other growing media.

66.17 root ball support materials: Pots, boxes, wire baskets, burlap, wire mesh, or twine that surround the root ball and trunk.
66.18  **root collar:** The transition zone between the trunk and root system (Figure 1) (also called root-stem transition zone or trunk flare).

66.19  **root initiation zone:** In palms, the region of the trunk from which roots emerge.

66.20  **root cutting:** Non-selective severing of roots.

66.21  **root pruning:** Selective severing of roots.

66.22  **shall:** As used in this standard, denotes a mandatory requirement.

66.23  **should:** As used in this standard, denotes an advisory recommendation.

66.24  **soil amendment:** Material incorporated into the soil that alters its physical, chemical, and/or biological characteristics.

66.25  **specifications:** A document stating a detailed plan or proposal for provision of a product or service.

66.26  **standard, ANSI A300:** The performance parameters established by industry consensus as a rule for the measure of extent, quality, quantity, value or weight used to write specifications.

66.27  **stem girdling root:** A root that compresses a trunk or buttress root.

66.28  **suitability and feasibility assessment:** An assessment of the site and tree or species to determine size, health, root issues, potential conflicts, species requirements, and site characteristics (e.g., soil texture, soil moisture, drainage, topography).

66.29  **transplanting:** The process of relocating an existing plant into the landscape.

66.30  **trunk diameter:** Stem width measured at a specified height.

66.31  **trunk protection:** Material installed around the trunk to prevent damage.
Flow chart of planting/transplanting

1. Define Objective
2. Assess Plant(s) and Site
3. Select Planting/Transplanting System and Stock
4. Develop Specification
5. Excavate and Lift
6. Move and Store
7. Inspect Plant for Acceptance
8. Prepare Site
9. Install Plant
10. Backfill and Mulch
11. Inspect for Acceptance
12. Post-Planting Care
Annex A – Sample suitability and feasibility assessment report
(This annex is not part of the ANSI A300 Part 6 standard.)

The assignment is to help determine the suitability for transplanting a valley oak (*Quercus lobata*). The information in this report is limited to the condition of the tree during my inspection on October 15, 2019. The report is to be used by the owner, owner’s agents, and the local municipality as a reference for existing conditions to help satisfy planning requirements.

The valley oak has a trunk diameter of 26 inches (81.64 inches in circumference) and is approximately 50 feet tall with a 45-foot crown diameter. The tree has normal foliar color, size, and density for the species with moderate sized scaffold branches and a symmetrical crown. The trunk is vertical with no visible decay. The root collar is partially exposed with visible buttress roots on all sides, and the environment under the tree consists of undisturbed soil. There are no utilities above or under the tree.

A tree’s suitability for transplantation is determined based on its health, structure, age, species characteristics, longevity, current, and new growing environments. Prior to transplanting it is important to assess these characteristics. The tree’s general health, foliar color and density, and signs of insects or disease are assessed. The structural condition of the tree including the roots, overall shape and symmetry of the crown, current growing environment, and past and future pruning needs all need to be accounted for and be acceptable. Species data and transplantation history and any other conditions that could limit the survival of the plant are also examined.

The transplant site including any above ground or underground utilities, access, soil conditions, slope, grade, and orientation, is also assessed during the evaluation for suitability. The species itself may be the limiting factor whereas there is anecdotal evidence to suggest valley oaks do not transplant as easily as other native oaks such as coast live oak (*Quercus agrifolia*) (Costello, L. R., Hagen B.W., and Jones K. S. 2011).

The valley oak is in good condition and has good suitability for transplanting and will be moved only a short distance across the field to its new location. There are no utility conflicts under or above the tree in its current or proposed location. The proposed location is close to a new house, and pruning for clearance will be required.

The following should be performed prior to transplanting:
- Mark the north side of the tree, and install with the same cardinal orientation as existed prior to transplanting.
- Dig the planting hole well ahead of transplanting to evaluate any unforeseen soil conditions or obstructions.
- Dig the hole sufficiently large enough to accommodate backfill soil that can encourage root growth and development.
- Avoid cracking or breaking the root ball.
- After planting, anchor the tree with guy wires or similar material to avoid shifting in the planting hole.

It is possible to transplant oaks during most times of the year in this part of California. Deciduous trees such as the valley oak should be transplanted during their dormant period after leaf drop in the fall and prior to bud break in the spring (Costello, L. R., Hagen B.W., and Jones K. S. 2011). Avoid transplanting during heat waves or times when frost or extreme low temperatures are expected.

The most recent edition of *ANSI A300 (Part 6) Transplanting Tree, Shrub, and other Woody Plant Maintenance - Standard Practices* suggests trees greater than sixteen inches (16") in diameter should have a minimum root ball of eight inches (8") for every inch of trunk diameter. Because valley oak is 26 inches in diameter this would require a root ball radius of eight- and one-half feet (8.5’) all the way around the trunk (17-foot root ball diameter).

Most of the weight will be in the root ball, and supporting the tree by its trunk may be required for control only. No portion of the support system shall directly contact the trunk without some type of protection.
such as carpet or other padding to avoid bark damage. However, wide slings that do not dig into or damage the bark may be acceptable.

There are some cultural practices that can be employed to help the valley oak survive after the root loss associated with transplantation. Keeping the current conditions inside the remaining root zone and proper watering will be important factors in the tree’s survival after transplantation. The ball size, diameter, and depth should encompass as much of the root system as necessary to successfully transplant the tree.

In conclusion the valley oak has good suitability for transplanting and has desirable characteristics for relocation. The valley oak should be transplanted during the dormant period after leaf drop in the fall and prior to bud break in the spring. Extreme heat and cold conditions should be avoided. Trees greater than sixteen inches (16”) in diameter should have a minimum root ball of eight inches (8”) for every inch of trunk diameter. Because the valley oak is 26 inches in diameter this would require a root ball radius of eight- and one-half feet (8.5 feet) all the way around the trunk (17-foot root ball diameter).

I recommend requiring the contractor transplanting the valley oak to provide written work specifications describing how the tree will be moved, when, how much root area is to be retained, pruning specifications, and watering requirements, along with an aftercare program and schedule, all according to the most recent applicable ANSI A300 Tree Shrub, and other Woody Plant Maintenance - Standard Practices Parts 1-10. Move the tree according to the most recent version of Best Management Practices: Tree Planting. Champaign, IL: International Society of Arboriculture.

References Cited


Annex B – Sample specification for planting and transplanting projects
(This annex is not part of the ANSI A300 Part 6 standard.)

Example 1. Hedge planting

Objective: Install plants to form a hedge to provide screening from the adjacent property.

The contractor will:
1) Assess the site for planting feasibility and collect a soil sample or nutrient analysis.
2) Provide ten (10) 4-foot tall ball and burlap or container arborvitae.
   a. The client will inspect the plants on arrive for acceptance (see acceptance criteria below)
   b. Root ball size shall be appropriate for the plant size.
3) Plant the arborvitae in a straight line at marked locations on a 3-foot spacing near the property line.
4) Cultivate the soil in a 3-foot wide line along the planting sites to a depth of 6 inches and incorporate organic matter and fertilizers, and adjust pH as specified by a soil nutrient analysis report. If nitrogen is needed per a soil nutrient analysis report, only a slow release fertilizer with a minimum of 50 percent water insoluble nitrogen should be used.
5) Cover plants during transportation to avoid dessication.
6) Excavate the planting hole to a size that is at least twice the diameter of the root ball and no deeper than the depth of the root ball.
7) Remove all root ball support materials or containers at the time of planting.
8) Water the plants to saturation at planting.
9) Apply landscape-generated wood chip mulch (free from contaminants such as nails and paint) from near the trunk to a 3-foot radius and to a depth of 2 inches.
10) Complete work by October 15 of this year.

After installation, plant maintenance will be the responsibility of the homeowner.

Plant acceptance criteria
The nursery plants may be rejected if:
- they are not the species or size specified,
- the root ball dimensions are not appropriate for the plant size,
- plants are not healthy with good structure and form,
- the root collar is not visible,
- stem girdling roots are present, or
- root balls are not moist.

Example 2. Large Tree Transplanting

Objective: Relocate the red maple to provide shade to the backyard deck and house in the summer.

The contractor will:
1) Assess the site for planting feasibility and collect a soil sample for nutrient analysis.
2) Root prune the red maple in August.
3) Dig and ball and burlap the 8-inch DBH red maple on the north side of the property, near the property line in October. The root ball will be about 80 inches in diameter and 30 inches deep.
4) Plant the tree at the marked location on the southwest side of the deck, 10 feet from the corner.
5) Cultivate the soil 2 feet around the planting site to a depth of 6 inches and incorporate organic matter and fertilizers, and adjust pH as specified by a soil nutrient analysis report. If nitrogen is needed per a soil nutrient analysis report, only a slow release fertilizer with a minimum of 50 percent water insoluble nitrogen should be used.
6) Excavate the planting hole to about the same diameter as the root ball and no deeper than the depth of the root ball. The gap between the root ball and the native soil will be filled with soil removed from the hole.
7) Leave all organic root ball supporting materials on the root ball.
8) Water the tree at transplanting.
9) Apply landscape-generated wood chip mulch (free of contaminants such as nails or paint) from near the trunk to slightly beyond the edge of the cultivated area, to a depth of 2 inches.
10) Remove all resulting debris from the site.
11) Complete the work by November 1 of this year.

After installation, plant maintenance will be the responsibility of the homeowner.
Annex C – Sample checklist for acceptance of young stock before planting
(This annex is not part of the ANSI A300 Part 6 standard.)

Prior to acceptance, buyers should inspect stock. If a particular defect or substandard element can be corrected, appropriate remedies may be performed prior to accepting delivery. Unacceptable trees that contain defects and substandard elements that cannot be corrected should be rejected.

General
- Species and cultivar should be as ordered.
- Plants must meet regulatory requirements (e.g., regarding pests, diseases, invasive species).
- Plants must be in good health and free from insect pests, diseases, scalded bark, or other significant defects.

Leaves, Crown, and Trunk
- The size, color, and appearance of leaves must be typical for the time of year and stage of growth.
- Branches should not be dead, diseased, or broken and should be distributed along the main trunk.
- Form must be appropriate for the species/cultivar.
  - Single straight central leader, no codominant stems or included bark.
  - Trunk caliper and taper must be sufficient so that the tree will remain vertical without a stake.

Roots
- Root ball diameter and height should be as specified.
- Root ball should be moist throughout.
- Root ball should be free of circling and stem girdling roots. Circling roots may be removed.
- Root distribution should be uniform throughout the soil, and should include a large percentage of small, fibrous roots.
Annex D  Explanations of various transplanting methods
(This annex is not part of the ANSI A300 Part 6 standard.)

The following are commonly used methods for transplanting.

Bare Root
- Bare root plants are prepared for relocation by digging around the root ball and removing most of the soil or growing media from the root ball.
- Most commonly, small caliper trees (less than two inches/five cm) are used, though trees of almost any size can also be planted bare root.
- Check regional guides for species that respond best to bare root planting and transplanting.
- Roots must be kept moist from the time of excavation until planting.
- Roots may be dipped in hydrogel or muddy water. If roots are not dipped in hydrogel or muddy water, they may be soaked in water for 12 to 24 hours prior to planting.
- Pneumatic and hydraulic excavation are acceptable methods for planting and transplanting.

Container
- Container plants are either grown in or prepared for relocation by moving into a flat, pot, tub, box, bag, basket, etc., usually made of plastic, fiber, wood, ceramic, or metal, used to grow or hold one or more plants.
- Ensure containers are of adequate size for the root ball.
- Sides of container should be tight against the root ball.
- Container should be strong enough to limit movement and withstand transportation and handling.
- A container top may be installed when necessary (e.g., when container may be tipped during transport).
- Ensure plants in containers are watered regularly.

Ball and Burlap
- Ball and burlap plants are prepared for relocation by digging around the root ball and then wrapping and securing the root ball in burlap or other material.
- Digging tools should make clean cuts to roots.
- The root ball and soil should be held firmly in place during wrapping and transport.
- The root ball must be of adequate size to sustain the plant following transplanting.

Tree Spade
- Tree spade plants are prepared for relocation using digging equipment that employs large, steel spades driven by hydraulic rams.
- Tree spade operations should not damage surrounding plants or cause excessive soil compaction.
- Plant should be centered in root ball of appropriate size.
- Adjustments should be made when necessary for differences in slope gradients between digging and planting sites.