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Foreword  This foreword will not be considered part of the revised American National Standard (ANSI) A300 (Part 2)-2017.

ANSI A300 standards are intended to guide work practices for the care of trees, palms, shrubs, and other woody landscape plants. They apply to arborists, horticulturists, landscape architects, and other professionals who provide for or supervise the management of these plants for property owners, property managers, businesses, government agencies, utilities, and others who use these services. The standard does not apply to agriculture, horticultural production, or silviculture, except where explicitly noted otherwise.

These standards should be used to develop specifications for work assignments; however, they are not intended to be used as work specifications in and of themselves. Effective specifications must include measurable criteria, and must account for the variable characteristics of landscape plants and the individual management objectives of their owners.

The Tree Care Industry Association (TCIA) oversees the Accredited Standards Committee (ASC) on Tree, Shrub, and Other Woody Plant Management Operations – Standard Practices, A300 (ASC A300), which writes the ANSI A300 Standards. TCIA is an ANSI-accredited Standards Developing Organization (SDO), and is secretariat of the ANSI A300 standards. ANSI requires that approved standards be developed according to accepted principles, and that they be reviewed and, if necessary, revised every five years.

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.

Since 1991, ASC A300 has met 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.

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.). The ANSI A300 standards unify and take authoritative precedence over all previously existing tree care industry standards.

This draft is a public review document. The public review period starts on August 11, 2017, and ends on September 25, 2017. This document is not approved as a draft for trial use.
How to file a public review comment: Official public comments must be entered on the TCIA website portal at www.tcia.org/A300comments before the deadline of 11:59 PM Eastern Standard Time (EST) September 25, 2017 in order to be considered, no exceptions will be made for late comments. You will be asked to register to gain access. Responses to official comments will be provided. Comments may be forwarded to ASC A300 members and/or the TCIA secretary, however comments that are forwarded to ASC A300 members or the TCIA Secretary and are not entered online will not be recorded as official comments and a response will not be provided. If you require an official response, you must post your comments on the TCIA website portal.

Information requests regarding this document must be forwarded to: rouse@tcia.org, A300 Secretary, c/o Tree Care Industry Association, Inc., 136 Harvey Road - Suite 101, Londonderry, NH, 03053.

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| Alliance for Community Trees          | Dana Karcher |
| AmericanHort (formerly ANLA)         | Craig Regelbrugge |
| American Society of Consulting Arborists | Rick Gessner |
| American Society of Landscape Architects | TBD (Alt.) |
| Asplundh Tree Expert Company         | Susan Cahill |
| Bartlett Tree Expert Company         | Geoff Kempter |
| Davey Tree Expert Company            | Wayne Dubin |
| International Society of Arboriculture | Dr. Thomas Smiley (Alt.) |
| Professional Grounds Management Society | Chris Klimas |
| National Association of Landscape Professionals (formerly PLANET) | Dr. Richard Rathjens (Alt.) |
| Society of Municipal Arborists       | Dr. Richard Hauer |
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Mission: To develop consensus performance standards for the professional management of trees, shrubs and other woody plants.

Vision: ANSI A300 standards will be the foundation for work specifications, training materials, quality protocols, and regulations for the management of trees, shrubs, palms, and other woody landscape plants.
Subclauses 1.1 to 1.3 excerpted from ANSI A300 (Part 1)-2017 *Pruning*.

1 **ANSI A300 standards**

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 (see Annex A – *Specification-writing guideline*).

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 agriculture, horticultural production, or silviculture unless this standard, or a portion thereof, is expressly referenced in other standards or specifications.


11.1 **Purpose**

The purpose of Part 2, Soil Management a. Assessment, b. Modification, c. Fertilization, and d. Drainage is to provide performance standards for the soil management of trees, shrubs, palms and other woody plants and to guide the development of written specifications, best practices, training materials, regulations, and other performance measures.

11.2 **Reason**

To guide the process of managing soil to optimize plant health.
11.3 Implementation

11.3.1 Specifications for soil management should be provided by an arborist or other qualified professional who is competent in soil management.

11.4 Safety

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

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

12 Normative references
The following standards contain provisions, which, through reference in the text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard shall apply the most recent edition of the standards indicated below.

- ANSI A300 Tree, Shrub, and Other Woody Plant Management – Standard Practices, all Parts
- ANSI Z60 Nursery stock
- ANSI Z133 for Arboricultural Operations – Safety Requirements
- 29 CFR 1910, Occupational Safety and Health Standards (General Industry)
- 16 U.S.C. §§703-711, Migratory Bird Treaty Act
- 16 U.S.C. 1531-1544, Endangered Species Act

1) Available from the Tree Care Industry Association, www.tcia.org

Figure 1: The following flowchart is the recommended procedure for soil management operations:
13 Objectives

13.1. One or more soil management objectives shall be specified.

13.2 Objectives should include, but are not limited to, one or more of the following:
   - Increase soil organic matter content;
   - Mitigate soil compaction;
   - Modify mulch;
   - Add nutrients;
   - Manage soil moisture; and/or,
   - Reduce soil erosion.

14 Soil management specifications

14.1 Prior to making recommendations or developing specifications, the site and soil should be assessed.

14.2 Specifications for soil management should include:
   - Objectives of the treatment or assessment;
Location of the plant(s) and/or site; 
Treatment or assessment methodology; and, 
Details of the treatment or assessment, such as: 
  Type, number and depth of soil samples; 
  Materials and rates to be applied; 
  Depth of treatment; 
  Treatment area; 
  Type and depth of mulch; 
  Fertilizer type, analysis and rate, and area of application; 
  Soil moisture condition at the time of treatment; 
  Location, depth, covering (e.g. fabric, gravel) and type of drain pipe; and, 
  Time period to conduct the assessment or treatment.

15 Soil management practices

15.1 Specified soil management practices should include, but are not limited to, one or more of the following: 
  Assessing soil conditions; 
  Adding amendments to alter soil physical conditions; 
  Tilling (cultivation) of soil; 
  Adjusting mulch; 
  Applying fertilizers; and 
  Managing drainage.

15.2 Work practices

15.2.1 Products and equipment shall be used in accordance with manufacturers’ recommendations, and federal, state, and local regulations. 

15.2.2 To achieve the specified objective(s), site factors shall be considered, including proximity to waterways, past soil management practices, slope, and irrigation. 

15.2.3 Plant conditions such as disease, insect infestations, and herbicide damage shall be considered prior to treatment. 

15.2.4 Practices that reduce natural leaf litter accumulation within the root zones of plants should be avoided.

16 Soil assessment

16.1 Soil and site physical characteristics should be assessed prior to designing, plant selection, planting, and/or developing management plans for landscapes. 

16.2 Soil assessment should include the evaluation of one or more of the following: 
  Site topography – surface drainage;
Soil profile;
Soil drainage (infiltration and percolation);
Depth to water table;
Presence of impermeable layers;
Soil texture;
Bulk density;
Salts;
Nutrients and pH; and,
Organic matter content.

16.3 Soil samples should be representative of the site (see annex B.)

17 Soil management a. soil modification

17.1 General

17.1.1 Soil modification shall include one or more of the following:
Addition of soil amendments;
Tilling for mitigation of soil compaction; and/or,
Modifying mulch.

17.2 Soil amendments

17.2.1 If soil organic matter is outside of a specified target range based on tree species and geographic location, treatment should be recommended.

17.2.2 To quickly increase organic matter content, composted organic materials should be incorporated into the soil.

17.2.3 To slowly increase organic matter content, organic matter should be applied to the soil surface as mulch.

17.2.4 To promote plant establishment, organic matter shall be incorporated uniformly into the soil volume where root growth is desired.

17.2.5 When amending the soil of established plants, soil amendments should be incorporated using vertical mulching, trenching or air-tilling techniques.

17.2.6 Composts, when used as soil amendments, should be tested by a qualified lab for chemical properties, such as pH, salt index, organic-matter content and carbon-to-nitrogen ratio (see annex C).

17.2.7 Gypsum should not be considered as an amendment for mitigation of soil compaction.
17.3 Soil tilling (cultivation)

17.3.1 Soil tilling should include one or more of the following methods:
- Mechanical tilling such as with a tractor-pulled plow, rototiller, shovel or hard rake;
- Holes vertically augered into the soil;
- Pneumatic soil loosening under high-pressure air; and/or,
- Hydraulic soil loosening under high-pressure water.

17.3.2 Considering all soil textures, the ideal soil bulk density is 1.33 g/cm³ (0.05 lbs/in³).

17.3.3 Pneumatic soil loosening should be considered the preferred method to mitigate compacted soil within the root zones of plants.

17.3.4 Compacted soils should be moist before being loosened using pneumatic excavation tools.

17.4 Mulch modification

17.4.1 Coarse wood-chip mulch that is fresh or partially composted should be preferred.

17.4.2 Application of fresh, coarse wood-chip mulch should be avoided if it is from a tree species known to cause an allelopathic response in the plants being mulched, to be contaminated by a transmittable disease, or to contain seeds of undesirable plant species.

17.4.3 Mulch shall not be applied over impervious plastic sheeting.

17.4.4 Mulch shall not be applied over geotextile fabric when the objective is to improve soil structure and/or increase organic matter content.

17.4.5 Mulch shall not be placed against tree trunks or cover large buttress roots.

17.4.6 Mulch should be applied over as much of the root zone as practical.

17.4.7 Mulch should be applied and maintained at a depth of 2-4 inches (5-10 cm).

17.4.8 Excess mulch, anaerobic mulch or contaminated mulch should be removed and replaced with a more appropriate mulch or thinner layer of mulch.

17.4.9 The ignitability of mulches shall be considered.

18 Soil management b. fertilization
18.1 General

18.1.1 Soil modification to improve nutrient uptake shall be considered prior to or in conjunction with fertilization.

18.1.2 Soil and/or foliar nutrient analysis and knowledge of local plant growth should be used as the basis for fertilizer recommendations.

18.1.3 Fertilizer specifications shall include the type, analysis, time and method of application, application area and rate of fertilization.

18.1.4 When fertilizing new transplants and plants sensitive to salt, a fertilizer with a low salt index should be used.

18.1.5 Applications of materials to adjust the soil pH should be considered when the pH is outside the optimal range.

18.1.6 When soil pH adjustments are specified for new plantings, they should be performed prior to plant installation.

18.1.7 Elemental sulfur should be the preferred material use to lower soil pH.

18.1.8 Limestone should be the preferred material used to raise pH.

18.1.9 Adjusting pH in calcareous soil should be considered impractical.

18.1.10 The soil pH should be determined every 3 to 5 years and adjusted as necessary.

18.1.11 Soil incorporation or soil injection should be the preferred methods to apply fertilizers.

18.2 Fertilizer applications

18.2.1 When to fertilize

18.2.1.1 Fertilizer applications should be made during the growing season, unless a slow-release fertilizer containing water-insoluble nitrogen is used.

18.3 Fertilizer formulations and rates

18.3.1 Fertilizer applications rates should be specified.

18.3.2 Fertilizer analysis should be specified based on objectives, condition and age of the plant, local knowledge, nutrient analysis, site conditions, and/or species.
18.3.3 Use of slow-release fertilizers should be preferred.

18.3.4 Fertilizers with a low salt index should be preferred (See annex D.)

18.4 Fertilizer analysis and rates in the absence of nutrient analysis

18.4.1 All products shall be used in accordance with manufacturers’ recommendations when they are available and appropriate for the situation.

18.4.2 When performing maintenance fertilization, fertilizers with higher ratios of P$_2$O$_5$ should be avoided.

18.4.3 Slow-release fertilizers should be applied at rates between 2 and 4 pounds of actual nitrogen per 1000 ft$^2$ (1 to 2 kg N/100 m$^2$) per application and should not exceed 6 pounds of actual nitrogen per 1000 ft$^2$ (2.9 kg N/100 m$^2$) within 12 months.

18.4.4 Quick-release fertilizers should be applied at rates between 1 and 2 pounds of actual nitrogen per 1000 ft$^2$ (0.5 to 1 kg N/100 m$^2$) per application and shall not exceed 4 pounds of actual nitrogen per 1000 ft$^2$ (2 kg N/100 m$^2$) within 12 months.

18.5 Fertilization area

18.5.1 The fertilization area shall consider root location, root accessibility, fertilization objectives, plant species, and site conditions.

18.5.2 For most trees and shrubs, the treatment area should be from near the trunk to near or just beyond the drip line. Inaccessible surfaces shall not be included in the rate calculation.

18.5.3 For fastigiate (columnar form) trees and unusual situations, the method for determining the treatment radius should be calculated by multiplying the plant’s stem diameter at 4½ feet (1.4 m) above ground, measured in inches (cm), by 1 to 1½ (0.12 to 0.18) to determine the radius, expressed in feet (m), from the trunk of the plant. For example, a 15-inch (38.1 cm) dbh tree would have a fertilization area radius of 15 to 23 feet (4.6 to 6.9 m).

18.6 Fertilizer application methods

18.6.1 General

18.6.1.1 Soil incorporation or soil injection should be the preferred methods to apply fertilizers.

18.6.1.2 Fertilizers and soil amendments selected to adjust pH should be incorporated or injected into the upper 4 to 8 inches of the soil.
18.6.1.3 Fertilizer shall be uniformly distributed within the defined fertilization area.

18.6.1.4 Damage to the buttress roots during fertilization should be avoided.

18.6.2 Soil surface application

18.6.2.1 Surface applied fertilizers shall be watered in.

18.6.2.2 Surface application of fertilizers should not be recommended where surface runoff is likely.

18.6.3 Sub-surface dry fertilization

18.6.3.1 Holes shall be evenly spaced within the defined treatment area.

18.6.3.2 Hole depth, diameter, and spacing shall be specified. Holes should be 2 to 4 inches (5 to 10 cm) in diameter, spaced 12 to 36 inches (30 to 91 cm) apart, and 4 to 8 (10 to 20 cm) inches deep, and filled no closer than 2 inches (5 cm) from the soil surface.

18.6.3.3 The fertilizer shall be evenly distributed among the holes.

18.6.4 Sub-surface liquid fertilizer injection

18.6.4.1 Injection sites shall be evenly spaced within the defined treatment area.

18.6.4.2 Injection site spacing and depth shall be specified. Injection sites should be 12 to 36 inches (30 to 91 cm) apart, and 4 to 8 inches (10 to 20 cm) deep, not to exceed 12 inches (30 cm) deep.

18.6.4.3 Fertilizer shall be evenly distributed among the injection sites.

18.6.5 Alternative fertilization techniques

18.6.5.1 Foliar applications, trunk injections, or implants shall be used only when soil application of fertilizer is impractical or ineffective in achieving fertilization objectives.

18.6.5.2 When applying foliar fertilizer, the fertilizer solution should be sprayed to thoroughly cover the foliage at a stage of growth when it can be absorbed.

18.6.6 Injections and implants

18.6.6.1 Timing of injection/implant application should be at the plant growth stage to achieve fertilization objectives.
18.6.6.2 Products should be applied in the root flare or as low as practical in the trunk.

18.6.6.3 Holes shall be made as small and shallow as practical for the application equipment being used.

18.6.6.4 Application intervals should be timed to optimize results with minimal negative effect to the plant.

18.6.6.5 Hardness, pH, and salinity of the water used for trunk injection should be considered.

18.6.6.6 Small diameter trees and drought-stressed trees should not be treated with injections or implants.

18.6.6.7 Drill bits used to create injection/implant sites should be sharp, designed to cut green wood and sized for the injection device.

19 Soil management c. drainage

19.1 General

19.1.1 Treatments to mitigate drainage problems should include, but are not limited to, one or more of the following:
   Select moisture-tolerant species;
   Reduce soil compaction;
   Deep cultivation to mitigation of impermeable layers;
   Grade changes;
   Construction of swales and ditches; and
   Installation of drainpipes.

19.1.2 Where drainage is restricted, and it is not practical to mitigate the conditions, species tolerant of wet soils should be selected.

19.1.3 Soil drainage improvement should be considered most practical when done as a treatment prior to plant installation.

19.1.4 When improving drainage is not practical, planting on soil mounds or berms should be preferred.

19.1.5 Drainage systems should be installed through or behind retaining walls to prevent water from accumulating behind the walls.

19.1.6 Drain systems shall have sufficient slope to achieve the drainage desired.
19.1.7 Planting containers shall have adequate drainage to remove excess water.

19.2 Mitigation of impenetrable layers

19.2.1 Impenetrable layers should be mitigated.

19.2.2 When practical, impenetrable layers should be mitigated by subsoil plowing or ripping prior to planting.

19.2.3 To improve drainage around existing plants, auguring holes through impenetrable layers to a more permeable layer should be considered.

19.3 Mitigation/adjustment of surface drainage

19.3.1 When soil drains slowly or water accumulates, surface drains (e.g. French drains, swales, ditches, culverts, berms) should be considered to divert water from trees or landscaped areas.

19.4 Mitigation/adjustment of subsurface drainage

19.4.1 Subsurface drainage pipes should be installed in sites where drainage is slow, the water table is close to the surface, or water has accumulated by retaining walls or foundations.

19.4.2 Subsurface drain pipes should be installed to an adequate depth to meet the objective.

19.4.3 The subsurface drain type (e.g. French drains, perforated pipes) and design (e.g. location, depth, slope, exit location) shall be specified.

19.4.4 French drains should be excavated to the depth needed to ensure favorable root zone conditions and be filled with coarse, uniform-sized gravel.

19.4.5 If geotextile fabric is used, it should be rated for the soil texture.

20. Definitions This clause will be considered part of the ANSI A300 (Part 2)-2017 standard.

20.1 allelopathy: Inhibition of plant growth or development that is induced by chemicals made by a competing plant.

20.2 anaerobic: Living or functioning in the absence of oxygen.

20.3 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.

20.4 **bulk density:** Mass (weight) of dried soil per unit volume (g/cm³); often used as a measure of soil compaction.

20.5 **buttress root:** Roots at the base of the trunk that help support the tree and equalize mechanical stress.

20.6 **calcareous soil:** A soil containing free calcium carbonate.

20.7 **coarse wood-chip:** Average wood particle size of ¾ inch (18 mm) to 1.5 inches (31 mm) in the long axis.

20.8 **compacted soil:** A soil with a high bulk density lacking structure and macroporosity characterized by restricted water infiltration and percolation (drainage) and limited root penetration.

20.9 **compost:** A stabilized product resulting from the biological decomposition of organic material that is beneficial to plant growth.

20.10 **dripline:** The soil surface area delineated by the branch spread of a single plant or group of plants.

20.11 **fertilization:** The application of essential elements to the soil or plant.

20.12 **fertilizer:** A material containing one or more of the elements essential for plant growth, development, or reproduction.

20.12.1 **fertilizer analysis:** The composition of a fertilizer expressed as a percentage by weight of total nitrogen (N), available phosphoric acid (P₂O₅), soluble potash (K₂O), and other nutrients.

20.12.2 **fertilizer ratio:** The ratio of total nitrogen (N), available phosphoric acid (P₂O₅), and soluble potash (K₂O); e.g., the ratio of a 30-10-10 fertilizer is 3:1:1.

20.13 **field capacity:** The maximum water content of a soil after drainage due to the force of gravity.

20.14 **flare (trunk flare, root flare):** The area at the base of the plant’s stem or trunk where the stem or trunk broadens to form roots.

20.15 **foliar application:** The application of a material to plant leaves.

20.16 **French drain:** A trench filled with gravel or rock that may contain perforated pipe at the bottom to direct surface or ground water away from an area.
20.17 **geotextile fabric:** A permeable fabric used to separate or stabilize soil.

20.18 **gypsum:** The common name for calcium sulfate used to supply calcium or to amend soils with a high sodium content.

20.19 **hardness:** An attribute of water, related to high content of dissolved calcium and magnesium.

20.20 **hydraulic (soil loosening, injection):** Using water pressure to loosen the soil or apply a soil amendment or fertilizer.

20.21 **impenetrable layer:** Soil layers that fully or partially restrict water, air movement, and/or root growth, such as hardpans, plow pans, rock, abrupt textural changes, or retaining walls.

20.22 **implant:** A capsule or other device that is inserted into the xylem of a tree.

20.23 **infiltration:** The entry of water into a soil.

20.24 **mulch:** A material applied to the soil surface to protect the soil surface, deter erosion, moderate soil temperature, conserve moisture, inhibit weeds and improve soil structure.

20.25 **mulch, organic:** A material with plant or animal origin applied to the soil surface.

20.26 **nutrient:** element or compound required for growth, reproduction or development of a plant.

20.27 **organic matter:** A material derived from a living organism or its byproduct.

20.28 **percolation:** The ease with which water passes through the soil profile.

20.29 **perforated pipe:** A pipe with holes in its wall allowing water to move into the pipe.

20.30 **pH:** A measurement of the acidity or alkalinity of a soil.

20.31 **pneumatic (soil loosening, injection):** Using pressured air to loosen the soil or apply a soil amendment or fertilizer.

20.32 **qualified professional:** An individual who, by reason of training and experience, has demonstrated the ability to safely and effectively perform assignments, and, where required, is properly credentialed in accordance with federal, state or local laws and regulations.
20.33 quick-release fertilizer: A fertilizer that is immediately available to the plant.

20.34 retaining wall: A structure built to stabilize a slope and keep soil in place.

20.35 root collar: The transition zone between the stem and the root system.

20.36 salinity: The concentration of dissolved salts in water.

20.37 salt index: A measure of the salt concentration that fertilizer produces in the soil solution. The higher the salt index, the more likely that plant damage will occur.

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

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

20.40 soil aeration: The process of improving air exchange in the soil.

20.42 soil amendment: A material incorporated into the soil that improves physical characteristics.

20.43 soil injection: Using pneumatic or hydrologic means to apply an amendment or fertilizer into the soil.

20.44 soil modification: Physically or chemically altering soils to improve conditions for plant growth.

20.45 soil profile: A vertical view of the soil showing its horizons or layers.

20.46 soil structure: Soil classification characteristic of how soil particles bind together (aggregate), creating voids between the aggregates.

20.47 soil texture: Soil classification characteristic of the relative size (fineness or coarseness) of soil mineral particles, specifically the proportions of sand, silt and clay.

20.48 specifications: A detailed measureable plan or proposal for performing a work activity or providing a product, usually a written document.

20.49 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.

20.50 slow-release fertilizer: A fertilizer containing plant nutrients in a form that delays availability for plant uptake after application, or extends availability to the plant.

20.51 subsurface application: The application of a material below the soil surface.
20.52 **surface application**: The application of a material above the soil surface.

20.53 **swale**: A low tract of land frequently created to manage water runoff.

20.54 **tillage**: The mechanical manipulation of the soil to alter the soil’s structure.

20.55 **topography**: The physical relief or terrain, such as hills, ridges, swales, drainage, slope and aspect – that influence water movement and drainage, soil depth, soil moisture content, exposure to sunlight, wind, and other factors.

20.56 **trenching**: To dig a furrow or ditch.

20.57 **trunk injection**: A technique where material is applied directly into the xylem of a tree.

20.58 **vertical mulching**: Filling vertical holes in the soil with materials to improve aeration, moisture characteristics, or to increase nutrients.

20.59 **wetting agent**: Chemical substances that increase the spreading and penetrating properties of a liquid.

20.60 **wood-chip mulch**: A material placed on the soil surface composed of ground wood, bark and leaves usually generated by sending tree parts through a wood chipping machine.
A300 Part 2 Soil Management standards are performance standards, and shall not be used as job specifications. Work specifications should be clearly detailed and contain measurable criteria.

The words “shall” and “should” are used in the standards. The word “shall” is used when writing specifications.

Writing specifications can be simple or complex and can be written in a format that suits your company/the job.

The specifications consist of three sections.

**Section 1. General**
- Contract Requirements: Description of work to be performed. (Example: Application of 2 inches of coarse wood-chip mulch to landscape beds surrounding buildings A-G).
- Regulations: Municipal, state or federal laws (Examples: Underground utility-line notification, soil management/arboricultural practices, storm-water management).
- Contractor qualifications: (Examples: Business license, professional certification).
- Schedule: Date work will commence and time frame within which work will be completed.
- Measurement of Job Performance: (Example: Visual inspection following job completion).

**Section 2. Products**
- Description of products used in the work: (Examples: Product labels, safety data sheets, EPA registration number).

**Section 3. Performance**
- Describe how the work is to be done:
Annex B – Site soil-sampling guidelines (This annex is not considered part of the ANSI A300 Part 2 Soil Management standard.)

B-1 The number of samples taken may depend on the size, the variability of soils and the history of the site.

B-2 When soil conditions appear variable, planting sites may be divided into sampling units.

B-3 The soil samples should be representative of the planting areas.

B-4 Samples taken at the 0- to 6-inch (0- to 15-cm) layer are typically done to assess chemical properties of the soil.

B-5 Soil profile analysis are samples taken at greater depths than 6 inches and are typically done to identify changes in texture, obstructions to drainage, and propensity for root development.

B-6 Sampling guidelines specific to pH tests

B-6.1 When a plant is present or planned, the depth of sampling should be equivalent to the depth of the plants absorbing root system.
Annex C – Suggested compost properties testing guideline (This annex is not considered part of the ANSI A300 Part 2 Soil Management standard.)

C-1 List of suggested compost characteristics to test:
- pH;
- Soluble salts;
- N-P-K content;
- Organic matter content;
- Moisture content;
- Particle size;
- Maturity;
- Stability;
- Inerts;
- Trace metals; and,
- Weed seed and pathogens.
Annex D – Common salt index values for select fertilizers (This annex is not considered part of the ANSI A300 Part 2 Soil Management standard.)

<table>
<thead>
<tr>
<th>Fertilizer</th>
<th>% Nutrient</th>
<th>Salt Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium Nitrate</td>
<td>33% N</td>
<td>105</td>
</tr>
<tr>
<td>Ammonium Sulfate</td>
<td>21% N</td>
<td>69</td>
</tr>
<tr>
<td>Calcium Nitrate</td>
<td>15.5% N</td>
<td>69</td>
</tr>
<tr>
<td>Potassium Chloride</td>
<td>60% K20</td>
<td>114</td>
</tr>
<tr>
<td>Potassium Sulfate</td>
<td>50% K20</td>
<td>46</td>
</tr>
<tr>
<td>Superphosphate</td>
<td>20% P2O5</td>
<td>8</td>
</tr>
<tr>
<td>UF</td>
<td>38% N</td>
<td>10</td>
</tr>
<tr>
<td>IBDU</td>
<td>30% N</td>
<td>5</td>
</tr>
<tr>
<td>Urea</td>
<td>45% N</td>
<td>75</td>
</tr>
</tbody>
</table>

Adapted from http://www.agroconection.com/salt-index.html