

LANDSCAPE DESIGN GUIDELINES

**PART 1 GENERAL**

In addition to these general landscape design guidelines, please see the documents and drawings listed below under 1.01 RELATED WORK.

1.01 RELATED WORK

Campus Planning & Design Office Landscape Guidelines: See <http://lbre.stanford.edu/architect/>

FDG Specifications Guidelines:

- Section 01532 Tree and Shrub Protection
- Section 02200 Site Preparation
- Section 02300 Earthwork
- Section 02810 Irrigation System
- Section 02900 Planting
- Section 02950 Site Restoration & Rehabilitation
- Section 15050 Basic Mechanical Materials and Methods Guidelines

FDG Drawings:

- Irrigation Drawings IR-01 - IR-34
- Planting Details PL-01 - PL-03

1.02 REFERENCES

A. "Staking" in *Arboriculture-Integrated Management of Landscape Trees, Shrubs and Vines*, by Richard W. Harris, James R. Clark and Nelda P. Matheny, Prentice-Hall, Inc 1999, pp.228-238. Specifications for tree staking should conform to this standard, including

- Tree support stakes shall be lodgepole pine with flexible ties tied in a "Figure-8" Pattern at only one point on the trunk.
- Ties shall be placed at the lowest point on the trunk at which the tree can stand upright.
- Two stakes (double staking system) is a minimum requirement.

Refer to the FDG Drawing PL-02, Tree Staking.

1.03 GENERAL DESIGN CONSIDERATIONS

A. General:

1. The Architect shall consider landscape design concepts that incorporate land use, heat island, water and energy considerations including appropriate irrigation equipment, drip irrigation, selection of drought resistant material, lawns developed only for program uses based on functional needs, etc.
2. Stanford's Lake Water System is the preferred irrigation water supply for any new or renovated landscapes, which shall be connected to the Lake Water System wherever possible. Request service from the Stanford Utilities Division in the Department of Sustainability and Energy Management.
  - The Lake Water system is not potable water.
  - A filtration system to handle algae and debris must be installed with all irrigation systems connected to Stanford's Lake Water System.

- Architects should check any questions on this with the Project Manager, who will clear with the Grounds Services Department in Stanford University Buildings and Grounds Maintenance to ensure that no cross-connections are made between the old and the newer systems.
- 3. The landscape contractor shall provide as-built planting plans showing installed plants with botanical names to Stanford University Grounds Services and the Maps and Records Department per their specifications.
- 4. The landscape contractor shall provide as-built irrigation plans to Stanford Grounds Services and to the Maps and Records Department, per their specifications.

B. Irrigation Systems:

1. These points are general guidelines. Please see the FDG Specifications Guideline 02810 Irrigation System for additional details.
2. All irrigation systems shall be automatic. All system components of the same function shall be a uniform brand.
3. All automatic irrigation systems shall be controlled by the Buildings and Grounds Maintenance central control computer in Stanford Grounds Services, unless otherwise approved by Grounds Services.
4. The central control irrigation systems shall be controlled by telephone connection from the Grounds Services irrigation computer to the appropriate Central Control Unit (CCU), and then by wireless, radio controlled connection from the CCU to the Satellite controllers. Satellite controllers must be Rainbird ESP-SAT controllers.
5. Each controller must be equipped with a radio and antenna. Radio tests must be performed and approved by Rainbird, Inc. **before** installation to insure a strong radio link and to determine the appropriate location and CCU to be used. Contact Rainbird, Inc at 866-477-9778 to arrange for radio tests and to determine the correct radio frequency. In some cases, purchase of a new CCU may be needed (for example, if radio communication tests show that none of the existing CCUs are usable). If a new CCU is needed, the project will need to provide a suitable location to install the CCU and the antenna (roof top, or suitable mast) The project will also need to install a telecommunications service outlet (RJ-11) for the Grounds Services computer to CCU connection, 120 volt power outlet for CCU, and a conduit from CCU location to the antenna.
6. Controller must be grounded after installation to protect unit from power surges. Grounding must be certified by Rainbird, Inc. **after** controller installation to validate warranty. Contact Rainbird, Inc at 866-477-9778 to arrange for grounding tests and certification.
7. Consultants shall also refer to the Stanford University Project Manager for coordination of design issues with the University Facilities Operations Grounds Services Manager, and/or the Manufacturer's system representative.
8. All slopes greater than thirty (30) degrees shall be watered by stream spray, rotor, drip, or other low precipitation irrigation heads if the given controller cannot cycle at two minutes several times a night.

9. All laterals shall be sized so as not to exceed a ten percent (10%) pressure drop from the nearest to the farthest head of any valved lateral, and so not to exceed a velocity of five feet per second in any section.
10. All remote control valves shall be sized for a minimum pressure drop of two (2) psi for the given GPM of the lateral and installed per irrigation drawings specifications.
11. Plant materials of differing watering requirements shall not be serviced by the same valve. In no case shall turf be on the same valve as any other plant material, unless approved by Stanford Grounds Services.
12. All trees shall have a minimum of 2 bubblers or appropriate sized drip rings to evenly saturate the entire rootball. Above grade bubblers are preferred for trees unless a tree well cannot be constructed. In the latter case, use subsurface drip lines with in-line emitters such as Netafim--See FDG Drawing IR-24. This method is preferred over that shown in FDG Drawing IR-21 wherever a tree well cannot be built.
13. In-line subsurface drip irrigation as shown in FDG Drawings IR-33 and IR-34 is to be used for shrubs in rows or closely spaced groups. This is preferred over individual emitters. If individual emitters are used there should be a minimum of 2 per plant.
14. Irrigation heads with different precipitation rates shall not be serviced by the same valve.
15. Where irrigation is solely dependent upon quick coupling valves, they shall be spaced no more than fifty (50') feet apart.
16. Complete irrigation coverage of planted areas is required.
17. Drip or other water-conserving irrigation heads are recommended wherever appropriate.
18. Valve boxes and other irrigation boxes shall be green in lawn areas and black in other areas (such as shrubs, groundcovers, and mulched areas).
29. Flow sensors and master valves shall not be located under concrete or asphalt. Flow sensors and master valves shall be located in areas such as soil, decomposed granite or lawn where digging can occur to access for maintenance and repair.
20. Student Housing areas, because of the vehicular traffic they constantly endure on driveways, parking lots, walkways, fire lanes and any location that vehicles may intentionally or unintentionally drive over or through, require the use of concrete sprinkler blocks to protect the various types of below-grade spray heads. Sprinkler blocks are used to protect the various heads from common vehicular traffic, to be used along sidewalks and other paving. See FDG Drawing IR-32.

C. Planting:

1. These points are general guidelines. Please see the FDG Specifications Guideline 02900 Planting for additional details.
2. Planting at the entrance to roadways, parking lots, or pedestrian areas shall be maintained at a height that allows clear visibility for persons leaving or entering the vehicular area. Plant species shall be chosen to allow this.
3. All plant material and turf seed/sod shall match those types that have shown successful growth and low maintenance at

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Stanford. Turf seed/sod shall be Dwarf Tall Fescue varieties only. Stanford Grounds Services may be contacted for recommendations.

4. Plant selection shall be compatible with the natural limitations of climate, weather, and soil conditions of the mid-peninsula region. Refer to Stanford University Campus Planning Office Landscape Design Guidelines or contact Stanford University Grounds services for further recommendations on plant selection.
5. Plants with peculiar horticultural or excessive maintenance requirements are discouraged.
6. Full consideration shall be given to the appropriateness of plants in given manmade environments (street trees, for example, should be provided adequate space).
7. Engineered fill soil (structural soil) shall be used where the root systems of trees or shrubs must grow under hard or impermeable surfaces, such as patios, sidewalks, streets, planting areas over structures or parking garages, parking lot medians and islands, and other similar conditions. Engineered fill soil is structural soil such as Cornell Structural Soil, which was developed at Cornell University to safely bear pavement loads after compaction and still allow root penetration and vigorous tree growth. See <http://www.hort.cornell.edu/uhi/outreach/csc/> for more information. All engineered fill soil shall be licensed, trademarked 'CU-Soil' to insure quality control.
8. Where possible, trees at medians, along roads, etc., should be kept a minimum of six (6') feet from the curb to facilitate street sweeping and minimize curb damage.
9. Large shrubs and trees shall be selected and sited around buildings in a way compatible with accepted standards of solar access and energy efficient design.
10. Plants shall not block or cover building security lighting.
11. The following plant types shall be avoided, except with written permission from Stanford University Grounds Services and the University Architect/Campus Planning Office:
  - a. Plants having invasive surface root systems near underground utilities, building foundations, and lawn areas.
  - b. Plants unduly prone to disease or pests (for example, Dutch Elm Disease and Eucalyptus red gum lerp psyllid).
  - c. Plants incompatible with water requirements of existing plant life (for example, California native oak in lawn, Coast redwood with drought tolerant native plants, and mixing drought-tolerant with water-loving species).
  - d. Plants known to be particularly active in fruit, pollen, or leaf fall (for example, acacia, loquat, cottonwood, fruit trees), except with express written approval of Stanford University Grounds Services. Non-fruiting varieties of olives are preferred.
  - e. Plants known to have particularly brittle structures (for example, certain Eucalyptus species, *Acacia melanoxylon*).
  - f. Plants known to be invasive in local native plant communities, for example, *Cortaderia selloana* (Pampas grass), *Cytisus scoparius* (Scotch broom).
  - g. *Sequoia sempervirens* (Coast Redwood) shall not be planted in areas where reclaimed water will be used for irrigation

without prior approval from Stanford University Grounds Services and the University Architect/Campus Planning Office. This tree is easily and severely damaged by salts in reclaimed water, causing both biological and aesthetic damage.

11. All planting sites shall have a soil analysis performed by a soils and plant lab approved by Stanford University Grounds Services. Recommendations from this analysis shall be incorporated into the Project scope as needed.
12. Palms shall be planted according to the Palm Planting Detail in the FDG Drawings, PL-03.
13. Trees shall be located appropriately to avoid conflict with overhead wires or building overhangs. Contact shall be made and approval given from Stanford University Grounds Services and the University Architect/Campus Planning Office if planting pits are found to be within 10 feet of buildings or power lines.
14. Trees shall be located appropriately to avoid conflict with utility lines. The landscape plan and utilities plan shall be coordinated as early as possible in the design phase of the project, to minimize locating new trees within 10 feet of utility main lines including water and sewer lines.

D. Tree and Shrub Protection

***The following guidelines apply to all projects and shall be included on one sheet in each set of plans:***

1. We have strict requirements which include the points listed below and additional procedures as detailed in the FDG Specifications Guideline 01532 Tree and Shrub Protection.
2. The root zone of all trees must be protected on all construction projects, as described below. A tree's root zone is defined as the area from the trunk out to 10' beyond the tree's dripline.
3. A Stanford Grounds Services Certified Arborist shall be contacted to evaluate all work within any trees' root zones.
4. All trees to remain on a project shall have protective fencing installed per the tree protection drawing included in the plan set.
5. Protective fencing shall be chain link on secure footings, or imbedded as required by the Campus Planning and Design Office or a Stanford University Grounds Services Certified Arborist, that will not fall over onto trees.
6. Protective fencing shall be placed at the outer edge of the root zone, 10' beyond the tree dripline wherever possible as shown on tree protection drawing. If project constraints do not allow for fencing at the outer edge of the root zone, fencing must be placed as close to this as possible and approved after it is in place by a Stanford University Grounds Services Certified Arborist.
7. Laydown, staging and parking areas shall be approved by the Stanford University Architect/Campus Planning Department and shall be shown on the plans if within the project limit area, or on the Construction Logistics plan if outside the project limit area. All tree protection guidelines apply to trees in laydown, staging and parking areas as well as to trees within the project limits.

8. Construction materials/equipment/personal vehicles shall not be stored, parked or temporarily placed in the root zones of any trees. Nothing shall be stored or placed temporarily within protective fencing, to avoid soil compaction and soil contamination under trees. Root zones of trees shall not be driven over. Provide alternative routes for construction traffic of any kind including cars, people, tractors, equipment, cranes, or any other traffic and all staging or storage areas.
9. Protect overhanging tree canopies from construction damage. If drive aisles are anticipated under low canopies call for an evaluation by a Stanford Grounds Services Certified Arborist to determine appropriate measures.
10. There shall be no grade change within a minimum of ten feet of the trunk of existing trees, and preferably none within the entire root zone. Native oaks are particularly sensitive to grade changes.
11. No rinsing, cleaning equipment or dumping construction liquid materials shall be allowed in the tree root zone, or in an area that drains into the root zone. Care shall be taken in cleaning up equipment. There shall be no storage of dumpsters or accumulated debris from demolition on or around the root zones of existing trees and shrubs.
12. Existing trees shall be monitored weekly and irrigated as needed during the course of construction.
13. No lime or other soil treatment shall be applied without the consent of a Stanford Grounds Services Certified Arborist.
14. All trenching shall conform to the following guidelines.
  - a. A Stanford Grounds Services Certified Arborist is required to be present to supervise any trenching, digging or excavation of any kind within a trees' root zone.
  - b. Roots larger than 2 inches in diameter shall not be severed without calling a Stanford Grounds Services Certified Arborist for cutting or review.
  - c. Tunneling or boring under roots rather than pruning is preferred.
  - d. Digging within a tree's root zone shall be avoided. If it is necessary, hand digging shall be used for any trenching within the tree's root zone unless otherwise approved by a Stanford Grounds Services Certified Arborist.
  - e. All roots that need to be cut shall be pruned cleanly, not torn.

The preceding guidelines shall be considered minimum requirements. The greater the distance of tree protection provided the greater the instance of tree success in construction areas.

END OF SECTION