

Assessment of Existing Trees
Loyola College Quadrangle Renovations
The Care of Trees, Inc.
March 23, 2005

General Introduction-

The Loyola Quadrangle contains a mixture of mature "monarch" trees from the original forest as well as planted trees from prior decades. Some of the planted trees are reaching maturity of their own. Most of the younger trees are in very good condition as are a few of the mature trees. A high level of maintenance was evident by the little amount of deadwood in the tree canopy.

Several of the mature trees have decline and dieback over the years caused by a combination of construction damage, soils compaction from foot traffic, and maintenance practices favoring turf management over tree management.

Proposed renovations will provide opportunities to assess longevity and consider the worthiness of trees in design. Some design decisions will allow more growing space as well as the opportunity for restoration measures for trees currently under stress.

However, construction activities also provide opportunities for additional damage and impact as well. In order to minimize these impacts it is essential that the following three step process be followed:

1. All design elements must be reviewed in relation to the tree environment (defined as the Critical Root Zone);
2. All construction elements must be reviewed likewise;
3. Based upon the above a plan and prescription for protection and stress reduction measures can be developed.

Assessment of Existing Trees

(Refer to Tree Inventory and Assessment spreadsheet for tree by tree review)

Assessment Summary:

As noted in the Introduction a great majority of the trees on the Quad are worthy candidates for long term survival given proper management in the design and construction process.

Fortunately, no trees were observed from ground level with structural issues that warrant removal at this point. This is not to say unsound conditions out of sight within trunks or below ground may exist, just that none were evident at this level of assessment.

Some of the trees under stress that exhibit potential for shortened life spans are designated for "replacement planting" and are summarized below. One site visit alone is difficult to gauge long term response as mature trees take 3-5 years or more to exhibit stress conditions or to recover from damage.

Summary of recommendations are as follows:

Consideration for future replacement planting- #7, 8, 12, 14, 22, 23.

Major root restoration measures- #1, 2, 6, 10, 12, 14, 19, 23.

Moderate root restoration measures- #3, 4, 5, 7, 8, 9, 20, 25, 27-32.

Final decisions to prioritize efforts spent on major restorations vs replacement planting can best be made at a site visit. Budgets for Major Root Restoration Measures will be provided for the Owner's consideration. *This spring / early summer would be excellent choices to initiate these treatments.* Fall or spring 2006 would be good times for Moderate Restoration Measures if efforts were to be prioritized.

Restoration Recommendations

The following are all restoration procedures for damaged root systems and declining trees. Some are state of the art materials and methods based upon latest research and science in arboriculture. Some are very basic. Exact prescription for each tree can be developed based upon Owner's priorities and design / construction decisions. Upon request, budgets can be developed for decision consideration.

Cambistat Tree Growth Regulator is a newly recognized material shown to be effective when applied to high impacted trees. It redirects canopy growth over 2-3 years into the close-in root system thus allowing increased absorption of nutrients and moisture during the stress recovery period. Specific methods and dosage is dictated by species and trunk diameter and prescribed by the project forester.

Radial Mulching is a practice of entrenching radial "spokes" in the upper soils out from the tree trunk using Supersonic Air tools (SSAT) and has several objectives: exposes prior root damage to examination; lets the arborist get a "feel" for the soils layers, level of quality, and composition; provides aeration to compacted soils; allows backfill of suitable composted amendments. Width, depth, type of amendments will be prescribed for each tree's situation.

Soil Nutrient Management-

In lieu of installing large mulch beds for trees in turf landscapes in order to increase organic soil composition new science is available. The objective is to transition from a highly bacterial soils make up favoring turf-grass to a highly fungal soil more favorable to mature trees without compromising turf vitality. Both granular and liquid biostimulents along with microbial inoculants and amendments are applied to rebuild and restore proper balance and composition for healthy, stress resistant root systems. Seasonal applications are timed over three years. Soil testing after the second year of treatments determines the need for following years based upon response.

Supplemental Water. This action is for high impact trees of significance during drought times. Based upon the number and size of trees various strategies can be considered to maintain adequate soil moisture during these times. A prescription for the number of gallons and strategy for watering designated trees will be developed. Large mature trees with impacts to root systems require as much as 100- 250 gallons per week during 90 degree days during summer drought times. Periodic inspections by the project forester/ arborist at this time are critical.

Design Elements Impacting the CRZs:

Walkways and Terraces (9-11 & Humanities)-

Where possible, elevating the proposed walks or Terrace sections above grade within the CRZ will allow roots / topsoil to remain with minimal impact. Root Aeration Matting will be specified and installed to meet structural requirements of the walk as well as site conditions for the trees. Construction and installation of the walk will be confined to the proposed walk with temporary tree protection defining the limits. Rubber tracked skid steer or similar low ground pressure equipment to be used.

Grading-

Grade cuts and fills within Critical Root Zones should be carefully reviewed. Grade fills can be mitigated with prescription for Root Aeration Matting but grade cuts remove roots due to their typically shallow nature (upper 24" of soils).

Retaining Walls-

Review of footers and tiebacks for walls within CRZs is important.

Site Landscape Lighting-

Site lighting pole bases and conduits will be placed for minimal impact to CRZs. Conduit routes will be designed for minimal impact. LP bases within protected CRZs will be root pruned using SSAT and the construction equipment / materials supported by temporary Root Protection Mat during excavation / construction. Conduits within the CRZs will be directionally bored or excavated with SSAT to minimize damage. Temporary tree protection fencing will delineate the access and construction within the FCE. Up-lights or lighted bollards will similarly be reviewed and constructed for minimal impact.

Landscape Elements-

Large root balled trees will be reviewed for locations and number to minimally impact protected CRZs. Planting bed locations are predominantly near buildings away from trees so will not cause issues in preparation.

Sediment / Erosion Control-

Location of proposed silt fence and direction berms if, used, will be reviewed for impact to the protected CRZ. Silt fence within protected CRZs will be installed on grade with bottom pinned to the existing grade and drainage stone placed to hold secure. Tree Protection adjacent to excavation of footers will have silt fence attached. Where silt fence is placed adjacent to RAM or RPM both materials will be pinned together and permanent fills placed to hold in place.

Irrigation-

If proposed, irrigation mains and electrical need to be reviewed with respect to the CRZs also. During drought times even mature trees require sufficient moisture especially those under prior stress. The ability to increase duration within zones of trees to supplement minimal rainfall during drought times is important.

Construction Elements

Demolition Procedures

Demolition of existing structures, asphalt, walks, or light poles shall follow procedures to minimize impact to root system, trunk, and branches. Prior to demolition the Contractor will review the designated trees, procedures, access, and equipment with the project forester / arborist. Tree protection fence shall be installed prior to demolition. Equipment access, stockpile, and loading will be positioned to not impact root systems. Backfill voids with suitable topsoil on the upper 12-18" and lightly grade to avoid additional compaction for work within protected CRZs.

General Excavation Procedures

Excavation for underground utilities, foundations, and footers adjacent to and impacting critical root zones shall follow the following procedures: Superintendent to review all locations with project forester prior to layout to determine issues of access, overhead clearance, stockpile of spoils, need for special equipment, special arboricultural measures, and timing of layout to allow special preservation and arboricultural measures. Slope management procedures may be needed to control layback adjacent to critical root zones, such as sheeting and shoring, or trench boxes. Superintendent shall notify project forester of layout for final review. Discrepancies between plans and site conditions will be noted. Project forester shall review start up of excavation to insure construction procedures are being followed. Additional root pruning may be necessary by hand should deeper roots of significance be uncovered. During backfill operations the final 18" shall be composed of site topsoil from stockpile or approved off site topsoil to provide a rooting medium for future re-growth. Compaction of this top layer shall be the

minimum necessary for final grading with no vibratory or roller equipment to be used assuming the area is not to be used for structural fills. When excavation operations occur within existing woodlands mulching as a ground cover may be more suitable than turf establishment.

Tree Protection During Construction

Once further design elements are determined specific protection and stress reduction measures can be prescribed.

Quadrangle Specimen Tree Inventory / Assessment

Tree #	DBH	Common Name	Assessed Ranking	Existing Issues / Comments	Preliminary	Recommendations Based Upon				Planning Comments
					CRZ	Assessment				
					Critical Root Zone Radius in Feet	Future Replacement				Design / Construction Elements of Concern
						Major Restoration Measures	Moderate Restoration Measures	No Restoration Needed		
1	43	White Oak	Fair	Thin top, good interior growth, compacted soils, turf, ex. Utilities underground.	64	X				Special demolition procedures, paving / grading.
2	36	White Oak	Fair	Thin top, good interior growth, buried root flair, compacted soils, turf, ex. Utilities underground.	54	X				Special demolition procedures, paving / grading.
3	10	Japanese Zelkova	Good	Compacted soils, turf, close to walk edge.	15		X			Special demolition procedures, paving / grading.
4	8	Japanese Zelkova	Good		12			X		Special demolition procedures, paving / grading.
5	14	Willow Oak	Very Good	Turf, ex utilities underground.	20			X		Retaining wall, Terrace.
6	33	White Oak	Good	Compacted soils, turf, ex. Utilities underground, ex, walkway.	50		X			Demo walk, new walk / grading, retaining wall.
7	15	Pin Oak	Fair	Compacted soils, turf, ex. Utilities underground.	22	X		X		
8	16	Black Gum	Fair	Different form, compacted soils, turf.	24	X		X		
9	9	Willow Oak	Very Good	Compacted soils, ex. Utilities underground.	12			X		
10	42	White Oak	Good	Tip decline, compacted soils, turf, ex. underground utilities.	64		X			Retaining wall
11	30	White Oak	Good		45					Demo walk, new walk / grade.
12	44	Red Oak	Poor	Dieback, decline, compacted soils, turf, ex. underground utility.	66	X	X			
13	8	Red Oak	Very Good	Dieback, decline, compacted soils, turf, ex. underground utility.	12					

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Quadrangle Specimen Tree Inventory / Assessment

Tree #	DBH	Common Name	Assessed Ranking	Existing Issues / Comments	Prelimin	Recommendations Based Upon				Planning Comments
					ary CRZ	Assessment				
	(Trunk diameter)				Critical Root Zone Radius in Feet	Future Replacement	Major Restoration Measures	Moderate Restoration Measures	No Restoration Needed	Design / Construction Elements of Concern
				Dieback, decline, compacted soils, turf, ex. underground utility.	55	X	X			Demo walk, new walk / grade
14	38	White Oak	Poor	Inspect for oak scale insects.	24					
15	16	Willow Oak	Good	Compacted soils, ex. Utilities underground.	24					
16	16	Willow Oak	Very Good	Compacted soils, ex. Utilities underground.	15					
17	10	Red Oak	Very Good	Compacted soils, ex. Utilities underground.	20					
18	14	Japanese Zelkova	Very Good	Buried root flare; turf.	45		X			
19	30	White Oak	Good		50			X		
20	34	White Oak	Good		20					
21	14	Willow Oak	Good		25	X				
22	18	Sycamore Maple	Good	Short lived invasive						
23	36	Black Oak	Poor	Decline, dieback, compacted soils, turf, ex underground utilities.	54	X	X			Demo walk, new pavers, grade.
24	42	American Elm	Good	Compacted soils, ex. Utilities underground.	62					Demo walk, new pavers, grade.
25	40	American Elm	Fair	Minor decline, compacted soils, ex. Utilities underground.	60			X		Demo walk, new pavers, grade.
26	12	American Holly	Good		18			X		Demo walk, new pavers, grade.
27	18	Pin Oak	Good	Compacted soils, restricted growing space.	25			X		Demo walk, new pavers, grade.
28	20	Pin Oak	Good	Compacted soils, restricted growing space.	30			X		Demo walk, new pavers, grade.
29	23	Pin Oak	Good	Compacted soils, restricted growing space.	34			X		Demo walk, new pavers, grade.
30	12	Pin Oak	Good	Compacted soils, restricted growing space.	18			X		Demo walk, new pavers, grade.
31	26	Pin Oak	Fair	Compacted soils, restricted growing space.	40			X		Demo walk, new pavers, grade.

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