Arborist Report
3215 Porter Dr.
Palo Alto, CA

Introduction and Overview

Stanford Real Estate is planning to redevelop the site at 3215 Porter Dr. in Palo Alto, CA. The building on the site was demolished for development of the adjacent site; the parking area and landscaping remain. HortScience | Bartlett Consulting was asked to prepare an **Arborist Report** for the site as part of the development application to the City of Palo Alto.

This report provides the following information:

1. An evaluation of the health and structural condition of the trees within the proposed project area based on a visual inspection from the ground.
2. An assessment of trees that will be preserved and removed based on plans provided by the client.
3. Guidelines for tree preservation during the design, construction, and maintenance phases of development.

Tree Assessment Methods

Trees were assessed on March 22, 2019. The assessment included all trees located within the proposed project area and with canopies overhanging the site. The assessment procedure consisted of the following steps:

1. Identifying the tree species;
2. Verifying tree tag numbers, which were previously attached to trees in 2016.
3. Measuring the trunk diameter at a point 54" above grade;
4. Evaluating the health and structural condition using a scale of 1 to 5:
   - ***5*** - A healthy, vigorous tree, reasonably free of signs and symptoms of disease, with good structure and form typical of the species.
   - ***4*** - Tree with slight decline in vigor, small amount of twig dieback, minor structural defects that could be corrected.
   - ***3*** - Tree with moderate vigor, moderate twig and small branch dieback, thinning of crown, poor leaf color, moderate structural defects that might be mitigated with regular care.
   - ***2*** - Tree in decline, epicormic growth, extensive dieback of medium to large branches, significant structural defects that cannot be abated.
   - ***1*** - Tree in severe decline, dieback of scaffold branches and/or trunk; most of foliage from epicormics; extensive structural defects that cannot be abated.
5. Rating the suitability for preservation as "high", "moderate" or "low". Suitability for preservation considers the health, age, and structural condition of the tree species and its potential to remain an asset to the site.

   High: Trees with good health and structural stability that have the potential for longevity at the site.

   Moderate: Trees with somewhat declining health and/or structural defects than can be abated with treatment. The tree will require more intense management and monitoring, and may have shorter life span than those in 'high' category.

   Low: Trees in poor health or with significant structural defects that cannot be mitigated. Tree is expected to continue to decline, regardless of treatment. The species or individual tree may have characteristics that are undesirable for landscapes, and generally are unsuited for use areas.

Description of Trees

HortScience reevaluated 24 trees. Based on the survey, nine blue gums along the north property line are located off site. Only three species were represented in the assessment (Table 1), with blue gum and Canary Island pine representing the most trees. Descriptions of each tree are found in the ***Tree Assessment*** and approximate locations are plotted on the ***Tree Inventory Map*** (see Exhibits).

Table 1. Condition ratings and frequency of occurrence of trees 3215 Porter Dr., Palo Alto CA

Common Name	Scientific Name	Condition			Total
		Poor (1-2)	Fair (3)	Good (4-5)	
Blue gum	*Eucalyptus globulus*	2	7	-	**9**
Red ironbark	*Eucalyptus sideroxylon*	-	1	-	**1**
Canary Island pine	*Pinus canariensis*	-	3	11	**14**
Total		**2**	**11**	**11**	**24**

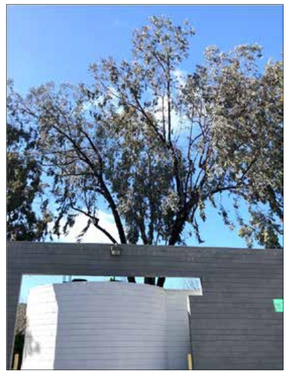
Canary Island pine comprised most of the trees on site, with 14 trees. Trees were mature, with trunk diameters ranging from 13 to 29 inches. Canary Island pines were mostly in good condition with good form and structure and dense crowns (Photo 1). Two trees in fair condition (#95, 140) had slightly thin crowns.

Red ironbark (#143) was the only other on-site tree located along the west property line against the fence. It had multiple trunks of 20, 20, and 18 inches and was in fair condition with a thinning crown (Photo 2).

The remaining nine trees were located just off site along the north property line and consisted of mature blue gums, with trunk diameters ranging from 10 to 36 inches. All trees had codominant or multiple trunks, and all but two trees were in fair condition. Trees had been previously topped and had multiple branches growing from the pruning locations. Two trees in poor condition (#99, 100) had small crowns and crowded form.

Photo 1 (right): Canary Island pines #94-97 were in good and fair conditions.

Photo 2 (far right): Red ironbark #143 was in fair condition with a thinning crown and fair structure.



The City of Palo Alto regulates all trees associated with a development project; therefore all 24 trees are considered protected.

Suitability for Preservation

Before evaluating the impacts that will occur during development, it is important to consider the quality of the tree resource itself, and the potential for individual trees that are preserved on development sites must be carefully selected to make sure that they may survive development impacts, adapt to a new environment, and perform well in the landscape.

Each tree was rated for suitability for preservation based upon its age, health, structural condition, and ability to safely coexist within a development environment (see ***Tree Assessment*** in Exhibits, and Table 2). We consider trees with high suitability for preservation to be the best candidates for preservation. We do not recommend retention of trees with low suitability for preservation in areas where people or property will be present. Retention of trees with moderate suitability for preservation depends upon the intensity of proposed site changes. Off-site trees were not rated.

- **Tree health**
  Healthy, vigorous trees are better able to tolerate impacts such as root injury, demolition of existing structures, changes in soil grade and moisture, and soil compaction than are non-vigorous trees.

- **Structural integrity**
  Trees with significant amounts of wood decay and other structural defects that cannot be corrected are likely to fail. Such trees should not be preserved in areas where damage to people or property is likely. For example, blue gum # 104, with decay in pruning cuts on the lower trunk, has a higher likelihood of failure and should be removed or monitored.

- **Species response**
  There is a wide variation in the response of individual species to construction impacts and changes in the environment. For instance, Canary Island pine is relatively tolerant of construction impacts.

- **Tree age and longevity**
  Old trees, while having significant emotional and aesthetic appeal, have limited physiological capacity to adjust to an altered environment. Young trees are better able to generate new tissue and respond to change.

- **Species invasiveness**
  Species that spread across a site and displace desired vegetation are not always appropriate for retention. This is particularly true when indigenous species are displaced. The California Invasive Plant Inventory Database (http://www.cal-ipc.org/paf/) lists species identified as being invasive. Palo Alto is part of the Central West Floristic Province. Blue Gum is listed as "limited."

Table 2. Tree suitability for preservation
3215 Porter Dr., Palo Alto CA

High	Trees in this category are in good health and structural stability and have the potential for longevity at the site. Ten Canary Island pines were in this category.
Moderate	Trees in this category have fair health and/or structural defects that may be abated with treatment. These trees require more intense management and monitoring, and may have shorter life-spans than those in the "high" category. Eight trees had a moderate suitability for preservation.
Low	Trees in this category are in poor health or have significant defects in structure that cannot be abated with treatment. These trees can be expected to decline regardless of management. The species or individual tree may possess either characteristics that are undesirable in landscape settings or be unsuited for use areas. Six off-site blue gums were in this category.

Evaluation of Impacts and Recommendations

The *Tree Assessment* was the reference point for tree health, condition, and suitability for preservation. I used the Tree Disposition and Landscape plans (The Guzzardo Partnership, 5/31/19) to estimate impacts to trees.

The plan shows a new building near the front of the site surrounded by patio, parking, and landscaping. A pedestrian pathway transects the north side of the site adjacent to the Palo Alto Hanover utility substation.

Improvements to the substation by the City will result in removal of blue gums #98-106, which are located on the 3350 Hanover site. Trees #94-97, 107, 138 and 139 are within the path alignment and will need to be removed for grading and construction. Canary Island pines #140-142, located within a small parking lot planter, will be removed to accommodate the new parking lot layout, which includes a ramp leading to a subterranean garage.

Based on my evaluation of the plans:

- Ten (10) on-site trees will be removed, all Canary Island pines;
- Nine off-site blue gums will be removed (by the City) for substation improvements;
- Four Canary Island pines (#82-85) at the northwest corner of the site will be preserved, two of the trees will experience minor to moderate impacts from path construction;
- One red ironbark at the northwest property line will remain undisturbed.

Excavation near trees #82-85 should be done carefully to avoid damaging roots. Guidelines for protection and preservation of these trees are included in the following section.

Tree Preservation Guidelines

The goal of tree preservation is not merely tree survival during development but maintenance of tree health and beauty for many years. Trees retained on sites that are either subject to extensive injury during construction or are inadequately maintained become a liability rather than an asset. The response of individual trees will depend on the amount of excavation and grading, the care with which demolition is undertaken, and the construction methods. Coordinating any construction activity inside the **TREE PROTECTION ZONE** can minimize these impacts.

The following recommendations will help reduce impacts to trees from development and maintain and improve their health and vitality through the clearing, grading and construction phases.

Tree Protection Zone

1. **A TREE PROTECTION ZONE** shall be identified for each tree to be preserved on the Tree Protection Plan prepared by the Project Arborist.
   a. Fence trees #82-85 to completely enclose the **TREE PROTECTION ZONE** prior to demolition, grubbing, or grading. Fences shall be 6 ft. chain link with posts sunk into the ground or equivalent as approved by the City.
   b. **TREE PROTECTION ZONE** shall extend to the edge of proposed pedestrian walkways to the north and east and to tree driplines in all other directions.
   c. Fences must be installed prior to beginning demolition and must remain until construction is complete.
   d. No grading, excavation, construction or storage or dumping of materials shall occur within the **TREE PROTECTION ZONE**. No underground services including utilities, sub-drains, water or sewer shall be placed in the **TREE PROTECTION ZONE**.

Design recommendations

1. All plans affecting trees shall be reviewed by the Project Arborist with regard to tree impacts. These include, but are not limited to, demolition plans, grading and utility plans, landscape, and irrigation plans.
2. Underground services including utilities, sub-drains, water or sewer shall be routed around the **TREE PROTECTION ZONE**. Where encroachment cannot be avoided, special construction techniques such as hand digging or tunneling under roots shall be employed where necessary to minimize root injury.
3. **Tree Preservation Guidelines**, prepared by the Project Arborist, should be included on all plans.
4. Do not lime within 25' of any tree. Lime is toxic to tree roots.
5. Any herbicides placed under paving materials must be safe for use around trees and labeled for that use.
6. Irrigation systems must be designed so that no trenching will occur not within the **TREE PROTECTION ZONE**.

Pre-construction treatments and recommendations

1. The construction superintendent shall meet with the Project Arborist before beginning work to discuss work procedures and tree protection.
2. Pruning trees to provide construction and access clearance may be required.

3. Prune trees to be preserved to clean the crown and to provide clearance. All pruning shall be done by a State of California Licensed Tree Contractor (C61/D49). All pruning shall be done by Certified Arborist or Certified Tree Worker in accordance with the Best Management Practices for Pruning (International Society of Arboriculture, 2002) and adhere to the most recent editions of the American National Standard for Tree Care Operations (Z133.1) and Pruning (A300).
4. All tree work shall comply with the Migratory Bird Treaty Act as well as California Fish and Wildlife code 3503-3513 to not disturb nesting birds. To the extent possible, tree pruning and removal should be scheduled outside of the breeding season. Breeding bird surveys should be conducted prior to tree work. Qualified biologists should be involved in establishing work buffers for active nests.

Recommendations for tree protection during construction

1. Prior to beginning work, the contractors working in the vicinity of trees to be preserved are required to meet with the Project Arborist at the site to review all work procedures, access routes, storage areas and tree protection measures.
2. Any root pruning required for construction purposes shall receive the prior approval of and be supervised by the Project Arborist. Roots should be cut with a saw to provide a flat and smooth cut. Removal of roots larger than 2" in diameter should be avoided.
3. If roots 2" and greater in diameter are encountered during site work and must be cut to complete the construction, the Project Arborist must be consulted to evaluate effects on the health and stability of the tree and recommend treatment.
4. No grading, construction, demolition, or other work shall occur within the **TREE PROTECTION ZONE**. Any modifications must be approved and monitored by the Project Arborist.
5. Fences have been erected to protect trees to be preserved. Fences define a specific **TREE PROTECTION ZONE** for each tree or group of trees. Fences are to remain until all site work has been completed. Fences may not be relocated or removed without permission of the Project Arborist.
6. Construction trailers, traffic and storage areas must remain outside fenced areas at all times.
7. Prior to grading, pad preparation, excavation for foundations/footings/walls, trenching, trees may require root pruning outside the **TREE PROTECTION ZONE.** Any root pruning required for construction purposes shall receive the prior approval of, and be supervised by, the Project Arborist.
8. If injury should occur to any tree during construction, it should be evaluated as soon as possible by the Project Arborist so that appropriate treatments can be applied.
9. No excess soil, chemicals, debris, equipment or other materials shall be dumped or stored within the **TREE PROTECTION ZONE**.
10. Any additional tree pruning needed for clearance during construction must be performed by a Project Arborist and not by construction personnel.

Maintenance of impacted trees

Preserved trees will experience a physical environment different from that pre-development. As a result, tree health and structural stability should be monitored. Occasional pruning, fertilization, mulch, pest management, replanting and irrigation may be required. In addition, provisions for monitoring both tree health and structural stability following construction must be made a priority.

Inspect trees annually and following major storms to identify conditions requiring treatment to manage risk associated with tree failure.

Our procedures included assessing trees for observable defects in structure. This is not to say that trees without significant defects will not fail. Failure of apparently defect-free trees does occur, especially during storm events. Wind forces, for example, can exceed the strength of defect-free wood causing branches and trunks to break. Wind forces coupled with rain can saturate soils, reducing their ability to hold roots, and blow over defect-free trees. Although we cannot predict all failures, identifying those trees with observable defects is a critical component of enhancing public safety.

Furthermore, trees change over time. Our inspections represent the condition of the tree at the time of inspection. As trees age, the likelihood of failure of branches or entire trees increases. Annual tree inspections are recommended to identify changes to tree health and structure. In addition, trees should be inspected after storms of unusual severity to evaluate damage and structural changes. Initiating these inspections is the responsibility of the client and/or tree owner.

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