APPENDIX C: BIOLOGICAL RESOURCES

PEER REVIEW OF THE ARBORIST REPORT FOR SANTA BARBARA COTTAGE HOSPITAL

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MEMORANDUM

DATE: April 7, 2004

TO: Jill O'Connor

FROM: Denise Kelly

SUBJECT: Peer Review of the Arborist Report for Santa Barbara Cottage Hospital

INTRODUCTION

LSA Associates, Inc. (LSA) has been hired by the City of Santa Barbara to write an Environmental Impact Report (EIR) on the Cottage Hospital modernization project. The Hospital is located at 320 West Pueblo Street, Santa Barbara, CA, 93105 and is seeking to seismically retrofit and redesign its campus in compliance with Senate Bill 1953. As part of the CEQA (California Environmental Quality Act) process, a peer review of the information presented by the applicant, Cottage Health System was included in LSA's scope of work. The following report is a peer review of the Arborist Report submitted for the project.

The following review is divided into two parts to reflect the two sections of the arborist report: text and graphics. This review refers to the Arborist Report for Santa Barbara Cottage Hospital by certified arborist Randall Mudge, dated November 11, 2002 and amended July 2 and October 23, 2003. Figures ARB1-4 (graphic plans) were submitted with the arborist report and are labeled Development Application Review Team Submittal (DART), from Arcadia Studios Landscape Architecture and Lee, Burkhart, Liu Architecture. Updated tree protection plans from Arcadia Studios are dated April 2, 2004 and tree disposition plans are dated February 18, 2004.

REVIEW

In the scope of work section of the arborist report, the author states that his purpose was to objectively evaluate the trees in anticipation of future development; thus this report was not scoped for CEQA use specifically. Site visits were conducted on March 16 and 17, 2004 to spot-check information presented in the report. Based on the site visits, some of the information presented in the report is unclear or incomplete, and should be presented in greater detail for CEQA review. This report will focus on what additional information is needed in order to create an analysis of the impacts to the trees, and present suggestions on how the report can be made more useable for the City's CEQA review process.

Comments on the Text

Moreton Bay Fig. The 83-inch Moreton Bay fig (*Ficus macrophylla*) at the corner of Pueblo and Castillo Streets is indeed a specimen that has outgrown its planting space. This tree will require special measures for its preservation during construction and perhaps design modifications to the

proposed hardscaping in order to prevent decline and further loss of vigor. The tree was planted in 1919, and appears to be the only remaining landscape feature from the hospital's second building period beginning in 1913. The tree is perceived with fondness and sentiment within the community, and appears to qualify as an object or structure of merit (Historic Structures Report, Cottage Hospital, January 2003, by San Buenaventura Research Associates).

This tree is a significant enough specimen to warrant a more in-depth report to address specific measures for its preservation or even whether the tree can be preserved with the potential impacts from the proposed construction. The landscape plans indicate a significant level of impact: the rooting area at Castillo and Pueblo Streets will be reduced from approximately 86 feet to approximately 60 feet, and the proposed design of the building surrounding the tree would require the limbs to be shortened to accommodate the new building. A pre-construction excavation to determine the extent of the existing root system should be undertaken so that decisions can be made regarding the proposed hardscape design and consequent root removals. The proposed preservation measures should then be addressed in an individual report and should be reviewed by Santa Barbara City Arborist David Gress. The report should include information on the following:

- Verification of the exact location of the tree (and root system) in reference to its surroundings and the proposed structures and hardscaping.
- Discussion of the species' relative tolerance to root disturbance and root pruning, and a discussion of how this fits with the mature specimen onsite. In particular, how the size, age and vigor of this tree may be affected in regard to the planned level of root removal and disturbance. Generally, no more than 20% of tree roots should be cut per year on a vigorous, healthy tree; root pruning is *not* recommended for older, stressed, or less vigorous trees. (Moreton Bay figs are vigorous as a species when they are young and have been planted in a favorable environment. This specimen, however, is mature and appears to be stressed due to the limited size of the planting space, soil compaction, lack of organic matter in the soil, etc.) The report should determine the extent of root pruning that could be allowed on this specimen, and discuss options to the proposed root pruning and modifications of the planned hardscaping such as bridging over roots, root tunneling, "no dig pavement", non-continuous footings, placing new curbs on top of existing pavement, etc. (See Figures 8.3, 8.4, 8.5, and 8.6 in the report appendix).

  Proposed fill, planting, and irrigation beneath the canopy should be avoided. Discuss modifications to the proposed landscape design, such as fencing and signage to discourage people from walking or sitting beneath the tree canopy in the future.

- Tunneling, trenching and root pruning activities (if approved by the City Arborist):
  a. The site arborist must be present, and retain the authority to stop work if necessary.
  b. Tunneling is a useful alternative to root trenching and pruning, use pneumatic excavation tools to determine the extent of the root system. As few roots as possible should be cut, as far away from the trunks as possible. If some roots must be cut, they must be cut cleanly with a circular rock saw or hand saw; equipment (trencher, backhoe, excavator) may not be used. Roots up to one inch may be cut, roots larger than one inch must be tunneled under.
  c. To prevent roots from drying out, all trenches should be watered and backfilled quickly with site soil or provided with damp burlap to prevent root desiccation.

- The importance of designating an ISA-certified (International Society of Arboriculture) or ASCA-registered (American Society of Consulting Arborists) consulting arborist that will be available for questions and construction monitoring. The arborist should be on site for any work relating to the Moreton Bay fig, and should be included in any engineering discussions regarding sidewalk replacement, road work, utility placement, etc.
- Specific pre-construction tree invigoration measures (barrier fencing with signs, supplemental irrigation, compost and mulch application, etc.) to start as soon as possible. The report should specify the amount of water to be applied, the number of days in the watering cycle, and the method of delivery. The tree should be well watered before layers of compost and mulch are applied, and the type and thickness of the materials should be specified. Depending on the timing of the construction phases, a light fertilization may be warranted.
- Pre-construction safety clearance pruning should be done under direction of a certified or registered arborist, and by ISA-certified tree workers experienced with this species. Pruning should be minimal and retain as much foliage as possible.
- Protective barrier fencing that is difficult to move (see tree protection measures below) and signage on the fencing per the tree protection measures listed on the Arcadia Studios plans.
- Crown and root protection during the demolition phase, including keeping any newly exposed roots moist and intact, and protecting the canopy from falling debris.
- Whether structural soils or amendments should be considered as backfill.
- Periodic wash-down of the leaves that will become dusty with demolition and construction. (Dust on leaves reduces their ability for photosynthesis and provides a nice habitat for mites and other insect pests.)
- Post-construction care, maintenance and monitoring specifics.

Oaks and Sycamores. The Mudge report states that 19 of the 69 coast live oaks (*Quercus agrifolia*) on site will be removed. The number and size of trees listed in the mitigation table of the report is sufficient. The preliminary plant list submitted by Arcadia Studios lists coast live oak in 24-inch box only (no quantity given). Oak mitigation should be per the Mudge report: six 48-inch box, 10 36-inch box, and 10 15-gallon trees. If box sizes are adjusted, the quantity should be adjusted accordingly.

The listed mitigation indicates a 3:1 replacement ratio for trees 12 inches in diameter at breast height (4.5 feet above grade) and larger. This is less than the ratio of 5:1 listed in the City of Santa Barbara zoning ordinance. However, the Architectural Board of Review (ABR) lists replacements on a 3:1 to 10:1 basis.

Some of the oaks on site are naturally occurring, and some have been planted. Considering the large size of some of the specimens, all removed oaks should be considered when calculating mitigation replacement numbers.

The mitigation measures should include a minimum yearly monitoring of the oaks, submitted to the City.

The monitoring report should done by an ISA-certified arborist and include height, canopy spread, trunk diameter at breast height, an assessment of health and vigor, and recommendations, if any.

The sycamores (*Platanus racemosa*) are native trees, but appear to have been planted as landscape specimens at the site. These native sycamores are riparian species, so they are not considered native to the site and will not require mitigation.

Construction near existing oaks. Excavation, planting, and irrigation within the dripline of existing oaks is not permitted per the oak tree information in the Master Environmental Assessment submitted by Santa Barbara City Planning Division. Soil removal with pneumatic tools may be allowed for the placement of a decomposed granite surface, however pneumatic excavation and fill must be a minimum of ten feet away from the trunk of trees greater than 12 inches in diameter. Root pruning within the dripline of oaks is not permitted.

Bischofia javanica. The report states that the Bischofia (*Bischofia javanica*) is typically unavailable in the nursery trade but should be re-introduced. This tree was introduced in Florida and has naturalized extensively there, displacing native vegetation and altering the structure of the plant communities there. Although the climate of Santa Barbara is much drier than that of most of Florida, it may be conducive to supporting tropical species such as this in wetter locations. However, conversations with landscape architect Bob Cunningham of Arcadia Studios and City Arborist Dave Gress suggest that this species has not historically been invasive in Santa Barbara.

Transplanted specimens. The large existing Giant Bird of Paradise (*Strelitzia nicolai*), palms (various species), and dragon trees (*Dracaena draco*) should be transplanted on site if possible. If this is not feasible due to phasing constraints or holding costs, these plants should be salvaged and donated. Given the health and vigor of the other plants on the site, transplanting them to another location is not recommended or economically feasible.

Health and Special Care. Although this portion of the report is not specifically required for CEQA review, it is important in reference to maintaining greenspace in the City. It was evident from the site visit and from Mr. Mudge's observations that the overall site would greatly benefit from additional landscape maintenance. Regular watering and care, especially during the initial plant establishment phase, is necessary for healthy plant growth and an attractive landscape. Stressed plants, or plants growing in very limited spaces are subject to many more diseases and pests.

Tables. Table 1 is a summary of useful information regarding removals. However, some of the trees listed as removals in the Table were not shown on the graphic plan as removals.

Table 2 includes the individual tree number, species, diameter, height, overall condition, and comments. The table should also include an estimate of the canopy spread for each tree. The canopy spread information is especially important in estimating the protection area for specimens that will be preserved onsite as well as gauging existing tree cover and shade.

Comments on the Graphics

DART submittals.

- The graphics presented with the arborist report, labeled Tree Mitigation Plan, gives *proposed* site information. What is required under CEQA is the *existing* site information in order to determine the significance of the environmental impact.
- Several of the trees listed in the text of the report (Table 2) are not shown on the plans as trees to be removed. Conversely, trees shown on the graphic to be removed are not listed in Table 2 as such.
- It is difficult to determine the status of trees in the DART graphic labeled Tree Mitigation Plan. The plan shows the proposed building and landscape with existing trees (a selection of both trees to be removed and trees to be retained) and the proposed landscaping. An existing site plan with existing trees would more clearly show which trees are to be removed as part of the construction. Information on the number, size and species of trees to be removed is part of the CEQA review process, and necessary to determine the level of impact. The existing trees to be protected along with the proposed mitigation trees should be shown on a separate, discrete plan.
- The note at the bottom of the Sheet ARB-2 reads "Locations of depicted trees may vary from actual condition, due to multiple sources of base information". This is not acceptable for tree protection purposes; the exact location is necessary to determine tree protection specifics.

Arcadia Studios Sheets PH4: Tree Protection Plan- Cottage West Campus and PH6: Tree Protection Plan- Cottage East Campus.

- Trees should be numbered with the same numbers that are used in the arborist report and submitted with previous plans. The new numbering/lettering system is confusing. Clarify what the black and grey broken lines indicate in the plan legend.
- Include new specifications on the plan for Moreton Bay fig and oaks after approval by the City Arborist. The tree protection plan must be submitted as part of the grading and demolition plans.
- The applicant must retain a certified or registered arborist for onsite inspections, consultations, and monitoring. The arborist must monitor the site a minimum of twice monthly during construction phases.
- The barrier around protected trees should be chain link fencing a minimum of six feet high and set in concrete-footed bases that are difficult to move. Protective fencing should be placed at the outer edge of the canopy dripline, plus five feet.
- Prior to construction, (six months minimum), provide all trees to be protected with optimal care (deep watering, pest control, organic compost and mulch, etc.). Soil should be irrigated in the top 24 inches, and checked with a soil probe. After initial deep watering, provide compost and mulch application, keeping materials away from woody tissues. Do not allow soil to dry between deep watering and mulch application. Timing of subsequent waterings to be under the direction of the site arborist. Erect barrier fencing around entire Moreton Bay fig root protection zone and provide optimal care until construction begins. Light applications of seaweed-based fertilizers only, do not fertilize unless approved by site arborist.

- Prune by thinning cuts only, and *only* for safety clearance. Do not prune in an attempt to balance the roots and the canopy at this time. All pruning to be under the direction of the site arborist and according to ISA standards. Pruning to be done by ISA-certified tree workers only.
- The site arborist must be present for all work and retain the authority to stop work if necessary. As few roots as possible should be cut, as far away from the trunks as possible. No more than 20% of roots should be cut on a given tree. Roots must be cut cleanly with a circular rock saw or hand saw, other forms of equipment (trencher, backhoe, excavator) may not be used. Roots up to one inch may be cut, roots larger than one inch must be tunneled under. To prevent roots from drying out, all trenches should be watered and backfilled quickly with site soil or provided with damp burlap to prevent root desiccation.
- Specifics for tree N4 list it as *Platanus racemosa* (California sycamore); the plan graphic shows it as an oak. Specifics for tree O4 lists it as *Quercus agrifolia* (coast live oak); the plan graphic shows it as a sycamore. There is a new walkway shown within three feet of the trunk of this 10-inch tree, individual protection measures and tunneling under the existing roots should be described in detail.

SUMMARY OF ADDITIONAL INFORMATION REQUIRED FOR CEQA REVIEW

- An up-to-date list of trees to be removed (quantity, diameter size, species).
- A report and protection plan specifically addressing the protection of the Moreton Bay fig, addressing the points listed above, approved by City Arborist Dave Gress.

SUMMARY OF ADDITIONAL INFORMATION REQUIRED FOR MITIGATION

- An up-to-date graphic of trees to be removed (removals on one plan, mitigation on another plan). The graphic should show the actual tree outline (canopy spread) of the existing trees to be removed and mitigation trees labeled as such.
- Construction details and drawings for all proposed work near all of the trees to be preserved so that impacts to trees can be assessed.
- Up-to-date protection specifications and graphics on the tree protection plan showing the actual tree canopy outline and the actual tree trunk location. The proposed protective fence should be clearly shown on this plan as well. Fencing should be specified as chain link secured with concrete-footed posts.

SOURCES AND REFERENCES

City of Santa Barbara Community Development Department, Planning Division.
Architectural Board of Review Design Guidelines: Tree Removal Requirements; Native and Specimen Tree Protection and Replacement Standards. No date.
City Conservation Element: Visual Resources, Biological Resources. No date.
Initial Study/Environmental Checklist, Santa Barbara Cottage Hospital Reconstruction. 2003.
Master Environmental Assessment: Oak Tree Information, Oak Tree Mitigation Measures. 1981.
Zoning Ordinance, Chapter 22.10 Vegetation Removal. 1994

Costello, L.R. and Jones, K.S. *Reducing Infrastructure Damage by Tree Roots: A Compendium of Strategies.* Cohassett, California: Western Chapter of the International Society of Arboriculture and University of California Cooperative Extension. 2003.

Cunningham, Bob. Arcadia Studios Landscape Architecture. Personal communication. March and April 2004.

Gress, David. Santa Barbara City Arborist. Personal communication. March 2004.

Metheny, Nelda and Clark, James R. *Trees and Development: A Technical Guide to Preservation of Trees During Land Development.* Champaign, Illinois: International Society of Arboriculture. 1998.

San Buenaventura Research Associates. *Historic Structures Report, Cottage Hospital.* 2003.

APPENDIX A

APPENDIX

The most important impacts to minimize are root removal and soil compaction that occur as the area is prepared for installation of the pavement. Where pavement must encroach within the tree protection zone, consider the amount of excavation required to create the pavement section and the degree of compaction required for the subbase. To the extent that pavement designs can minimize those stresses, impacts to trees can be reduced. This may be accomplished in several ways (also see Chapter 4).

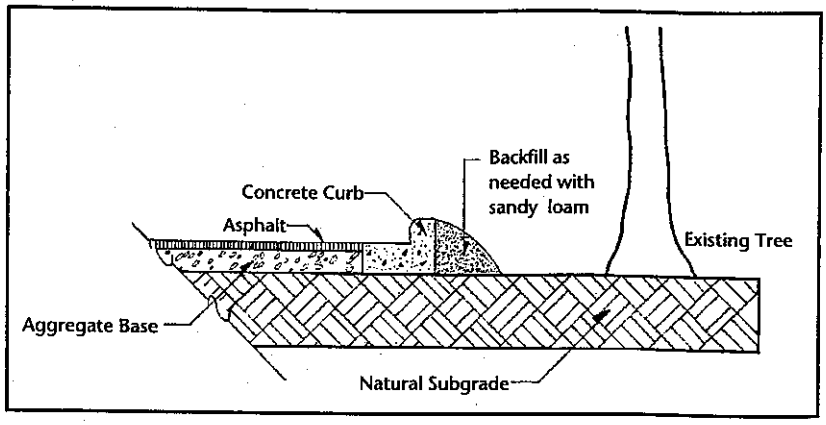

FIGURE 8.3 A "no-dig" type of pavement places the pavement section atop natural grade, thereby minimizing root disturbance and soil compaction. Extra reinforcement in the pavement and use of a geotextile under the base material may be needed to increase the stability of the pavement. (Adapted from a detail provided by Mary Ann Beale, City of Charlotte, North Carolina.)

- Use the pavement type requiring the thinnest section. Concrete usually requires a thinner section than asphalt or interlocking pavers.
- Place heavy-load corridors that require a thicker pavement section away from trees.
- Adjust finish grades so that the pavement section is built on top of natural grade, using a "no-dig" design (Figure 8.3). Some edge treatment will be necessary to retain the pavement section. The pavement will be higher than the surrounding grade. If the grade differential is a concern, mulch can be placed on the soil surface to meet the grade of the pavement.
- Increase the strength of the paving material so that is does not rely on a compacted subbase for strength. This is usually accomplished by putting extra reinforcing material in the surface layer.
- To reduce subbase compaction requirements, place a geotextile fabric at the bottom of the pavement section to protect from displacement into soft soil.

Heavily reinforced concrete requires the thinnest pavement section and least amount of subbase compaction, but it is expensive. Brick or interlocking pavers on sand are usually considered the best pavement under trees because they are more pervious than concrete or asphalt, although frost can heave these in cold-weather areas (Figure 8.4). Pavers may require more excavation to install than concrete unless a no-dig design is used for above-ground installation. Preparation of a compacted base usually is required. Pavers are more subject to displacement by roots and soil movement than concrete, although repair is easier because small sections can be removed and replaced. (See Case Study #4).

The amount of pavement a tree can safely tolerate depends on how much root interference occurs during installation and the potential for the tree to re-establish roots under the pavement. If the driveway and parking area on a residential lot can be installed simply by smoothing and hand-tamping the surface soil, then it may be possible to cover a portion of the optimum tree protection zone. On the other hand, pavements for major streets that require 2 to 3 feet of excavation for subbase preparation, curb, sidewalk, and perhaps underground utilities, must be more respectful of the tree.

Curbs require excavation for construction (see Chapter 4, Figure 4.10). Rolled curbs require the least amount of excavation. Where significant root injury would occur to install the curb, it may be possible to place the curb on top of the pavement (Photo 8.5). A steel bar holds the curb in place (Figure 8.5). A gutter is not constructed.

Footing and Foundation Design

The amount of soil excavation and compaction required varies greatly with footing and foundation type and, therefore, affects the degree of impact to adjacent trees. The consultant should discuss design options with the engineer to determine which design would have the least impact to trees.

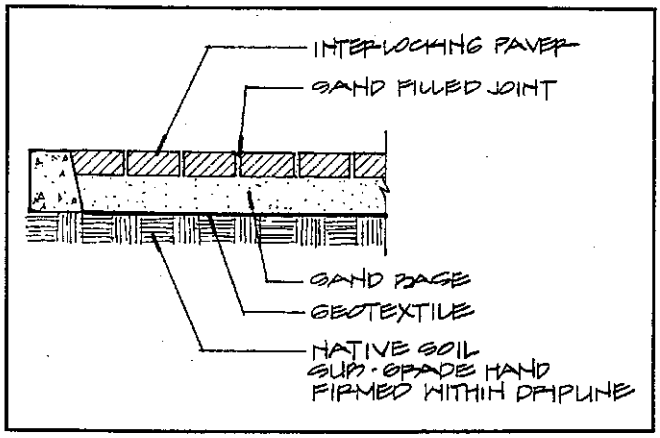

FIGURE 8.4 Brick or interlocking pavers on sand often are recommended as pervious paving. Use of geotextile under the sand and hand-firmed subgrade can minimize root impacts.

PHOTO 8.5 Excavation into the roots of this tree was avoided by placing the pavement section on top of existing grade and constructing the curb on top of the pavement (see Figure 8.5 for construction detail). (Photo courtesy of Howell Beach, Robert E. Marvin & Associates.)

PHOTO 8.6 Footings can be designed to span over tree roots, as shown with this brick wall. A metal plate spans the distance between footings (inset) (see also construction detail, Figure 8.6).

Where structures must be placed close to trees, some alternative footing designs may be considered.

- Use custom footing (designed by an engineer) in the vicinity of the tree that bridges over the roots (Photo 8.6; Figure 8.6).
- Cantilever the structure, so the building extends outwards from the footing.
- Install a raised foundation with discontinuous footing (piers).

Sometimes the least disruptive method is the pier foundation with grade beams placed above grade (see Chapter 4, Figure 4.11e). The diameter, depth, and spacing of the piers, as well as the size and weight of the equipment needed to drill the piers, define the potential for root injury. Compared to other foundation types, this design may provide little benefit to trees if piers are large and closely spaced. If the pier is end supported, the excavation must be as wide or wider than the base of the footing. If the beams are not specified to be above grade, a trench will be dug, usually to 18 inches, to construct it, potentially severing many roots.

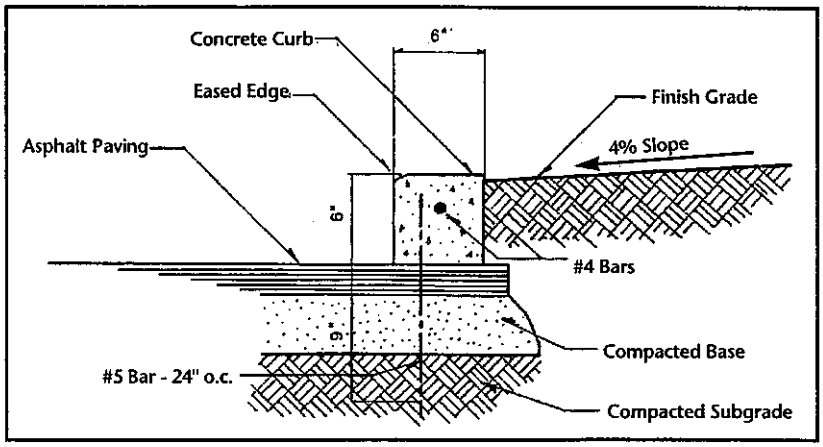

FIGURE 8.5 Placing the curb on top of the edge of pavement may reduce excavation into the root system compared to a typical curb detail. The curb is held in place with steel bars. (Adapted from detail provided by Howell Beach, Robert E. Marvin & Associates.)

Structure Design

Several factors about the design of structures adjacent to trees should be considered in order to minimize impacts to the tree. This primarily involves minimizing pruning requirements by considering potential interference of the tree's canopy with the structure—both in the present and with future growth.

- Make allowances for future growth of the tree in trunk girth and canopy height and spread.
- Locate fireplaces to avoid chimneys near canopies or locations where tree litter will accumulate. Local requirements for clearance may vary.
- Consider window location for desired views. Close views would be enhanced by mature trees, while distant views may place the tree in conflict with the view and lead to excessive pruning.
- If the structure will be within the dripline, consider limiting the height of the structure to avoid excessive pruning.
- Consider placement of solar panels or passive solar heating relative to trees.
- Consider line-of-sight for communication devices (e.g., satellite dishes).

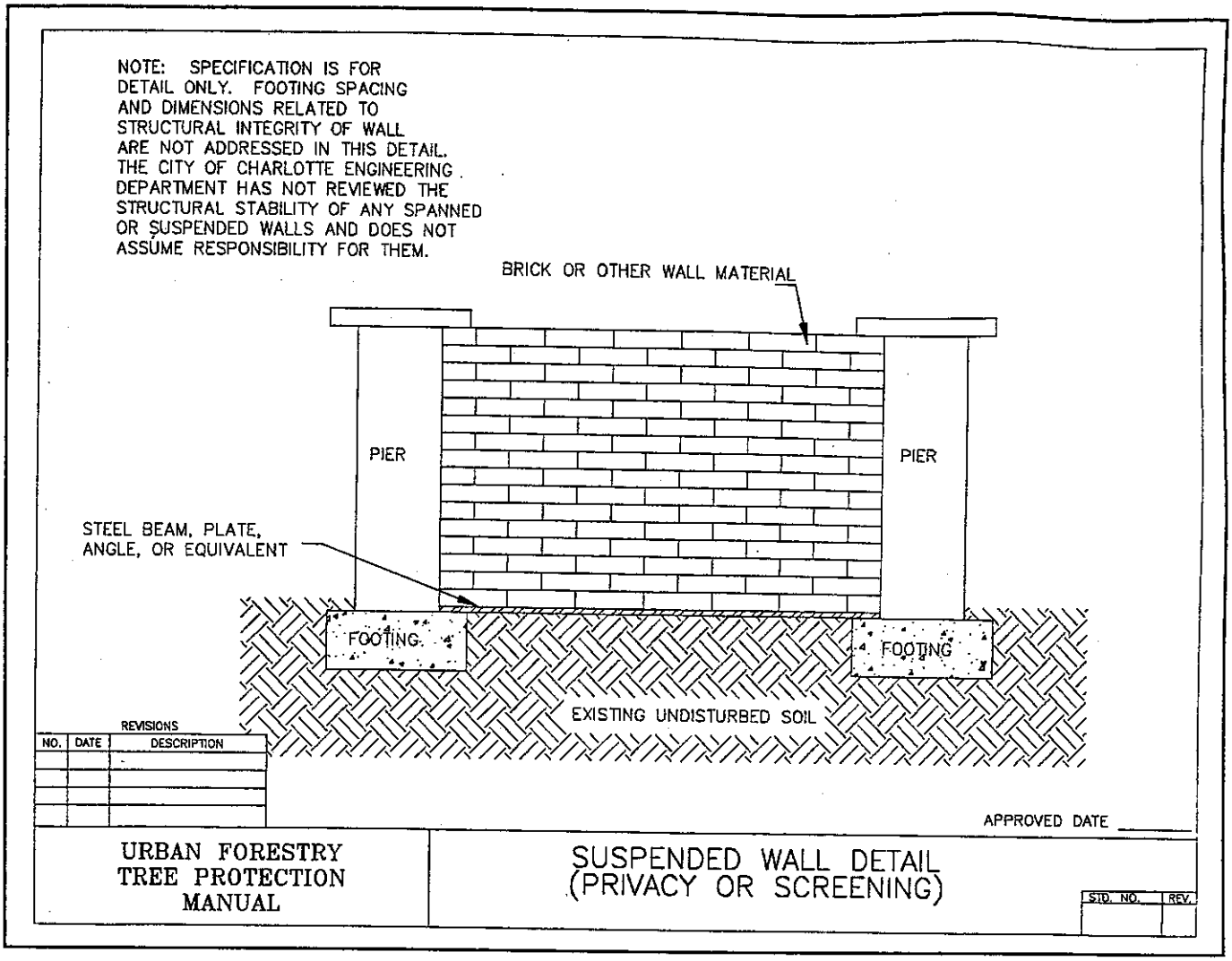

FIGURE 8.6 Detail of a wall suspended between piers. (Detail provided by Mary Ann Beale, City of Charlotte, North Carolina.)

Utilities and Services

The consultant must work with the designer and engineer to devise utility installation methods and alignments that minimize tree impacts while allowing the contractor to complete the job. The ideal situation would exclude all service and utility lines within the tree protection zone. This ideal is not always possible to attain.

Locations of electrical distribution lines and water, sewer, and storm drain main lines are usually included on plans. Less frequently, service line locations are shown. Often the route of the service lines from the service drop to the structure is determined by the installing contractors while in the field. Usually the utility contractor plots the alignment in the field by running the service drop lines from the connection point off the distribution line to the structure being serviced with the shortest, straightest line possible. Line placement may need to be adjusted to avoid existing trees. When the location of lines is important to tree protection, the consultant should make sure project plans and specifications include all utilities.

The number of trenches required to install utilities can be reduced by placing multiple lines in joint trenches. When utilities must go through a grove, place all lines through a single corridor. Because service lines are installed by different contractors (e.g., telephone, cable TV, electric, gas), joint trenches must be accessible when each is at the site.

Water, storm drain, and sewer lines require specific amounts of separation (see "Utilities and Services" in Chapter 4) and must tie into existing systems, so the possibilities for relocation are limited. The main lines usually are placed in the street. If trees are along the street edge, lines might be placed closer to the opposite side. It is usually more difficult and expensive to tunnel main lines under root systems than under service lines because of the depth and large diameter of the pipes.

Utility junction boxes, splice boxes, and manholes require extensive excavation and large equipment to install. They should be placed outside the tree protection zone.