

PART II

Cemetery

Management

Guidelines

OUR SON

NORWOOD

Chapter 3

General Management Guidelines

IN THIS CHAPTER

Preservation Treatment Approach	30
General Management Guidelines	32
Spatial Organization	33
Circulation	34
Vegetation	35
Buildings and Structures	53
Small-Scale Features: Markers, Curbs, Plot Fences, and Artworks	58
Small-Scale Features: Site Furnishings, Flagpoles, Signs, and Commemorative Features	70
New Interment Options	74
Archeological Features	75

This chapter contains recommendations that apply to all five of Austin’s historic city cemeteries. It informs, and is intended to be used in conjunction with, the following chapters pertaining to each individual cemetery.

Planning for historic cemetery preservation begins with determining the appropriate overall treatment approach, then developing guidelines that complement the approach. This chapter begins with an overview of the preservation philosophy used to determine the recommended treatment for the historic municipal cemeteries of Austin. This is followed by management guidelines based on this philosophy, which apply to preservation in all five cemeteries.

A master plan presents a clear vision for the future, one that combines the goals of the City government with the aspirations of the community. The recommendations contained in this plan reflect best practices in historic cemetery management, and in that way, the plan presents conditions and standards toward which PARD can progress over time. In some cases, additional funding, training, and/or resources may be required before a recommendation can be implemented.

PRESERVATION TREATMENT APPROACH

In order to determine the most suitable overall philosophy that supports the preservation of the five historic municipal cemeteries of Austin, the team reviewed the four treatment approaches approved by the Secretary of the Interior for historic properties. Described as forming “the philosophical basis for responsible preservation practice and enabling long-term preservation of a landscape’s historic features, qualities, and materials,” these approaches are defined as:

- **Preservation:** the act or process of applying measures necessary to sustain the existing form, integrity, and material of a historic property. Includes stabilization work, where necessary, as well as ongoing preservation maintenance and repair of historic materials and features.
- **Rehabilitation:** the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.
- **Restoration:** the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by removing features from other periods in its history and reconstructing missing features from the restoration period.
- **Reconstruction:** the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.⁵⁰

The team determined that three of these treatment approaches were not appropriate for this project: preservation is overly restrictive because it does not allow for enhanced interpretation and access; restoration and reconstruction are inappropriate because they assume, as a prerequisite, that sufficient documentation exists to accurately portray a lost historic condition.

No documentary sources have been found that are detailed enough to support comprehensive restoration or reconstruction of any of these cemeteries to a particular period of significance.

Based on the goals for this cemetery plan expressed by Austin’s Parks and Recreation Department and its stakeholders, **rehabilitation** is recommended as the appropriate overarching treatment approach

50. *The Secretary of the Interior’s Standards for the Treatment of Historic Properties*; <http://www.nps.gov/tps/standards.htm>.

for all five of the municipal cemeteries. This approach allows for protection of the historic character of these cemeteries and their resources, while carefully addressing the need for conservation work, enhancement of interpretive opportunities, improved circulation, cemetery services expansions, and the replacement or addition of visitor amenities. Such work is necessary to preserve historic cemetery features, and also serves to increase public interest and generate funding sources for conservation work. As the overarching treatment approach for the cemeteries, rehabilitation also supports smaller feature-focused preservation, restoration, and reconstruction projects, if needed and supported by documentation.

Rehabilitation guidelines are based on the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (Guidelines). The ten basic principles that comprise the Guidelines are intended to help preserve the distinctive character of a historic landscape while allowing for reasonable change to meet new needs, as follows:

1. A property will be used as it was historically, or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

These principles create a baseline to which intended changes to historic landscapes must be compared. These standards are neither technical nor prescriptive, but promote responsible preservation practices. The management guidelines that follow arise from these principles.

When a cemetery or an individual historic resource within a cemetery has been designated as a local landmark by the City of Austin or as a Recorded Texas Historic Landmark (RTHL) by the Texas Historical Commission (THC), compliance with the applicable city ordinances or state statutes, respectively, is required.

GENERAL MANAGEMENT GUIDELINES

Austin's five historic municipal cemeteries are distinctly different in character, but they share many common conditions and use issues. The general guidelines in this chapter pertain to issues that are common to all five cemeteries and should be considered during the planning and design review process for any preservation treatments, alterations, or proposed new projects. While they provide a balanced, reasonable, and disciplined approach to problem-solving, in and of themselves, these general guidelines should be implemented in conjunction with the more detailed treatment recommendations contained in the subsequent chapters, one for each cemetery.

The following general guidelines apply to the treatment of the five historic cemeteries:

- Maintain significant features of the historic cemeteries in good condition. Repair all condition issues identified as areas of concern in order of priority as detailed in subsequent chapters of this plan.
- Base all work involving historically significant features on documentation discovered through primary and secondary sources, or by physical investigation. If more documentary evidence is discovered subsequent to the final publication of this plan, append it to the plan and include it in considerations for treatment.
- Document all alterations to historically significant landscape features through “before and after” drawings, photographs, and descriptive narratives.
- Use the latest technologies, including GIS, GPS, remote sensing, and new archeological methodologies, such as ground penetrating radar, in order to locate and identify landscape features, such as unmarked graves.
- Ensure that any construction, demolition, or maintenance activity that involves ground disturbance is monitored by a qualified archaeologist. Involve archaeologists in early planning for new projects.
- In addition to this document, refer to the City’s Comprehensive Urban Forest Plan, and follow the City’s Standards of Care for tree planting and maintenance, except where modified for cemetery trees.

SPATIAL ORGANIZATION

Spatial organization is the three-dimensional organization and pattern of spaces in a landscape. It is created by the landscape’s cultural and natural features, including topography, fencing, circulation features, building clusters, and vegetation. The spatial organization of each of the five municipal cemeteries represents different aspects of Austin’s cultural heritage. Preservation of these spaces contributes to the preservation of the overall historic character of the city. Consider the following:

- Maintain the patterns of plot grids and cemetery sections, grave orientations, and roadways that were established during the historic period of each cemetery.
- Consider the effects of new development on historic spatial relationships. For example, if a visitor center or columbarium is developed, ensure that structures do not overwhelm historic markers in size and scale.

- Replace historically significant features that cannot be repaired and are slated for removal with compatible new features in order to maintain historic spatial patterns. For example, replacement fencing should be similar in height to the original. New buildings, constructed to replace old buildings that cannot be repaired, should maintain the scale and orientation of the originals.
- Consider the contribution of vegetation patterns to historic patterns of spatial organization, such as the division and enclosure of spaces. Replace historic trees and other plants in-kind (same species and form), with consideration towards the contribution of their evergreen or deciduous qualities.

CIRCULATION

Circulation features may include roads, walks, and paths, both formal and informal. Circulation issues concern both vehicles and pedestrians. The following guidelines can be applied to all five cemeteries.

Vehicular Circulation

- Avoid removing historically significant roads or drives. If a road is no longer needed for vehicles, retain it as a pedestrian pathway.
- Assure that, if new roads or drives are essential to accommodate new uses, they are compatible with historic circulation patterns and do not adversely impact existing historic features.
- If it is necessary to construct a new road, consider re-establishing a road or drive that was important during the historic period, if its alignment can meet current needs.

Parking

Provide consolidated parking areas either outside the boundaries of these historic cemeteries, or in concentrated areas within the cemeteries. Consolidation will have the following positive effects:

- Limit the impacts of vehicular circulation on historic resources.
- Reduce the intrusiveness of the automobile on historic views.
- Limit safety conflicts between vehicles and pedestrians.

Pedestrian Circulation

- Retain historic pedestrian circulation patterns as much as possible, including common turf paths that divide cemetery and plot sections. Do not use these spaces as burial plots.
- Consider the potential impacts of new pedestrian walks or other paved areas on historic circulation patterns, important views, and sensitive archeological resources.

Repair of Roads and Sidewalks

Refer to individual cemetery sections for recommendations regarding the repair and maintenance of cemetery roads and sidewalks.

Connectivity and Urban Trails

In accordance with *Imagine Austin*, the City's comprehensive plan, the City seeks to provide pedestrian and bicycle connections through city-owned spaces. No new connections through municipal cemeteries are included in this plan, and any future proposals will be vetted through a public process that includes representatives from surrounding neighborhoods, as well as cemetery stakeholders.

VEGETATION

Cemeteries are cultural landscapes containing a variety of features—including trees and plants—that tell a story about a community and its history. For example, a cemetery site may have been chosen because it was shaded by a grove of trees; evergreen trees may have been planted on or near graves as a symbol of eternal life; and individual or family plots may be ornamented by flowering plants, such as roses or bulbs, that represent an antique variety from the family's country of origin. However, as planted landscapes, cemeteries are also dynamic compositions: their components grow, decline, and are eventually removed and/or replaced.

Individual trees and other plants within the cemeteries are considered historic if they were either growing or planted within the period of significance of a cemetery, or if they are part of a pattern of vegetation from the period of significance. This is an important distinction that applies, in particular, to vegetation, because of its dynamic nature. For example, an individual tree is considered historic if it survives from the period of significance, but an allée of trees from the period of significance can also be considered historic, even if some of its component trees are recent replacements. Even if the component plants of a pattern like an allée, grove, or hedge have been completely replaced, the pattern itself is historic. It is important to retain historic individual plants as well as historic vegetation patterns as much as is practicable to preserve the historic character of these landscapes.

Historic trees and patterns of other vegetation contribute strongly to the character of Austin's municipal cemeteries. However, the gradual loss of trees and other plants that grew during the historic periods of these cemeteries has led to an erosion of their historic character.

The primary goals concerning vegetation within the historic cemeteries are: preservation of historic vegetation, replacement of missing historic vegetation, and planting of new vegetation in a way that complements the historic character of these landscapes.

Historic Cemetery Trees

Trees within the historic cemeteries give these landscapes unique character, grace, and spatial order. For the purposes of this report, the term *historic tree* is used to describe trees that were planted or established during a cemetery's period of significance, or have been planted since that time to replace one of these trees. This term does not confer or reflect protection or oversight for these trees unless they are also designated as *protected trees* or *heritage trees*.

Historic trees that are at least 19 inches in diameter or greater are considered *protected trees*, per City of Austin Code, and those at least 24 inches in diameter and either a Texas ash, bald cypress, American elm, cedar elm, Texas madrone, bigtooth maple, pecan, Arizona or Eastern black walnut, or any oak species, are considered *heritage trees*. For consistency, tree diameter is measured at chest height or 4½ feet above grade.

Removal of a protected tree within the city limits requires approval by the City Arborist; removal of a heritage tree requires either a variance that must be presented to the Land Use Commission or an administrative variance that can be granted by the City Arborist. In addition, a permit is required for removal of any tree on public land over three inches in diameter. (See the City of Austin Environmental Criteria Manual for details.)

In addition, a Public Tree Care permit, issued by PARD Forestry, is required for the removal or pruning of public trees, if that work is not done by PARD Forestry. A Tree Ordinance Review Application (TORA) is required, for any tree 19 inches in diameter or greater, before tree removal, impacts to the Critical Root Zone (CRZ), or tree canopy impacts of more than 25 percent. TORA are reviewed by the City Arborist.

Some of the historic trees within the cemeteries, the post oaks in particular, may be more than 250 years old and pre-date the establishment of the cemetery. Most of these post oaks, as well as many live oaks and other oak species within the cemeteries, are large enough to be considered *protected* or *heritage trees*. Other trees within the cemeteries are considered historic but are not designated as protected or heritage trees because of their small mature size (less than 19 inches in diameter). These trees were planted in family and individual plots as part of the mourning process and include such

species as Eastern red cedar, crape myrtle, arborvitae, Italian cypress, and others. These trees should be protected as historic features of the cemetery.

In the past ten years, drought conditions have stressed cemetery trees, leading to dramatic losses, particularly in Oakwood Cemetery, where the cemetery team recently surveyed 643 live trees and 550 stumps, representing the loss of 46 percent of the total number of trees known to have grown within the cemetery. Second in losses to Oakwood is Oakwood Annex, which has lost 25 percent of its trees.⁵¹ These numbers do not take into account wind-thrown trees, or other trees for which no stump remains.

Preservation, care, and maintenance of these trees are paramount to maintain the integrity of the cemeteries. Adequate tree maintenance requires strategies for preservation, removal, re-planting, and developing horticultural practices for proper nutrition and growth. Recommendations for tree maintenance follow.

Preserving Historic Trees

- Develop a tree protection, preservation, planting, and maintenance plan for each cemetery in collaboration with an International Society of Arboriculture (ISA) Certified Arborist, who will help identify tree risk, pinpoint problematic site conditions, and determine the best course of action. This arborist would collaborate with PARD Forestry and the Urban Forest Office to develop the plan.
- Perform soil testing to determine nutrient levels and fertilize the trees annually with a slow release fertilizer, preferably an organic material like compost, to add specific nutrients as determined based on the outcome of the soil test.
- Mulch all trees to help keep the soil cool and moist, discourage the growth of weeds, and reduce the need to mow near the base of a tree, which can cause damage. Organic shredded hardwood mulch should be spread at a depth of 3–4 inches and cover as much of the tree's critical root zone (CRZ) as possible (Figure 7, next page). When mulching to that extent is not practical or desirable, apply mulch to as much of the area under the tree's dripline as possible. It is very important that mulch not cover any part of the tree trunk, as this can encourage insect damage, disease, and the development of girdling roots; it is best to maintain a mulch-free area for several inches around the tree base.
- Water trees (only as necessary and appropriate for each species) during periods of insufficient rainfall.

51. AmaTerra, tree survey charts produced for this report, 2014.

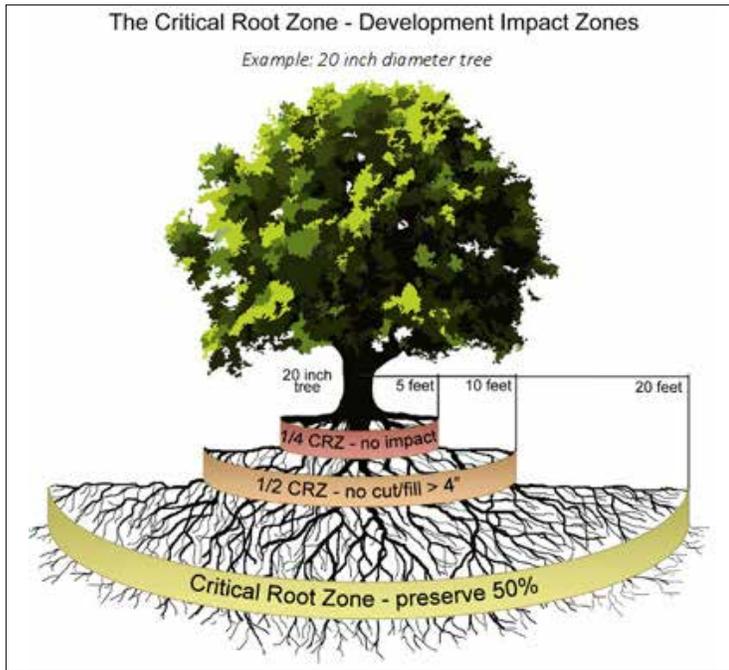


Figure 7. Illustration showing the critical root zone of a tree (City of Austin Environmental Criteria Manual, Section 3)

- Perform bulk density testing of soil in the CRZ of trees to determine the amount and depth of soil compaction. Aerate any soil (per standard American National Standards Institute [ANSI] A300 process) within a tree's CRZ that has been compacted by vehicles and excavation equipment, to an extent determined by soil testing. Aeration will increase a tree's oxygen supply, root growth, and water uptake, and typically involves the use of specialized equipment such as an Air-Spade throughout the tree's CRZ. Aeration should be performed by an experienced ISA Certified Arborist. All aerated areas should be fenced and sufficiently watered for a year.
- Maintain historic trees unless they are dead, dying, diseased and untreatable, or pose a high risk to people and infrastructure. When dealing with a historic tree—one that is significant in its own right or as a component of a larger historic vegetation pattern—explore all options for addressing risk before taking the most radical course. Make every reasonable effort to first treat or stabilize a historic tree that is diseased or damaged prior to considering removal, when appropriate, and if allocation of resources permits such a course of action. Stabilization can include simple solutions such as propping up a low-hanging limb or anchoring it in place with cables (Figure 8 and Figure 9). Removing large, dead branches and cabling weak branch attachments may adequately reduce the risk of falling limbs. Installing a lightning protection system may prevent a large tree from being struck and damaged. In all cases, an ISA Certified Arborist shall be consulted and perform any alternative risk mitigation.

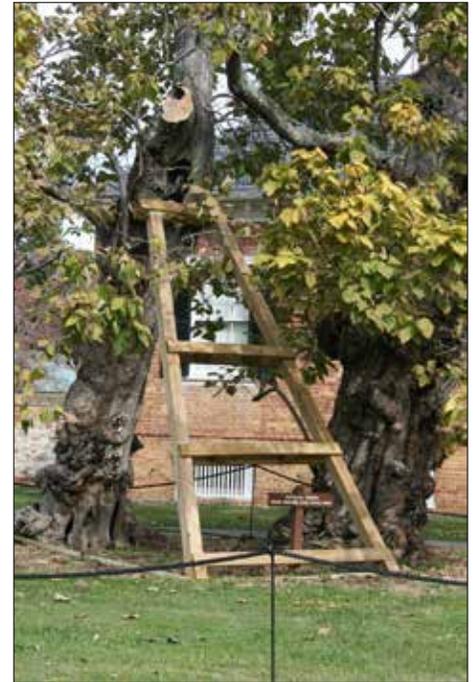


Figure 8. These two-hundred-year-old catalpa trees have been protected and stabilized for their value in interpreting the history of the Chatham House in Fredericksburg, Virginia. (John Milner Associates, 2010)

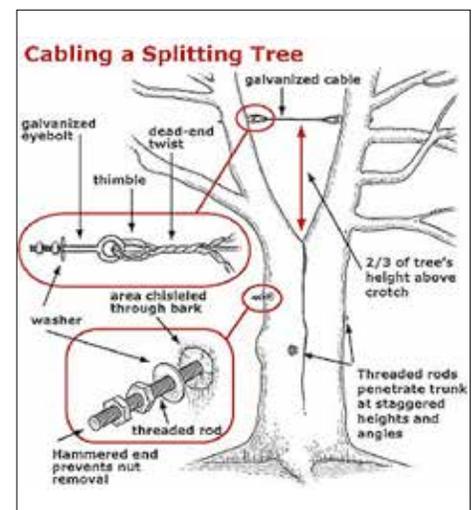


Figure 9. Diagram showing tree cabling methods (ThisOldHouse.com)

- Remember that, while preserving the conditions of historic grave markers and monuments is important, large shade trees, especially post oaks (*Quercus stellata*), are irreplaceable in-kind within the current generation. If the growth of a tree is dislodging a grave marker, consider moving the marker away from the tree as a temporary measure instead of cutting down a tree that is a historic feature. Carefully document the marker and its location before and after relocation. The marker can then be shifted back to its original position after the tree is eventually removed. Use the same process/program for properly indexing displaced marker fragments. Try to reinstall the marker within the plot. Do not remove a marker from its location unless a process is in place to track it.
- Inspect the cemetery after inclement or windy weather, looking for tree damage that would necessitate pruning or stabilizing. Depending on the allocation of resources to Urban Forestry, regular inspections may depend on volunteers.
- Prune trees at maturity within or adjacent to graves only as necessary to remove dead, broken, or diseased wood and to allow for pedestrian and vehicular passage. If there is an alternative way to pass by the tree that does not require pruning, do not prune. Prior to pruning, erect plywood structures over markers to protect them from damage where necessary and when appropriate. If there is no alternative, prune according to three priority levels:
 - o **First priority:** Conduct safety pruning of trees within the cemetery. Large, dead branches (four inches in diameter and larger) and trunks that cannot be stabilized present a risk to visitors and may damage markers if they fall.
 - o **Second priority:** Prune to preserve the health of a tree, including improving its internal structure. Prune trees within or adjoining family plots or graves in order to allow passage beneath, if no alternative route is available, keep sight lines clear, and to encourage air circulation that will lessen the growth of biological growth on markers. This rule applies only to trees that naturally form a canopy, not to those more shrub-like in form.
 - o **Third priority:** Prune for aesthetics, such as enhancing the natural form and character of a tree or to encourage flowering. **Special Note:** Topping of crape myrtles shall not be performed. Crape myrtles should be pruned only to remove dead wood or crossing branches that may contribute to poor tree health. When pruning for flowering, follow horticultural best practices for the particular flowering season of the species in question.

- Ensure that the design of proposed structures, markers, circulation features, or plantings addresses the preservation of existing trees and does not negatively impact the health of root systems. Reference the City of Austin Environmental Criteria Manual, Section 3.5.2, to determine the location of any soil-disturbing activity.
- Ensure that the critical root zones of existing trees are not compacted by vehicles driving or parking, spoils storage, or storage of equipment or materials, unless otherwise approved by PARD Forestry.
- Protect existing trees in excavation areas (including new burials) with fencing and closely monitor throughout the construction period.⁵² Impacts on heritage tree root zones or the removal of 25% or more of the canopy requires a permit from the City Arborist's office. Tree roots typically extend well past the drip line of the tree. At a minimum, the area within the CRZ should be protected from soil compaction as a result of excavation or other heavy equipment, which will inhibit water penetration to the root zone and threaten the health of the tree. For tree impacts approved by a permit, tree roots should be pruned several months prior to excavation, according to the Environmental Criteria Manual Section 3.5.2, to prevent ripping of the roots. Any roots damaged during excavation should be cut cleanly and perpendicularly to the root (see ANSI A300 Part 5). Protect existing post oaks at 1¼ to 1½ times larger than the minimum critical root zone protection standard, whichever is most feasible.
- Install utility lines, if absolutely necessary, by boring under tree roots rather than by trenching through the roots. This includes installation of irrigation lines at any location within the root zone.
- If there is no alternative to excavation within the critical root zone, prune all cut roots with a clean, sterile, and very sharp pruning tool. This helps the tree regenerate healthy roots at these cut ends. Seal the roots with a pruning sealer immediately following pruning. (Spray paint is acceptable.) If roots are left ragged or torn, they will rot and allow disease organisms to invade the tree. For any roots greater than one inch in diameter, contact PARD Forestry for approval and consultation before cutting. Any root impact to a heritage tree requires a tree permit from the City Arborist.
- Implement a cyclical maintenance program that includes periodic inspection of all trees for damage, disease, and/or evidence of decline in order to prevent deterioration or loss of plant material. Treat each condition appropriately and ensure that maintenance actions are well documented in the cemetery maintenance records. Regular tree maintenance also will prevent damage to adjacent and nearby resources, such as grave markers and fencing.

52. Elizabeth Redden, "Managing the Trees of Arlington Cemetery," *Orion* (March/April, 2008), <http://www.orionmagazine.org/index.php/articles/article/2932/>.

- Educate cemetery maintenance staff on the significance of historic and other existing trees, and ensure that they receive training from PARD Forestry that is appropriate to the unique conditions within each cemetery.

Removing Historic Trees

Remove a historic tree only when it poses a risk to humans, cultural resources, or natural resources due to its potential to drop limbs, fall, or transfer disease to other plants, and when no other solution is possible.

- Request approval from PARD Forestry before removing any public tree. A public tree is defined as any tree three inches in diameter or greater (or two inches in diameter or greater, if planted on behalf of the City) measured at 4½ feet above soil grade, regardless of the tree's age or condition.
 - Removal of protected trees requires a permit, and removal of heritage trees requires a variance, prior to removal, from the City Arborist's office (see page 36).
 - Document the tree to be removed, including its condition and appearance, in written and photographic form. In addition, document the condition of the tree's site, so that conditions that may have contributed to the loss of the tree can be identified.
 - Ensure that the removal of any tree is noted in the GIS survey and tree inventory.
 - Use the most ecologically sensitive means of vegetation removal that the tree size allows, such as hand-pulling or removal with small tools, before employing heavy equipment. Chemicals shall not be used to remove trees unless PARD Forestry approves the specific work to be done by a licensed herbicide applicator.
 - Heavy vehicles should not drive in or around the CRZ of other nearby trees, in order to avoid soil compaction. Use certified tree climbers, rather than bucket trucks, whenever possible. Use rubber mats or plywood covered with 12 inches of mulch if driving vehicles in the CRZ cannot be avoided.
 - Prior to tree removal, field-check clearing locations with an archaeologist to ensure that other cultural resources will not be adversely affected.
 - Cut the trunks of trees and shrubs to be removed flush with the ground without damaging adjacent features. Allow the remnant stump to decay without the assistance of chemicals.⁵³ Do not uproot stumps, as this may disturb subsurface archeological resources. After the stump has decayed, topsoil can be added and the area reseeded.
53. Folk wisdom proposes drilling large holes in the stump, filling them with compost, and piling compost and then mulch onto the stump to keep it moist throughout the year. The stump may take two to five years to decompose. Do not apply a chemical fertilizer; it may wash out into the surrounding landscape and damage markers or burn turf.

- When a tree is to be planted to replace a stump adjacent to a plot enclosure or marker, remove the stump, using an Air-Spade or similar system as follows:
 - o Consult with an archaeologist prior to removal;
 - o Protect adjacent markers and curbs with wooden covers or other protective material;
 - o With the Air-Spade, clear dirt from around the stump, exposing roots to approximately 12 inches below grade; and
 - o Sever roots to enable removal of the stump to 12 inches.
- Remove, when possible, felled trees and large shrubs by lifting rather than dragging, which can gouge the ground surface.
- If gouging occurs, immediately cover any damaged areas with leaf litter or erosion control material, as appropriate, to reduce the potential for soil erosion, and replant the area with native or naturalized species of grass or groundcover.

Replacing Historic Trees

Replacing trees in a historic cemetery requires methods that respect the sensitivity and importance of the cemetery and its major features, including, in particular, the grave markers that share common ground with historic trees. The following recommendations help guide practices that minimize adverse impacts to the cemetery landscape; prevent damage to grave markers, walls, curbing, and fencing; and protect the character and integrity of the cemetery as a cultural landscape.

- Determine the appropriate replanting method in consultation with an archaeologist or historical landscape architect.
- Plant the new tree in the same location as the tree it is replacing, if possible, to minimize the impact of planting activity, since the soil in that area has already been disturbed. If fragile resources above or below ground may limit equipment access, consider planting the replacement tree in a different location, but record the location of both the original tree and its replacement for future reference.
- Modify standard tree-planting methods (in a hole five times the width of the tree ball), if the larger hole may damage historic site features. Consider utilizing one of two alternative methods:
 - o Stump planting reduces the impact of excavation on adjacent cultural resources. If the stump of the tree to be replaced is fairly rotted, the replacement can be easily planted within the stump void (Figure 10 and Figure 11).

- o Mound planting minimizes ground disturbance: place the root ball in a slight (2–3 inches deep) depression in the soil, then mound soil around it. Taper the mound and add mulch. Water well and often, as tree mounds are prone to drying out. The tree should be established within one or two years. *Note: Tree mounds can change the visual character of a site, so if this method is used in key viewsheds, plant only small saplings.* The root ball of the replacement sapling should be small enough to easily fit into the decomposed void area of the stump with at least 6-8 inches additional space on each side for soil backfill. Elevate the top of the root ball 3-4 inches above the surrounding grade; as the stump decays, the root ball will settle into the hole. Water well and often until the new tree settles.⁵⁴
- Replace dead or damaged historic trees in-kind when possible, choosing specimens of the same species, variety, and form.
- Consult with an ISA Certified Arborist who has experience with historic landscapes and trees about replacing a tree with the exact species, particularly historic specimens. It may not be economically or environmentally feasible to replace certain species. Every attempt should be made, however, to locate sources for replacement post oaks, although they are difficult to find.

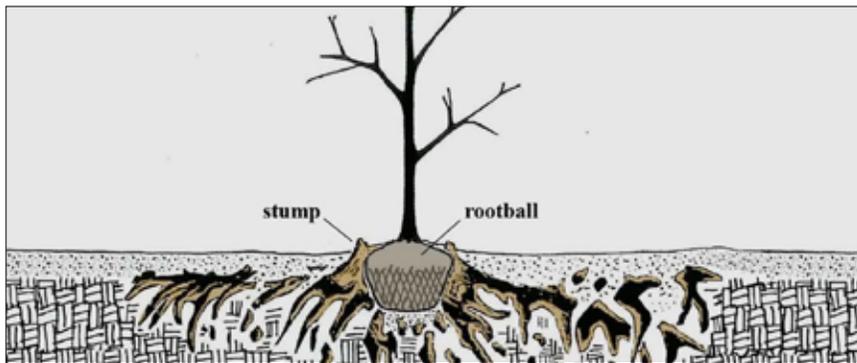


Figure 10. Planting in the same location as a decayed stump allows replacing trees in the exact location as the original. (National Council for Preservation Technology and Training)



Figure 11. Example of a stump that should be encouraged to decay and utilized for planting a replacement tree (John Milner Associates, 2010)

54. Debbie Smith, "Replacing Trees in Historic Landscapes," *Clippings: Concepts and Techniques for Maintaining Cultural Landscapes* (Washington, DC: National Park Service, 2009), www.nps.gov/oclp/Clippings.pdf.

- If in-kind replacements are not available or appropriate (due to disease susceptibility, hardiness, maintenance requirements, climate change, availability, etc.), replace with species of similar mature size, shape/form, texture, and color.
- Ensure that replacement trees are documented and added to the GIS data and tree inventory.

Planting New Trees

Plant new trees in locations indicated in the plans for individual cemeteries, drawing from the list of trees contained in the booklet, *Native and Adapted Landscape Plants: An Earthwise Guide for Central Texas*.⁵⁵

Note: some of these trees may not be appropriate for some of the soils located within the cemeteries. Conduct careful research into the horticultural needs of the species being considered. Observe which tree species seem to be thriving in each cemetery and use that as a guide in choosing the best trees for the site.

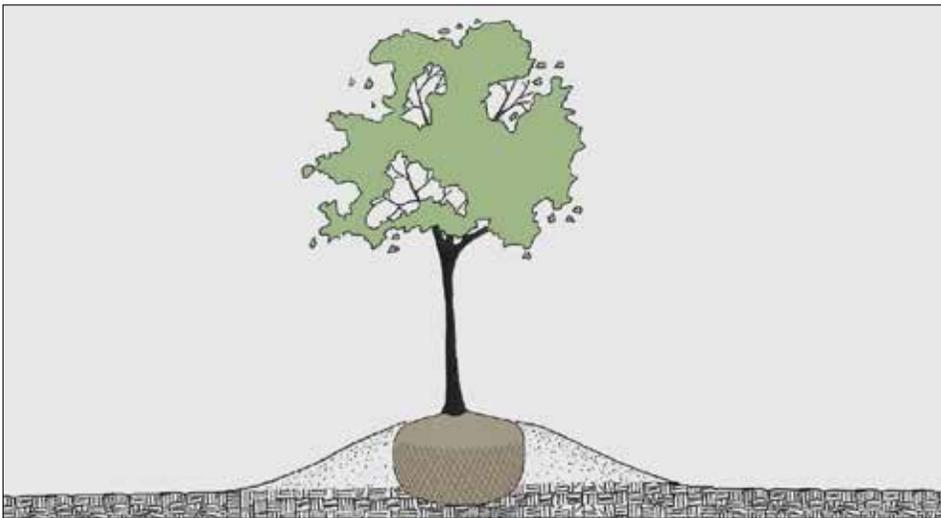


Figure 12. Planting a tree in a 2–3 inch deep depression protects below-ground historic resources. (National Council for Preservation Technology and Training)

55. City of Austin Watershed Protection Department, "Native and Adapted Landscape Plants: An Earthwise Guide for Central Texas." <https://www.austintexas.gov/sites/default/files/files/Watershed/growgreen/plantguide.pdf>.

- Engage an archaeologist to monitor new planting efforts in areas that may contain subsurface cultural resources.
- Investigate areas under consideration for new plantings prior to excavation. If the area may contain underground historic resources, consider planting trees using the mounding technique (Figure 12).

Trees of Special Concern

While Austin's five historic cemeteries contain many trees that are significant for their size or age, three specific species of trees merit special consideration in the cemetery landscape.

Post Oaks

Post oaks are among the oldest trees in Austin's cemeteries; some specimens likely pre-date the founding of the city, when this area was covered with oak groves. The post oaks found in these historic cemeteries are irreplaceable historic resources. In addition to the guidelines presented above:

- Avoid, to the extent possible, implementing any work that involves excavation within $1\frac{1}{4}$ to $1\frac{1}{2}$ times the critical root zone of post oaks. If excavation or other work involving root disturbance, earth moving, or heavy equipment is absolutely necessary, contact PARD Forestry for consultation. Conduct this work only in winter (the tree's dormant season), following these recommendations:
 - o Fence the critical root zone of a post oak prior to grave excavation or other activity involving heavy machinery or root disturbance. Use a five-foot-tall chain-link fence to completely encompass an area $1\frac{1}{4}$ to $1\frac{1}{2}$ times as large as the critical root zone. Do not allow heavy equipment or stockpiling of any type in this zone.
 - o Perform soil testing and apply slow release fertilizer only as prescribed by test results.
- Apply between three and four inches of compost to as much of the CRZ as possible, maintaining several inches of clearance from trunks.
- Perform soil testing for nutrient composition and apply a slow release fertilizer, preferably organic compost, as prescribed by test results. Irrigate carefully, taking care to not water too often. Post oaks will die if subjected to the same watering regime as turf. Instead, in the absence of rain, apply one inch of water once a week, then two inches every third or fourth week, to encourage deep rooting. The minimum for a post oak in the absence of rain is a single, two-inch application of water once a month. **Do not water more than once a week.**

- Inspect each tree regularly for hypoxylon canker. Educate maintenance staff and other stakeholders on identification of hypoxylon canker. This disease strikes trees that are already stressed, so the best prevention is to keep trees as healthy as possible by properly following proper tree care practices. Once hypoxylon canker is visibly affecting a tree, the tree will likely die and should be evaluated for public safety.
- Control insect pests using an Integrated Pest Management-type approach, beginning always with the most conservative and environmentally sound treatment.

Crape Myrtles

Crape myrtles have been popular in southern landscapes since they were introduced to the United States in the late 1700s. Because of their graceful shapes and colorful flowers, they were often planted in cemeteries. Many of the crape myrtles growing in Austin cemeteries were likely planted in the early to mid-twentieth century.

- **Never “top” a crape myrtle.** These naturally graceful trees need very little, if any, pruning at all. Although even some professional landscape companies can be seen topping these trees, they are operating under the misapprehension that this work encourages blooming, when in fact, it encourages rapid and weak-wooded growth, destroying the natural form of the plant forever. The only pruning that should be done on a crape myrtle is to remove any sucker shoots emerging from the base or lower trunk areas, so that the natural beauty of the trunks can be appreciated.
- Care for crape myrtles in historic cemeteries by performing soil testing to determine nutrient levels, and providing (in late February or early March) a light application of an organic fertilizer low in phosphorus, equivalent to a 3-1-2 or 4-1-2 ratio, as prescribed by the outcome of the soil testing. Keep crape myrtles mulched to discourage weeds and protect their root systems. When weeds and grasses are kept down by mulch, this also helps protect the tree against mower and weed trimmer damage. Healthy trees will be more likely to resist common crape myrtle enemies: powdery mildew and aphids.

Eastern Red Cedar

Eastern red cedar has a lovely natural shape and will retain that form through its first few decades. As a cedar ages and begins to shade out and lose its lower branches, its form changes from a large shrub to a tree form. Avoid pruning these native trees, except for the removal of dead or fallen branches.

Preserving Historic Shrubs and Perennials

The historic cemeteries in Austin contain some remnants of shrubs and perennials that survive from the historic period, including iris and other bulbs. These valuable plants add to the narrative told by other cemetery features, and some may represent varieties that are now rare and difficult to locate in the nursery trades. By their survival over time, they also have proven to be drought- and neglect-resistant varieties that may be useful today for ornamental, low-water landscapes.

- Involve local garden clubs, such as the Travis County Master Gardeners Association, in identifying and caring for heritage plants within the cemeteries.
- Encourage a program of community propagation of historic shrubs and perennials within the cemeteries. This will not only ensure that if a plant is lost, it can be replaced, but also will support the survival of heritage plant types.
- Prune heritage shrubs judiciously and only if needed for access. Shrubs that grow close to grave markers, encouraging the growth of mold and lichen, are only a concern for marble or limestone markers, not granite. Pruning should only be implemented by a horticulturalist trained in the treatment of historic plants.
- Prune hedges to be narrower at the top than at the base, so that light can reach the lower branches and to prevent legginess.
- For arborvitae, which are abundant throughout most of the cemeteries, conduct any heavy pruning just before spring growth begins, so that new growth conceals pruning cuts. Arborvitae also responds well to the shearing of new growth.

Planting Shrubs and Perennials

As part of the mourning process, many private plot owners plant individual or family grave plots with annuals, perennials, groundcovers, shrubs, and sometimes, trees. The following steps are recommended:

- Ensure that the plant palette incorporates appropriate species for specific locations. For example, avoid using a large-scale shrub adjacent to a walk, which may require excessive pruning to maintain at an appropriate scale.
- Avoid planting species that have proven to be invasive in Central Texas.
- Prepare and post cemetery rules regarding commemorative plantings. If not maintained, some shrubs, vines, and perennials can become locally invasive. Clarify that a cemetery manager has the right to remove plantings if they become overgrown or begin to impact other plots.

Invasive Plants

Remove all new volunteer growth of invasive species at least once a year to avoid damage caused by unchecked, fast-growing invasive plants. Remove invasive plants growing within the cemeteries, unless they were deliberately planted as a memorial within a grave plot or to ornament the common areas or internal drives within with cemeteries. The cemeteries contain several of the most invasive plants in the area, including paper mulberry (*Broussonetia papyfera*), Chinese parasol tree (*Firmiana simplex*), glossy privet (*Ligustrum lucidum*), Japanese honeysuckle (*Lonicera japonica*), and nandina (*Nandina domestica*).⁵⁶

Invasives are hardy, and some have been used as ornamentals within the cemeteries because of their survivability. Do not remove invasive plants if they are surviving original design elements within a cemetery, forming allées or outlining family or individual plots. Remove these *only* if they are causing damage to a historic resource. It is likely that species such as hackberry and mulberry were bird-seeded and can be removed with impunity, but consult with PARD Forestry prior to removing any tree. Refer to the City's Invasive Species Management Plan for additional guidance.

Ball moss is a plant (not actually a moss) that attaches itself to trees, fences, and monuments in Austin's cemeteries. It is a relative of Spanish moss and pineapple. Contrary to popular belief, ball moss is not parasitic; it does not take any nutrients or water from the trees to which it is attached.

56. TexasInvasives.org, http://www.texasinvasives.org/plant_database/coa_results.php?offset=12.

Sometimes, a tree's interior branches die from a lack of sunlight. The dead interior branches creates a perfect environment for ball moss, which prefers a shady, humid environment. A large colony of ball moss can become heavy and cause dead branches to break.

Anyone concerned about a specific tree should call 311 to report their concern. More information about ball moss is available from the Texas Forest Service.

Cemetery Lawn Care

Caring for cemetery lawns is the most costly and time-consuming maintenance task faced by staff of municipal cemeteries. Maintaining the health and character of turf can be challenging, but it is critical to many communities from an aesthetic viewpoint and in order to maintain access to individual graves in an actively-used cemetery. However, each cemetery is different, with varying slopes, soils, lawn and groundcover composition, levels of public use, and funding. These general guidelines apply to issues common to all of the cemeteries.⁵⁷

Analyze

- Evaluate the particular challenges to keeping healthy lawns in the cemeteries, such as compacted or erodible soils, dense weeds, depressions from settling, "social paths" created by pedestrians, poor soil fertility, limited water availability, or heavy shade.
- Conduct a soil test every three years to check for soil fertility or mineral imbalances that can cause bare areas or encourage weed infestation. The local agricultural extension service provides kits and a laboratory for soil testing.
- Add a slow-release, organic fertilizer and minerals based on the results of the soil test. Avoid chemical products, which may contain salts that can damage stone. After fertilizer is applied, sweep off any fertilizer that comes into contact with stone or other historic materials.

Prepare

- Report all areas of depression in the soil, resulting from the settling of burial shafts or the removal of trees or shrubs, to an archaeologist experienced with work in historic cemeteries. If the depression is a safety or drainage hazard and the decision is made to fill it in, it is important to first determine whether it might indicate an unmarked grave. The archaeologist will have been previously designated.

57. This section was written with assistance from the Chicora Foundation, Inc.'s "Best Practices for Cemetery Lawn Maintenance," <http://www.chicora.org/pdfs/Lawn%20Maintenance.pdf>.

- Adjust the grade of any sunken or low areas through the addition of fill, rather than removal of soil. In areas that hold water against historic materials, add fill to create positive drainage.

Plant

- Re-vegetate bare or thin patches of turf to prevent erosion and limit dust.
- Within the cemeteries, establish turf composed of a mix of native grasses. For example, the Lady Bird Johnson Wildflower Center has conducted extensive testing to develop a mix that will grow well in areas that get full sun or no more than 50 percent shade. This mix will do well throughout most of Oakwood, as well as Oakwood Annex Cemetery, Plummers Cemetery, and Austin Memorial Park Cemetery. However, this seed mix does not do well in sandy soils, so it should be tested in a small area prior to use in Evergreen Cemetery and the southwestern corner of Oakwood Cemetery. This mix is available commercially as "Habiturf" (a mix of buffalo grass, blue grama, and curly mesquite), available from the Douglass King Company.⁵⁸ These species will also thrive in clay soils in shaded areas.
- Establish, in sandy and dry soils, a groundcover comprised of sedges, horseherb, and Texas frogfruit. Most of these are evergreen to semi-evergreen, depending on the severity of winter. They also require very little mowing.⁵⁹

Maintain

- Develop a maintenance guideline handout, in English and Spanish, to be distributed to individuals responsible for mowing, trimming, and weeding in the historic cemeteries. The fragility of these historic landscapes must be emphasized to those working within them. Remind crews that a historic cemetery is handled differently than a typical residential or commercial property.
- Control weeds by first establishing a healthier lawn, which can shade out many herbaceous weeds. In dense areas of weeds, hand rake and remove weeds before they set seed. Do not broadcast or spray herbicides, as these chemicals may be harmful to marble, limestone, and other historic materials. Do not apply herbicides within the critical root zones of trees. If herbicides must be used, select the least acidic product and apply carefully. Woody weeds can be controlled by clipping the weed to the ground and spot-applying the herbicide directly to the cut stump. Roundup® is especially effective and least environmentally damaging when used this way.
- Refer to the City's Integrated Pest Management Plan for additional guidance.

58. "Native Lawns: Habiturf, A Multi-Species Mix for North, West, and Central Texas," https://www.wildflower.org/consulting_how_to/.

59. "Ask Mr. Smarty Plants: Native grass for sandy soil and shade," Lady Bird Wildflower Center, <http://www.wildflower.org/expert/show.php?id=6971>.

- Use the smallest machinery possible for the excavation of graves or for maintenance purposes in order to reduce potential damage to turf through compaction or other disturbance.
- Aerate areas of compacted soil, particularly adjacent to cemetery drives and in locations where maintenance or excavation equipment has been parked. Aerate cool season grasses in the fall and warm season grasses in late spring and summer.
- Avoid aerating within the critical root zones of trees. Any aeration within the CRZ must be approved through a permit (TORA) from the City Arborist's office.
- Establish a mowing routine through which no more than $\frac{1}{3}$ of grass height is removed in one mowing. The frequency of mowing depends on the type of grass: Bermuda grass requires more frequent mowing than St. Augustine, although the latter requires more water. Native grasses require far less water after establishment than Bermuda or St. Augustine do, and native grasses also are typically dormant in the summer, requiring less mowing.
- Use turf wheels on riding mowers in the historic cemetery.
- Use power mowers only within 12 inches of markers, trees, and shrubs, and complete the work with weed trimmers that use the lightest possible gauge metal-free nylon string, no heavier than 0.09 inch. Active and regular inspections by the cemetery superintendent of mowed areas during and after mowing supports responsible maintenance employee behavior. Any damage to markers or curbs should be photographed and noted in cemetery maintenance records. Report any damage immediately to a representative of PARD. Report tree damage immediately to PARD Forestry.
- Use discharge guards on all mowers to protect the gravestones from thrown debris. Direct the discharge chutes away from markers while mowing. Rake up and discard all large clumps of grass debris left by mowers.
- Equip all mowers with rubber bumpers on the decks, any axle assembly, or other feature on the mower that might come in contact with a stone while mowing. This can be fabricated out of old inner tubes or tires and can be riveted on. Loose cell foam can also be used as a bumper.
- Alternate the direction of mowing every other cut to prevent ruts created by repetitive use, particularly on slopes.

Irrigation

Irrigate cemetery lawns only when attempting to re-establish turf using sod, seed, or plugs. With the possible exception of Austin Memorial Park Cemetery, these cemeteries were not irrigated during their periods of historic significance, and lawns were allowed to go dormant during dry and/or hot months.⁶⁰ Natural seasonal changes in the appearance of lawns would be appropriate from the standpoints of both historic character and natural resource conservation. In older cemeteries with limestone and marble markers, overhead irrigation is not recommended because the water damages the older, softer stone. Irrigation for establishing turf and other plants can be provided within the cemeteries from a hose bib or quick coupler installed in a ground-level valve box.

If irrigation with an automatic irrigation system is absolutely required, as it might be in an active cemetery, valve-in-head or zoned, ground-level sprays or rotor systems are recommended because the individual heads or zones can be shut down when graves are being opened or during funerals. Automatic systems should be controlled by a rain sensor to prevent over-watering and waste. Whenever possible, take advantage of the city's Reclaimed Water Program by connecting the cemeteries with the reclaimed water system.

Note: Based on citizen input and feedback from the Environmental Board, the Planning Commission recommends that the City consider hiring an outside, multi-disciplinary consulting firm (with expertise in the areas of irrigation; tree care and maintenance; monuments, gravestones, and conservation; and archeology) to advise on cemetery irrigation.

60. For more information about the evolution of the concept of the American lawn, refer to Virginia Scott Jenkins' *The Lawn: A History of an American Obsession* (Washington, D.C.: Smithsonian Institution Press, 1994).

BUILDINGS AND STRUCTURES

The field of historic preservation differentiates between *buildings*, which are intended to shelter some form of human activity, and *structures*, which are not. Examples of each type of built resource are described below. Fences, a type of structure, merit their own discussion.

Buildings

Buildings are present in all of the cemeteries, except for Plummers. These cemetery buildings have varying uses and conditions, so particular recommendations concerning individual buildings will be addressed in those sections. The following general recommendations regarding buildings in historic cemeteries are proposed:

- Unless identified as non-contributing elements in the cemetery, all repair and preservation work on a building in a historic cemetery should be directed by a preservation architect to ensure that the work is done in accordance with best historic preservation practices.
- Document a historic building with care, prior to beginning any construction or repair work. Such documentation is presented usually in the form of a historic structure report, describing the physical history of the building, assessing its conditions, evaluating its historical significance, and providing recommendations for stabilization, repair, reconstruction, and/or adaptive reuse.
- Avoid constructing new buildings in historic cemeteries that are no longer active. If new programs are needed for the support of the cemetery, adaptively reuse existing buildings.

Structures

Structures found within the historic cemeteries include freestanding walls, gate piers, culverts, and retaining walls. Walls and other concrete and masonry structures are located at Oakwood Cemetery, Oakwood Annex, and Austin Memorial Park Cemetery. While specific recommendations regarding these structures will be presented in individual cemetery sections, the following general guidelines should be considered prior to undertaking any repair or rehabilitation work on these and other historic structures:

- Repair, rather than replace, deteriorated structures whenever possible. If the severity of deterioration leads to instability and risk, and a structure requires replacement, the new structure should match the original in design, color, texture, materials, and other visual qualities. Existing materials should be reused to the greatest extent possible.
- Document existing structures before, during, and after demolition and/or removal with photographs, scaled drawings, and notes, giving particular attention to materials, color, texture, dimensions, and construction technique.
- Design new structures to complement or enhance, rather than detract from, the historic character of the cemeteries. For example, concrete block, vinyl, resin, aluminum, and plastics may not be appropriate materials.
- Ensure that materials are not taken from historic structures unless the structure has been approved for demolition and fully documented.
- When possible, new materials should match historic materials being replaced (e.g., replace cast iron with cast iron, rather than with plastic, resin, or vinyl).

Recommendations also include the development of a visitor gathering area in each of the historic cemeteries. Each should be furnished with a kiosk that would contain a map of the cemetery and other information in both poster and brochure formats. These kiosks should be of a simple design that will not present a false sense of history, yet reference the historic character of the cemeteries. For example, traditional designs could be executed in contemporary materials or vice versa (Figure 13–Figure 16).



Figure 13. Traditionally-styled, roofed kiosk (John Milner Associates Collection)



Figure 14. Roofed, brick masonry kiosk that is part of a cemetery entrance gateway and provides a pedestrian entrance (John Milner Associates, 2009)



Figure 15. Contemporary kiosk with a green roof (Snoqualmie Falls, Washington) (GoPixPic.com)



Figure 16. Contemporary kiosk utilizing a mix of modern and traditional materials (Lone Fir Cemetery, Portland, Oregon) (Lango.Hansen, Landscape Architects)

Fences

Fences are important character-defining features of historic cemeteries and are also often the public face of the cemetery. The silver-colored chain link boundary fences around Austin Municipal Park Cemetery, Oakwood Cemetery, and Oakwood Cemetery Annex have a negative effect on the historic character of these significant sites. These fences are rusting, dented, and even topped with barbed wire in some cases. In addition, the silver color draws attention to itself while a darker color is more visually transparent. The following actions are recommended:

- Replace all of the existing chain link boundary fences with black or dark green-black painted metal picket fences (Figure 17).
- To lower costs, some lengths of fences that are not along streets and are screened by vegetation could be replaced by black or dark green-black vinyl-coated chain link (Figure 18).
- Where views to adjacent residences may need to be screened, a dark-stained, more opaque fence could be considered.
- In some cases, fences could be part of an Art in Public Places project through which art works can express local culture (Figure 19 and Figure 20).

Specific recommendations regarding the fencing for each cemetery are presented in their individual sections.



Figure 17. This traditional black painted steel picket fence encloses the historic Colonial Park Cemetery in Savannah, Georgia. (Laura Knott, 2014)



Figure 18. Black chain link is less expensive than steel picket fence and can be used for areas of low visibility.. (Atlas Fence)



Figure 19. This playground fence in San Francisco was a public art project. (http://bartalosillustration.com/wp-content/uploads/2012/06/Bartalos2012-05-22_8865-Valencia-St-panels-9+10-750x460.jpg)



Figure 20. The main gateway into the Zilker Park Botanical Garden was designed and crafted by Austin architect, Lars Stanley, as an Art in Public Places project. (http://www.tipsonart.org/images/photos/lars_stanley/large/03_lars_lg.jpg)

SMALL-SCALE FEATURES: MARKERS, CURBS, PLOT FENCES, AND ARTWORKS

Few records have been found that document the presence and conditions of small-scale features within the cemeteries during the periods of significance. However, the age of individual grave markers is fairly easy to determine by their style, patina, weathering, and sometimes by the death date of the deceased, although death date is not always a reliable determinant. The relative age of other features, such as plot curbing and fencing, can be determined in the same way. Other features, such as flower urns and grave decorations, benches, and trash receptacles, are more ephemeral in nature and are likely more recent than the markers. The five cemeteries also contain unique works of art and craft that date from the nineteenth century into the twentieth century.

Recommendations for small-scale features within the historic cemeteries focus on two goals. The first is the conservation of historic markers, curbing, fencing, and works of art and craft. The goal of conservation in this context is to extend the life and integrity of these features using planned appropriate interventions. Although some of these features require repair, most can endure with proper treatment.

The second goal is the provision of site furnishings to enhance visitor comfort and orientation. Improvement of the visitor experience is crucial to gaining the public support needed to sustain ongoing conservation of these historic resources. Guidelines regarding these two important goals are as follows.

Grave Markers

The oldest grave markers within the historic cemeteries were carved from marble or limestone and range from good to poor condition. There are also a few metal markers located within all the cemeteries; these also vary widely in condition, although most are rusted to some degree. The newer and more weather-resistant granite markers are generally more intact. (See Appendix C for more information on typical conditions.)

Overall, the condition of grave marker materials varies widely from cemetery to cemetery. Damage to markers can be attributed to soil expansion, poor installation, vandalism, careless mowing practices, tree limb damage, and overhead irrigation, although some more delicate hand-crafted markers also exhibit damage from weathering.

1. Prioritize work to be completed.

Prioritize work based on risks to public safety and imminent threats to historic material, per the Texas Health and Safety Code [Sec. 713.011], which defines a municipality's responsibilities to maintain a public cemetery that it operates in a condition that does not endanger the public health, safety, comfort, or welfare.

This priority system reflects anticipated acceleration of the deterioration process over time. At a certain point during that process, materials reach a "point of no return" after which it may become impossible or financially prohibitive to rehabilitate or restore individual components or systems reliant upon that material. Although fiscal planning for maintenance or repair can effectively respond to the varying levels of immediacy indicated in the information presented below, Level Three conditions cannot be ignored completely. Failure to address those conditions can escalate problems to Level Two or Level One status with corresponding increases in repair costs.

Annual budgeting for cyclical repairs is highly recommended.

Please note that proposals for all work must be approved by PARD prior to implementation.

Level One: Imperative

This work addresses life/safety or structural failure issues and should be implemented as soon as possible. For example, a damaged or dislocated marker that appears likely to topple or otherwise is a threat to health and safety would be considered Level One.

Immediately stabilize severely tilting or broken markers with wood frames or braces until they can be re-set. In addition, the investigation and stabilization of collapsed box tombs in Oakwood Cemetery should also be considered a Level One priority. An archaeologist should be involved in work with box tombs.

Level Two: Required (1–3 Years)

This work involves major repairs that should be carried out within the next 1–3 year period. This includes professional treatment of major cracking and disaggregated materials and the removal of biological growth. It is also important during this period to conduct public education regarding appropriate repair and cleaning techniques, and to train maintenance staff regarding best practices for mowing and trimming.

Level Three: Desirable (3–5 Years)

This work does not have immediate life safety or material degradation implications, but if not pursued soon, may lead to future loss or degradation and loss of historic integrity. This is also the category for issues that only affect surface conditions. Note: failure to address Level Three conditions can escalate problems to Level Two or Level One status, with corresponding increases in repair costs. Level Three work can include cleaning to treat general soiling, evaluating concrete encasements and other inappropriate repairs to determine interventions, and determining if severity of damage to sculpture indicates temporary removal and conservation.

Markers or monuments that do not pose a threat to public health or safety may be reset, repaired, conserved, or cleaned by the lot owner; that individual may contract with cemetery conservation professionals or non-profit organizations for these services. The following pages contain information on appropriate repair and cleaning procedures.

2. Avoid damage from maintenance activities.

Instigate an immediate ban on use of rider mowers and string trimmers with metal cores within 12" of all markers. String trimmers using round nylon lines can be used close to markers.

Avoid the use of chemical pesticides, herbicides, and fertilizers around historic markers. Acidic chemicals can deteriorate marble and limestone, while alkaline chemicals can deteriorate granite. Use organic methods instead, or treat weeds by hand pulling. Consider installing a gravel covering or plant a family plot or individual grave in groundcover.

Do not remove, and take care not to damage, the small markers placed at gravesites by funeral homes, whether placed temporarily or for long periods of time, particularly if these are the only grave markers.

3. Develop a process for documenting markers.

The documentation of individual grave markers will help the City to prioritize their repair, resetting, or conservation. Some of this work already may have been completed by volunteers and/or members of Save Austin's Cemeteries (SAC). Volunteers can provide valuable assistance with this activity. The City may choose to partner with SAC for the management of this effort.

This activity should be started right away. It is not necessary or advisable to wait for the documentation of *all* grave markers to be completed before repair work begins.

A marker documentation project might include the following tasks:

- Determine the information to be documented. The Texas Historical Commission provides a sample individual grave marker survey form, which may be used as-is or adapted to meet the City's needs. (See Appendix C.)
- Identify the target number and type of photographs to be captured for each marker.
- Identify who will collect the survey forms and photographs, how and where that information will be stored, and how it can be accessed and updated over time.
- Develop a priority list for each cemetery by section/block.
- Recruit and train volunteers.
- Deploy volunteers and track progress.
- Regularly report on project status until completion.

4. Develop a procedure for documenting and handling loose marker fragments.

Marker fragments are particularly vulnerable to theft, discard, or damage from vandalism or maintenance practices. The following process is recommended

- Carefully document all fragments in the location where they are found, prior to removing them for storage. Record measurements, descriptions, and photographs. Note fragments that are missing but not yet located.
- Provide a secure storage area for broken and displaced material and a methodology for cataloging these materials.
- If protected storage is not feasible, consider documenting the fragments and burying them behind the parent stone (the remaining large, standing fragment) a few inches under the soil surface. Here they will be preserved and suffer less deterioration than if they are left to weather. The steps for burying are as follows:
 1. Dig a hole 10 inches deep, in which the stone can lie flat;
 2. Place two inches of clean, graded white sand in the hole for drainage;
 3. Place the stone flat and face up in the sand; and
 4. Cover the stone with a two-inch layer of sand and then six inches of soil. The sand protects and identifies the location of the fragment for future recovery.

5. Evaluate grave marker foundation conditions.

Observations of the master plan team during fieldwork raised questions about the quality of foundations being installed beneath grave markers, and the extent to which poor foundations or installation procedures may be causing some of the shifting, tilting, and toppling of markers.

- Working with an engineer or other qualified professional, establish appropriate standards for marker foundation construction.
- Investigate existing foundations of a representative sample of grave markers that have toppled to determine if foundation construction or quality of installation meets those standards, once established.

6. Develop procedures for resetting markers.

PARD Cemetery staff offer marker resetting services to individual lot owners for a fee. Otherwise, PARD will reset a marker only if it poses a threat to public safety due to danger of toppling or breaking because of severe leaning.

Document the marker carefully before commencing work and do not proceed without professional advice if the marker appears fragile in any way.

The following guidelines for resetting are recommended:

- Follow recommendations provided by cemetery preservation professionals when commencing a resetting project.
- Accomplish resetting using a crew of staff or volunteers that have been trained by a cemetery preservation professional.
- Take particular care in resetting marble or limestone markers, as they are vulnerable to interior fractures that may be invisible from the outside.
- Before attempting to reset a marker, determine the marker's weight; if this exceeds the capacity of available hoists or other equipment, enlist the help of a monument company or other trained professionals who have access to appropriately sized equipment.

7. Develop procedures for repairing markers.

Repair markers only under the guidance of qualified cemetery conservators familiar with historic local materials and their particular qualities. All required lab tests should be performed by an experienced architectural conservation lab.

- Document every marker to be repaired with diagrams, notes, and photographs before, during, and after repairs or restoration.
- Consider the compatibility of physical properties of the repair material (such as that used for patching and crack repair) and the natural substrate, to determine if they react to the environment in the same way. This will aid in longevity of repairs and will prevent accelerated degradation of the materials from inappropriate repairs. Evaluate the following properties before selecting a material:
 - o **Appearance:** Repairs should be virtually indistinguishable from original work; selected fillers, cements, and mortars should closely match the existing material in both color and texture. Document all repairs thoroughly to insure there can be no future misinterpretation of a marker's true history.

- o **Dimensional Stability:** Materials should have a low drying shrinkage rate, typically defined as less than 0.05 percent.
- o **Consistency:** Repair material should be consistent in appearance and performance in every application and batch used for a single object.
- o **Vapor Permeability:** Some repair materials have additives that make them less permeable than the masonry they are repairing, which may cause stress and damage to the historic materials adjacent to the patch. Use of repair materials with high vapor permeability prevents moisture entrapment between the repair and adjacent material, allowing internal moisture to escape without causing deterioration.
- o **Thermal Expansion:** Coefficient of thermal expansion of repair materials should be matched to expansion coefficients of the materials to be repaired, in order to allow long-term durability in exterior exposures that are subject to wide temperature variations.

8. Evaluate cracking and spalling.

- Not all cracks require repair. Some cracks may simply be a part of the natural weathering process. Small, hairline cracks on vertical surfaces should not be repaired unless they are deep or run through the unit.
- Repair of cracks may require the installation of a pin for reinforcement and a cementitious patch or grout repair. Mend broken vertical stones, particularly marble, with threaded nylon rods and polyester resins or other approved materials. Long, deep cracks must be patched using a knife-grade patching compound to prevent further moisture penetration. The visual impact of such a repair should be minimized by using a colored mortar that is similar to the color of the material being patched. Fill chips or other voids with mortars made of lime, cement, and stone dust matching the original material.
- Repair small pieces of stone lost through spalling with a cementitious patching compound that matches the color and hardness of the masonry. Proprietary patching compounds must only be installed by trained conservators. Commercially-available patching compounds can be either Portland cement-based or natural hydraulic lime-based. It is important to choose a patching compound that is compatible with the materials to be repaired.
- Repair damaged areas that are too large to patch by installation of a *Dutchman*. In this procedure, the deteriorated portion of the material is cut away and a new piece of material (the Dutchman) is installed to match the existing. Dutchman repair is a much more durable repair than a cementitious patch repair.

A cementitious patch may need to be replaced after 10-15 years, while a properly installed Dutchman should last as long as the parent material itself. Dutchman repairs require skill to install correctly and should not be attempted by inexperienced personnel.

9. Develop approved procedures for cleaning.

Cleaning treatments fall into three general categories: water-based, chemical, and mechanical methods. Water-based methods include pressurized water spray, heated water treatments, and mist spray. Chemical methods involve the use of soaps, detergents, acidic and basic cleaners, and biocidal treatments in a variety of gels, liquids, pastes, and poultices. Mechanical cleaning methods include the use of tools, such as brushes, scrapers, and specialized rotating and laser-based cleaning equipment. It is possible to combine treatments for the best results, such as combining mild mechanical methods with a low-pressure water spray.

Clean markers only to reveal the original colors and other qualities of a stone, uncover inscriptions that are hidden by biological growth and dirt, or remove accumulated material that could lead to stone deterioration in marble and limestone. Light soiling and biological growth may be acceptable, particularly if inscriptions and carvings on the stone are still legible.

Some surfaces may be too delicate to clean and should be evaluated by a professional conservator, particularly limestones that are weathered and may not retain a protective finish, or that are disaggregating. The Texas Historical Commission has developed a short set of guidelines for cleaning cemetery markers:

- Use a non-ionic soap. One of the most readily available soaps is Orvus®, which can be found in feed stores. Mix a solution of one heaping tablespoon of Orvus® to one gallon of clean water. This soap is available as either a liquid or a paste.
- Pre-wet the stone thoroughly with clean water and keep the stone wet during the entire washing process.
- Thoroughly wash the wet stone using natural bristled, wooden handled brushes of various sizes. The use of plastic handles is not recommended, as color from the handles may leave material on the stone that will be very difficult to remove.
- Be thorough. Wash surfaces and rinse thoroughly with clean water.
- When cleaning marble or limestone, one tablespoon of household ammonia can be added to the above mixture to help remove some greases and oils. Do not use ammonia on or near any bronze or other metal elements.

- Lichens and algae can be removed by first thoroughly soaking the stone and then using a wooden scraper to gently remove the biological growth. This process may need to be repeated several times.
- Not all stains can be removed. Do not expect the stone to appear new after cleaning.
- Do not clean marble, limestone, or sandstone more than once every 18 months. Every cleaning removes some of the face of the stone. However, occasionally rinsing with clean water to remove bird droppings and other accretions is acceptable.
- Keep a simple treatment record of every cleaning, including date of cleaning, materials used, and any change in condition since last cleaning (such as missing parts, graffiti and other damage). These records should be kept at a central location so that the condition of the stones can be monitored over time.
- When cleaning is necessary, low-pressure water washing can be effective. Water pressure should be no stronger than 150–200 pounds per square inch (psi). Any cleaning method using water should not occur when the outside temperature will fall below 50 degrees Fahrenheit for three days (72 hours) after cleaning.
- Consult a masonry conservator before using any chemical cleaners. Chemical treatments should be approached with great caution because they can cause irreversible damage. Do not use any household chemicals, such as bleach, on grave markers.
- Choose inconspicuous test panels on monuments to be cleaned and evaluate to avoid over-cleaning. Chemical cleaners must be chosen by a knowledgeable professional who understands the type and condition of the masonry material to be cleaned. Only non-acidic, neutral-pH detergents should be used, and in conjunction with non-metallic brushes or scrapers; metal can permanently damage masonry. Acidic cleaners or highly alkaline cleaners can damage historic materials and should be avoided.
- Remove biological staining using an approved masonry cleaner containing a quaternary ammonium compound, if shown to be appropriate for the stone.
- Avoid using high-pressure, abrasive sandblasting with hard, sharp blasting media on historic materials, because it is extremely damaging.

Plot Curbs and Coverings

Curbs and coverings that enclose family plots and individual graves within the historic cemeteries range from good to poor condition. The primary causes of poor conditions are the high shrink-swell conditions of some soils, failure of metal connectors, or damage from vehicles. In heavy clay, if a feature was not installed on a deep gravel footing, then it will likely shift and eventually displace in response to soil movement.

With the exception of shell covers, repair of masonry plot curbs should have a priority over repair of coverings until more information is available regarding the covering's origins and date of installation. The following recommendations are focused on curb repair and preservation:

- Instigate an immediate ban on use of mowers and string trimmers with metal cores within 12" of all curbs. If a string trimmer must be used, a round nylon line no heavier than 0.08-inch is preferable to contoured and/or extruded lines.
- Document all curbs, noting materials, dimensions, and locations, and record conditions with photographs. Curbs made from marble or limestone are more vulnerable to deterioration and should take priority over those of granite or concrete, unless individual features are particularly threatened.
- Prioritize work using the Level One through Level Three methodology as recommended in the Grave Markers section, (pages 59–60).
- Reset plot curbs formed from masonry units as follows. Poured concrete curbs are integral to their location and cannot be reset—only stabilized and maintained, or replaced.
 - o Document material, condition, and location carefully prior to commencing work. Note if and how individual units are tied together, whether by metal pin or other material, and the condition of the connectors;
 - o Lift individual units, and number to match plan locations so that the border can be reassembled accurately;
 - o Excavate for a compacted gravel footing for stability and increased drainage, as recommended by a civil engineer; and
 - o Reassemble plot curb structure, using either stainless steel or nylon ties.

Plot Fencing

Oakwood Cemetery is the only one of the cemeteries that contains fenced family plots. Most of the fences are composed of cast iron, bent steel, steel pipe, or steel wire fabric on steel posts. Bronze and zinc elements are often used as small fence components. The paint has failed from most metal fencing, and some metal elements exhibit pitting, but in general most of the metal patina surfaces are stable due to the dry climate of the area. Some plot fences have been regularly maintained by cleaning and painting. Treat plot fencing as follows:

- Secure, immediately, all cemetery plot fencing with a padlock system to prevent theft. Such lock systems might include those types used to secure bicycles. Assure that materials used are compatible with the historic character of the cemetery. For example, brightly colored locking systems should not be used. Make sure that locking chains or bolts are padded, vinyl coated, or otherwise treated to protect historic materials.
- Document all plot fencing. (See Appendix C for sample forms.)
- Take particular care when treating metal plates embossed with the name and location of the manufacturer—it is rare to find these still attached to historic fencing.
- Prior to cleaning and painting, evaluate the overall condition of the fence or object to determine if actions beyond protection and maintenance are required. Cleaning and painting may not be appropriate for all fencing within the cemetery—some fences have stable patinas and may be better left alone.
- Any paint removal must comply with City abatement procedures.
- Treat ironwork only if the surface is not stable and rust is causing structural deterioration. If necessary to preserve ironwork, remove multiple layers of deteriorated paint using appropriate methods, including wire-brushing for non-decorative elements exhibiting light rust. However, first test to assure that the cleaning method will not damage the metal, as soft metals can be easily abraded by wire brushes or blasting. Otherwise, for cast iron and wrought iron, hand scraping and wire brushing are appropriate. Bent steel fencing may be more sensitive to scraping and brushing; test the surface prior to treatment. Low-pressure grit blasting may also be used if it does not abrade the surface.
- Multiple layers of paint may also be removed with an alkaline paint stripper, followed by application of a neutralizing afterwash, taking care to protect nearby plants and turf. Elements with severe corrosion should be removed to a shop for repair.
- Apply appropriate paint or other coating after cleaning to decrease corrosion rates, if applicable. Newly-cleaned metal should be protected immediately with a rust-inhibiting primer.

Low-VOC alkyd-based enamel paints are recommended for field finishing. Zinc-rich primers may be applied in a carefully controlled shop setting. Latex and other water-based paints are not recommended. Choose colors that do not detract from the historic character of the cemetery, such as black or dark green-black.

- Reset fence posts that are out of plumb. Fence posts may be set in concrete or other masonry foundations. Reset fence posts with a cementitious grout or with lead.
- Tighten all loose bolts, screws, and other anchors using a lubricant. Proceed carefully to avoid breaking any rusty fasteners. Replace missing anchors, where necessary, with new stainless steel anchors. Paint anchors to blend with historic materials.
- Install new architectural-grade polyurethane sealant at all joints between cast iron fence pieces and at all bolts and other anchors. The correct installation of sealant will help keep water out of the fence assembly. Choose tint to match historic materials.
- Replace missing fence sections and other metal elements, such as finials, as priorities allow. A number of fencing companies now produce replicas of historic fencing elements for this purpose. Refer also to the Chicora Foundation's website about cemetery fencing: <http://chicora.org/cemetery-fences.html>.
- Avoid replacing fence sections if they can be repaired. If they cannot be repaired, replace with new materials that match the original in design, color, texture, material, and other visual qualities.
- Ensure that materials are not taken from another historic fence unless the fence has been approved for removal and fully documented prior to demolition.

Artworks

All five historic cemeteries contain unique works of art and craft that were created to ornament graves. These artworks were created using a variety of materials, including stone, steel, glass, paper, and ceramics. These unique features should be carefully documented using GPS and color photography, and further research conducted regarding the artists and craftspeople who constructed them.

SMALL-SCALE FEATURES: SITE FURNISHINGS, FLAGPOLES, SIGNS, AND COMMEMORATIVE FEATURES

Site Furnishings

Furnishings, such as benches and trash receptacles, exist within all the cemeteries to provide for the comfort and convenience of visitors. Most benches have been installed by individuals within private burial plots, but there is a need for public resting and gathering places with seating and trash receptacles, and possibly drinking fountains, in all of the cemeteries. Such furnishings offer an alternative to resting on grave markers and littering.

Trash receptacles already have been provided adjacent to cemetery drives, in most cases. While placed in convenient locations, their sometimes battered and rusty appearance detracts from the historic character of the cemeteries. It is recommended that they be replaced.

Most of the open space within the cemeteries is occupied by either cemetery drives, common pathways between family plots and sections, or private plots. However, all cemeteries contain under-utilized common areas in which clusters of seating can be arranged for visitors to rest and refresh. Proposed locations will be discussed in more detail in each of the cemetery sections.

The City of Austin has chosen Landscape Forms' "Plainwell" line of benches and trash receptacles, made of cast aluminum and painted "Stone," for use in downtown public spaces and "special parks." These are also recommended for all five cemeteries. The traditional design of these furnishings rendered in contemporary materials complements the historic character of the cemeteries while easily differentiated as contemporary additions (Figure 21 and Figure 22). Other site furnishings should be drawn from this line, or designed to match in style and color.



Figure 21. Trash receptacle recommended for City of Austin downtown parks. Landscape Forms' Plainwell contemporary park furnishings have a historic reference, but are made from contemporary materials. (Landscape Forms)



Figure 22. Bench recommended for City of Austin downtown parks. Landscape Forms' Plainwell contemporary park furnishings have a historic reference, but are made from contemporary materials. (Landscape Forms)

Flagpoles

Flagpoles have been erected in both Evergreen and Austin Memorial Park cemeteries. Recommendations regarding these flagpoles are included in individual cemetery sections. In general, recommendations regarding flagpoles are as follows:

- Erect flagpoles only as integral features within the overall design of a cemetery, and the centerpiece of a design or a complementary element. For example, a visitor gathering area might also be the ideal location for a flagpole, which can be incorporated into the design to also mark the location of the gathering area. This design should be professionally developed by a landscape architect.
- Flagpoles at entrances should be incorporated into the design of the entrance, perhaps attached to walls or piers, or associated with an entrance kiosk. The entrance, including the locations of flagpoles, should be professionally designed.
- Avoid installing new flagpoles within the public viewshed of a historic building or cemetery entrance. Instead, consult with a landscape architect to incorporate a flagpole into the design so that it frames, rather than intrudes into, the view.

Signs

An upgraded informational and directional signage system is needed for all of the cemeteries. In each cemetery, a grave location system could easily be provided in map form in a kiosk structure, as previously mentioned (see Figures 13–16). In-depth historic information would assist the visitor in understanding the importance of these community history resources, and could be presented in written or graphic form or in a podcast transmitted from the kiosk. To assist with wayfinding, interior street signs should be updated, added, and/or repaired, and entrance signage improved.

- Visitor kiosks should display a map of the cemetery that indicates numbered or lettered sections, and provide this information in flyers that visitors can take with them. This information also could be associated with a website where the visitor could look up a name and then use the wayfinding information provided to find that particular grave with ease.
- Use small, ground-level markers that coordinate with cemetery maps to identify cemetery sections and roads, for ease of locating graves (Figure 23, next page).
- Signage within and across cemeteries should share a consistent visual identity, which could be developed through a comprehensive signage plan. Such a plan would provide graphic standards, technical specifications, and sign detail drawings to be



Figure 23. Sample cemetery drive markers. These markers can identify streets and/or cemetery sections but should be simple and narrow or low profile to protect the historic character of the cemetery. Stone, concrete, or painted or weathering steel is preferred over galvanized metal. (John Milner Associates Collection)



Figure 24. This simple post sign directs the visitor to the grave of a significant person. (John Milner Associates Collection)

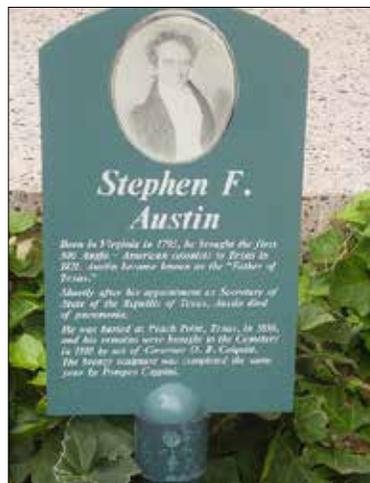


Figure 25. This low sign provides a brief summary of the significance of this important Texan. (Photozok)



Figure 26. Interpretive marker at Oakwood Cemetery with a QC code (John Milner Associates)



Figure 27. The rustic stone base of this interpretive marker blends well into the surrounding landscape. (John Milner Associates, 2009)

consistently applied to all new signage at the historic cemeteries. This plan could be based on comprehensive signage plans that have already been developed for the City of Austin and should visually relate to other signage systems.

- Interpretive markers should be incorporated into the sign system. These markers can be used throughout the cemeteries to provide information about important citizens buried there and about their contributions to the community (Figure 24, Figure 25, and Figure 26). Other markers could provide information about particular sections of the cemetery (Figure 27).

Commemorative Features

Commemorative features include markers and other memorials of various sizes, scales, and materials, as well as special tree plantings. These features provide important links to historic and more recent events and persons associated with Austin. Together with their landscape setting, they are integral components of the historic cemeteries. To adequately plan for their retention and maintenance, as well as future additions, consider these guidelines:

- Create a long-term plan and vision for the accommodation of future commemorative features. The plan should identify appropriate types and locations for proposed features, including statuary, monuments, and memorial tree plantings. *Note: Locations for memorial tree plantings have been identified in the chapters for Evergreen Cemetery and Austin Memorial Park Cemetery.*
- Prepare a comprehensive maintenance program for commemorative features that includes a manual to guide work for each type of marker or memorial, such as bronze plaques or marble sculpture. Markers and other memorials are revered objects that require regular maintenance to remain in good condition.
- Inspect memorials regularly to ensure that they remain in good condition. Document inspections with reports and photographs to aid in the understanding of any chronic conditions.
- Maintain bronze or copper elements through the application of clear wax or acrylic coatings. Wax coatings require more frequent re-application but are easier to touch up. Acrylic coatings must be stripped and replaced in entirety. Maintain the original designed landscape compositions surrounding markers and memorials as part of the history of the objects. Repair or replace overgrown plantings and cracked paving, for example, and correct poor site drainage.
- Refer to guidelines established for vegetation for further information regarding care and maintenance of important trees and other memorial plantings.

NEW INTERMENT OPTIONS

The City of Austin currently offers two interment options: burial of remains in a casket, or burial of cremated remains in an urn. While in-ground burial traditionally has been preferred by many people in the United States, cremation has and continues to gain in popularity. Two options for the disposition of cremated remains are proposed in this master plan:

- Columbarium: A structure which contains openings where cremated remains, in an urn or other container, may be placed.
- Scatter garden: Usually a well-defined, landscaped area containing appropriate plantings, which offers an alternative for those people who would like the cremated remains of their loved ones to “return to the earth.”

Columbariums and scatter gardens offer the additional benefit of enabling more interments in a smaller area than traditional burials do. For a cemetery such as Evergreen, which has the capacity to continue new burials for only a few more years, these options would extend the active service of that cemetery, possibly for many more years.

Another option—natural or “green” burial—refers to one of several types of interment that strive to minimize the environmental impact of burial by avoiding the use of embalming chemicals and concrete burial vaults, and instead utilizing non-toxic, biodegradable caskets or other burial containers made of sustainably harvested material. Natural burial areas are often developed as individual cemeteries or as designated areas within a cemetery. Natural burial sometimes involves the planting of a tree or shrub over the grave, to create a memorial grove of trees within the natural burial area. For more information, visit the Green Burial Council website at greenburialcouncil.org.

These terms will be used to describe specific recommendations in the City’s cemeteries. Additional information and photographs are provided to illustrate the recommendations in those specific chapters.

ARCHEOLOGICAL RESOURCES

Austin's historic municipal cemeteries are important archeological sites. Many burials (in all cemeteries except Austin Memorial Park Cemetery) are unmarked and have not been yet located. The following are recommended:

- Use ground-penetrating radar, electrical resistance, magnetic survey, and/or other similar techniques to locate unmarked graves in the cemeteries.
- Consider the archeological potential and significance of a previously undisturbed site when selecting a site for new burials or other projects that involve subsurface ground disturbance.
- Evaluate proposed construction projects in consultation with an archaeologist.
- Obtain the services of an archaeologist to conduct testing of any new construction sites with the potential to contain archeological resources.
- Avoid impacts to archeological sites by designating a limit-of-disturbance area around the resource. The limit-of-disturbance area should be determined by an archaeologist.
- Consider preparing a comprehensive archeological resources management plan for the historic cemeteries to better inform future projects. The plan should include:
 - o a complete inventory of previously recorded archeological sites within (and immediately adjacent to) the cemeteries;
 - o cultural contexts describing the prehistoric and historic-period occupations in the vicinities of the cemeteries;
 - o a map depicting archeologically sensitive areas;
 - o a summary of all previous archeological research conducted in the vicinities;
 - o a map depicting previously surveyed areas;
 - o a map depicting previously disturbed areas and/or areas where no archeological resources could exist for other reasons;
 - o and significance criteria, research priorities, and site evaluation protocols that can be used to inform future archeological survey, investigation, mitigation, and planning decisions.

