Existing and Historic Bathhouse Row Landscape Study

Hot Springs National Park, Arkansas

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As described in the request for quotes D5219 (DSC-CAP), PX20007D101, the study is divided into several sections, which are taken up in order here.

1. Existing vegetation

The enclosed 1987 maps consitute the major portion of this section. Identification and nomenclature are according to the following sources:

Bailey, L. H. 1949. Manual of Cultivated Plants. MacMillan, New York.
Graf, A. B. 1970. Exotic Plant Manual. Roehrs, East Rutherford, New Jersey.
Hunter, C. 1985. Wildflowers of Arkansas. The ozark Society FOundation, Little Rock.
Moore, D. 1972. Trees of Arkansas. Arkansas Forestry Commission. Little Rock.
Rehder, A. 1940. Manual of Cultivated Trees and Shrubs. Macmillan, New York.

For each species logged on a map, a series of condition codes is given. From left to right the columns are as follows:

Ht.: Height in feet

Cond.: Condition on a scale from 1 (best) to 5 (worst)

Bud.: Terminal bud on a scale from 1 (strongest) to 4 (no longer active); 5 indicates plant has been topped

I-D: Insect-disease infection on a scale from 1 (non discernible) to 5 (heaviest infestation)

A/L: Age and longevity in years

Fieldwork was done in July 1987. Except for recently-planted individuals, the condition of these woody plants is not likely to change rapidly. They have survived extreme drought conditions in three seasons since 1980. We feel that our assessment of their condition should hold for at least five years.

Each specimen mapped was evaluated for its transplantation potential, and a "W" printed in its condition code when transplantation appeared promising. Because

of their greater age and lack of vigor, most plants were not recommended for transplantation. Older and larger plants can sometimes be successfully moved, but it is a high risk operation. Transplantation should be attempted only in the dormant season, and the following procedures observed:

Prune the top commensurate with root loss, by thinning or shearing depending on species.

Prevent drying of feeder roots during transplanting.

Loosen enough soil in the planting location to amply accommodate the roots. Soil amendments and fertilizers are not needed at planting.

Establish good contact between soil and roots, as for instance by using water while backfilling. Do not overpack soil.

Replant at the same depth as before.

Maintain soil moisture by deep soaking as required for at least on full growing season after transplanting.

Restrict fertilization to light surface application during the first growing season.

2. Historic plant maps and lists.

Working from planting lists proposed for the 1890's and 1920's, and from a 1932 set of maps, historic photographs and descriptions were inspected for identity and location of plants. Primary material was not always available. Considerable reliance was placed on the report by Rhodes. Identification could not be as authoritative as for existing plants, but species were not named without reasonable certainty. Plants that could not be mapped but were reported planted are listed in Section Three.

The 1890's landscaping featured trees and lawns in front of the bathhouses.

Shrubs and flowers appeared on planting lists but were not widely used before the late 1890's. There was a tendency to favor exotics from more tropical locations or plants in use in the northeastern United States or Europe. A number of well-adapted exotics were selected, however, and several native trees were widely used including Southern Magnolia, elms, and Sycamore. A small number of display beds of flowers were planted, but their locations could not always be determined. Some flower, shrub and tree planting was also done on the lower slopes of Hot Springs Mountain outside the map area. Landscaping became fuller in the 1900 - 1910 period. There were many small flowering trees on the plant lists whose use could not be determined. An actual plant order in 1897 contained species well adapted to the region, including a number of shrubs with showy flowers.

Pictorial evidence of the 1930's landscape shows full foundation plantings in front of the bathhouses. The documentary record indicates extensive planting in the 1920's, followed by consolidation and maturation in the following decade. There were more flowers used in the 1920's. A 1920's planting of Crape Myrtles in bathhouse lawns and Arlington Lawn was apparently short-lived; little evidence of it remains in photographs of the 1930's. The shrubbery was mainly deciduous and unpruned, probably showy in flower, giving a less formal look than at present. Hedge use was more extensive than now, likely a small leaved privet such as Chinese Privet. There was little evidence of Heavenly Bamboo, hollies, yews or Cherry Laurel. Much of the present planting at the east edge of Arlington Lawn was probably started at this period, but could not be documented from photographs.

3. Soils and planting recommendations

Five areas were analyzed for soil texture, pH and nutrients. Each sample was drawn from five locations within the area, at depths of four to six inches, and was

mixed before analyses. Results are given below:

Sample area	Soil chemistry				Particle size %		
	total N	total P	total K	pH	sand	silt	clay
Magnolia Promenade	5ppm	2ppm	5ppm	6.45	27	40	33
Bathhouse Lawns	5ppm	2ppm	3ppm	5.95	26	35	39
Arlington Lawn	2ppm	2ppm	5ppm	5.04	22	39	39
Tufa Terrace	3ppm	1ppm	2ppm	8.17	42	23	35
Grand Promenade	2ppm	1ppm	2ppm	7.94	32	33	35

Soil differences do not seem to be critical for existing vegetation. Indifference of plantings to soil variation was noted in the 1890's. The pH range is wide, but apparently within tolerance limits of most of the material used. Camellia, Gardenia and Rhododendron are, however, examples of acid-requiring plants which should not be planted on the alkaline soils. Soil nutrients are low in all locations. Although silt and sand content of the soils varies considerably, clay percentages vary little. This indicates similar storage capacities for water and nutrients.

The following list of species recommended for future landscape use is comprised almost entirely of materials used in landscapes of the 1890's and 1930's, excluding species deemed inappropriate by virtue of size, lack of hardiness, short life span, susceptibility to pests, etc.

Exotic trees

Paulownia tomentosa, Empress Tree
Cleyera japonica, Sakaki
Osmanthus illicifolius
Chamaecyparis pisifera plumosa, Sawara Cypress

Native trees

Acer saccharum, Sugar Maple

Amelanchier arboria, Serviceberry
Carya tomentosa, Mockernut Hickory
Calalpa speciosa
Celtis laevigata, Sugarberry
Cercis canadensis, Redbud
Chionanthus virginicus, White Fringetree
Cornus florida, Flowering Dogwood
Fraxinus americana, White Ash
Ilex opaca, American Holly
Juniperus virginiana, Red Cedar
Liquidambar styraciflua, Sweet Gum
Liriodendron tulipifera, Tulip Poplar
Magnolia virginiana, Sweetbay
Pinus taeda, Loblolly Pine
Platanus occidentalis, Sycamore
Quercus alba, White Oak
Quercus falcata, Southern Red Oak
Quercus muehlenbergia, Chinkapin Oak
Ulmus alata, Winged Elm
Ulmus americana, American Elm

Exotic shrubs

Abelia grandiflora, Glossy Abelia
Berberis thunbergii, Japanese Barberry
Buxus microphylla japonica, Japanese Box
Buxus sempervirens, Common Box
Cephalotaxus drupacea, Japanese Plum Yew
Chaenomeles lagenaria, Japanese Quince
Elaegnus pungens reflexa, Bronze Eleagnus
Escallonia montevidensis
Euonymus japonica, Japanese Euonymus
Forsythia intermedia, Golden Bells
Gardenia jasminoides, Cape Jasmine
Hibiscus syriacus cultivars, Rose of Sharon
Ilex cornuta, Chinese Holly
Ilex crenata, Japanese Holly
Juniperus sabina, Savin Juniper
Lagerstroemia indica, Crape Myrtle
Ligustrum amurense, Amoor River Privet
Ligustrum japonicum, Wax Leaf Privet
Lonicera morrowii
Lonicera fragrantissima, Winter Honeysuckle
Lonicera tatarica, Tatarian Honeysuckle
Philadelphus grandiflorus, Mockorange
Photinia serrulata
Prunus laurocerasus, Common Cherry Laurel
Rhododendron cultivars, Azalea
Rosa bracteata, Macartney Rose
Spiraea cantoniensis
Spiraea japonica
Spiraea prunifolia, Bridal Wreath

Spiraea thunbergii
Spiraea vanhoutte, Bridal Wreath
Thuja orientalis cultivars, Arbor Vitae
Weigelia florida

Native shrubs

Aesculus pavia, Red Buckeye
Campsis radicans, Trumpet Vine
Hydrangea arborescens grandiflora
Hypericum densiflorum, St. John's Wort
Ilex vomitoria, Yaupon
Myrica cerifera, Wax Myrtle
Yucca aloifolia, Spanish Bayonet

Exotic ground covers

Hedera helix, English Ivy
Vinca major, Periwinkle

Native wildflowers

Asclepias tuberosa, Butterfly Milkweed
Bidens aristosa, Tickseed Sunflower
Clitora mariana, Butterfly Pea
Coreopsis grandiflora, Tickseed
Coreopsis lanceolata, Lance-leaved Coreopsis
Coreopsis tinctoria, Calliopsis
Delphinium carolinianum, Tall Larkspur
Delphinium tricorne, Dwarf Larkspur
Echinacea pallida, Pale-purple Coneflower
Echinacea purpurea, Purple Coneflower
Helianthus angustifolia, Narrow-leaved Sunflower
Helianthus divaricatus, Woodland Sunflower
Liatris aspera, Rough Blazing Star
Liatris elegans, Gayfeather
Monarda fistulosa, Beebalm
Monarda russeliana, Horsemint
Oxalis vidacea, Wood Sorrel
Pentstemon digitalis, Foxglove Beardtongue
Phlox pilosa, Downy Phlox
Pyrrhopappus carolineanus, False Dandelion
Ranunculus species, Buttercup
Rudbeckia grandiflora, Large Coneflower
Rudbeckia hirta, Black-eyed Susan
Rudbeckia triloba, Brown-eyed Susan
Ruellia strepens, Smooth Petunia
Tradescantia ernestiana, Spiderwort
Verbena canadensis, Rose Vervain
Viola pedata, Birdsfoot

Exotic Grasses

Cynodon dactylon, Common Bermuda
Cynodon hybrids, Hybrid Bermuda
Eremochloa ophiuroides, Centipede Grass
Lolium multiflorum, Annual Ryegrass
Poa praetensis, Kentucky Bluegrass
Trifolium repens, White Clover
Zoysia hybrid, Meyer Zoysia

Exotic Bulbs

Caladium bicolor cultivars
Gladiolus cultivars
Narcissus cultivars

Exotic Bedding Plants

Canna generalis cultivars
Celosia cultivars
Chrysanthemum morifolium cultivars
Coleus blumei cultivars
Colocasia esculenta, Elephant Ear Taro
Geranium cultivars
Musa ensete, Banana
Petunia cultivars
Salvia splendens cultivars, Scarlet Sage
Zinnia cultivars

New woody plantings should be comprised of species and varieties that will not require regular pruning to maintain desired size. Except for hedges outlining walks, the earlier landscaping emphasized informal plantings of flowering shrubs at building foundations, in lawns, and edging lawns. Trees included large-growing species for shade, planted in rows in confined spaces, and small showy flowering trees as landscape accents.

Flowers along Bathhouse Row should be employed as in its first four decades, either as bold shrub sized components of foundation plantings (for example, Cannas) or in beds near Central Avenue. Flower beds were also maintained below the bandstand. The planter beds flanking the main entrance stairway below the Grand Promenade are suitable sites for flowers.

4. Threatened and endangered plants

Dale (1981) reported to Hot Springs National Park that he found no rare or endangered species of vascular plants in the area covered by the current study. Taylor (1981) reported to Hot Springs National Park finding no rare or endangered species of ferns, although three endemics of calcareous soils were located on and near tufa outcrops. Bazan (1981) reported to Hot Springs National Park that no rare or endangered liverworts were found.

In our field work we found no rare or endangered plants. the most likely locations would be in more inaccessable areas of the Park where intensity of disturbance has been low, if such areas exist. Unusual, inconspicuous, herbaceous plants might also occur around flowing springs, where the searches for ferns and liverworts were concentrated.

5. Cultural recommendations

Separate recommendations are given for each subunit as they are described in the invitation to bid.

A. Magnolia Promenade

Although few of the magnolias are in prime condition, the species proves to be a rugged landscape tree. Tree number three on map one is a high-risk tree, but we do not recommend the immediate removal of this or other Promenade trees other than those with a condition score of five. All the trees should be sprayed for the control of scale insects on leaves and twigs. Decayed wood should be excavated and the cavities filled and sealed; however, a great deal of the exposed sapwood is sound and is being overgrown by healthy repair tissue. Pruning scars above two inches in diameter should be sealed.

The magnolias need pruning, but only to remove dead branches and stubs, along with adventitious sprouts that have developed where large branches were removed.

Feeding roots are extensive and shallow, most certainly extending under the sidewalk and into the bathhouse lawns. Any side walk repair or regrading is bound to damage them, and should be done with great care.

Turf can be managed as outlined for the bathhouse lawns, except that tilling would run the risk of seriously damaging magnolia roots.

B. Bathhouse Lawns

The holly hedges show no evidence of serious disease or insect infestation, but their general health is depressed by close shearing. These species are naturally small trees; they could well be replaced by the dwarf Ilex cornuta rotunda which has been used in a few places. Berberis thunbergii, a lower-growing plant which makes an effective barrier hedge, could be used in place of the hollies.

Foundation plants suffer in both appearance and vigor from heavy pruning. Heavenly Bamboos should have old stems removed at the base, but not be sheared. Azaleas require spraying to control lacebug. Chinese hollies, ligustrums, yaupons, and Cephalotaxus are difficult to maintain in these plantings because of the severe pruning required to maintain suitable sizes. Appropriate plants of lower stature include Forsythia, dwarf crape myrtles, Philadelphus, Japanese Quince, species of Box, compact cultivars of arborvitae, yuccas, Japanese Barberry, spireas, and Ligustrum quihoui.

Turf areas require thorough renovation. Herbicide such as Roundup should be applied in early fall. After several weeks, Annual Ryegrass may be sown if desired. The following spring apply dolomitic lime, phosphorus and

potassium and till to a depth of four inches. Sprig or sod Centipede Grass. Apply slow-release nitrogen followed by irrigation in early summer. Water regularly the first season. Make an annual spring application of a slow release complete fertilizer, and summer application of slow release nitrogen. This fertilizer will meet the needs of foundation plants and will benefit Promenade magnolias. It should not be necessary to top-dress lawns. Attributes of Centipede Grass include: excludes weeds; tolerates some drought; stands moderate traffic; has deep green color; greens in spring as early as other warm season grasses; survives winter cold in Hot Springs; is not as invasive as Bermuda Grass. Centipede cannot be oversown with Winter Rye, nor can other winter-dormant grasses with the exception of Common Bermuda. Thus we do not recommend winter-green lawn. Even Common Bermuda suffers reduced vigor when oversown with Annual Rye. An alternate route to a green winter lawn is to establish Tall Fescue or Kentucky Bluegrass as a year-round lawn. These grasses are not, however, able to grow a sod dense enough to exclude invasion by broadleaved weeds or Bermuda, and they require faithful summer irigation.

Where flower beds are established, soil preparation should include tilling in four inches of peatmoss in addition to lime and fertilizer as recommended for lawns. Regular irrigation will be required.

C. Main Entrance

There are no woody plants or turf grasses of distinction in this area, and no flowers. The American Hollies produce too much shade for lawn grasses, yet close pruning reduces the vigor and appearance of the hollies. The plantings to the south of the steps leading from the main entrance to the Grand Promenade are overgrown; to the north they are sparse and of very low

vigor. We recommend that this area be completely relandscaped, with intensively managed lawns, flowers and woody plants.

D. Arlington Lawn

The turf should be renovated as recommended for the Bathhouse lawn. Irrigation is essential while the new sod is becoming established. If long-term irrigation cannot be provided, omit the summer fertilization with nitrogen. Spring fertilization should include the shrubbery bordering the lawn. Maintain the low character of the shrubbery around the platform south of the tufa boulder. Fill gaps in perimeter shrubbery with taller plants form the list in Section Three of this report. Crape Myrtle and Rose of Sharon can could be re-established along the front perimeter inside the holly hedge, provided they are watered consistently for a year or longer, until they are well established. Except for the holly hedge, pruning of woody vegetation should be limited to complete removal of weak or overgrown stems, and generally should not include shearing.

E. Display Springs

The steepest slopes around the east and south sides of the spring have too little soil to support shrubs, as is indicated by the very poor condition of chinese hollies here. We suggest using a ground cover such as English Ivy, as was done around the turn of the century. Shrubs to the west of the spring would screen the rear of the Maurice Bathhouse if allowed to grow taller and wider.

F. Transition Area

This contains a mixture of planted and naturally-occuring trees and shrubs, including several invasive woody species, and some ground covers. It is sloping, and in general, there is enough vegetation to cover the slopes.

We suggest the periodic removal of excess woody weeds such as Ash, Chinaberry, Elm, Hackberry, Honeysuckle, Mulberry, and Silktree seedlings and runners, and the elimination of Kudzu by repeated herbicide applications.

G. Grand Promenade

Maturation of the promenade since it was completed about 30 years ago has produced an attractive landscape. Relatively little relandscaping seems called for, mainly where plants have become overmature or died. Proper maintenance will prolong the attractiveness of many of the plants. Some older Redbud and Dogwood trees are in need of surgical treatment such a filling rotted cavities and removing dead snags. Rejuvenative pruning by removing oldest stems can be practiced on a number of species including Heavenly Bamboo, Common Cherry Laurel, Vaupon and Pfitzer Juniper. Where new material is used, we suggest choosing plants from the lists in Section Three that are not now found on the promenade.

Closely-trimmed chinese hollies suffer from the same problems as the hedges in front of the bathhouses. Small trees and shrubs show considerable evidence of damage from string trimmers. General health of shrubs would improve if pruning were reduced. Newly-planted trees and shrubs require deeper and more consistent watering than they have been getting. A complete slow release fertilizer should be broadcast in early spring. Use no lime. Azaleas and Euonymus at the Reserve Street entrance should be sprayed for lace bug and scale, respectively.

H. Open Lawn Bays

In general, the turf species established here seem adapted to where they grow. Because of drier soils these bays cannot be expected to support high quality weed-free lawns. They can, however, be presentable. Early spring

fertilization with a complete slow release fertilizer will meet nutrient needs. Use no lime. Thin areas can be oversown with Common Bermuda in early spring. In summer mowing height should be no lower than two to three inches. Special care should be taken to avoid scalping where string trimmers are used.

I. Open Woods

We saw few management needs for these areas. The canopy is closed, and canopy plus understory and litter have the soil well protected. No threatening diseases or insects were noted. Trail shortcuts should be more effectively blocked to control erosion. There are no problems from invasive species.

Sources

Bathhouse Row Adaptive Use Program. The Bathhouse Row Landscape: Technical Report I. 1985. National Park Service.

Bazan, Evangelina. 1981. Floristice Investigation for the Hepatics Within the Discharge Area of the Hot Springs. Prepared for Hot Springs National Park.

Crawford, Jane C. 1982. Vegetation Study and Renovation Planting Plan for the Grand Promenade in Hot Springs National Park, Arkansas.

Dale, E. E. Jr. 1981. A Search for Rare or Endangered Species of Vascular Plants of the Tufa Area in Hot Springs National Park. Prepared for Hot Springs National Park.

General Management Plan, Development Concept Plan, Hot Springs National Park. 1986. National Park Service.

Hot Springs National Park Topographical Sheets. 1932. National Park Service.

Photographs and publicity brochures in archival storage at Hot Springs National Park.

Rhodes, Diane. 1985. Historic Grounds and Structures, An Interim Report of Bathhouse Row, Hot Springs national Park, Arkansas. National park Service, Denver Service Center.

Taylor, W. C. 1981. Ferns of the Tufa Deposits on Hot Springs Mountain, Hot Springs National Park. Prepared for Eastern National Park and Monument Association, Philadelphia.