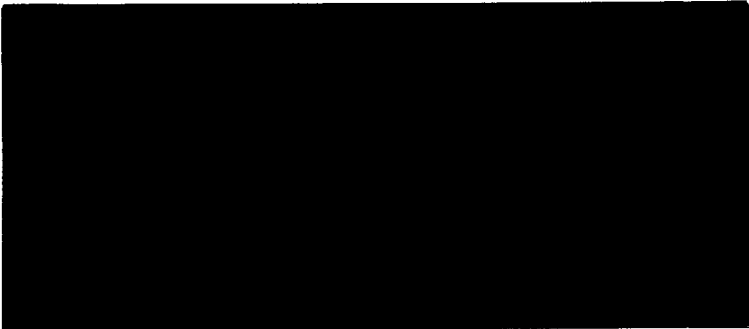


The Mid-Atlantic Region (MAR) of the National Park Service is the central administrative office for 28 park units in five states: Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia. The diversity of parks and their resources is reflected in their designations as national parks, national seashores, national historic parks, national recreational areas, national military parks, and national rivers.

The MAR Branch of Resource Protection administers scientific consultation, research, and monitoring efforts in these parks, involving a wide range of biological, physical, and social sciences. The Research/Resources Management Series was established as a medium for distributing current scientific information obtained from studies designed to improve the management, protection and interpretation of park resources. Information contained in this Series is potentially useful to other Park Service areas outside the MAR and also benefits independent researchers working in the parks and elsewhere. The Series provides for the retention of research information and makes possible more complete in-house evaluation of internal research, technical, and consultant reports.



The Series includes:

1. Research reports which directly address resource management problems in the parks.
2. Literature reviews and bibliographies of existing information relative to park resources or resource management problems.
3. Presentations of basic resource inventory data.
4. Other applicable reports relating to the research and resource management programs of the Mid-Atlantic Region.

Research/Resources Management Reports are produced in limited quantities and, as long as the supply lasts, copies may be obtained from the Branch of Resource Protection, Mid-Atlantic Region.

NOTE: Use of trade names does not constitute or imply U.S. Government endorsement of commercial products.

D-120

MAR-5

Landscape Maintenance Plan for
Independence National Historical Park

Prepared by

Ann F. Rhoads, A. William Graham, Gregory Waters
Morris Arboretum of the University of Pennsylvania
9414 Meadowbrook Avenue, Philadelphia, PA 19118

June 1983

#CX4000-1-0050

PLEASE RETURN TO:
TECHNICAL INFORMATION CENTER
LEWIS SERVICE CENTER
NATIONAL PARK SERVICE

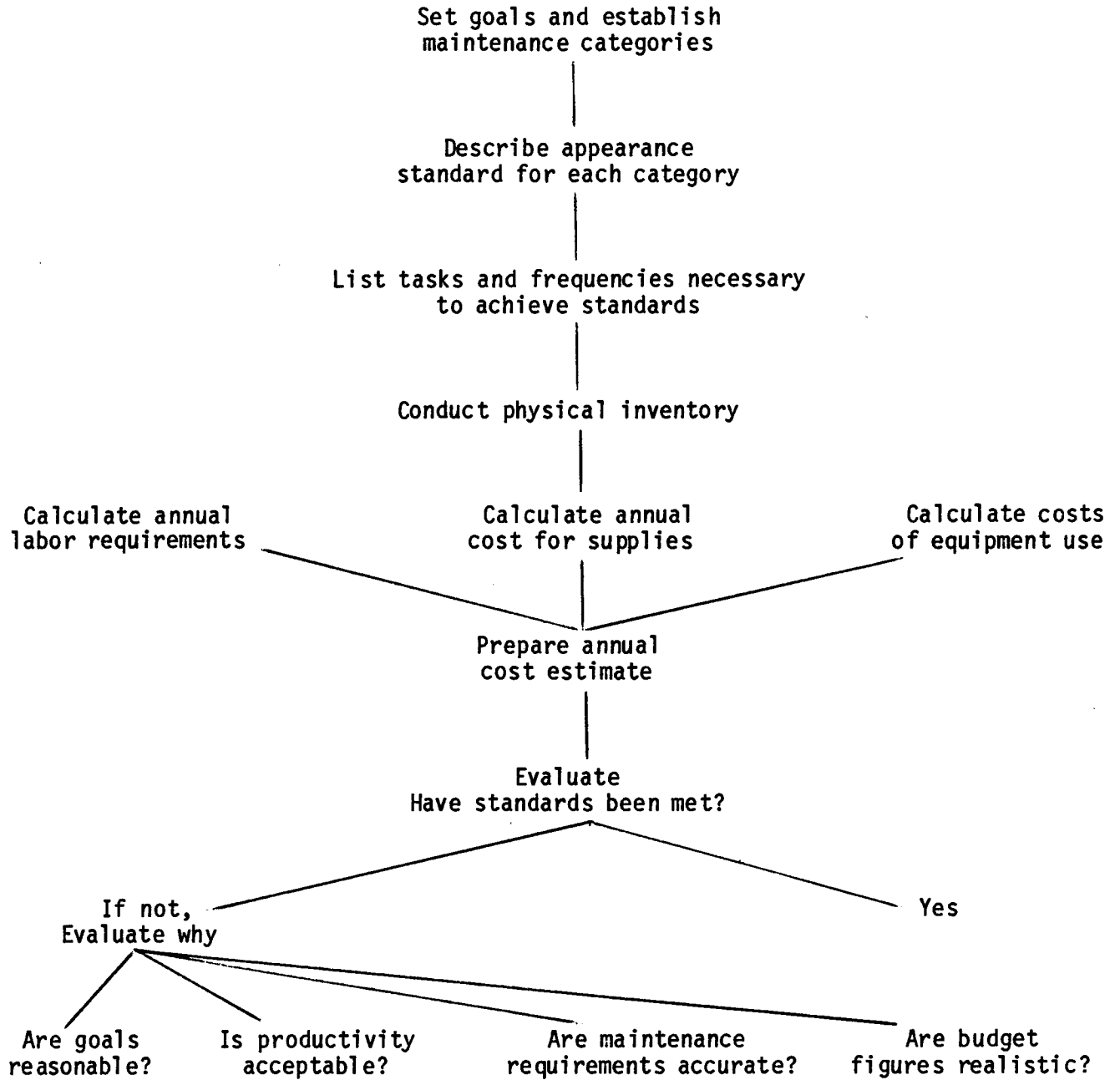
TABLE OF CONTENTS

Abstract	1
Summary of the Process	2
Introduction	3
Maintenance Goals and Priorities	3
Task List.	5
Physical Inventory	6
Annual Labor Requirements.	7
Annual Cost Estimate	8
Labor Costs.	8
Supplies	8
Machinery and Equipment.	8
Total Annual Cost.	9
Evaluation and Adjustments	9
Literature Cited11
Appendices	
A. General Description of Maintenance Categories	
B. Independence National Historical Park Landscape Maintenance Categories	
C. Turf Maintenance Standards	
D. Shade Tree Maintenance Standards	
E. Annual Cycle of Activities	
F. Task Frequency of Each Level of Maintenance	
G. Physical Inventory Summary of Garden Areas of Independence National Historical Park	
H. Proportion of Paving, Lawn, and Ornamental Plantings in Independence National Historical Park	
I. Labor Requirements to Maintain Franklin Court at "A" and "B" Levels	
J. Maintenance Record Form	

ABSTRACT

This report describes a system for organizing and analyzing landscape maintenance needs. The process involves setting appropriate landscape maintenance goals and projecting staff and equipment needs to achieve the goals. Finally, a comparison of actual performance with stated goals permits evaluation of the system. Points are identified where conscious choices can be made to accommodate budget reductions or other constraints. The significance of landscape design in determining maintenance requirements is discussed.

Development of a Landscape Maintenance Plan
Summary of the Process



Introduction

All landscaped areas require annual maintenance. Development of a detailed program of scheduled maintenance, including all tasks necessary for the care of trees, shrubs, flowers and lawns, will aid the park administration in the efficient allocation of resources and assure that essential maintenance tasks are not overlooked. A landscape maintenance plan will also be useful in preparation of budgets and ordering supplies and equipment.

The process described in this report can be used to develop a maintenance plan for an existing park area or to project the maintenance needs of new areas or proposed re-landscaping projects. It complements information in the Maintenance Impact Statement Handbook (1), published by the Department of the Interior, and the Park Maintenance Management Manual (3), published by the Pennsylvania Department of Community Affairs, by applying the concept specifically to landscaped areas.

Maintenance Goals and Priorities

The first step in developing a landscape maintenance plan is to set maintenance goals and priorities. This involves establishing guidelines for the appearance of a landscaped area. All parks can be divided into separate areas based on the physical arrangement of the space, land use, or types of plantings. Each area should be considered separately in terms of maintenance goals.

Several factors influence the establishment of appropriate goals. One is the significance of the area as defined by the level of visitation and therefore the public visibility and impact. Areas of high visitation also

experience more wear and tear and require additional maintenance just to keep the plants healthy.

How an area is used also affects the maintenance requirement. For instance, turf areas used for lawn games must be kept short and even, but a meadow used by birdwatchers and wildflower enthusiasts should be cut only once a year.

In addition, the nature of the landscape design also has a bearing on maintenance requirements. Areas with formal design elements such as clipped hedges and parterres with seasonal displays of bedding plants require more maintenance than less formal landscapes. In fact some areas may contain a mosaic of maintenance levels depending on the existing design elements, for instance high maintenance rose beds surrounded by turf for which lower maintenance requirements would be acceptable.

Individual plants also differ in their maintenance requirements. In a breakdown of yearly maintenance requirements of different plant species, researchers at the University of California report that an elm tree requires on the average five and one half hours of work per year compared with less than one hour for a sycamore (4).

Maintenance goals and priorities should be set by the park administration working closely with the horticultural staff so that goals are appropriate to the use of each park area and to the expectations of the public as well as to the nature of the plantings within. It must be remembered that landscapes are composed of living, growing plants and goals should be achievable within the bounds of sound horticultural practice.

Park areas can be divided into four categories as far as landscape

maintenance goals are concerned. Category A includes the most visible parts of the park, those which experience the highest annual visitation and consequently receive the greatest impact from visitors. Category B includes areas which are not as heavily used as the central core. Category C includes peripheral areas which receive a much lower rate of visitation. High maintenance features such as formal hedges or flower beds are not present in "C" areas. Category D includes natural woodlands, meadows and fields which require little or no annual maintenance (Appendix A).

Appendix B contains a breakdown of landscape maintenance categories for landscape units of Independence National Historical Park (INHP). As an urban park located in a downtown area, INHP does not include any zones of natural vegetation (Category D). In parks which do include undisturbed natural areas a fourth category would be added to encompass spaces requiring little or no scheduled annual maintenance. Appendices C and D contain descriptions of actual maintenance goals for turf and shade tree maintenance for categories A, B, and C. The goals describe the standards of appearance for each area, and are the result of consultation between park administration and horticultural staff in 1980. Therefore these standards reflect the National Park Service management policies and park objectives at that time. These sets of detailed standards serve as examples of similar documents which should be prepared for all maintenance units.

Task List

Once maintenance goals have been defined, a general schedule of tasks required to achieve the goals, and the frequency and method by which they

should be performed, can be constructed. In Appendix E an annual cycle of maintenance tasks is outlined. In Appendix F the frequency with which these tasks must be performed to achieve three levels of maintenance (Categories A, B, and C) is compared. The major difference between the categories lies in the frequency with which such tasks as mowing, edging and weeding are performed. Task lists for specific park areas will vary depending on the actual landscape elements present in that area. Category C areas should not include high maintenance plants or formal gardens.

Physical Inventory

In order to fully describe maintenance requirements each landscaped area must be inventoried. The inventory should record square feet of turf, ground cover, mulch, flower beds, shrub beds, and hard surfaces (paving). Also, linear feet of lawn and bed edge should be recorded as well as the kinds and numbers of all trees and shrubs. Species and length of hedges should be included.

An inventory can be accomplished by actually measuring and counting each element in an existing landscape. Alternatively, if accurate scale drawings are available the inventory can be developed from them. Similarly, future park additions can be inventoried using scale drawings of the proposed landscape.

An inventory of landscaped areas of Independence National Historical Park is summarized in Appendix G. Appendix H is a graphic representation of land use in landscaped areas of INHP developed from the inventory data.

Annual Labor Requirements

With maintenance goals defined, tasks necessary to achieve the goals outlined, and an inventory of the actual landscape elements completed, the next step is to determine the work time needed to accomplish each task. The process involves listing all tasks, estimating the time required to do each task once and multiplying by the number of times a task must be done each year to come up with the number of hours involved per year. Labor requirements can be calculated on an area by area basis or for the park as a whole.

An estimate of the time required to do each task once is based on average worker productivity per unit area multiplied by the actual area as listed in the inventory. For instance, an average productivity figure for mowing grass is .67 hr. per 1000 square feet using a 16 inch mower (3). The area of grass in Franklin Court is 2605 square feet so each mowing will take approximately 1.7 hours plus clean up time. If the schedule calls for weekly mowing from early April until mid-November the task will have to be done thirty-one times per year and thus involve 52.7 hours of labor each year.

By performing similar calculations for each scheduled maintenance task, a total picture of the yearly time requirement to maintain an area can be developed. Appendix I shows the maintenance requirements for Franklin Court (Independence National Historical Park) maintained as a Category A area and as a Category B area as defined by the 1980 maintenance goals. Comparison of these figures shows that it would take 83% more time to maintain this area at an A level than at a B level. This type of comparison could be useful in planning maintenance regimes under budgetary limitations.

Average productivity rates for various landscape maintenance tasks can be

arrived at by recording the actual working time of crews on the job. The width of mowers or the nature of other equipment used must be considered when reporting productivity rates. A form developed for this purpose is included as Appendix J. Although local experience is the best source of productivity figures, some estimates of time requirements to do various maintenance jobs are available from such sources as the Manual of Site Management (2) and the Park Maintenance Management Manual (3).

Annual Cost Estimate

Labor Costs - Yearly labor requirements can be multiplied by average hourly wage to estimate annual labor costs. In order to account for travel to and from the work site, and other non-productive time a figure of 25% should be added to the basic time calculation.

Supplies - Using physical inventory data, amounts of fertilizers, herbicides, mulch and other supplies needed for each area can be calculated. These costs can then be completed.

Machinery and Equipment - Use of the proper equipment can improve efficiency greatly. Equipment costs, however, must be included in total cost figures in proportion to their use.

In order to develop realistic figures on equipment costs it will be necessary to know or estimate equipment life in actual hours of use for each piece. Then original cost plus maintenance and repair costs can be divided by the total hours of useful life to yield an hourly cost. Fuel costs must also be added. More detailed explanations of methods for figuring equipment costs are included in the Park Maintenance Management Manual published by the

Pennsylvania Department of Community Affairs (3).

Total Annual Cost - An estimate of total annual maintenance costs is arrived at by adding labor, supply and equipment costs for the area in question.

Evaluation and Adjustments

Use of this approach for organizing landscape maintenance activity should result in an understanding between the maintenance staff and the park administration as to maintenance goals for various park units. If goals are not met several questions should be asked: 1) Are the goals reasonable from a horticultural and economic viewpoint? 2) Have sufficient resources in manpower and equipment been provided? 3) Is worker productivity up to expectation? 4) Are budget figures realistic?

If reduced funds necessitate cutting the maintenance budget, rational decisions can be made regarding cutbacks. For instance, designation of maintenance categories could be reconsidered for selected park areas. Use of the procedure described here for estimating annual labor requirements allows a comparison of costs at various levels. Alternatively, simplifying the design or eliminating certain high maintenance plantings might be appropriate.

A maintenance plan of the type described in this report is a starting point for improved management of park landscape resources. The next step should be the development of a computerized data base to store, analyze and update inventory and maintenance information. Such a system would facilitate preparation of reports and budgets as well as maintenance schedules.

In addition, by recording the maintenance history and performance of

landscape units or individual plants the system would provide valuable data for use in planning future plantings. However, an automated, or a manually operated, management system will only work if park administrators are committed to structuring, evaluating, and updating the system regularly in response to specific local needs.

LITERATURE CITED

1. Anonymous. April 1980. Maintenance Impact Statement Handbook. United States Department of the Interior Heritage Conservation and Recreation Service. Washington, D.C. 34 pp.
2. Anonymous. 1978. Manual of Site Management. Environmental Design Press. Reston, VA.
3. Anonymous. 1979. Park Maintenance Management Manual. Pennsylvania Department of Community Affairs Bureau of Recreation and Conservation. Technical Assistance Publication #18.
4. Van Dam, John, John W. Mamar and William W. Wood. 1981. Labor Requirement Analysis for Landscape Maintenance. Leaflet 2.232 Division of Agricultural Sciences, University of California.

APPENDIX A
GENERAL DESCRIPTION OF MAINTENANCE CATEGORIES

CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D
Highest quality, appropriate for entry ways, formal gardens, and areas of heavy passive use as well as formal playing fields.	Appropriate for areas of moderate to heavy use including general purpose athletic fields. Design should avoid formal elements.	Appropriate for areas of low use and informal design, remote from buildings.	Natural woodlands, field and meadows.
Plants well cared for and well groomed at all times.	Plants well cared for but not always groomed.	Basic plant health maintained.	Little or no maintenance required other than annual mowing of meadow areas.
Shrub beds appropriate.	Bedding of trees and shrubs appropriate.	Beds not appropriate, although informal groupings of low maintenance shrubs are.	
Annual and perennial bedding plants appropriate.	Low maintenance perennials are appropriate but annual bedding plants are not.	Flower beds not appropriate, however naturalized plantings of flowering bulbs or other herbaceous plants could be used.	
Specially trained plants such as formal hedges, espalier, topiary and pleaching may be included.	Specially trained plants should be limited to sheared hedges.	Specially trained plants not appropriate.	
Groundcovers appropriate where they will achieve desired design effects.	Groundcovers should be specially chosen for low maintenance requirements.	Only very low maintenance groundcovers should be used.	

APPENDIX B
INDEPENDENCE NATIONAL HISTORICAL PARK
LANDSCAPE MAINTENANCE CATEGORIES



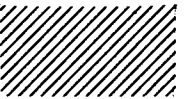
Category A

Bell Pavilion, central area
Independence Square
Franklin Court
Visitors' Center



Category B

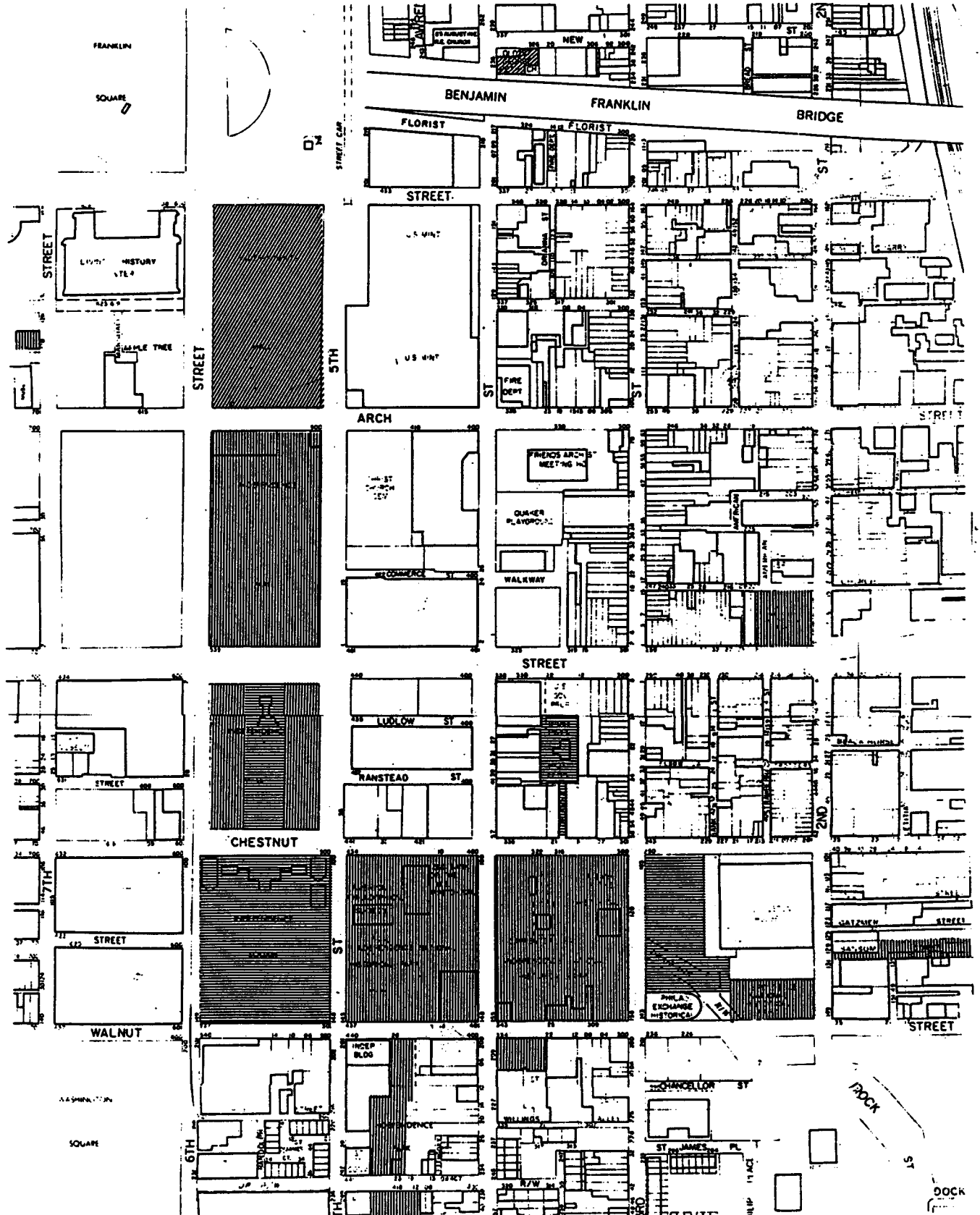
Second Bank Block
First Bank Block
Bell Pavilion Terraces
Second Block of Independence Mall
Graff House
Rose Garden
Magnolia Garden
City Tavern
Christ Church
Deshler Morris House
St. Joseph's Church
Poe House
Sansom Street Pedestrian Mall
Bishop White House



Category C

St. George's Church
Third Block of Independence Mall
Gloria Dei

APPENDIX B (continued)



APPENDIX C
TURF MAINTENANCE STANDARDS
INDEPENDENCE NATIONAL HISTORICAL PARK
1980

	CATEGORY A	CATEGORY B	CATEGORY C
Species Composition	Blend of 2 or more improved turf type fescues or blend of 2 or more improved ryegrasses, or blend of 4 or 5 varieties of Kentucky bluegrass.	Kentucky bluegrass or turf type ryegrass or fescue.	Mixture of native and introduced grasses.
Grass Height	No less than 2 1/2" or greater than 3 1/2".	No less than 2 1/2" or greater than 4".	No less than 3" or greater than 6".
Appearance	Dark green and growing from mid-March through November.	Green and growing from April to November.	Sufficient cover to prevent soil erosion.
Weeds	95% free of weeds. No individual weed patches to exceed 6" diameter.	80% free of weeds. No individual weed patches to exceed 12" diameter.	Free of noxious weeds.
Bare Spots	Not to exceed 5% of total area. No individual bare spot to exceed 6" diameter.	Not to exceed 20% of total area. No individual bare spot to exceed 12" diameter.	No spots over 10 ft. ² to remain over the winter.
Edges	Grass blades not to extend more than 3 1/2" from the edge of the root mat. Root mat not to extend more than 1 1/2" over the paving or other established edge line.	Grass blades not to extend more than 4" from the edge of the root mat. Root mat not to extend more than 2 1/2" over the paving or other established edge line.	Formal edges are not appropriate.
Fallen Leaves	Fallen leaves must not be allowed to obscure more than 50% of the turf area for more than one week. All fallen leaves to be removed prior to winter.	Fallen leaves must not be allowed to obscure more than 75% of the turf area for more than 10 days. All fallen leaves to be removed prior to winter.	Fallen leaves to be removed where they pose a threat to underlying vegetation.

APPENDIX D
 SHADE TREE MAINTENANCE STANDARDS
 INDEPENDENCE NATIONAL HISTORICAL PARK
 1980

	CATEGORY A	CATEGORY B	CATEGORY C
Trunk and Limbs*	Trees should be well-groomed.	Trees should be free of obvious defects.	Trees should be free of hazards and defects noticeable at a distance of 100' or more.
Deadwood*	None larger than 1/2" diameter.	None larger than 1 1/2" diameter.	None larger than 3" diameter.
Suckers and Water Sprouts*	None	None longer than 1'.	None longer than 3'.
Crossing Limbs*	None	None	None
V-Crotches*	Eliminated or strengthened with cables or braces.	Eliminated or strengthened with cables or braces.	Eliminated or strengthened with cables or braces if located near buildings or pedestrian passages.
Dead Trees	None	None	None remaining longer than 2 months.
Broken Branches or Stubs*	None	None larger than 2" diameter.	None larger than 3 1/2" diameter.
Clearance*	No branches below 10' height over pedestrian routes or 18' over roadways. Branches not to extend to within 6' of utility lines or building facades.	Same as A.	Same as A.
Root Zone	Mulch and other appropriate measures should be employed to reduce soil compaction.	Same as A.	Same as A.
Insect/Disease	Tree to remain of specimen quality. No pest problems which interfere with normal growth or appearance to be tolerated.	Plant should remain functional in the landscape and look green and moderately full.	Plant should remain functional in the landscape and be reasonably attractive from a distance of 100' or more.

APPENDIX D (continued)
 SHADE TREE MAINTENANCE STANDARDS
 INDEPENDENCE NATIONAL HISTORICAL PARK
 1980

	CATEGORY A	CATEGORY B	CATEGORY C
Foliage			
General Appearance	Healthy in appearance during the entire growing season.	Foliage should be generally green and healthy.	Same as B.
Color	Foliage color should be normal dark green.	Foliage color should be normal dark green.	Foliage color should be green with no obvious deficiency symptoms.
Insect/Disease	Foliage should be at least 90% free of insect or disease damage.	Foliage should be at least 80% free of insect or disease damage.	Life threatening levels of damage should be prevented.
Flowers	Maximum floral display every year.	Annual floral display.	Flowering desirable.

* Trees should be inspected before spring growth to determine how they meet these appearance criteria.

APPENDIX F

Tasks and Frequencies Necessary to Achieve Different Levels of Maintenance
INDEPENDENCE NATIONAL HISTORICAL PARK
1980

TASK	CATEGORY A	CATEGORY B	CATEGORY C
<u>LAWN</u>			
Mow	Weekly April 15-November 15	Every 9 Days April 15-November 15	Every 14 days May-November
Trim (weed eater)	Every other mowing	Every other mowing	NA
Trim (hand edger)	2x/year June, September	1x/year July	NA
Fertilize	3x/year April, June, November	2x/year May, November	1x/year November
Aerate	2x/year April, September	2x/year April, September	Spot treatment only when compaction becomes a problem.
Apply pre-emergent herbicide	2x/year May, June	1x/year May	NA
Apply post-emergent herbicide	2x/year June, September	1x/year June	Spot treatment only on noxious weed problems.
Remove fallen leaves	2x/week mid October-mid November	1x/week mid October-mid November	1x/year November
Irrigate	Weekly April-November (if needed)	Weekly April-November (if needed)	As necessary to establish grass on disturbed soils.
Reseed	2x/year April, August (if needed)	1x/year April or August (if needed)	As necessary to establish grass on disturbed soils.
<u>TREES</u>			
Remove dead or broken branches	As they occur	As they occur	1x/year Winter
Prune	1x/year Winter	1x/2 years, Winter	1x/3 years, Winter
Prune espalier	3x/year May, June, July	NA	NA
Fertilize	1x/year November	1x/2 years, November	1x/3 years, November
Mulch and Weed	2x/year May, July	1x/year June	1x/year June
Irrigate	Weekly May-October (if needed)	Weekly May-October (if needed)	During severe drought only.
Dormant oil spray	1x/year March	1x/year March	1x/year March
<u>SHRUBS</u>			
Prune	1x/year June	1x/year June	1x/year June
Prune hedges	2x/year June, August	1x/year July	1x/3 years, July
Mulch	2x/year May, July	1x/year May	1x/year May
Fertilize	1x/year November	1x/year November	1x/3 years, November
Irrigate	Weekly May-October (if needed)	Weekly May-October (if needed)	During severe drought only.
Winter protection (if req'd.)	2x/year December, January	2x/year December, January	Plant only winter hardy types.

APPENDIX F (continued)

Tasks and Frequences Necessary to Achieve Different Levels of Maintenance
INDEPENDENCE NATIONAL HISTORICAL PARK
1980

TASK	CATEGORY A	CATEGORY B	CATEGORY C
<u>GROUND COVER BEDS</u>			
Weed control (pre-emergent herbicide)	2x/year April, June	1x/year April	1x/year April
Trim edges	3x/year May, July, September	2x/year May, July	1x/year July
Fertilize	1x/year November	1x/year November	1x/2 years, November
Replant	1x/year April (if needed)	NA	NA
<u>FLOWER BEDS & CONTAINERS</u>			
Prepare soil/plant	2x/year May, September	2x/year May, September	NA
Weed	6x/year June, July, August	4x/year June, July, August	NA
Mulch	2x/year May, September	2x/year May, September	NA
Irrigate	2x/week May-October (if needed)	2x/week May-October (if needed)	NA
Final clean-up	1x/year November	1x/year November	NA
<u>PAVING</u>			
Weed control (herbicide)	2x/year May, August	1x/year July	1x/year July
Snow removal	As required, entire paved area	As required, single trails over existing paving	NA
Sweep	Weekly	2x/month	NA
<u>ENTIRE AREA</u>			
Litter pickup	Daily	2x/week	2x/month
Pest inspection*	Weekly April-mid November	Weekly April-mid November	Monthly May-October

* Inspection to detect presence of pest problems should be done regularly as specified. Pest control measures, however, should only be employed when and where necessary.

APPENDIX G
 PHYSICAL INVENTORY SUMMARY OF GARDEN AREAS
 IN INDEPENDENCE NATIONAL HISTORICAL PARK

	Lawn Area (sq. ft.)	Lawn Edges (feet)	Ground Cover Beds (sq. ft.)	Ground Cover Edge (feet)	Flower Display Bed (sq. ft.)	Shrub Bed (sq. ft.)	Trees	Paving (sq. ft.)
St. Joseph's	4,356	371	7,402	938	-0-	6,098	10	2,418
Magnolia Garden	3,040	247	3,720	569	-0-	3,720	25	3,570
Rose Garden	11,364	1,139	3,640	1,811	-0-	2,530	50	17,388
First Bank Block	92,416	4,028	14,891	1,057	1,313	6,523	193	27,974
Second Bank Block	70,964	3,972	10,194	1,421	-0-	14,473	159	45,997
Bishop White House	500	95	4,012	858	230	8,569	29	2,661
Franklin Court	2,605	550	1,286	610	-0-	196	28	18,580
Independence Square	100,400	4,877	600	250	-0-	6,475	92	44,121
Bell Pavilion	19,800	614	23,450	4,768	875	1,566	232	89,881
Mall-2nd Block	2,450	290	1,750	2,679	-0-	4,025	250	160,554
Mall-3rd Block	-0-	-0-	5,040	880	-0-	7,566	608	153,690
Christ Church	11,280	395	1,717	59	-0-	1,900	26	5,851
Gloria Dei	188,615	2,160	43	29	-0-	1,947	75	2,380
Deshler-Morris	16,800	1,589	*	918	*	16,800	25	1,930
Poe House	15,611	946	-0-	-0-	100	922	19	2,005
Graff House	-0-	-0-	193	43	78	657	14	1,623
Visitors Center	-0-	-0-	378	87	-0-	2,902	51	124,930
City Tavern	11,513	235	-0-	-0-	-0-	1,184	35	1,295
Sansom St Pedsn Mall	-0-	-0-	95	39	-0-	-0-	26	13,314
St. Georges	2,790	155	480	52	-0-	20	23	-0-
TOTAL	554,504	21,663	78,891	17,068	2,596	88,073	1,970	720,162

Note: Because of mixed plantings the shrub bed, ground cover, and flower bed area overlap in several garden areas.

* Included in shrub bed area.

APPENDIX H

PROPORTION OF PAVING, LAWN, AND ORNAMENTAL PLANTINGS
IN INDEPENDENCE NATIONAL HISTORICAL PARK

Estimated Park Acreage - 33.6 acres

<p>PAVING 16.8 acres (49.9%)</p>	<p>LAWN 12.9 Acres (38.4%)</p> <p>Shrubs, Ground Covers and Flower Beds - 3.9 Acres (11.7%)</p>
---	--

APPENDIX I

Labor Required to Maintain Franklin Court
at "A" Level

	Inventory	Hours Per Unit*	Time In Hours	Frequency												Yearly Frequency	Hours Per Year
				J	F	M	A	M	J	J	A	S	O	N	D		
LAWNS																	
Mowing	2605 ft ²	.67/1000 ft ²	1.7				3	4	4	4	5	4	4	3		31	52.7
Trim (weed eater)	550 ft	.40/1000 ft	0.2				1	2	2	2	2	2	2	2		15	3.0
Trim (hand edger)	550 ft	2/1000 ft	1.1						1			1				2	2.2
Pre-emergent herbicide	2605 ft ²	.67/1000 ft ²	1.7				1		1							2	3.4
Post-emergent herbicide	2605 ft ²	.67/1000 ft ²	1.7						1		1					2	3.4
Fertilize (cyclone spreader)	2605 ft ²	.25/1000 ft ²	0.7						1		1		1			3	2.1
Aeration	2605 ft ²	.67/1000 ft ²	1.7					1			1					2	3.5
Rake	2605 ft ²	.34/1000 ft ²	0.9										4	4		8	7.2
GROUND COVER BEDS																	
Pre-emergent herbicide	1286 ft ²	.3/1000 ft ²	0.4						1			1				2	0.8
Fertilize	1286 ft ²	.3/1000 ft ²	0.4					1								1	0.4
Trim Ground Cover Edge	610 ft	3/1000 ft	1.8					1		1		1				3	5.4
SHRUBS																	
Prune	12 plants	.2/plant	2.4							1						1	2.4
Trim Hedges	250 ft	1/50 ft	5.0							1		1				2	10.0
Mulch	196 ft ²	.5/1000 ft ²	0.1					1			1					2	0.2
Fertilize	196 ft ²	.25/1000 ft ²	0.1					1								1	0.1
Apply Winter Protection**	6 plants	.15/tree	0.9						1							1	1.8
TREES																	
Prune	23 trees	.25/tree	5.8													1	5.8
Prune Espalier	5 trees	.25/tree	1.3					1	1	1						3	3.9
Fertilize (soil injection)	28 trees	.25/tree	7.0					1								1	7.0
Mulch and Weed	28 trees	.08/tree	2.3						1			1				2	4.6
Spray with Dormant Oil	28 trees	.04/tree	1.1					1								1	1.1
FLOWER BEDS AND CONTAINERS																	
Soil Preparation & Planting	76 ft ²	1/100 ft ²	0.8						1			1				2	1.6
Mulch	76 ft ²	.3/100 ft ²	0.3						1			1				2	0.6
Weed Control (hand)	76 ft ²	.3/100 ft ²	0.3						1	1	1	1	1	1		6	1.8
Fall Clean Up	76 ft ²	.5/100 ft ²	0.4												1	1	0.4

APPENDIX I (continued)

Labor Required to Maintain Franklin Court
at "B" Level

	Inventory	Hours Per Unit*	Time In Hours	Frequency												Yearly Frequency	Hours Per Year
				J	F	M	A	M	J	J	A	S	O	N	D		
LAWNS																	
Mowing	2605 ft ²	.67/1000 ft ²	1.7				2	3	4	3	3	4	3	3		25	42.5
Trim (weed eater)	550 ft	.40/1000 ft	0.2				1	2	2	2	1	2	2	1		13	2.6
Trim (hand edger)	550 ft	2/1000 ft	1.1						1							1	1.1
Pre-emergent herbicide	2605 ft ²	.67/1000 ft ²	1.7				1									1	1.7
Post-emergent herbicide	2605 ft ²	.67/1000 ft ²	1.7						1							1	1.7
Fertilize (cyclone spreader)	2605 ft ²	.25/1000 ft ²	0.7				1					1				2	1.4
Aeration	2605 ft ²	.67/1000 ft ²	1.7					1				1				2	3.4
Rake	2605 ft ²	.34/1000 ft ²	0.9										2	2		4	3.6
GROUND COVER BEDS																	
Pre-emergent herbicide	1286 ft ²	.3/1000 ft ²	0.4				1									1	0.4
Fertilize	1286 ft ²	.3/1000 ft ²	0.4				1									1	0.4
Trim Ground Cover Edge	610 ft	3/1000 ft ²	1.8						1			1				2	3.6
SHRUBS																	
Prune	12 plants	.2/plant	2.4						1							1	2.4
Trim Hedges	250 ft	1/50 ft	5.0						1							1	5.0
Mulch	196 ft ²	.5/1000 ft ²	0.1				1									1	0.1
Fertilize	196 ft ²	.25/1000 ft ²	0.1				1									1	0.1
Apply Winter Protection**	6 plants	.15/plant	0.9					1							1	2	1.8
TREES																	
Prune	23 trees	.25/tree	5.8												1	1	5.8
Prune Espalier	5 trees	.25/tree	1.3				1	1	1							3	3.9
Fertilize (soil injection)	28 trees	.25/tree	7.0												.5	.5	3.5
Mulch and Weed	28 trees	.08/tree	2.3				1									1	2.3
Spray with Dormant Oil	28 trees	.04/tree	1.1				1									1	1.1
FLOWER BEDS AND CONTAINERS																	
Soil Preparation & Planting	76 ft ²	1/100 ft ²	0.8					1				1				2	1.6
Mulch	76 ft ²	.3/100 ft ²	0.3					1				1				2	0.6
Weed Control (hand)	76 ft ²	.3/100 ft ²	0.3						1	1	1	1				4	1.2
Fall Clean Up	76 ft ²	.5/100 ft ²	0.4											1		1	0.4

APPENDIX J

MAINTENANCE RECORD
WEEK OF _____

AREA _____

	NUMBER OF PEOPLE	TOTAL HOURS	EQUIPMENT USED		NUMBER OF PEOPLE	TOTAL HOURS	EQUIPMENT USED
<u>LAWNS</u>				<u>SHADE TREES</u>			
Cut				Removal			
Edge				Prune			
Fertilize				Mulch			
Pest Control				Fertilize			
Herbicide				Pest Control			
Aerate				<u>YINES</u>			
Renovate				Prune/Train			
<u>GROUND COVERS</u>				Mulch			
Trim Edges				Fertilize			
Weed				Pest Control			
Fertilize				<u>CONTAINERS</u>			
Pest Control				Plant			
<u>HEDGES</u>				Water			
Prune				Fertilize			
Mulch				Pest Control			
Fertilize				<u>FLOWER BEDS</u>			
Pest Control				Soil Preparation			
<u>SHRUBS</u>				Plant			
Prune				Weed			
Mulch				Water			
Fertilize				Pest Control			
Pest Control				<u>PAVING</u>			
				Trash Clean Up			
				Weed Control			
				Snow Removal			