

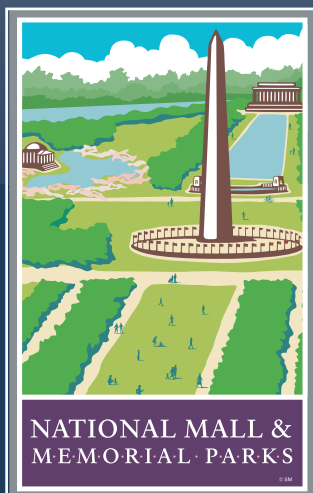


THE NATIONAL MALL

1997
THE LEGACY PLAN

1901
MCMILLAN PLAN

1791
L'ENFANT PLAN



**Best Management Practices Used
at Designed Landscapes in Washington D.C.**
A Background Report for the National Mall Plan
March 2007

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National Park Service
U.S. Department of the Interior

National Mall & Memorial Parks
Washington, D.C.



**BEST MANAGEMENT PRACTICES USED
AT DESIGNED LANDSCAPES IN WASHINGTON, D.C.**

A Background Report for the National Mall Plan

March 2007

Unless otherwise credited, all photographs are by Lindsay J. Kordis.

SUMMARY

The National Mall & Memorial Parks conducted a study during summer 2006 to learn about best maintenance practices used by professional grounds managers at nine designed landscapes in Washington, D.C. The purpose of the study was to collect information that could be used in the development of a National Mall plan.

The study found a correlation between attractive designed local landscapes and well-organized and trained groundskeeping departments that understood the designs' intention and were committed to fulfilling that intention in order to create places of beauty. Designers at these local landscapes also thoughtfully incorporated and integrated design details to establish a sense of place and/or an organizational identity, to better accommodate modern use patterns and intensities, to improve the security and public safety of visitors, to encourage positive visitor behavior, to conserve materials, and to ease maintenance practices. Maintenance practices, staff organization, and design details that were common throughout the case studies or that seemed particularly innovative are summarized thematically below and are explained in more detail in the study.

DESIGN APPROACH AND PLANNING

- *Create a sense of place.* Designed landscapes need identity. The use of logos, coordinated site furnishings, signs, uniforms, etc. help create a sense of place and set a quality and design standard that reinforces positive behavior and cleanliness.
- *Show that quality counts.* Quality materials and detailing elevate the experience and provide psychological indicators for positive behavior.
- *Pave pathways and landings to absorb greater levels of pedestrian traffic.* Hard surfaces under benches, trash receptacles, and other street furniture reduce impacts, and users usually treat quality paving and other materials better.
- *Design edge treatments to conserve resources and control pedestrian movement.* Edges need to control loose aggregate and granular materials so that they do not migrate into drainage grates, paved walkways, and turf areas. Curbing, post-and-chain fencing, low retaining walls, and other forms of edge treatment delineate turf areas or planting beds from pathways, deter short-cutting, and encourage visitors to stay on designated pathways.
- *Plan for events by designating areas for certain types of uses.* Regularly spaced, permanent footings or eye bolts can be hidden within edge treatments to take the place of tent stakes. Irrigation systems should be designed so that line placement is not compromised or damaged by expected uses.
- *Use subtle but effective design solutions for security precautions.* Gates, bollards, and fencing can be attractive and support the identity of the designed landscape. Several organizations use their logo on these elements to contribute to a sense of place.
- *Gates can suggest a threshold, transitioning visitors' into a protected reserve.* Gates provide both psychological and physical entries, transforming visitor experiences and resulting in more positive behavior.
- *Specify plants that will thrive in the designed landscape.* Plants and landscape maintenance can address public safety and security concerns. Plant growth characteristics should be considered so that areas are clearly visible and places that may be conducive to illicit behavior are limited.
- *Fine gardening sets a tone of expectation for visitor conduct.* Visitor behavior is usually different in designed landscapes that define themselves as outdoor museums, plant col-

lections, or gardens for touring, not for recreation or sporting use.

- *Use attractive signs, with easy to understand messages, to educate visitors.* Educational and/or interpretive signs set a higher standard of behavior. Use prominently placed visitor rules of behaviors to encourage desired and appropriate visitor conduct.
- Encourage visitor stewardship. Using language on signs that builds public support will encourage positive visitor behavior, making maintenance and higher standards easier to achieve. Involving the public in activities such as planting, volunteering, and cleanup helps create user ownership.
- *Make it Clean and Green.* Understand the importance of environmental consciousness. “Clean and Green” messaging helps communicate organizational attitudes toward sustainability and the environment. Designed landscapes that are “green” are often safer, cleaner and healthier for everyone.

ACCESS AND EVENT MANAGEMENT

- *Control visitor impacts through reasonable limitations.* Limiting hours, access locations by means of gates and decorative fences, and the number of events all help reduce impacts and protect the landscape.
- *Assign events to areas that are in optimal condition and/or that can better absorb related impacts.*

MAINTENANCE PRACTICES

- *Use written landscape standards to provide clear, understandable goals for groundskeepers.*
- *Ensure that staff members understand the design intent of the designed landscape and the important characteristics or contributing elements worthy of preservation.* Groundskeepers can exercise their creativity through landscape elements — such as the choice of replacement plant materials within historic landscapes that will not compromise the integrity of the designed landscape.

- *Maintain proactively and keep it clean.* Promptly removing gum and all visible trash contributes to a “cared for” appearance and makes maintenance of the designed landscape easier.
- *Use quick response teams to quickly respond to maintenance needs.* This is a cost-effective way of addressing immediate needs, resulting in long-term savings by catching problems before they become more serious.

Staff Organization

- *Develop an Effective Staffing Model:* Use a model that works for the organization.
- *Use educated and experienced staff members; they are vital to success.* Management must be committed to continuous education of staff members. Training helps foster a sense of ownership and commitment. Cross-training with other groups and organizations can increase skills and allows best practices to be shared.
- *Foster staff pride in a job well-done.* Assigning staff by geographic zones can help create a sense of ownership and stewardship among staff members because they feel committed to the designed landscape and to the organization. Regular peer inspections and positive reinforcement help keep maintenance standards high and verify if landscape standards are being achieved.
- *Write down landscape standards and criteria.* Using clear and understandable goals, as well as monthly calendars and checklists, can help track work, approve changes, and improve performance.

Outsourced Work

- *Use outsourcing to enable an organization to focus on achieving defined standards and to allow the development of technical skills and site-specific expertise.* Snow removal, trash removal, and mowing are the most commonly outsourced maintenance activities at many sites.

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INTRODUCTION

BACKGROUND

The National Mall is one of the most significant designed cultural landscapes in the United States — a living part of our heritage. Its physical design and iconic architecture have become emblematic of our nation, and its appearance should reflect its value. Managed by the National Park Service (NPS) through the National Mall & Memorial Parks, the National Mall welcomes more than 25 million visitors annually who come to commemorate, contemplate, celebrate, demonstrate, and recreate in this great civic space. However, there are no clear guidelines for how to meet conflicting demands for extensive public use while at the same time maintaining a national space worthy of the American people, and achieving this balancing is critical to the future of the National Mall. Without an affordable yet effective plan for year-round operations and maintenance, the promise of the National Mall's original design intent cannot be sustained.

This local best practices study is being conducted as part of the effort to develop a National Mall plan, which is intended to set a 50-year vision framework for the preservation of this evolving historic landscape. The local study will complement a national and international best practices study that has been prepared by the Center for Park Management and that focuses more on managing intensively used landscapes to higher standards.

PURPOSE

The purpose of the study is to learn about best practices from nine designed landscapes in the Washington, D.C., metropolitan area to see if the practices used at these sites might be applicable to areas of the National Mall. The nine sites are

American University
Dumbarton Oaks
George Washington University

National Gallery of Art Sculpture Garden
Smithsonian Institution Gardens
U.S. Botanic Garden
U.S. Capitol Grounds
U.S. National Arboretum
Washington National Cathedral

The intent is to identify industry standards or benchmarks that reflect the correlation between exemplary public landscapes and thoughtful solutions, efficient grounds-keeping operations, and effective personnel organization. These benchmarks will assist the National Park Service in determining acceptable landscape standards for the National Mall.

METHODOLOGY AND CASE STUDIES

The nine case studies were conducted through surveys, interviews, online research, and site visits to examine design solutions, along with operational, organizational, and other grounds maintenance practices. Identical questionnaires were given to groundskeepers at the beginning of the study process, and the level of information that was provided varied as respondents chose to focus on different aspects of their operations. Design details were noted, recorded, and photographed during site visits.

The case studies were chosen because they share some or all of the following characteristics with the National Mall:

- designed historic landscapes
- outdoor public spaces
- similar size
- similar composition (in terms of trees and lawn)
- similar climate
- hosting of large public events

- need to continuously meet high expectations from the public

These shared characteristics are highlighted in Table 1.

STRUCTURE OF REPORT

The best practices for each case study covered in this report for groundskeeping operations include design details that help make that landscape easier to maintain and that ultimately fulfill the landscape’s design intent, along with staff organization, training, out-sourced work, and maintenance practices.

Design Approach and Planning

To ensure that the designer’s intent for a landscape is fulfilled, the design must consider groundskeeping operations. Simple and often integrated design details can make maintenance procedures easier to perform and ultimately help a landscape look better. Design details can also address security and public safety concerns, and help control visitor circulation within a site by delineating horticultural and pedestrian spaces. Design details, such as edge treatments, can help conserve plant materials and protect resources, such as irrigation heads. Subtle detailing can even imply expected visitor behavior, which may help reduce normal visitor impacts and prevent damage to the landscape. Landscape designers need to consider how a site will be maintained and to incorporate details that make fulfilling the design intent more feasible.

Maintenance

High-quality groundskeeping is critical to the success of public landscapes. Verdant and healthy-looking public landscapes encourage use by giving visitors a sense of belonging and community and by offering them a sense of security and safety, according to the Project for Public Spaces (2006). Conversely, less well-maintained public places feel abandoned, causing visitors to feel threatened or in danger, discouraging use, and potentially fostering inappropriate and illicit activities, such as vandalism or graffiti.

Good groundskeeping practices include more than just cutting lawns, pruning trees and shrubs, weeding flower beds, and carefully storing equipment. The Urban Land Institute notes that “pleasant, well-trained, and uniformed maintenance staff and park officials in clearly marked vehicles create a sense of careful oversight. Rigorous enforcement of rules . . . cuts off disorder at the lowest level, discouraging the potential for violent crime. Clean restrooms, regular trash removal, and prompt repair of broken equipment are important factors in making a good impression” (Myerson 2006). Efficient groundskeeping procedures, regular maintenance schedules, landscape standards, and the evaluation of landscape performance against those standards are all equally important factors that can contribute to the success of public landscapes.

Table 1: Shared Characteristics of Case Studies with the National Mall

Case Studies	Designed Historic Landscape	Outdoor Public Space	Similar Size	Similar Composition	Similar Climate	Hosting of Large Public Events	Need to Meet High Public Expectations
American University		•			•	•	•
Dumbarton Oaks	•	•			•		•
George Washington University		•			•	•	•
National Gallery of Art Sculpture Garden		•			•		•
Smithsonian Institution Gardens		•			•		•
U.S. Capitol Grounds	•	•	•	•	•	•	•
U.S. Botanic Garden		•			•		•
U.S. National Arboretum	•	•	•	•	•		•
Washington National Cathedral	•	•		•	•	•	•



- 1 American University
- 2 Dumbarton Oaks
- 3 George Washington University
- 4 National Gallery of Art Sculpture Garden
- 5 Smithsonian Institution
- 6 U.S. Botanic Garden
- 7 U.S. Capitol Grounds
- 8 U.S. National Arboretum
- 9 Washington National Cathedral

**Designed Landscapes
Case Study Sites
Washington, D.C.**

AMERICAN UNIVERSITY

American University, a private facility in northwest Washington, consists of 85 acres of turf areas, including sports fields, planting beds, asphalt roads and walkways, and concrete walkways.

BEST PRACTICES

- Quality paving materials emphasize a certain level of care and subtly indicate how visitors are expected to behave.
- Events are limited in size.
- A geographic zoning approach, with personnel assigned to each zone, fosters a greater sense of ownership among staff.
- A flexible approach toward projects that require extra staff, such as snow removal, offers opportunities for teamwork and for zone teams to exchange maintenance methods.
- Nontoxic products are used in high-traffic areas and where students are in close contact with the landscaping.
- Labor-consuming maintenance activities, such as mowing, are contracted out, allowing staff time for more technical maintenance activities, such as horticulture.
- The personnel system establishes visible career paths and allows for promotion and upward mobility.
- Written landscape standards track completion and evaluate the quality of maintenance activities. The standards are simple and straightforward, emphasizing results, not how the results are achieved.

DESIGN APPROACH AND PLANNING

The university's master plan calls for a more pedestrian-friendly campus through the use of different paving materials. Some asphalt and concrete areas within the Quad, the cen-



Landscaping at American University's main entrance welcomes visitors to the campus.

tral non-sporting turf area on the campus, have already been replaced with a diverse palette of paving materials more amenable to pedestrian use. The new quality materials signify a certain quality of care by the maintenance division and other university staff and imply a visitor code of conduct, subliminally indicating how visitors are expected to behave. Total removal of asphalt and concrete throughout the campus is one of the master plan's ultimate goals.

Mark Feist, assistant director of facilities management for the university's Grounds Maintenance, Vehicles, and Support Services Division, says the maintenance team members have a very inclusive approach to their work, collaborating with landscape architects within the Office of the University Architect and other university environmental committees concerned with master planning and other place-making efforts for the campus.

ACCESS AND EVENT MANAGEMENT

Pedestrian movement is unrestricted, while vehicular access is controlled by means of security bollards placed throughout the campus.

Events are limited to university-sponsored activities, although special exceptions are occasionally extended to outside groups. Events can range from small, intimate wedding ceremonies to highly attended sporting events. A formal approval process is used to control events. Most events occur on turf areas.

MAINTENANCE

Staff Organization

American University employs 26 general and specialized full-time staff for normal maintenance. Feist has organized the staff into six geographic zones, each led by a grounds maintenance supervisor. Staff members, including the designated supervisors, perform normal groundskeeping activities for their zone (i.e., preparing planting beds, mulching, watering, fertilizing, weeding, inspecting irrigation systems, and removing trash). Staff members who work in the sports field zone are primarily responsible for turf maintenance and recovery, but they also maintain a tree grove picnic area and some decorative planting beds. A grounds clean-up and recycling supervisor oversees several recycling associates.

Feist, who has managed the division for the last 10 years, explains that the geographic zoning approach to personnel organization seems to foster a greater sense of ownership

among staff. Work locations, however, may change throughout the year depending on specific needs. For example, staff from several zones may work together to remove leaves throughout the fall, plant flowering annuals in late spring, or prepare for special events throughout the year. Feist's flexible approach toward projects that require extra staff, such as snow removal, offers opportunities for teamwork and the exchange of maintenance methods between zone teams.

American University's maintenance division also provides advancement opportunities for employees. Grounds maintenance supervisors in each zone are required to possess special certifications (specifically, CLT-E (PLANET), DC Class 7-B, and DC pesticide certification), and they are given 18 months to complete the certification requirements, with support from the university. A certified irrigation technician and a grounds maintenance coordinator are also members of the maintenance division. The irrigation technician is a specialist, while the grounds maintenance coordinator administers contractors (e.g., pesticide and mowing contracts) and acts as a resource person for purchasing needs.

Such a personnel system establishes visible career paths and suggests a maintenance division where promotion and upward mobility are possible. Feist has been working with staff members to develop individual devel-



A variety of materials are used on the university's Quad.





The campus features horticultural planting beds and container gardening.



opment plans over the last seven years. These plans emphasize the need for on-the-job and external training. Feist ensures that staff grow professionally through training opportunities that help build skill levels.

Training

In addition to attending seminars and training hosted by the Professional Grounds Management Society (PGMS) and other industry organizations, the university hosts two annual training sessions for area grounds maintenance professionals on the campus. PGMS and the Northern Virginia Nurserymen's Association co-sponsor the first training event, a large outdoor field day attended by 300–400 professionals. The day features roughly 20 maintenance sessions that include, among other topics, a perennial walk, insect identification, and weed identification.

Feist points out that his staff members are motivated to work hard and attend trainings by the sheer anticipation of the annual field day; they want to ensure that the university's landscape really "shines" and that they remain knowledgeable about maintenance best practices. The second annual training event, the DC Cooperative Extensive Service Pesticide Training, is led by university maintenance staff members. Finally, the campus has been established as an arboretum. One of the requirements for such a designation involves

providing educational opportunities, such as arboretum tours, to the larger community.

Outsourced Work

Labor-consuming maintenance activities, such as mowing, are contracted out, allowing time for more technical maintenance activities, such as horticulture. Other outsourced work includes tree work, pest control, asphalt and concrete repair, and supplemental temporary labor. Feist notes that his maintenance team simply cannot compete with external contractors on some maintenance activities. For example, planting beds have been purposefully increased in size both to save money and to fulfill the university's vision of an urban campus with distinct horticultural elements. Larger planting beds require more labor, so rather than hiring more staff, Feist has redistributed resources by assigning staff to care for the planting beds rather than mowing turf areas.

Maintenance Practices

The maintenance division is trying to incorporate more sustainable approaches as horticultural elements increase around the campus. The maintenance team has moved away from rotating annual plantings and has increasingly added more perennial plantings. Feist mentioned the Knockout Rose, in particular, for its brilliant color and general re-

sistance to pests and disease. Feist also mentioned that in the fall of 2006 organic herbicides would be tested on the Quad. Though organic products are more expensive, Feist says that it is critical that non-toxic products be used in high-traffic areas and where students are sitting and laying around.

The division also collaborates with the university's Environmental Issues Committee on issues of sustainability. The two groups developed a logo for service vehicles to emphasize the university's and the maintenance division's commitment to sustainable maintenance practices. The maintenance golf cart displays the logo and the university's eagle mascot in green with following slogan, "The American Dream is Green." The logo establishes the maintenance division's presence on campus and highlights its commitment to caring for the environment.

Feist along with the zone supervisors collectively developed several written documents to track completion and evaluate the quality of in-house maintenance activities.

First, the manager and supervisors have created a monthly maintenance calendar, which reminds staff of everything from when pesticide licenses should be renewed, perennials cut back, equipment prepared, and planting beds fertilized to external staff training sessions, federal holidays, and zone inspections. The manager notes the completion date for each activity on the calendar.

Second, Feist and the supervisors have developed a list of landscape standards for each zone, which doubles as a peer zone inspection sheet. The landscape standards focus on general groundskeeping activities and plant care. Standards include

- Grounds are free of litter.
- Turf/lawn areas are weed-free and in good appearance.

Examples of standards related to plant material care include

- Plants are disease and insect free.
- Dead or yellowing foliage is removed.

The landscape standards are *not* meant to be prescriptive, dictating how the landscape standards are achieved. Instead, the standards focus on results and are described in simple, straightforward terms. For example, the planting bed has been weeded, *not* on how it was accomplished (e.g., whether pre-emergent herbicides were applied, hand weeding was done, or various weeding tools were used to eliminate weeds).

In addition to determining how the grounds should look, the landscape standards are used as zone and individual performance indicators for each of the six zones. Inspections across the six zones are conducted three times a year by a random group of fellow maintenance staff, ranging from supervisors to groundskeepers. This approach allows for more constructive feedback and gives staff plenty of time to resolve problem areas within each zone. Feist notes that "this process has been successful through placing special emphasis on the positive rather than creating a 'got ya' approach."

According to Feist, documents help track improvement, reflect what was felt or what decisions were reached, and act as a tool for checking progress. Measuring quality and improvement quantitatively has proven dif-



The logo on the maintenance vehicle emphasizes sustainable practices.

difficult, but the written documents have allowed the division to change its approach to campus clean-up (e.g., trash removal, sweeping). Previously, the division convened in the morning and worked together to clean the campus. Now, a specially organized clean-up crew is responsible for this task. Feist tracked the hours of labor required by both approaches and determined that 50% of labor hours were saved by the organized team approach. Over the next few years, Feist is hoping that the various written documents will track changes in quality levels, revealing how certain levels of quality for different maintenance activities were achieved.

The development of effective document maintenance procedures has ensured efficient and successful maintenance operations, while an emphasis on team building,

peer reviews, and corporate culture has helped strengthen staff work ethics, foster pride in work, and retain staff.

The maintenance division is also dedicated to involving the larger academic community in caring for their university environment. The maintenance division prepares 15 small landscaping projects for student and faculty volunteers to accomplish during the annual Campus Beautification Day.

On return visits to the university campus, Feist has heard alumni say to family members “that they planted that shrub or helped to create that garden.” Feist believes that these types of campus gardening projects bring the academic community together, fostering a sense of ownership over the campus environment.

DUMBARTON OAKS

The gardens at Dumbarton Oaks, located in northwest Washington, consist of 16 acres of historic landscape designed by Beatrix Farrand. Designed for the Bliss family in the early 20th century, the private residential gardens include a series of formally landscaped terraces and slopes that feature traditional European gardening elements and plantings to provide color and interest in the spring and autumn. According to the website, Dumbarton Oaks also contains a series of garden rooms, or outdoor living spaces, such as tennis courts, lawn play areas, a swimming pool, and hardscaped areas suitable for “family use or for entertaining.” The gardens were conveyed to Harvard University in 1940 to establish the Dumbarton Oaks Research Library and Collection, and endowments were established expressly for the purpose of maintaining the gardens and for supporting a program of research in landscape architecture.

BEST PRACTICES

- The design of the garden suggests and encourages quiet, reflective visitor behavior.
- The edge of planting beds are defined to protect irrigation heads, retain soil, prevent invasive grass from rooting, and keep visitors out of planting beds.



Fountain Terrace.

Dumbarton Oaks Research Library & Collection,
Washington, D.C.



South-facing front lawn.

Dumbarton Oaks Research Library & Collection,
Washington, D.C.



North-facing terraced backyard.

Dumbarton Oaks Research Library & Collection,
Washington, D.C.

- The maintenance staff is organized by zones, which takes advantage of staff members’ interests and supports developing professional and personal gardening interests.
- On-the-job training is key to successfully preserving the historic design and maintaining the health and attractiveness of the gardens.
- It is important to maintain a good balance between staff who possess experience-based knowledge and those with academic-based knowledge.



Dumbarton Oaks Research Library & Collection, Washington, D.C.



Dumbarton Oaks Research Library & Collection, Washington, D.C.

Different types of borders are used in the Rose Garden (left) and the Herb Garden (right).

DESIGN APPROACH AND PLANNING

Dumbarton Oaks features fine gardening within gated, private residential grounds. The nature of the gardens is one of sensory delight experienced during a leisurely visit. The narrow walkways are paved with a variety of quality materials and encourage slow strolls. Landings throughout the terraced gardens are largely paved with materials to absorb visitor impacts; visitors are meant to pause in these spaces to admire a vista or perennial bed. The entire atmosphere of the garden suggests and encourages quiet, reflective visitor behavior.

Similar to design features used at other designed landscapes, Dumbarton Oaks defines the edge of planting beds to protect irrigation heads, retain soil, prevent invasive grass from rooting, and keep visitors out of planting beds.

ACCESS AND EVENT MANAGEMENT

Public access is restricted to afternoons from mid-March to the end of October, when an admission fee is charged and pedestrian access is controlled by security personnel. During other months pedestrians can enter freely between 2 p.m. and 5 p.m. Only authorized vehicles are allowed to enter the property at any time.

No external events are permitted, although the research institution stages events as part of its academic activities.



Various paving materials add interest to the overall garden design.

MAINTENANCE

Staff Organization

According to Gail Griffin, the director of gardens, 12 full-time gardeners and specialists maintain the formal gardens. Gardeners are organized into three crews that work in specific areas, or zones, of the garden. The senior gardener supervises a varying number of gardeners within each crew; the size of crews largely depends on the intensity of labor required in each garden zone, as well as the gardeners' own professional interests and experience. For example, one senior gardener has developed in-depth knowledge of the pool and fountain mechanics over a 38-year career and prefers to work in a zone with such features rather than in a fine gardening zone. According to Griffin, the zone organization takes advantage of her staff members' interests and supports developing professional and personal gardening interests. One staff member, "a floater," works within all the zones as projects that require additional resources arise.

Training

On-the-job training seems to be the key to successfully preserving the historic design and maintaining the health and attractiveness of the gardens. Griffin referenced the "pure Farrand impression" that the gardens seem to possess, according to one garden history scholar. New staff members learn from older gardeners, who had learned from the successor to the original designer and maintenance team. Staff members tend to stay at the gardens, passing knowledge down and helping the gardens remain intact.

Staff members also attend external trainings, including annual attendance at day-long training courses offered locally. Griffin referenced one such external training at the University of Maryland. She also said that the turf manager and the integrated pest manager have completed week-long courses at local universities.



Planting bed edged to protect irrigation head and retain soil.

Outsourced Work

Tree removal, conservation of hardscapes (i.e., the tiled pool, different architectural features within the gardens), brick masonry, and ironwork are all outsourced to external companies or consultants.

Maintenance Practices

Staff members have diverse backgrounds. All are experienced, and Griffin noted that the division between titles (i.e., horticulturalist or gardener) was "artificial" because there are horticulturalists with just associate degrees and gardeners with 40 years of experience. Griffin stressed the importance of maintaining a good balance between staff who possess experience-based knowledge and those with academic-based knowledge.

Griffin keeps a basic maintenance calendar. Planning is relatively informal and involves selecting plants when they are in season to use the following year. Staff members maintain the structural integrity of Farrand's design by adhering to the original color schemes. Since Farrand did not list plant specifications, staff members permit themselves some creative license and choose the plants they want to include in the gardens.

Dumbarton Oaks tries to use as many "organic" or "green" products as possible. She also noted a weather station and greenhouse on site.

GEORGE WASHINGTON UNIVERSITY

George Washington University, a private educational facility covering 22 inner city blocks in northwest Washington, is comprised of open turf lawns for impromptu activities and designed gardens, such as the rose garden, for quiet reflection (Gasparin 1997).*

BEST PRACTICES

- To create a sense of identity, the university's colors, name, or logo appears on everything — street benches, trash receptacles, orientation signs, gates, banners, and even maintenance vehicles.
- Since security is a major concern, emergency call towers have been installed, and trees and shrubs are pruned to allow for a clear line of sight.
- Annual color rotation is an important design element and helps establish a sense of identity, or place, for the campus.
- Staff members are assigned to geographic zones around the campus and are given their own areas of responsibility, imparting feelings of “ownership.”
- As employees become familiar with their zones, they are encouraged to use their own judgment, initiative, and experience in daily and seasonal maintenance.

DESIGN APPROACH AND PLANNING

George Washington University is an open, inner city campus environment. The geographic perimeter is difficult to define; nevertheless, it is clear when one is entering and

* Information in this case study is based on “George Washington University,” by Noel J. Gasparin, *Grounds Maintenance* (Mar. 1, 1997). Available at <http://grounds-mag.com/mag/grounds_maintenance_george_washington_university/index.html>.



George Washington University Yard



Kogan Plaza

leaving the campus. The university colors, name, or logo appears on everything — street benches, trash receptacles, orientation signs, gates, banners, and even maintenance vehicles. Student names and graduation year are imprinted into brick pavers in Kogan Plaza, which helps foster a sense of place, ownership, and ultimately stewardship for current students and alumni. Since security is a major concern, emergency call towers have been installed, and trees and shrubs are pruned to allow for a clear line of sight. Security bollards are used to separate and control vehicular and pedestrian circulation.



Outdoor garden rooms and raised planting beds filled with blooming flowers help create an urban oasis.



According to Noel Gasparin, the Grounds Department manager, the gardens are designed for quiet reflection and landscapes with as much open space as possible for impromptu activities and other student diversions. These open spaces are either open turf areas with well-defined paved walkways, such as University Yard, or paved outdoor garden rooms, such as Kogan Plaza.

Like many of the other case study areas, edge treatments are carefully considered. Post-and-chain fences in university colors and evergreen hedges are two methods to separate planting areas from walkways.

Annual color rotation is an important design element and helps establish a sense of identity, or place, for the campus. Gasparin selects and obtains 4,500 fall annuals, 25,000 bulbs, and 10,000 summer annuals for planting. However, “much of the landscape relies on perennial beds, including coreopsis, rudbeckia, hostas, echinacea, and a variety of ornamental grasses” (Gasparin 1997).

ACCESS AND EVENT MANAGEMENT

Pedestrian movement is unrestricted throughout the campus. Security bollards are used to restrict vehicular access on pedestrian walkways.

Various university-sponsored activities and externally sponsored events occur through-

out the campus grounds, including commencement exercises, concerts, protests, and art festivals. Organizations holding events are responsible for the cost of any damage to the site, according to Gasparin.



Post-and-chain fencing in university colors and evergreen hedges delineate spaces.

MAINTENANCE

Staff Organization

The Grounds Department at George Washington University is comprised of 23 full-time employees, with a manager, two foremen, and 20 staff members (gardeners/equipment operators, general landscape workers pest control operators, a street sweeper, and a mechanic).

Staff members are assigned to geographic zones around the campus and given their own areas of responsibility. This organization of personnel imparts feelings of “ownership,” according to Gasparin.

No interns assist the Grounds Department. Several community volunteers assist with the campus rose gardens.

Training

According to Gasparin, “training is important to the department” and occurs in a variety of ways in the field. Staff members may be given a “hands-on demonstration on pruning roses, a lecture and hand out on fertilizers and their proper application, or a video on safe equipment operation.” Gasparin also notes that the university’s benefits program supports 100% tuition for all credited courses, and many staff participate in the university’s landscape design program.



Promptly removing gum from sidewalks on campus emphasizes the importance of maintaining a clean environment.

Outsourced Work

According to the survey response and *Grounds Maintenance* article, all maintenance activities are performed in-house.

Maintenance Practices

Staff members are trained to perform a variety of tasks. Maintenance procedures and horticultural duties vary throughout the seasons, but some tasks remain constant. Although there is no specific schedule for performing tasks, litter and debris collection are the first priority at the beginning of each workday. Night-shift employees are responsible for sweeping parking lots, sidewalks, and street curbs, and emptying trash and recycling containers. Performance of other maintenance activities seems less scheduled on a day-to-day basis. Two workers were removing gum from sidewalks during a site visit, emphasizing the importance of a clean campus.

Gasparin notes, “as employees become familiar with their zones, we encourage them to use their own judgment, initiative, and experience in daily and seasonal maintenance. This approach has developed increased pride in employees, improved their self esteem, and resulted in a workforce that is eager to learn.”

Such judgment and experience are especially important when it comes to watering the campus landscape. According to the *Grounds Maintenance* article, only one quarter of the campus is irrigated by automatic systems, with the remainder being hand watered. Precise water is also critical because most of the buildings on campus are well over 25 years old, and “excessive watering leads to water flooding into the ground floors,” says Gasparin.



Roses are a prominent planting on campus and prefer to be watered at their bases, according to the staff member in this photograph.

The Grounds Department makes every effort to be as environmentally conscious as possible, according to Gasparin. Plastic waste bags have been replaced with paper waste bags, and cordless electric mowers are used, which work well when mowing small strips of turf throughout the campus. They also reduce noise pollution, air pollution, and allow for greater mowing time with less annoyance to the general public (Gasparin 1997).



Irrigation heads are protected by curbing.

NATIONAL GALLERY OF ART SCULPTURE GARDEN

The National Gallery of Art (NGA) maintains a 6.1-acre outdoor public sculpture garden for the display of sculpture and horticultural arts on the National Mall between 3rd and 9th streets at Constitution Avenue NW. The garden was designed by Laurie Olin in 1994 and was opened to the public in 1999. The garden features 17 works from the Gallery's collection, as well as loans from special exhibitions. A reflecting pool becomes an ice-skating rink in winter.



Aerial view of the National Gallery of Art's Sculpture Garden.

BEST PRACTICES

- The original design intent for the garden remains, but plantings are changed continually to provide an aesthetically pleasing but safe setting for the sculptures and visitors.
- To ensure safety and security, visitors and staff members must be able to see the entire garden.
- To prevent visitors from touching and potentially damaging the sculpture, plantings and installed stanchions and chains delineate the lawn from the path.
- It is important for staff members to have a sense of ownership over the garden.

DESIGN APPROACH AND PLANNING

Primarily featuring 20th century American sculpture, Olin's final plan for the Sculpture Garden references the two main 18th and 19th century contributors to the original design of the National Mall, L'Enfant and Downing. Olin's design "attempts to incorporate the formality of L'Enfant with the natural beauty of Downing" (NGA n.d.). The formality of the fountain and the ellipse of linden trees contrasts nicely with "the rest of the site [which] is very free flowing using a wide variety of plant material" (NGA n.d.)



The Sculpture Garden is designed for year-round use. The fountain becomes a skating rink in winter, and the Pavilion Café offers refreshments for visitors.



Gated entrance reminds visitors they are entering a special area.



Plantings and post-and-chain barrier are used to protect Roy Lichtenstein's *House I*.

While the garden's structure remains faithful to the 1994 design intent, the plant specifications are constantly changing to provide an aesthetically pleasing yet secure and safe setting for works of art. According to Jim Kaufmann, the manager of the Sculpture Garden and a horticulturalist and arborist certified by the International Society of Arboriculture, changing curatorial staff members have differing "ideas about the garden, what it should look like, how the landscaping should frame the various artwork, and generally how Art should be viewed." The Sculpture Garden evolves as the curators change and as funding becomes available.

New security concerns have been raised since September 11, and visibility is a major concern. Now, visitors and staff members have to be able to see from one end of the garden to the other. Inappropriate plant specification seems to be the thrust of the visibility problem. Kaufmann gave an example, "a 15-foot viburnum was continuously cut to waist level for security reasons. This plant was pruned too low [for its species] and so, as funding became available, it was replaced with dwarf conifers."

The relationship between public safety and presenting and preserving the artwork in a tactful way is also a major concern for the Sculpture Garden. Visitors want to interact

with the sculptures, touching the tactile materials or playing with or on the sculptures' facades. Roy Lichtenstein's *House I* is a favorite piece with children and adults alike. To prevent visitors from touching and potentially damaging the sculpture, Kaufmann and his colleagues planted *vinca minor* (common periwinkle) and installed stanchions and chains to delineate the lawn from the path. These physical barriers become a psychological indicator for most visitors that they should not trespass and go near the sculpture. Similarly the Sol LeWitt *Four-Sided Pyramid* in the middle of a grassy area was a favorite play item for children. Kaufmann said that when a child almost fell off the sculpture, the maintenance crew planted low cherry laurels around it.

Other psychological indicators on visitor behavior exist throughout the Sculpture Garden. Perimeter fencing funnels visitors through one of six gates. Passing from the wide, open National Mall to the Sculpture Garden implies certain standards for visitor behavior. Pamphlets containing a map, tree and shrub inventory, and interpretive information about the sculptures also remind visitors that they are in an outdoor art gallery. Messaging throughout the garden states prohibitions, including the most important restriction: "Do not touch the works of art."

ACCESS AND EVENT MANAGEMENT

The garden is generally open to the public from 10 a.m. to 5 p.m., with longer hours in the summer. The garden is enclosed by a decorative metal fence with marble piers and plinths and six gates along the perimeter of the sculpture garden control pedestrian access. Vehicular access is limited to service vehicles, and one gate controls vehicles making deliveries to a service area.

Events, which are limited to those sponsored by the National Gallery or Art or the concessioner, Guest Services, Inc. (GSI), primarily include a jazz concert series in the summer and ice skating in the winter.

MAINTENANCE

Staff Organization

Kaufmann supervises one full-time gardener, who assists with daily maintenance projects. The rest of the 17 employees of the NGA Horticulture Division maintain the grounds at the East and West Galleries and assist with special event preparation and break down. Kaufmann notes that “an additional crew of up to six gardeners are occasionally available to assist with maintenance” in the Sculpture Garden. Most of these staff members are “plants men” who have experience-based knowledge, although a few staff members have university or associate degrees in related fields.

Training

Kaufmann notes that on-the-job training and external training are available to staff members; however, attendance at external training sessions is not “tremendous.” For example, several years ago, Kaufmann attended a week-long Arborist Master class that covered tree climbing and safeguards and found it so useful that two other NGA gardeners attended it the following year. Kaufmann also mentioned life-skills training sessions (i.e., personal planning, personal



Pamphlet containers invite visitors to enjoy the gardens and remind them of rules.



Granite markers identify artworks and remind visitors not to touch the sculptures.

finances) that were available internally to NGA staff.

Outsourced Work

The removal of trash and snow is contracted out, but done in tandem with NGA employees. Contractors also remove mature trees.

Maintenance Practices

Maintenance practices are not written for the Sculpture Garden, although Kaufmann keeps a basic list of activities. He has also set

a very informal maintenance schedule, as well as a tree and landscape inventory.

Kaufmann emphasized the importance of staff members “having a sense of ownership over the garden.” He described a recent turf

replacement project that required additional staff resources, noting how frustrating it was for staff members who were not able to finish the project. Kaufman stressed that “people need a sense of completion with their work.”

SMITHSONIAN INSTITUTION GARDENS

The Smithsonian Institution gardens include 32.8 acres of designed landscapes, turf, sidewalks, and parking lots bordering the Smithsonian Institution museums and galleries flanking the National Mall. Paul Lindell, a landscape architect with the Smithsonian Horticulture Services Division, says that these landscapes were “designed to complement the museums they border and to enhance the overall museum experience of learning, appreciation, and enjoyment. Within a busy urban setting, the Smithsonian Gardens offer sensory delights, environmental habitats, dynamic backdrops for art interpretation and cultural traditions, and settings for contemplation and reflection.”

BEST PRACTICES

- The Smithsonian Institution gardens skillfully use a variety of textures, including flowering plants, leafy trees and shrubs, lush turf areas, and exotic plants, to create a pleasing and welcoming environment.
- Wide walkways and sitting areas are paved with brick, stone, or other quality materials, contributing to the feel of the gardens and helping absorb the impact of intense foot traffic.
- A variety of carefully placed signs give visitors information about current exhibitions and events, educate them about urban wildlife habitats, and remind them of the importance of not touching outdoor sculpture.
- Gardens are clearly delineated from pedestrian walkways through curbing and raised beds. Various materials are used to border planting beds, including low stone or brick curbs, decorative wrought iron railing and fencing, and low metal edging.



Aerial view from the Smithsonian Castle into the Enid A. Haupt Garden.



The entrance to the Smithsonian Castle.

DESIGN APPROACH AND PLANNING

A general atmosphere of “delight” has been created within all of the Smithsonian Institution gardens through the skillful use of blooming annuals and perennials, leafy trees and shrubs, lush green turf areas, and exotic plantings. Attractive and architecturally interesting plants are artfully arranged in planting containers throughout the grounds, and baskets overflowing with colorful flowers hang suspended from lampposts along walkways. The Smithsonian communicates a serious interest in horticulture and fine gardening through its highly manicured



Raised beds brings flowers closer to the viewer in the Mary Livingston Ripley Garden.

grounds and the well-maintained facilities (i.e., clear walkways composed of quality materials, whimsical and clean garden furniture, and well-lit pathways). Interpreted as “outdoor museums,” the gardens are for “learning, appreciation, and enjoyment,” just like the artifacts and paintings in the museums. Similar to the behavior of visitors inside, the gardens also elicit quiet responses of admiration by visitors.

The wide walkways and sitting areas are paved with brick, stone, or other quality materials. These materials not only contribute to the feel of the gardens, they also help absorb the impact of intense foot traffic. All benches, where visitors are most likely to pause and linger, are located on these hard surfaces, further reducing impacts caused by visitors.

Several of the gardens feature perimeter fencing and gated entryways, such as the Enid A. Haupt Garden and the Hirshhorn Museum Sculpture Garden. As previously mentioned, gated entryways seem to encourage positive behavior from visitors.

The Smithsonian gardens contain a multitude of carefully placed signs. A kiosk outside the Haupt Garden advertises current exhibitions along with a calendar of events and activities. Small signs on the perimeter fencing list prohibited behavior, while alerting visitors to free public wireless access.



Exotic plants in the Enid A. Haupt Garden.

Some signs indicate the entrance to a garden while other signs educate visitors on everything from urban wildlife habitats to the importance of not touching outdoor sculpture.

Like the gardens in many of the other case studies, the Smithsonian gardens are clearly delineated from pedestrian walkways through curbing and raised beds. Various materials are used to edge planting beds, including low stone or brick curbs, decorative wrought iron railing and fencing, and low metal edging. Such design details keep visitors out of planting beds and help contain plant materials. Raised planting beds within the Mary Livingston Ripley Garden also bring plants closer to eye level, creating more of a museum feel within the garden. This design detail dictates a certain visitor distance and behavior.



Benches on hard surfaces reduce impacts on turf.

ACCESS AND EVENT MANAGEMENT

Pedestrians have unrestricted access to the grounds during public hours (from dawn until dusk, with some variation during the summer), except for the gated Enid A. Haupt and Hirshhorn Sculpture gardens. Only service vehicles are permitted on site, and they must be inspected first by security officers.

Events within the gardens must be sponsored by an organization within the Smithsonian Institution and typically include exhibition openings, concerts, educational classes, public outreach, and enrichment programs. Some events, such as corporate rentals, help raise funds for the Smithsonian. Lindell notes that “the number in attendance at events is governed by fire codes and standard accepted space requirements for the public (i.e., square foot requirements per person).”



Butterfly habitat garden.

MAINTENANCE

Staff Organization

The Smithsonian Institution’s Horticulture Services Division (HSD) employs 44 staff members who are assigned to specific areas of responsibility throughout the gardens. If the need arises for more staff resources, for example, during seasonal planting, then “staff members are pooled to provide quick change outs,” says Lindell. Most of the staff



Container gardening and hanging baskets provide visual interest in the Enid A. Haupt Garden.



A variety of sign designs are used for visitor information, orientation, and education.

are salaried professionals who are paid through the federal government grade scale (GS), with most of the staff at GS-8 or above. Many employees in the Gardeners Series have been reclassified to Biological Science Technicians instead of Gardeners, which places them on the GS pay scale for salaried professionals instead of on an hourly wage scale. Job satisfaction seems to be high, as staff members enjoy salaries and benefits commensurate with high levels of education and experience. The division enjoys a “very good retention rate.”

Both student interns and expert volunteers help supplement the HSD workforce. For the past few years, the division has hired 12 interns between March and August, paying them a stipend. Interns typically have a background in landscape architecture or horticulture. Roughly 30 volunteers, many of whom are master gardeners, assist in the various gardens, as well as the Archives of American Gardens and the greenhouses.

Training

The Horticulture Services Division has held in-service training since 1993. The training is open to everyone at the Smithsonian, and the HSD staff is required to attend. The sessions are open to organizations outside the Smithsonian as well. In the past staff from the National Park Service, the American Horticultural Society, American University, Brookside Gardens, Green Springs Gardens, Hillwood Museum and Gardens, the U.S. Botanic Gardens, and the U.S. Arboretum, to name a few, have attended.

Outsourced Work

Only mowing and tree work are contracted out.

Maintenance Practices

HSD staff members perform all daily maintenance, including trash and snow removal. Staff members pick up trash found within their designated garden areas, while building

management staff members empty outdoor trash receptacles. A weather station in the garden near the Smithsonian Castle helps determine when use of the irrigation system is needed. The Smithsonian uses an integrated pest management program. Planting themes for annual flowers are planned two years in advance, while other plants are typically planned one year in advance. Staff members also provide tours of the various Smithsonian Institution gardens and answer questions from the public, as well as perform maintenance activities, including managing the irrigation systems in their respective areas of responsibility.



Maintenance vehicles.



The use of various types of brick and stone edging and decorative railing and fencing subtly control visitor use.

UNITED STATES BOTANIC GARDEN

The United States Botanic Garden (USBG) lies at the foot of the U.S. Capitol on the National Mall and is managed by the Architect of the Capitol. Approximately 7 acres of outdoor ornamental gardens, conservatories, and greenhouses comprise the garden, including the Conservatory, Bartholdi Park, and the National Garden (which opened in October 2006). There is also an offsite plant materials production facility, the largest greenhouse supporting a public garden in the United States. The Botanic Garden is “a living plant museum, [designed] to demonstrate the ecological, economic, therapeutic, cultural, and aesthetic importance of plants to the future well being of humans,” according to Christine Flanagan, manager for public programs at the garden.

BEST PRACTICES

- Ornamental plantings are continuously changed to reflect current trends in American horticulture and new plants.
- Small but important design features, such as raised planting beds, curbs, and fences, help control pedestrian movement, restricting visitors to surfaces that can absorb the impact of heavy foot traffic.
- Visual design clues throughout the park help explain to visitors how they should use the park and behave within it. Fine gardening sets a certain tone or atmosphere in the park, encouraging more reserved visitor behavior.
- Excellent customer service is emphasized as a desired quality among gardeners, who are visible to the public.

DESIGN APPROACH AND PLANNING

Bartholdi Park

Bartholdi Park is an outdoor public park maintained by the U.S. Botanic Garden. Just



Bartholdi Park with Conservatory



Bartholdi Park

off the National Mall in southwest Washington, the park serves as a home landscape demonstration garden and showcases innovative plant combinations in a variety of styles and design themes. The ornamental plantings are continuously updated to reflect modern trends in American horticulture and new plant introductions. Plants are labeled for botanic classification, and signs with information about gardening or interpretation of certain historic elements within the park help create casual educational opportunities.

Bartholdi Park contains semi-private hard-scaped spaces for visitors to pause and reflect or simply have their lunches in. It also has narrow, winding paths, which set a slower pace



Visual design clues throughout the park help explain to visitors how they should use the park and behave within it. Fine gardening sets a certain tone or atmosphere in the park, encouraging more reserved visitor behavior.

Diverse paving materials and a variety of plants used within beds and containers contribute to a sense of quality within the public park. This perceived sense of quality, along with some of the aforementioned design details, helps influence visitor behavior.



Outdoor rooms in Bartholdi Park offer areas for visitors to relax and eat lunch.

The National Garden

The National Garden, which was still under construction at the time of the case study, is located on a 3-acre site just west of the Conservatory on the National Mall. Some of the park is visible to passers-by, and these visible areas of the garden offer several noteworthy design suggestions. Raised planting beds and a visually permeable fence that is setback within the planting beds surround the perimeter of the garden, providing security and restricting vehicular and pedestrian access. The designs are integrated with the overall garden design details, and they are unobtrusive. The raised planting beds are edged with a stylized concrete curb approximately 1 foot high; it looks sophisticated while providing a psychological barrier that deters pedestrians from stepping up and into the planting bed. It also protects an irrigation system from possible pedestrian damage.

and add to the intimate, private feel of the park — a stark contrast to Independence Avenue, which borders the park.



Signs in Bartholdi Park are used for identification of plant species and historical interpretation.





Diverse plant and paving materials add to a sense of quality.

The perimeter fencing is over 6 feet high, appears strong, and restricts pedestrian access to hours of operation through a series of electronically controlled magnetic gates. Passing through a gate often has psychological significance for visitors. According to landscape architect Anne Whiston Spirn, gates become “a



context for passage, determining how things flow through it” with the knowledge that one is “stepping across boundaries from one domain into another.” The USBG logo, represented in the metal work, implies that the garden is well protected and maintained, along with a code of appropriate visitor behavior.

Another design detail accommodates tent use during events in a way that protects irrigation and makes tent erection simpler. A turf area sized to fit a large tent was edged with stone that had regularly spaced built-in tent anchors / eye bolts located under brass caps (approximately 6½ to 7 feet on center).



The curbed walkways within the interior of the National Garden function in a similar manner by keeping pedestrians from straying into planting beds and turf areas. Since the walkways are composed of a loose pebble material, the curbs also retain the pebbles, preventing spillage into the planting beds. Small but important design features, such as raised planting beds, curbs, and fences, help control pedestrian movement, restricting visitors to surfaces that can absorb the impact of heavy foot traffic. They may also assist in conserving materials.



See-through fencing and raised planting beds appear integrated and unobtrusive, but provide a sense of security for visitors and protection for planting beds.

ACCESS AND EVENT MANAGEMENT

Access for pedestrians and vehicles is controlled at all USBG sites through restricted hours, fences, gates, bollards, or security guards.

Only two events per week are allowed, although the events vary from press conferences and congressional events to small musical performances to educational programs and school field trips. Private receptions and dinners are restricted to evening hours, and attendance is limited.

MAINTENANCE

Staff Organization

The Botanic Garden employs around 50 gardeners and staff members who are assigned to specific plant areas in the greenhouse facility, the Conservatory, and Bartholdi Park. Flanagan notes, “staff report to separate duty areas as their duty stations but may move between areas to work on special projects.” Full-time in-house staff members attend to most landscape maintenance and operations needs, including weeding, planting, pruning, site preparation (such as soil amendment and tilling), and trash removal from receptacles. In-house staff also design and plan seasonal planting themes for the Conservatory beds and the container gardens one to two years in advance. Additionally, staff members renovate



Stone edge containing built-in tent anchors.

beds and damaged plant materials in an annual cycle in Bartholdi Park.

According to Flanagan, most employees in the Operations Division are highly skilled, while the expertise of those in the Horticulture Division varies from university-educated or highly experienced gardeners to unskilled gardeners. Flanagan emphasized the need for highly skilled, experienced, and educated horticulturalists and operations workers for fine gardening. For example, an August 2006 job announcement for a gardener requires the “ability to do the theoretical, precise, and/or artistic work of the Gardener occupation.” Horticulture volunteers, many of whom are master gardeners, as well as several semi-skilled paid interns, work alongside and supplement full-time staff members. Most interns are children of employees.

Training

No training was specified in the respondent’s survey or during the telephone interview.

Outsourced Work

Mowing, larger site preparation (such as irrigation installation) and dumpster trash removal are all outsourced.

Maintenance Practices

Horticulture and operations maintenance practices are managed with a “museum-like” approach. Any maintenance generally occurs in the Conservatory during non-visitor hours of operation, either prior to 10 a.m. or after 5 p.m. A janitorial team removes trash from all public areas once a day. Trash receptacles are strategically located throughout public areas of the Botanic Garden so that



trash is typically minimal and requires only once-a-day pick-up. Plants are brought in from an offsite production facility, where employees work for most of the day. Any planting or maintenance needed within the Conservatory occurs in the morning before visitors arrive.

Maintenance in Bartholdi Park can occur during visitor hours (from dawn until dusk) and often does, as visitors seem to enjoy speaking with the employees about the various plants, according to Flanagan. This emphasis on excellent customer service is a desired quality among gardeners, who are visible to the public. An August 2006 job announcement for a gardener requires applicants to “have experience providing effective customer services



Curbed walkways prevent pebbles from being scattered into planting beds.

utilizing tact and diplomacy in a public setting.”

UNITED STATES CAPITOL GROUNDS

The historic, designed grounds of the United States Capitol, along with supporting buildings and facilities that constitute the legislative branch of the federal government, are comprised of roughly 300 acres and are managed and maintained by the Architect of the Capitol. The Capitol grounds are adjacent to the National Mall and most closely resemble its landscape character and composition — a stately civic space containing commemorative works and memorials that are flanked by trees and turf.

BEST PRACTICES

- Supervisors and gardeners are organized into three zones.
- Raised or curbed planting beds help retain mulch and plant material and prevent pedestrian traffic.
- Logos on maintenance vehicles identify who is responsible for groundskeeping.

DESIGN APPROACH AND PLANNING

The Capitol grounds are composed of paved landings with fountains and raised planting beds, turf and tree-lined walkways, and planting beds designed for horticultural color and interest. More formal gardens are located near some of the other legislative buildings.

Planting beds on the north side of the Capitol are either raised or curbed to retain mulch and plant material. They also act as a psychological barrier, preventing pedestrian traffic.

To deal with security concerns on the Capitol grounds, bollards are a permanent feature to control vehicular access to the grounds adjacent to the Capitol. Temporary jersey barriers, which have been painted green to blend with their surroundings, have also been added to control access.



The U.S. Capitol grounds create a stately civic space for the legislative branch of government.

ACCESS AND EVENT MANAGEMENT

Like the National Mall, the U.S. Capitol grounds are generally always open to pedestrians, while vehicular access is restricted and controlled in many areas. Perimeter security is a concern for both buildings and facilities within the Capitol grounds, so design solutions have been implemented to ensure continued security. Numerous local and national events occur on the Capitol grounds each year, including concerts, demonstrations, inaugurations and state funerals. (The National Park Service is authorized to sponsor a series of no more than four concerts per year by the Na-



Turf and tree-lined walkways present a welcoming appearance, and horticultural planting beds are designed for visual appeal.

tional Symphony Orchestra on the west lawn of the U.S. Capitol.) According to Deputy Superintendent Ted Bechtol, “depending on the type of event, both the number of annual events and the attendance at each event is limited, [and] House and Senate leadership approve or disapprove major events.”

MAINTENANCE

Staff Organization

The U.S. Capitol grounds staff includes 62 people in the maintenance division — a 5:1

worker-to-acre ratio. This figure includes trade specialists, such as plumbers, masons, mechanics, and heavy equipment operators or drivers. Bechtol notes that a workforce of approximately 35 supervisors, gardeners, and arborists perform “large-scale, repetitive” grounds maintenance activities and that all maintenance requirements are fulfilled in-house for security reasons, including tree work, snow and trash removal, and limited recycling. A small group of unskilled seasonal interns (primarily, the children of employees) supplement the workforce during summer. Volunteers are not permitted for security rea-



Curbed planting beds retain mulch and plant material, as well as discourage pedestrian traffic.



sons. Supervisors and gardeners are organized into three zones, each tasked with maintaining the Senate buildings and parks, the House of Representatives buildings and parks, and Capitol Square, while the “tree crew is campus wide.”

Training

Most gardeners have some skills and experience but little formal education. On-the-job training occurs, and external training opportunities are available, including courses through professional grounds maintenance organizations and classes offered by the Smithsonian Institution in the winter.

Outsourced Work

Work is not outsourced for security reasons.

Maintenance Practices

Only the maintenance practices stated above were specified in the respondent’s survey and during the telephone interview.

The Architect of the Capitol logo on maintenance vehicles clearly indicates who is responsible for groundskeeping at the U.S. Capitol.



Distinctive mountings for directional signs help visitors find their way.



Security bollards and jersey barriers are painted green to blend more with their surroundings.

U.S. NATIONAL ARBORETUM

The U.S. National Arboretum in northeast Washington consists of 446 acres of various plant collections, designed gardens, and woodland and grassland wildlife habitats. Administered by the U.S. Department of Agriculture's Agriculture Research Services, the mission of the U.S. National Arboretum is "to serve the public need for scientific research, education, and gardens that conserve and showcase plants to enhance the environment."

BEST PRACTICES

- Large grassy areas have been converted into meadows and are not designed for sport. Instead, these areas foster wildlife and help relieve soil compaction.
- Signs used throughout the Arboretum identify plants, educate visitors, and define expected visitor behavior. Visitor rules are printed in Arboretum brochures and maps, as well as on discreet signs throughout the grounds.
- Wide landings and pedestrian walkways are paved with brick, stone, and other quality and durable materials. Many of the landings contain benches or tables and chairs, for visitors to pause and quietly reflect on the surroundings.



Paved landings and discreet signs create a pleasant, relaxing environment.



Looking south toward the National Capitol Columns.



Looking north toward the National Herb Garden.

- Edge treatments have been either discreetly integrated into the landscape or are highly stylized to complement a specific garden's theme.
- The Arboretum benefits from numerous support organizations, who provide fiduciary support and volunteer service.
- Well thought-out plans for how a specific area could look nicer or how it could be improved prevents operating in crisis mode and not achieving long-term goals for landscapes.



Signs serve various functions — education, orientation, wayfinding, and donations.

DESIGN APPROACH AND PLANNING

The National Arboretum is surrounded by visibly permeable fencing, with two stone gates marked with the Arboretum logo and signs to admit visitors and vehicles. Signs used throughout the Arboretum identify plants, educate visitors, and define expected visitor behavior. Visitor rules are printed in Arboretum brochures and maps, as well as on discreet signs throughout the grounds. Scott Aker, a supervisory horticulturalist at the Arboretum, thinks that “rules of conduct are pretty intuitive at the Arboretum, and people take cues from how others are behav-



Wide paved walkways invite visitors to stroll through the gardens.

ing inside the Arboretum grounds.” Historically, the Arboretum has limited activities to specific visitor uses. Large grassy areas have been converted into meadows and are not designed for sport. Instead, these areas foster wildlife and help relieve soil compaction.”

The Arboretum features wide, paved landings and pedestrian walkways throughout the grounds, including 9.5 miles of winding roadways for vehicles. Brick, stone, and other quality and durable materials suggest a high level of care and absorb the impact of large numbers of visitors. Many of the landings contain benches or tables and chairs, encouraging visitors to pause and quietly reflect on the surroundings.

Similar to designs used at the other case study areas, the Arboretum has also delineated planting beds from walkways, yet has done so with creative flair. Either discreetly integrated into the landscape or highly stylized to complement the specific garden’s theme, edge treatments have been thoughtfully and successfully executed. Plant material remains within the planting beds, and visitors stay on the walkways.



Landings paved with quality, durable materials.

ACCESS AND EVENT MANAGEMENT

Public access is restricted to the facility's hours of operations (8 a.m. to 5 p.m.), except some evening events. Security guards, gates, and perimeter fencing all help control vehicular access.

Events at the U.S. National Arboretum have only recently been permitted; new authorities have been published in the *Code of Federal Regulations*, such as the rental of spaces for parties and weddings. The number in attendance at events is limited by the size of the space.

MAINTENANCE

Staff Organization

The Arboretum maintenance team consists of 23 staff members, including a unit leader who has overall management responsibility for the gardens and collections, six curators of collections, two supervisory horticulturists, 12 gardener technicians, one laborer responsible for mowing turf areas not mowed by a contractor, and a pest management specialist.

According to Aker, staff members are assigned to a collection to develop expertise in a plant grouping, but they spend more of their time working collectively on team projects. This current organization is two years old, and a key reason for restructuring was to allow staff to work in areas of current priority.



Distinctive edge treatments are used to complement a specific garden's theme.

Interns and a large, committed volunteer base also supplement the Arboretum's workforce. According to the Arboretum's website, "internships are available in horticulture and are supported by non-profit organizations and privately donated funds." Approximately 150 volunteers regularly offer their time as gardeners, guides, or docents. The volunteer program is highly organized and requires four hours of volunteer time a week, with a one-year commitment. It includes training and orientation. Aker notes that volunteers have actually built gardens within the Arboretum, including the National Herb Garden (Potomac Garden Club) and the Native Plant Collection (Federal Garden Club).

The Arboretum also benefits from numerous support organizations, including the Friends of the National Arboretum, the Garden Club of America, the Herb Society of America, the National Bonsai Foundation, the National Capital Area Federation of Garden Clubs, Inc., the National Capital Orchid Society, National Garden Clubs, Inc., the Society of American Florists, and the Women's National Farm and Garden Association. These organizations provide fiduciary support and/or volunteer service hours.

Training

No specific training opportunities for Arboretum employees were mentioned in the survey. On-the-job training likely occurs between staff members, and Paul Lindell at the Smithsonian Institution's Horticultural Services Division mentioned that staff members from the Arboretum have attended their training sessions in the past.

Outsourced Work

Tree work and some mowing are contracted out, and a contractor empties trash receptacles once a week.

Maintenance Practices

No written or documented specifications or desired landscape standards exist for the Arboretum, although there is a methodology for certain activities — how much mulch to add, how to amend soil, and how to plant a tree consistently well and correctly to reduce loss. Aker says a different level of care is applied to different areas throughout the Arboretum. For example, the meadows are mown once a year and invasive plants are treated every four years. Since there is no written maintenance calendar, grounds are maintained in order of priority within the Arboretum. The azalea and rhododendron area becomes a priority area in February and March when the public comes to see the flowering shrubs in bloom. While one curator and one technician are assigned to a specific area in the Arboretum, priority areas require everyone's time and effort. Other projects, such as restoring a landscape degraded by invasive species, help integrate staff members.

Aker does not interpret a "priority" as a "crisis." He thinks that operating in crisis mode is a trap for not planning or not setting any preliminary goals for landscapes. He wants his team to anticipate and prepare, "thinking about how a specific area could look nicer or how it could be improved." Aker admits that the staff members sometimes "steer" people interested in hosting events at the Arboretum "toward areas that look nice already." This allows staff members to continue working on priority areas without interruption.

Irrigation is critical to the continued good health and attractiveness of the landscapes at the Arboretum. Historically, the Arboretum depended on rainfall. Over the last few years an automatic irrigation system has been installed in most of the azalea and native plants areas. This system is not integrated, however, and still requires manual operation. Unfortunately, Aker said that there is no employee to fulfill this function at this time.

WASHINGTON NATIONAL CATHEDRAL

Washington National Cathedral, a “national house of prayer for all people,” is located on 57 acres, known as the Close, in northwest Washington. In addition to the church, school, and staff buildings and facilities, the Close includes an array of designed landscapes, including the surrounding turf lawns, herbaceous gardens, a Frederick Law Olmstead designed woodland, and sports fields.

BEST PRACTICES

- Stone and concrete slabs are located underneath all seating and trash receptacles and near orientation and interpretive signs.
- Planting beds and walkways are lined with stone or brick curbs to help keep visitors on designated paths and hardscape landings, as well as keep soil and mulch within the planting beds.
- The maintenance staff is organized by geographic zones and is supported by volunteers and student interns.

DESIGN APPROACH AND PLANNING

Washington National Cathedral is highly visible, both in physical location and cultural prominence. Sitting atop Mount St. Alban, the cathedral can be seen throughout the city, making it a top destination for tourists as well as local residents. To absorb the impact often caused by such high visitation, sidewalks are wide near the main entrance of the cathedral to accommodate the throngs of visitors off-loaded from tourist buses. Wide circular mulch beds protect the roots of mature trees at the west entrance of the cathedral as well.

In general, the pristine condition of the lawn and the well-maintained circular beds surrounding trees encourage visitors to stay off the lawn and on designated paths. Through-



Donovan Marks for Washington National Cathedral



Ken Cobb for Washington National Cathedral

Washington National Cathedral from the Bishop's Garden.



Walkways near the cathedral entrance are wide to handle throngs of visitors, and mulch protects tree roots.

out the cathedral grounds, stone and concrete slabs are located underneath all seating and trash receptacles and near orientation and interpretive signs. High levels of foot traffic are likely in these areas, and the hard slabs absorb impact more than turf. The angular cuts of these slabs also make mowing turf around the street furniture much easier.

Planting beds and walkways within the Bishop's Garden, an herb garden on the grounds, are all lined with stone or brick curbs similar to those at the National Garden. The curbs help keep visitors on designated paths and hardscape landings, as well as soil and mulch within the planting beds.

ACCESS AND EVENT MANAGEMENT

Access to the grounds by pedestrians and vehicles is restricted by hours (dawn to dusk), perimeter fencing, and security personnel who patrol the site when the cathedral is closed.

Religious services, ceremonies, and state funerals are types of events that occur at the cathedral; generally, no externally sponsored events are allowed.

MAINTENANCE

Staff Organization

The Protestant Episcopal Cathedral Foundation administers all aspects of the National Cathedral and the associated primary, secondary, and continuing educational institutions,



Curbed planting beds and walkways control impacts.



Hard platforms for seating, trash receptacles, and signs reduce use impacts on turf.

including the Horticulture and Grounds Division. The division employs 18 staff members and is organized into geographic zones. Joe Luebke, director for Horticulture and Grounds, manages two managers, one for turf and one for horticulture. The turf manager is responsible for all cathedral lawn areas and sports fields for an adjacent private school. He also manages the schedules of five turf specialists. The Horticulture manager manages all ornamental gardening aspects of the cathedral grounds, as well as six zone gardeners and two general laborers. Luebke notes that the zone organizational approach helps foster a sense of “ownership.” An irrigation technician and a mechanic also work as specialty personnel throughout the cathedral grounds.

Volunteers and interns occasionally supplement the work performed by division staff. All Hallows Guild, a garden group formed to raise funds for the cathedral grounds, has a volunteer program with approximately 15 people. Volunteers receive general cathedral orientation and a garden tour to help familiarize them with the site, and they are supervised by zone gardeners. Ornamental horticulture students or interns have worked with the Horticulture and Grounds Division in the past.

Training

A variety of training opportunities are available to staff members, including on-the-job training and mentoring. Continuing education, such as external seminars, is strongly urged. Many staff members attend the Smithsonian Institution’s invitational in-service training in January and February. The training includes weekly lectures on various aspects of grounds maintenance, and Luebke notes that these lectures also provide an opportunity for networking within the field.

Outsourced Work

Only tree removal and other associated tree work are outsourced to a contractor.

Maintenance Practices

Nearly all maintenance is performed by in-house staff, including weekly mowing. There are no written landscape standards; however, the appearance of the grounds is linked to performance evaluations. The division has an automatic performance review program, which allows supervisors and managers to add comments on a staff member’s performance to his electronic file. Comments are typically added after a manager has verbally advised the staff member of an existing maintenance problem. The automatic performance review program collates a list of comments entered throughout the year, which is used at the year-end evaluation.

SELECTED BIBLIOGRAPHY

- Barber, Lucy G.
2002 *Marching on Washington: The Forging of an American Political Tradition*. Berkley: University of California Press.
- Commission of Fine Arts
1939 "Report to the Senate and the House of Representatives concerning the Thomas Jefferson Memorial." Washington, DC, February 1939.
- Cox, Warren, Hugh Newell Jacobsen, Francis D. Lothbridge, and David R. Rosenthal
1974 *A Guide to the Architecture of Washington, DC*. 2nd ed. Washington Metro Chapter of the American Institute of Architects. New York: McGraw-Hill Book Company.
- Cultural Landscape Foundation
2006 "Cultural Landscapes Defined." Available at <<http://www.tclf.org/whatis/htm>>. Accessed Dec. 28, 2006.
- Del Tredici, Peter
2006 "Brave New Ecology: On the Road to More Sustainable Urban Landscapes, the Natives-versus-Exotics Controversy, Says One Plant Scientist, Is a Dead End." *Landscape Architecture* February, 46-52.
- Gasparin, Noel J.
1997 "George Washington University." *Grounds Maintenance* (Mar. 1). Available at <http://grounds-mag.com/mag/grounds_maintenance_george_washington_university/index.html>. Accessed Dec. 28, 2006.
- Hammerschlag, Richard S., and James C. Patterson
1978 "Case Studies 13: Constitution Gardens: The Making of an Urban Park." Ecological Services Laboratory, National Park Service, National Capital Region / National Mall and Memorial Parks. Environmental Press Design: Reston, VA.
- Hantman, Alan M.
2002 "What are the Challenges for Historic Places?" Comments by Alan M. Hantman, FAIA, Architect of the Capitol at the Public Safety and Historic Places Conference Jan. 22. Available at <http://www.aoc.gov/aoc/press-room/challenges_020122.cfm>.
- LaPage, Will
2005 "@Issue: Ethics and Health of Public Park Systems." *Parks & Recreation*. February.
- Myerson, Deborah
2006 "Parks, People, and Community: Making Parks Accessible to the Community". Urban Land Institute Community Catalyst Report Number 4. The Urban Land Institute, Washington, DC.
- National Capital Planning Commission
2004 *Comprehensive Plan for the National Capital: Federal Elements*. Washington, DC.
- National Gallery of Art
n.d. "Brief History of the NGA Sculpture Garden." National Gallery of Art Sculpture Garden.
- Project for Public Spaces
2006 "William H. Whyte." Available at <http://www.pps.org/Who_We_Are/who_ware_whyte.html>.
- Scott, Pamela, and Antoinette J. Lee
1993 *Buildings of the District of Columbia*. Society of Architectural Historians, Building of the United States book series. New York: Oxford University Press.
- Robinson III, Harry
n.d. "Re-placing Framework." *UniverCity* 20/20. 63-71.
- Whiston Spirn, Anne
1998 *The Language of Landscape*. New Haven: Yale University Press.

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As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environment and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.