National Park Service
U.S. Department of the Interior

Olmsted Center
for Landscape Preservation

Hedge Management Plan for Saint-Gaudens National Historic Site

Hedge Management Plan for Saint-Gaudens National Historic Site

CORNISH, NEW HAMPSHIRE

John Auwaerter
George W. Curry, Project Director
State University of New York
College of Environmental Science and Forestry

Olmsted Center for Landscape Preservation
National Park Service, Boston, Massachusetts, 2008

This report has been prepared in partnership with the Olmsted Center for Landscape Preservation, which promotes the preservation of significant landscapes through research, planning, stewardship, and education. The Center accomplishes its mission in collaboration with a network of partners including national parks, universities, government agencies and private nonprofit organizations. This report was developed through a cooperative agreement with the Department of Landscape Architecture at the State University of New York College of Environmental Science and Forestry, Syracuse, New York.

Olmsted Center for Landscape Preservation
Boston National Historical Park
Charlestown Navy Yard, Quarters C
Boston, MA 02129
Phone: 617.241.6954
Fax: 617.241.3952
www.nps.gov/oclp/

Cover Photo: Hedges in the terrace garden, May 2006. (Olmsted Center)

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

Title page: Hedges in the terrace garden, 2006.

FIGURES

ACKNOWLEDGMENTS

Many individuals contributed to the completion of this report. At Saint-Gaudens National Historic Site, we would like to thank James Haaf for being the contact for the project, providing information on current and past management of the hedges, assisting with site visits, and reviewing draft documents. Many thanks also to B. J. Dunn, Superintendent; Henry Duffy, Curator; Mike Healy, Facility Manager; Gregory Schwarz, Visitor Services; Peter Stone, Mechanic; and Stephen Walasewicz, Natural Resource Manager, for providing project direction and reviewing draft documents. We would also like to thank Bill Noble, former gardener at Saint-Gaudens and author of a 1987 report on the hedges, for coming up to the site to scope the project, discuss past management, and assess existing conditions.

At the Olmsted Center for Landscape Preservation, we would like to thank Margie Coffin Brown for providing project guidance, coordination with the Cultural Landscape Report, and review comments based on her long-standing work with the site. In addition, Robert Page, Director, provided overall project oversight and Charles Pepper, Deputy Director, provided guidance on preservation maintenance issues and shared his past work at the site relevant to the hedges. Lisa Nowak, Historical Landscape Architect, provided information on the history of the hedges. Thanks also to former interns at the Olmsted Center, Maciej Konieczny for his initial work on inventorying the hedges, Jan Haenraets for documenting the existing conditions and Joel Smith for developing the base plans.

At the State University of New York College of Environmental Science and Forestry, we would like to thank Don Leopold, Distinguished Teaching Professor, for visiting the site and providing a conditions assessment and report on the viability of the hedges, birch allee, and Pan grove. Thanks also to Thaisa Way, former Visiting Instructor in Landscape Architecture, for visiting the site and sharing her observations on the hedges.

INTRODUCTION

The historic evergreen hedges at Saint-Gaudens National Historic Site are character-defining features that delineate the perimeter of the landscape and a series of garden rooms (Figure 0.1). Planted in hemlock and white pine, the hedges extend for nearly 3,000 linear feet and consist of upwards of 1,500 plants, some of which are nearly 120 years old. They are both dynamic natural vegetation and static architectural features. Over the years, plants have been replaced, hemlock has taken over white pine, and sections have been allowed to mature to dimensions far larger than existed historically. Certain hedges have also lost lower limbs due to inadequate environmental conditions and improper maintenance so that they no longer provide the intended spatial character in the landscape. Maintaining the hedges in a manner that reflects their character during the period of significance (1885 to c.1950) while also retaining their health and vigor has long posed a management challenge.

This report provides a comprehensive management plan to address these challenges. It documents existing and historic conditions and addresses appropriate maintenance, renovation, and replacement strategies to preserve and enhance the historic character of the hedges. The report is based on the three-volume Cultural Landscape Report (CLR) for Saint-Gaudens National Historic Site, and on previous hedge management studies. As defined in the CLR treatment plan (Volume III), the primary treatment for the overall landscape is preservation for most landscape features, including the hedges. The treatment approach defined in the CLR focuses on retaining and enhancing the historic character of the landscape as it had evolved through the period of significance beginning in 1885, when Saint-Gaudens moved to Cornish, and ending in c.1950 during stewardship by the Trustees of the Saint-Gaudens Memorial. This hedge management plan expands upon this treatment approach by further detailing the treatment of individual hedge sections, articulating a treatment philosophy for hedge renovation and replacement, establishing guidelines for preservation maintenance, and prioritizing management actions for the short-term and long-term care of the hedges.

The recommendations in this hedge management plan have been developed in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (1996). As a hybrid preservation planning document that incorporates aspects of landscape documentation, treatment, and maintenance, this report follows methodologies found in *A Guide to Cultural Landscape Reports* (NPS, 1998), and

Guide to Developing a Preservation Maintenance Plan for a Historic Landscape (NPS, 1998).

EXISTING CONDITIONS OVERVIEW

This section provides an overview of the existing condition of the hedges at Saint-Gaudens as of 2007, addressing their organization, character, environmental setting, and current maintenance. Detailed documentation on the existing condition of each hedge is included in Part 3 of this plan.

HEDGE ORGANIZATION

For the purposes of this plan and in keeping with the methods of the CLR, the hedges at Saint-Gaudens are organized into fourteen landscape features, each of which generally corresponds with a space in the landscape. Each of these hedge features consists of one or more hedge sections, which are the smallest hedge management unit and generally correspond with a side of a garden room or a separate planting. There are a total of thirty hedge sections, labeled as H-1 to H-30 (see Drawing 1). The terrace garden, Adams, and Shaw hedges each have shared hedge sections. For example, hedge section H-11 serves as the east wall of the Pan grove and also the west wall of the terrace garden.

West meadow hedge (H-1): Part of the system of hedges lining Saint Gaudens Road along the west meadow, extending west from the entrance to Aspet, initially planted in c.1893–94.

Horseshoe hedge (H-2, 3, 4): A two-part three-section hedge framing the entrance drive loop at the front of Aspet known as the horseshoe, initially planted in c.1893–94. Part of the system of hedges lining Saint Gaudens Road.

Cutting garden hedge (H-5, 6): A two-section hedge surrounding the cutting garden east of the entrance to Aspet, initially planted in c.1893–94 and 1903. Part of the system of hedges lining Saint Gaudens Road.

Kitchen hedge (H-7, 8): A two-section circular hedge surrounding the kitchen yard on the east side of Aspet, initially planted in c.1893–94 or possibly prior to Saint-Gaudens' occupancy.

Little Studio hedge (H-9): The hedge framing two sides of the rectangular pool terrace to the north of the Little Studio, initially planted in c.1893–94.

Pan grove hedge (H-10, 11): A two-section hedge framing two sides of the rectangular Pan grove garden room on the east side of the Little Studio, initially planted in c.1893–94. The hedge contains a shared section adjoining the terrace garden.

Terrace garden hedge (H-11, 12, 13, 14): A four-section hedge framing three sides of the lower terrace and east side of the middle terrace in the

formal gardens north of Aspet, adjoining the Pan grove and Adams hedges and initially planted in c.1893–94 and 1903. The hedge contains two shared sections adjoining the Pan grove and Adams Memorial.

Adams hedge (H-14, 15, 16, 17): A four-section hedge framing four sides of a small garden room housing the Adams Memorial, with shared sections adjoining the terrace garden and Shaw hedge, initially planted in c.1893–94 and 1903. The hedge historically enclosed a cutting garden.

Shaw hedge (H-17, 18, 19, 20, 21): A 5-section hedge framing four sides of a long rectangular garden room housing the Shaw Memorial with a dog leg section at the east end, initially planted in c.1893–94. The hedge, which historically enclosed a vegetable garden and later a bowling green, has a shared section with the Adams Memorial.

Galleries entrance hedge (H-22, 23): A two-section hedge framing the entrance and west side of a circular terrace between the Atrium and Picture Gallery, initially planted in c.1948.

Lincoln bust hedge (H-24, 25): A two-section hedge framing the walk to the Lincoln bust and an adjoining small garden room east of the Atrium, initially planted c.1948.

Visitor center hedge (H-26): The hedge along the north side of the service drive planted in c.1967 to screen the maintenance shop (currently the Visitor Center) from other areas of the site.

Caretaker's Cottage hedge (H-27, 28): A two-section hedge around the perimeter of the Caretaker's Cottage yard, initially planted in c.1893–94 and lengthened around the cottage at some point between 1917 and 1926. Part of the system of hedges lining Saint Gaudens Road.

Parking lot hedge (H-29, 30): A two-section hedge along the front of the parking lot along Saint Gaudens Road, initially planted in c.1930.

ENVIRONMENTAL SETTING

The core area of Saint-Gaudens National Historic Site containing the hedges is situated on the east side of the upper Connecticut River Valley, approximately one-quarter mile from the river. The site, at an elevation of 550 feet above sea level, slopes downward west toward the river and north toward Blow-Me-Down Brook. The house and surrounding gardens are situated in a clearing surrounded on all sides by mature mixed evergreen and hardwood forest (Figure 0.2).

The region is rural, characterized by widely scattered houses, small farms, and extensive areas of woods. The nearest village is Windsor, located across the river in Vermont. The main entrance to the site is off Saint Gaudens Road, a minor two-lane state and town-maintained road that provides access to farms and country places east of the site.

Climate

Saint-Gaudens National Historic Site is in a temperate northern climate with cold winters averaging 20 degrees F, and cool summers averaging 66 degrees Fahrenheit. Regionally, the site is in a warmer microclimate created by the Connecticut River Valley. Precipitation occurs fairly evenly throughout the year, with average winter snowfall amounting to 76 inches, and overall precipitation about 40 inches. The average relative humidity in the afternoon is 55 percent; and there is 60 percent sunshine in the summer and 50 percent in the winter.[1] The site is in the lower range of USDA plant hardiness zone 5, with average minimum temperatures of -15 to -20 degrees Fahrenheit.

Soils

Most of Saint-Gaudens is located on deep, excessively drained soils formed in sandy glacial outwash deposits that are classified as the Windsor series. Most of the hedges are situated on Windsor loamy sand, 3 to 8 percent slopes (WdB), which is on the top of a terrace; the west end of the west meadow hedge along Saint Gaudens Road is in Windsor loam sand at 8 to 15 percent slope (WdC), which is on the side of a terrace. Both soils are rapidly permeable, with low water capacity and tendency toward drought and low fertility. The depth to bedrock is generally more than 5 feet.[2] The extent of soil disturbance in the areas surrounding the hedges is not known, although several areas have been modified into built terraces characterized by fairly level surfaces with steep banks.

Light

Most of the hedges are oriented in an east-west direction that allows for full sun in open areas on the south side and limited sun on the north (primarily late afternoon western light). The amount of shade on the hedges has increased overall since the historic period due to the growth of woods on former fields along Saint Gaudens Road, ornamental tree plantings (birch allee, Pan grove, etc.), and from the increased dimensions of the hedges. The historic rectangular profile of the hedges increases the amount of shade on the lower parts of the canopy.

HEDGE PLANT CHARACTERISTICS & CONDITION

Species

The clipped hedges at Saint-Gaudens consist of pure hemlock, pure white pine, and mixed white pine and hemlock (tapestry). Although both are evergreens and are native associates in a white pine-hemlock forest, hemlock and white pine have different habits and growing requirements, and therefore respond differently to management as hedges.

Eastern White Pine

The Eastern white pine found in the Saint-Gaudens hedges is the native, typical variety found in the Northeast, *Pinus strobus* var. *strobus*.[3] Most of the original plants were probably transplanted from surrounding old fields (the species is known in New England as "old field pine"). Although not a common hedge plant, white pine is capable of producing a well-defined, long-lived hedge provided it is maintained with the correct growing conditions (half to full sun) and pruning/shearing techniques. Hedge treatises from the early twentieth century recommend white pine as an excellent hedge plant.[4] At the Canadian Central Experimental Farm in Ottawa, Ontario (same hardiness zone as Cornish), a white pine hedge planted in 1890 still had a dense, full canopy forty years later in 1930, at a height of 7 feet and width of 8 feet 9 inches (Figure 0.3). At the time, it was noted that the "…White Pine has made an attractive and satisfactory hedge and after forty years is still in good condition…Because of its soft, light green foliage it is very striking in appearance and much admired. Being a native species it is quite hardy at Ottawa and during all the years since it was planted it has never been injured by winter."[5] The battered profile (angled sides) of this particular hedge allowed the lower canopy to receive maximum sunlight. Today, seventy-seven years later, however, the hedge in Ottawa has lost most of its lower canopy, most likely due in part to shade from adjoining overgrown hedges (Figure 0.4).

White pine prefers well-drained, acidic soils, but its growth is usually best on soils with good moisture retention. It grows naturally on sandy loamy soils such as found at Saint-Gaudens. The species typically reaches heights of over 100 feet, and live over two hundred years if left undisturbed. Growth is generally slow during the first two years, accelerates to 3 feet of new growth per year between ages ten and fifteen, and then stabilizes to between 1 and 2 feet of new growth annually. White pine develops new growth in late spring, generally through June. This new growth is generally in the form a strong, apical shoot, and not from shoots on older wood. White pine is moderately shade intolerant, and can achieve maximum height growth in as little as 45 percent full sunlight under normal circumstances. The rooting habit is a vestige of a taproot with usually three to five large roots spread outward and downward in the soil. White pine is subject to a number of diseases and pests, including white pine blister rust, ambrosia beetle, bark beetle, elongated hemlock scale, hemlock sawfly, pine bark aphid, spruce spider mite, and white pine weevil.[6]

Eastern Hemlock

The hemlock found in the hedges at Saint-Gaudens is the common, native Eastern or Canada hemlock (also known as hemlock spruce), *Tsuga canadensis*. It was historically one of the most popular plants for formal hedges in the

Northeast. The species responds very well to clipping, and can be kept at almost any height and shape (Figure 0.5).

Eastern hemlock prefers moist to very moist, well-drained and acidic to neutral soils, and does not grow well where summer droughts are the norm. It occurs naturally in cool, moist sandy loamy soils such as found at Saint-Gaudens. The species typically reaches heights of between 70 and 100 feet, and is generally long-lived, on average approaching four hundred years. Growth is generally slow, with new growth in late spring, generally through June. This new growth occurs anywhere along its younger wood. Easter hemlock is the most shade tolerant of all tree species, and can survive with as little as 5 percent of full sunlight. In hedge situations, however, excessive shade will reduce or eliminate the canopy (Figure 0.6). The rooting habit is generally shallow, although it can become deeper in better drained sites. Hemlock is subject to a number of diseases and pests, including canker, blister rust, needle rust, elongated hemlock scale, hemlock eriophyid mite, hemlock looper, hemlock scale, hemlock sawfly, hemlock woolly adelgid (not yet found in the region, but nearby), spruce budworm, and spruce spider mite. Hemlock is also a favorite fodder for deer, and browsing is a common occurrence in the region. [7]

Size, Shape and Function

The hedges range in size from approximately four to eighteen feet tall, and from three to approximately twelve feet wide. All are rectangular in profile, except for the Galleries entrance hedge, which has a cone and battered profile. In plan, the hedges within the garden rooms and east of the Little Studio and at the Lincoln Bust extending off the Atrium are rectangular (see Drawing 1). Hedges that are semi-circular in plan include those bordering the main entrance to Aspet, known as the Horseshoe, the upper section of the terrace garden hedge, and the Galleries entrance hedge. Hedges that in plan have informal or irregular curves include the kitchen hedge, and the hedges along Saint Gaudens Road and enclosing the cutting garden and Caretaker's Cottage.

The preferred profile for all hedges is one that has an inward batter (the slope of the side faces) that allows maximum sunlight to reach the bottom branches (Figure 0.7). The rectangular profile typical at the Saint-Gaudens hedges is considered a fair type of profile, but if the side canopy slants inward at the base, this is considered a poor profile for hedges because it inhibits light from reaching the lower limbs. None of the hedges at Saint-Gaudens have this type of vase shape.

Physical Condition Overview

The hedges are overall healthy, with no evidence of dieback caused by insects, pathogens, salt, or any other possible biotic or abiotic causes. Most of the hedges have varying amounts of dieback primarily in the lower side canopy that appear to be caused by shading from the hedge itself or by adjoining vegetation such as woods, specimen trees, and weeds.[8] Most hedges also have areas of weak canopy caused primarily by shading. Some hedges, such as the cutting garden hedge, have weak branching as a result of lateral overgrowth of the side branches. These hedges are susceptible to snow-load damage. Lastly, some loss of side canopy may be the result of breakage from snowplowing or abrasion by vehicles or pedestrians.

Over three-quarters of the hedges are hemlock, in part because it naturally responds more favorably to the constraints of management as a hedge. Where it forms a tapestry with hemlock, the white pine generally dominates the upper portions of the canopy and the south side where light levels are higher. The Little Studio hedge and west meadow hedges are the only pure white pine hedges.

EXISTING MAINTENANCE OVERVIEW

Previous Hedge Studies

The existing condition of the hedges reflects a long period of establishment, replanting, and renovation. Although they have been recognized as a character-defining feature of the landscape, it was in the mid-1980s as part of a comprehensive landscape preservation planning effort that they began to receive focused attention. Maintenance and renovation of the Saint-Gaudens hedges was addressed in several studies undertaken between 1986 and 1995, as research on the site history portion of a Cultural Landscape Report was underway, but prior to completion of the analysis and evaluation of the significance of the property. While these studies provide documentation and detailed direction on the management of the hedges, they were not developed in the context of landscape significance and treatment as presently prescribed in the complete CLR through treatment. Now all more than twelve years old, these documents also do not address changes in conditions and current management needs.

Between 1986 and 1987, Diane Kostial McGuire and Barbara Harrison Watson prepared a hedge maintenance manual, entitled “Historic Hedge Maintenance Manual for Saint-Gaudens National Historic Site,” that focused on improvement of the existing hedges.[9] The report identified lack of proper shearing, uneven dimensions, competition from weeds, and inadequate light as the main problems for the hedges. Due to lack of an historical evaluation (the CLR analysis and evaluation had not been completed), the report considered 1907 (Augustus Saint-

Gaudens' death) to be the end of the historic period while the current CLR Volume II Analysis section (2008) recognizes the historic period as extending to c.1950 during stewardship by the Saint-Gaudens Memorial. The McGuire and Watson report therefore emphasized returning to white pine hedges.

The most extensive of the hedge studies is William Noble's "Hedge Restoration Manual," completed in c.1987.[10] In his experience as Gardener for Saint-Gaudens beginning in 1986, Noble provided extensive documentation on the history of the hedges, then-current problems, and proposed maintenance and renovation strategies, including requirements for a nursery. The emphasis of these strategies, which were based in part on Noble's experience in maintaining the hedges, was primarily on repairing rather than replanting the existing hedges through proper horticultural and management practices. Perhaps most importantly, the report outlined the peculiar pruning and shearing requirements of white pine, and a technique for infilling using small, young plants. The report did not prioritize plans for renovation or replacement of individual hedge sections. Most of the recommendations in this report remain valid today, except for changes in the conditions of the hedges. The report was also written prior to the completion of the CLR analysis and evaluation, and so does not place the management of the hedges in the larger treatment of the overall landscape. As with the McGuire and Watson report, this report generally limits the historic period to Augustus Saint-Gaudens' lifetime.

In June 1993 the Olmsted Center for Landscape Preservation completed a preservation maintenance plan for the site.[11] This plan addressed seasonal preservation practices and work procedures for the hedges that expanded upon the recommendations of the Noble report. Two years later in May 1995, the Olmsted Center completed the "Historic Plant Inventory for Saint-Gaudens National Historic Site."[12] This report inventoried the hedge species, assigned each a number, and included a map of the existing appearance of the hedges and other vegetation in the historic core of the property.

Since these studies were completed, the condition of the hedges has improved overall due largely to the enhanced maintenance. With the exception of some more heavily shaded areas, the hedges are generally tighter and more evenly sheared than was the case when the studies were undertaken in the mid-1980s, and the problems with competition from weeds is largely under control.

Current Maintenance Overview

The hedges are routinely sheared on an annual basis between July and September to maintain their historic rectangular profile. Shearing all hedges on the site generally requires a minimum of four hundred hours. More intensive trimming,

such as pinching, pruning, and removal of deadwood, is not carried out on an annual basis (the last pinching occurred in 1998), primarily due to inadequate staffing. Renovation work, including cabling, deadwood removal, and interplanting and replanting of individual trees within the hedges, has also largely ceased since 2000. The hedges were last fertilized in 1998 with a 5-1-9 organic blend granular, although most also receive some feeding applied to adjoining lawns on an annual basis. The hedges are not irrigated, except where new plantings are installed.[13]

A complete listing of maintenance work on the hedges between 1996 and 2007 is included in Appendix B.

ANALYSIS AND EVALUATION OVERVIEW

Saint-Gaudens National Historic Site is nationally significant for its association with the American sculptor Augustus Saint-Gaudens. As a National Historic Site, Saint-Gaudens was administratively listed in the National Register of Historic Places in 1966, but documentation (National Register form) was not completed until 1985. A 1998 draft revision to this documentation identifies that the site is significant, in addition to its association with Saint-Gaudens (Criterion B), under three additional contexts: Association with the Cornish Arts Colony (Criterion A); as a notable example of landscape architecture, both as a work of Saint-Gaudens in the neoclassical style and later improvements by noted landscape architect Ellen Biddle Shipman (Criterion C); and as an early example of the preservation and memorialization of America's cultural legacy under the stewardship of Augusta Saint-Gaudens and the Trustees of the Saint-Gaudens Memorial (Criterion A).[14] The primary period of significance proposed in the 1998 draft is 1885 to 1907, the years Saint-Gaudens lived at Aspet. The secondary period of significance identified in the 1998 draft documentation is 1919 to c.1948, corresponding with the period of historic preservation and memorialization.

Most recently, the analysis and evaluation in the Cultural Landscape Report, Volume II (2008), recommends a continuous period of significance from 1886 to c.1950, extending from Augustus Saint-Gaudens' life at the site, through his wife Augusta's early commemoration efforts, to the time during the Trustees' stewardship when they achieved a majority of the physical improvement goals, notably construction of the new galleries and planting of the birch allee by c.1950.[15] As with the previous documentation, the CLR Volume II recommends that the site be recognized under Criterion B for association with Augustus Saint-Gaudens and Criteria A and C in the areas of art, landscape architecture and conservation/historic preservation. In addition the significance under Criterion

C in the area of architecture is included as recommended by the List of Classified Structures survey.

Within the proposed expanded period of significance recommended in the CLR, all of the hedges are considered contributing landscape features, except for the visitor center hedge, which was added in 1967 to screen a temporary maintenance building and is therefore non-contributing. The hedges contribute to the landscape's historic character, defined in NPS cultural landscape methodology as "the sum of all visual aspects, features, materials, and spaces associated with a cultural landscape's history."[16] However, some hedges have changed through replacement or alteration of their plant material, notably the Little Studio hedge that was replanted in c.1970 on a different alignment, or the west meadow hedge along Saint Gaudens Road that was also replanted in the 1970s and again replanted in 2007, and was also replanted on a slightly different alignment. In addition, the historic character of certain hedges or sections of hedges have changed since the end of the historic period due to alteration of condition, scale, profile, and alignment resulting from inadequate maintenance.

Figure 0.1: View looking east over the kitchen and Shaw hedges from a second floor window of Aspet, with the birch allee to the left and the mature woods south of Saint-Gaudens Road to the right, 2007 (Olmsted Center for Landscape Preservation).

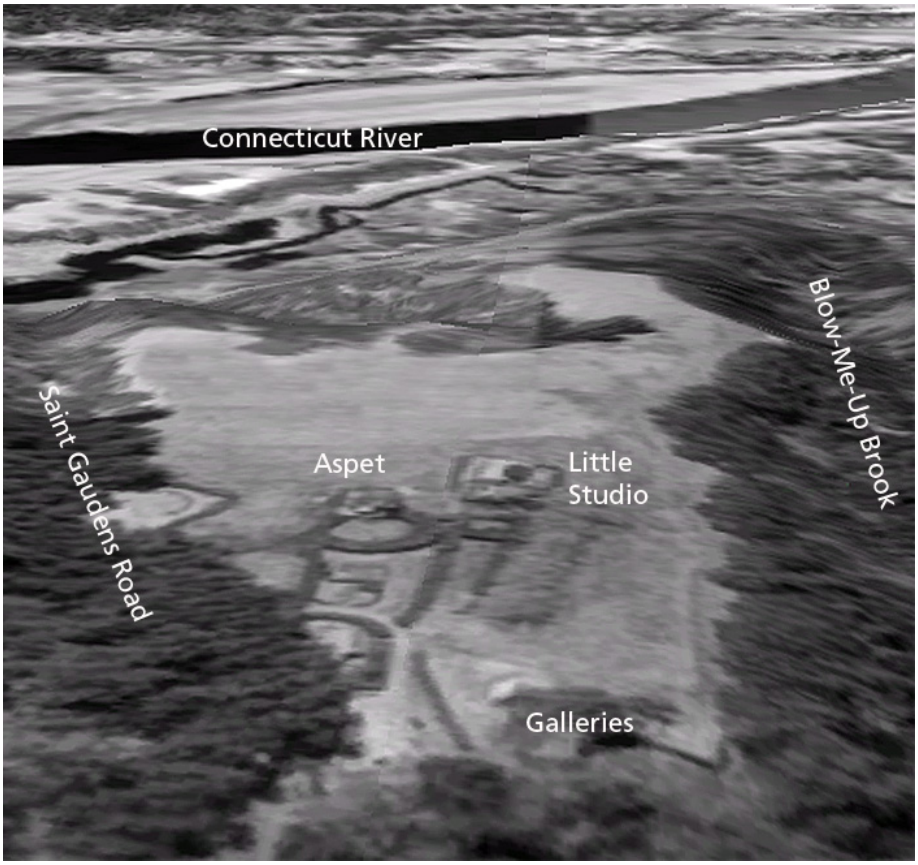

Figure 0.2: Aerial view looking west over Saint-Gaudens National Historic Site toward the Connecticut River, illustrating environmental setting (USGS aerial photograph, c.2004, 3-D animation courtesy of Microsoft Live Search, annotated by SUNY ESF).

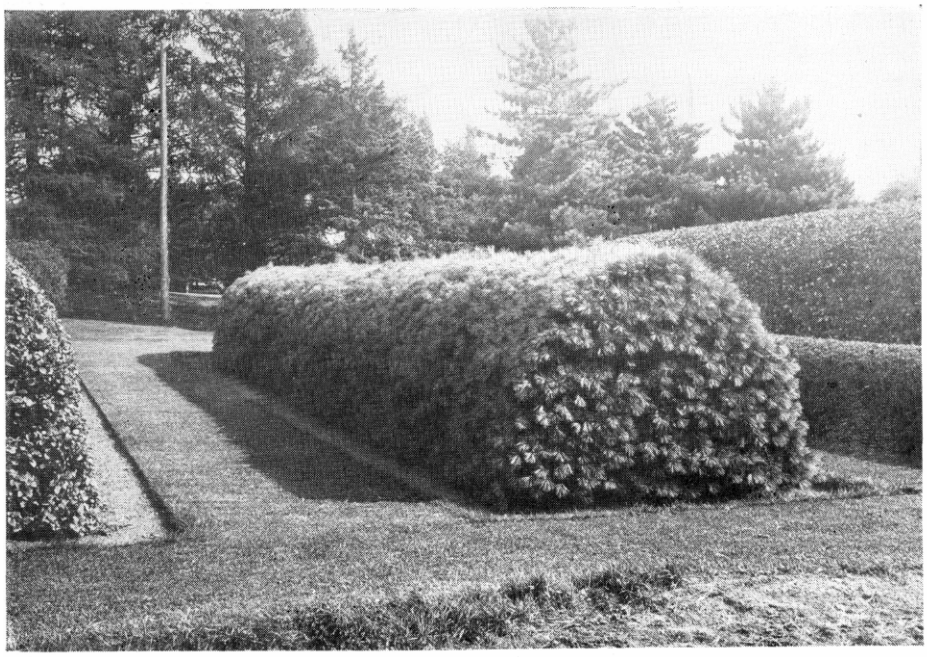

Figure 0.3: Mature white pine hedge at the Canadian Central Experimental Farm in Ottawa forty years after planting, c.1931 (W. T. Macoun, *Hedges and their Uses* [Ottawa: Dominion of Canada Department of Agriculture, Bulletin No. 142, 1931], 22).

Figure 0.4: A current view of the same white pine hedge as shown in figure 0.3, illustrating loss of lower canopy most likely due in part to increased level of shade, 2006 (SUNY ESF).

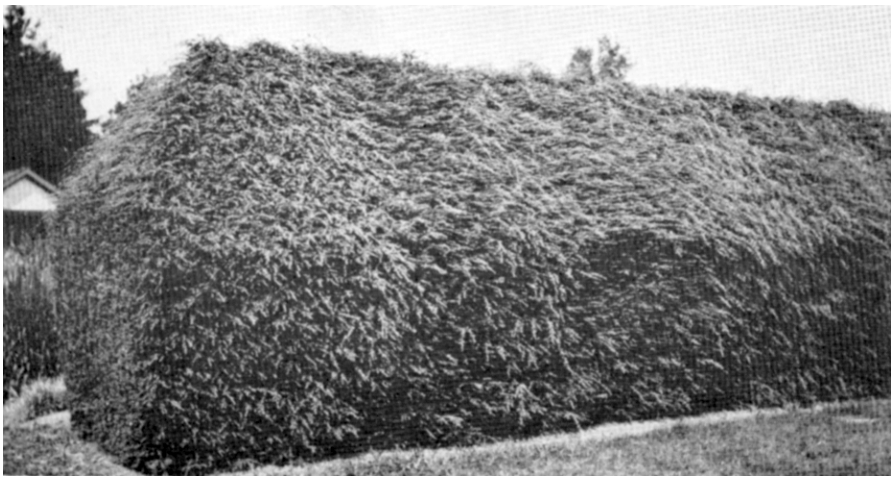

Figure 0.5: Mature hemlock hedge at the Canadian Experimental Farm, Agassiz, British Columbia, approximately forty years after planting, c.1930 (W. T. Macoun, *Hedges and their Uses* [Ottawa: Dominion of Canada Department of Agriculture, Bulletin No. 142, 1931], 42).

Figure 0.6: Hemlock hedge (similar to figure 0.5) at the Canadian Central Experimental Farm in Ottawa, planted in 1889, photographed 2007. Note loss of side canopy, probably due from excessive shade from adjoining hedge (SUNY ESF).

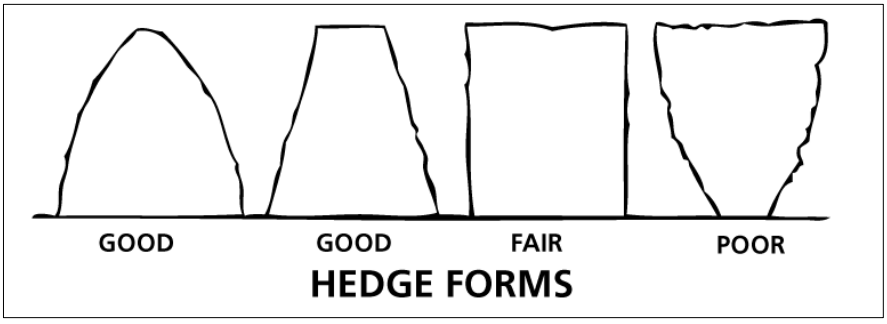

Figure 0.7: Rating of common hedge forms based on health of hedge. The good forms have a substantial batter outward toward the base, which allows sunshine to reach the lower branches (SUNY ESF sketch based on Donald Wyman, *Hedges, Screens & Windbreaks* [New York: Whittlesey House, 1938], 41).

PART 1: GENERAL HEDGE TREATMENT GUIDELINES

This part describes the treatment guidelines that apply to the hedges as a whole, establishing a treatment philosophy based on the recommendations of the CLR, and identifying general guidelines for repair and replacement. Detailed treatment of each hedge section is described in Part 3, Specific Hedge Management Guidelines.

HEDGE TREATMENT PHILOSOPHY

In National Park Service cultural landscape management, treatment is a term used to describe planned changes to the physical appearance of a landscape, usually for the goal of enhancing historic character in the context of contemporary park operations. Treatment of the Saint-Gaudens landscape has been addressed in a number of documents, culminating with the current Cultural Landscape Report (CLR) Volume III: Treatment. Prior to this report, the earliest document assessing treatment for the overall landscape was a draft Cultural Landscape Report by Pressley and Associates, "Landscape Management Options" (1994). The authors recommended preservation as the primary treatment, as defined by *Secretary of the Interior's Standards for the Treatment of Historic Properties*, because of the overall good condition, historical integrity, and number of extant features. The site's 1996 General Management Plan (GMP) likewise articulated a preservation philosophy for landscape as well as the artwork and structures.[17] The GMP also indicated three complicating factors in a preservation treatment approach for the landscape: the need to accommodate visitors and interpretation, the need to provide administration and maintenance facilities, and the "living memorial" concept outlined in the park's enabling legislation.[18] In light of the park's desire to preserve the historic resources in balance with the practical and legislated requirements of the site, the preferred fourth alternative in the GMP presented a two-phased approach to treatment with onsite and offsite development. As a result, a rehabilitation zone was established at the southeast corner of the historic core around a 1960s temporary maintenance facility that was converted to a visitor center in 2002–03.

The current CLR Volume III reiterates preservation as the primary treatment for the site, with a rehabilitation zone encompassing only the visitor center and its immediately adjoining landscape. With respect to the hedges, CLR Volume III recommends that they be treated according to the standards for preservation, except for the non-historic visitor center hedge (H-26). In a preservation treatment, the hedges would be managed to perpetuate their historic character in terms of materials, design, and setting. Preservation may include in-kind

replacement of plant material where the existing plants are inconsistent with the historic character of the hedge and cannot be returned to their historic form through pruning, shearing, and other maintenance techniques. In-kind replacement may not be possible in some locations due to changes in growing conditions, particularly in terms of shade tolerance. In such circumstances, a preservation treatment approach may incorporate the use of substitute plant materials that are compatible with the historic character of the hedge and the overall landscape. As a general rule, however, preservation and in-kind replacement should be considered before adopting solutions which allow for substitute species. The cumulative effect of many substitutions of plant species and other modifications could compromise the historical setting, materials, and feeling of the site.

In the context of preservation as the primary treatment, the current CLR Volume III recommends that as a general approach, the landscape be managed to preserve and enhance its historic character as it existed by the end of the period of significance in c.1950. By this date, the last major improvements had been made under stewardship of the Trustees of the Saint-Gaudens Memorial, notably the addition of the New Galleries and birch allee.[19] Within the umbrella of this general treatment approach, the hedges warrant a modified approach that recognizes the dynamic nature of the hedges, and in particular the unintentional changes that occurred to them during World War II and following burning of the Studio of the Caryatids in 1944, which closed the site until 1948.[20] During this time, maintenance of the hedges was curtailed, resulting in overgrowth. Once overgrown, the hedges could not be brought back to their intended size without causing dieback. By the end of the historic period in c.1950, some hedges had been retained in their clipped although larger form; some were replaced, such as the portion of the Shaw hedge (H-18) adjoining the birch allee; and others were let go and grew into trees, including the west meadow hedge (H-1), Little Studio hedge (H-9) and the north side of the cutting garden hedge (H-6), although they were later replaced and are today managed as hedges. Another two hedges—the Galleries entrance hedge (H-22, 23) and the Lincoln bust hedge (H-24, 25)—were added in c.1948 at the very end of the historic period and only reached maturity in the years afterwards.

Due to their dynamic nature, it is recommended that treatment of the hedges follow a flexible approach within the c.1950 treatment period identified in the CLR. This approach for the hedges should emphasize the original design intent and subsequent designed changes made during the period of significance. As a general benchmark, all hedges except for the later Galleries entrance and Lincoln bust hedges (H-22 through 25) should be managed for the character they had attained prior to the lack of management that occurred during the 1940s.

Designed/intentional changes made prior to 1940 should be retained and perpetuated where feasible. In terms of species composition, all pre-1940 hedges (except H-2 and possibly H-7 and 8) should be managed to retain and enhance their stock of white pine because white pine was the original plant material and is highly distinctive aspect of the landscape's historic character. However, hemlock was introduced at an early date (possibly during Augustus Saint-Gaudens' lifetime) notably through interplanting where white pine had failed. This change in plant material resulted in the existing tapestry of pine and hemlock found in most of the hedges today. Several of the hedge sections were replaced in pure hemlock due to shaded conditions during the later historic period as well as afterwards. Where it is not possible to maintain white pine due to environmental conditions, use of pure hemlock would be appropriate.

LEVELS OF TREATMENT

Within this treatment philosophy for the hedges, there are two levels of treatment for the historic hedges that correspond to general hedge typologies defined by historic function and design intent (Drawing 2). The first level of treatment encompasses those hedges that have a formal design and architectural function—the horseshoe, Little Studio, Pan grove, terrace garden, Adams, Shaw. Due to the small scale and formal design of the landscape spaces that they enclose, these hedges warrant a strict adherence to perpetuating their historic profile, scale, alignment, species, and level of maintenance that existed prior to c.1940. The galleries entrance hedge and Lincoln bust hedge also fall under this level of treatment, but since they were planted in c.1948 at the very end of the historic period, they instead warrant adherence only to their original design intent. The scale, shape/profile, and full canopy of these hedges are critical to maintaining the historic formal landscape spaces they enclose. Where the existing plant materials no longer maintain the historic character and design intent, replacement may be warranted.

The second level of treatment encompasses those historic hedges within less formal areas of the landscape that serve primarily a screening or perimeter-defining function—the west meadow (road), cutting garden, kitchen, Caretaker's Cottage, and parking lot hedges (see Drawing 2). Due to their design and function, these hedges may allow for a more flexible approach toward perpetuating their historic profile, scale, alignment, species, and level of maintenance. Under this second level of treatment, slight changes in alignment, overgrowth, and minor loss of side canopy may be appropriate without compromising the overall historic character of the landscape. For these hedges, minor changes in alignment, profile, and species composition could also be appropriate in replacement scenarios. This level of treatment may also allow for retention of historic plant material where it differs in scale and enclosure from

historic conditions, such as the large hemlocks in the kitchen hedge. Retaining and prolonging the life of historic plant material enhances historic character by imparting a feeling of antiquity. Aged plants can also serve as a valuable interpretive tool by providing a dynamic connection to the past and tangible evidence of time passage.

One hedge within the historic core of Aspet falls outside of the two treatment categories defined above. The visitor center hedge (H-26) was planted in c.1967, thus post-dates the period of significance for the landscape. While this hemlock hedge is in excellent condition, the recommended treatment approach as outlined in the CLR Volume III ranges from modification to complete removal. Treatment of this hedge is guided by its impact on adjoining historic features and the historic character of the landscape in general.

TREATMENT GUIDELINES FOR RENOVATION AND REPLACEMENT

When a hedge does not adequately reflect its historic character or is otherwise incompatible with the historic character of the landscape, then there are two treatment options: repair (typically referred to in hedge management as renovation) or replacement. Renovation encompasses corrective and maintenance measures to the existing plants, while replacement encompasses removal of the existing plants and replanting of the entire hedge feature.

HEDGE RENOVATION

Renovation (repair) is warranted when the existing hedge is close in appearance to its historic character, valued for its historic plant material, and/or when it is in overall in sound condition but has weak sections and gaps. Renovation of evergreen hedges is limited by the inability of the plants to sprout new growth on old wood (generally wood without needles). Pruning into old wood will cause the hedge to die back. At Saint-Gaudens, generally there is between 12 to 18 inches of needle canopy at the top of the hemlock hedges, so it may be possible to lower the height of these plants by one foot.[21] White pine generally has less room for pruning than hemlock because it does not produce needles on the lower part of the one-year twig. The depth of appropriate pruning on the sides of both white pine and hemlock is generally thinner on the sides than on the top. Aside from hand pruning and shearing, appropriate renovation treatment strategies include:

- Interplanting with young stock to fill in bare areas and gaps
- Replanting of failed individual trees with large stock
- Cabling, staking, or tying to reposition fallen limbs and fill in bare spots

Interplanting (infilling gaps) can provide a sound short and long-term renovation strategy. The park has in recent years interplanted white pine in the horseshoe and Shaw dogleg hedges, and hemlock was widely used historically to infill failing white pine hedges, leading to the tapestry effect that is found today (Figure 1.1). Interplanting should use young, vigorous plants, preferably bare-root or one-foot or less diameter balled and burlapped, in order to minimize disturbance to root systems of the existing plants.[22] These young plants should be positioned in the hedge where they will receive ample sunlight, but also where they can be adequately trimmed to maintain the appropriate dimensions of the hedge. The addition of plants along the edges of existing hedges generally would not detract from the historic character of the hedge provided the outward form is maintained. For most hedges, hemlock will perform best in interplanting, given that the weak areas and gaps are usually within shaded lower areas of the hedges. White pine interplanting may be successful on southern exposures. Spring is the best time to do interplanting, as plants begin to send out new growth and as winter damage to existing hedges can be assessed.

Replanting of individual or short runs of plants within a hedge may be a successful renovation strategy where there is ample sunlight to allow the young plants to become established. Replacement plantings made on deeply shaded interior areas of a hedge will most likely fail. The replacement plants should be of sufficient size to allow filling of the gap within a reasonable time, but also small enough to limit impacts on the root systems of existing plants. Replacement plants should be grown in full sun with an annual pruning to maximize branching and basal density. As with interplanting, spring is the best time to replant.[23]

Cabling can be used both for repositioning branches within the hedge and for maintaining branches in their existing location. Several options include vinyl-coated wire attached with hooks that can expand to accommodate growth of the branches, and woven fabric such as “arbor tape,” or “tree slings.[24] In some instances, staking may also be an appropriate means of stabilizing long, swooping branches (such as in the kitchen hedge). A variation on cabling may provide a technique for renovation where it is necessary to cut back the height of a hedge beyond live canopy (i.e., by several feet). In this technique, the top is cut back as required, but the side branches are left at their existing height. These live side branches are then bent over the bare top and tied down. After a year or two, these branches will fill in the top of the hedge, but will most likely produce tops susceptible to breakage from winter snow loads.[25]

For weak side canopies, the addition of lashed-branch screening or similar lattice may be an appropriate interim renovation measure to reinforce spatial enclosure when interplanting, replanting, or other measures are not feasible. Such screening

may have been used historically during the 1920s in the white pine hedges in the terrace garden, either by itself or as a support for vines such as sweet peas, one of Mrs. Saint-Gaudens' favorites (Figure 1.2). [26] Such screening would be a contemporary addition rather than restoration of an historic condition. For example, section H-10 in the Pan grove hedge is too shaded to allow for infill plantings; lashed branch fencing installed on the weak rear hedge (H-10) would reinforce the spatial character of this garden room as an interim measure prior to hedge replacement.

HEDGE REPLACEMENT

When renovation (repair) is insufficient to maintain a hedge or reestablish its historic character, then replacement of the entire hedge section is warranted—unless the plants warrant preservation for their historic value (such as the aged hemlocks in the kitchen hedge). The following factors may support replacement, listed in order of priority based on the hedge typology (see Drawing 1):

Formal-Architectural Hedges

1. Incompatible with the historic proportions of the garden space
2. Historic profile cannot be reestablished
3. No longer performs historic function (e.g., screening, defining space)
4. Does not retain historic species composition
5. Does not retain historic plant material
6. Plants in poor condition

Screening/Perimeter-Defining Hedges

1. No longer performs historic function (e.g., screening)
2. Historic profile cannot be reestablished
3. Is substantially overgrown relative to adjoining features
4. Does not retain historic species composition
5. Doest not retain historic plant material
6. Plants in poor condition

Non-Historic Hedges

1. Detracts from historic character of the landscape
2. Plants in poor condition

In most cases, multiple factors should be identified before a hedge is identified for replacement. Replacement must also take into consideration the impact of replacement on adjoining hedge sections and landscape features, such as the birch allee. The following are issues to be considered as part of planning for hedge replacement:

Compliance and Archeology

Section 106 review, by park cultural resource advisors and the State Historic Preservation Officer, should include information on the historic condition of the hedge, existing conditions, and proposed replacement. The guidance in this report has been developed according to the *Secretary of the Interior's Standards* and therefore implementation should not result in findings of adverse effect on the landscape. Section 106 review should also address the potential effect of hedge replacement on subsurface archeological resources. In order to assess potential impacts, the following information should be included for each hedge section to be replaced:

1. Date of the most recent plantings
2. Dates of initial plantings and dates of replacement plantings
3. Size of root balls for the plantings
4. Method used for digging planting holes (i.e. hand excavation or machine excavation)
5. If area around the plantings had soil added to it or graded away from it.[27]

While much of this information is contained in Table 1 (Appendix D), additional information may be needed, notably on the level of disturbance resulting from original and subsequent plantings. Generally, the earliest hedges of white pine were most likely taken from nearby fields as bareroot stock. Later infill plantings along the edges of the hedges were also most likely bareroot. Stock in replacement hedges were most likely nursery-grown stock, either in pots or bagged & burlapped (b & b) that would have required more ground disturbance than bare root stock.

Prior to removal of the existing plants, the hedge should be carefully documented in terms of plant location, species, and size (base trunk diameter, height, and width) and overall appearance and health. This documentation may be useful in determining the appropriate historic alignment of the replacement hedge. Since the age of many of the hedges is not known for certain, consideration should be given to analyzing the age of sample individual plants through dedrochronology.

Coordination & Sequencing

Hedge replacement should be undertaken in coordination with replacement of adjoining landscape features that impact growing conditions, such as light levels and rooting. For example, if hedges in the shade of the birch allee warrant replacement, it may be appropriate to replace them when the allee is replanted given the shade and root competition from the birch. Coordinated replacement should be considered only if replacement of the involved features is warranted within the same general time of two to five years.

Replacement of individual hedge sections should also be sequenced based on interconnected or common sections, particularly within the Pan grove, terrace garden, Adams, and Shaw hedges to maintain the symmetry of these garden spaces. For example, replacement of hedge section H-11 between the Pan grove and terrace garden should be undertaken along with the two other hedge sections framing the lower terrace (H-12, 14).

Species Composition

In keeping with the previously discussed general treatment approach, hedge replacement, when necessary, should use the species that existed during the historic period: pure white pine, pure hemlock, or a mixed white pine-hemlock/tapestry. Selection of plant species should also address current growing conditions and maintenance. The species should be appropriate to existing light and moisture levels so that a vigorous and healthy hedge will become established. Maintenance may also be a consideration in species composition given that significantly more labor is required to maintain a white pine hedge.

Using the hemlock and white pine found historically, there are four general approaches to species composition for hedge replacement (except for the post-1940 Galleries and Lincoln bust hedges which should only be replaced in pure hemlock). Preference in approach may vary depending on the particular hedge.

1. *Replace using the plant species present in c.1940 prior to the lack of management that began during World War II*: This approach to replacement would perpetuate changes in species composition that occurred through the historic period. Examples of this approach include replanting the hedge section between the Pan grove and terrace garden (H-11) in pure hemlock, perpetuating the change from white pine made in c. 1930. The section between the terrace garden and Adams Memorial (H-14) would be replanted as a tapestry of white pine and hemlock, perpetuating hemlock infill that was made within the original white pine hedge.
2. *Replace using the original plant species and then follow the historic development pattern*: Under this approach, most hedges would be replaced in white pine, and then hemlock would be added either through interplanting or complete replacement as white pine failed due to lack of light or other issues. This approach to replanting would take a long-term view toward reestablishing the species composition that existed by c.1940. Examples of this approach would include replacing the section between the Pan grove and terrace garden (H-11) in its original white pine, and then over time as shade increases from the birch trees in the Pan grove (if replaced at the same time), the hedge would be

replaced with hemlock as it existed in 1940. The section between the terrace garden and Adams Memorial (H-14) would be replaced in white pine, with hemlock infill added over time as the hedge thins, producing the tapestry hedge that existed in 1940.

3. *Replace using existing plant species composition*: This approach would be a default where there is insufficient documentation on species composition in c.1940. Recent infill plantings that obviously post-date the historic period should be excluded in the replacement hedge.
4. *Replace using the species composition best suited to the environmental conditions*: An example of this approach would be replacement of the west meadow hedge, recently replanted in its original white pine, with hemlock due to the heavy shade from the adjoining woods.

Use of Substitute Plant Species

The use of substitute plant species for common Eastern white pine and Eastern hemlock does not appear warranted at this time due to pests, disease, or maintenance issues. The threat of hemlock woolly adelgid, although not now present in the immediate area, is likely in the future. This insect can, however, be managed in vigorous small-scale plants such as hedges through application of dormant oil.

While the use of substitute plant species does not appear warranted at this time, there are several worth mentioning. Northern Japanese hemlock (*Tsuga diversifolia*) and Siebold hemlock (*Tsuga sieboldii,* also from Japan), both long used as ornamentals in the eastern United States, are perhaps the closest in character to Eastern hemlock, and are also not seriously affected by woolly adelgid. However, they would be problematic replacement species because they may not be sufficiently cold hardy given their hardiness limited to Zone 5.[28]

For white pine, there are apparently no other species that would improve on the disease resistance or shade tolerance of Eastern white pine. There is, however, a strain of the common Eastern white pine that may warrant consideration to address the long-standing problems with managing the New Hampshire native strain as a hedge due to its fast-growing and leggy habit. This strain, native to Prince Edward Island, Nova Scotia, and in adjoining areas of New Brunswick and Maine, has more compact crowns and is slower growing. It appears, however, to have a darker color, but the extent to which this varies from the New Hampshire native has not been evaluated in the field.[29] There are also other denser and more slow-growing cultivars of white pine, such as *Pinus strobus* 'Compacta,' but the appearance of the needles on these is much more dense than the species and therefore would probably produce a change in the historic character of the

hedges. 'Compacta' is also a very expensive plant, presently selling at $250 per 4 to 5 foot plant.[30]

Plant Spacing

Replacement hedges should be planted on the historic centerline of the hedge. Most of the hedges were originally planted with one or two rows of plants, closely spaced, with infill plants added later along the edges. Replication of the original or subsequent plant spacing should not be considered a priority in hedge replacement if it does not affect the historic character of the hedge. The best current horticultural practice should be employed to achieve the historic dimensions of the hedge in a reasonable time, and to ensure the future health and vigor of the hedge. A single row is generally sufficient to produce a full hedge, unless a very wide hedge is desired from the outset. When using young stock, 1 to 3 feet in height, the appropriate spacing between plants is 15 to 18 inches.[31]

Hedge Scale

Replacement hedges should be managed to allow quick growth to within two to three feet of the range of desired dimensions (height and width). Once the hedge grows to within the lower limit of this range, it should be managed to allow the minimal amount of outward growth possible.

Short-Term Cyclical Replacement

With historically white pine hedges in low-light areas, such as the west meadow hedge, a possible approach toward replacement may include short-term/cyclical replacement. This approach would replace the white pine once they begin to loose lower limbs or otherwise become weak, for example on a ten-year cycle. This approach would be appropriate only if there is sufficient light to allow the white pine to become established within the cycle as a full, compact hedge.

CONTEMPORARY MODIFICATIONS

As outlined previously, the hedges should be treated to retain or enhance their historic character, addressing both the original design intent as well as development through the period of significance ending in c.1950. With preservation as the primary treatment, all hedges will be retained as features in the landscape, although there may be instances where it is necessary to make modifications from the historic (1885–c.1950) condition. There are two general types of modifications that may be needed aside from modification in species composition discussed previously. In both cases, the preferred treatment will be preservation or in-kind replacement based on historic conditions.

1. Shift in location: A slight shift in the historic location of the hedge, as part of hedge replacement, may be warranted to improve the growing

conditions of the hedge, to prevent deterioration of adjoining buildings, structures, or objects, to facilitate maintenance, or to improve safety (sight distances, etc.). Generally a shift in location should be minimized and kept as close as possible to the historic location. The shift should retain to the fullest extent possible the spatial character defined by the hedge.

2. Creation of new openings: New openings in the hedges may be required to accommodate pedestrian circulation. New openings should be considered a last resort since they may affect the spatial definition of the landscape. If new openings are required, they should be made as archways within the hedge (depending on the height of the hedge) rather than as full-height openings in order to maintain the appearance of a continuous hedge. It may also be appropriate to change existing non-historic openings to archways (such as Adams north entry).

Figure 1.1: Example of interplanting in the horseshoe hedge, 2006. At right next to Superintendent BJ Dunn are white pine interplantings made in the late 1980s, and on the far left are older examples of hemlock infill within the original white pine hedge (SUNY ESF).

Figure 1.2: View looking north through the terrace garden showing lashed-branch screening along the weak sides of white pine hedges, c.1920 (Saint-Gaudens National Historic Site, photograph 557).

PART 2: HEDGE MAINTENANCE GUIDELINES

The following is an overview of hedge management guidelines derived from reports specific to the hedges at Saint-Gaudens National Historic Site, as well as general treatises on hedge management. This emphasis of this section is on providing general guidance and framework for maintenance of the hedges. Also included are guidelines on selecting and propagating plant material for hedge renovation and replacement. In keeping with the recommended treatment approach, the hedges should overall be maintained to produce a well-tended character defined by sheared and even canopy, absence of weeds and deadwood, and a raked and mulched bed.

A general calendar of maintenance tasks and work procedures, based on William Noble's "Hedge Restoration Manual" (1987) and the Olmsted Center's "Preservation Maintenance Plan" (June 1993), is summarized in Appendix C. Management of hedge maintenance practices should be coordinated with the NPS Facility Management Software System (FMSS) anticipated for implementation system-wide in the near future.

ENVIRONMENTAL CONDITIONS

Maintenance of adequate environmental conditions (soil, light, moisture, etc.) is necessary to ensuring the long-term preservation of the hedges. While the existing conditions are generally adequate for white pine and hemlock, both of which are native to the region and to the existing soils, continual monitoring and possibly adjustment are warranted to ensure optimal growing conditions.

FERTILIZATION AND IRRIGATION

The aim of fertilization should be to strengthen weak hedges, rather than to encourage excessive new growth that may make them more difficult to restrain in hedge form. The hedges presently do not indicate any weakness due to lack of nutrients or improper soil acidity (pH).[32] Hemlock and white pine prefer a slightly acidic soil (ph 5.0-7.0), but pH in the level of 4.0-5.0 is also acceptable.[33] The natural high permeability of the soils at the site generally produces acidic conditions. The most recent testing indicated a pH of 5.5, which may reflect past application of lime to adjoining lawn areas.[34] If the pH falls below 4, which is unlikely, then corrective action would be warranted.

The most current soil testing around the hedges in 1998 revealed the following nutrient levels, all of which are adequate levels: Phosphorous 121, Potassium 136, Magnesium 88, Calcium 1200 ppm.[35] White pine can suffer from iron chlorosis,

but this is unlikely in acidic soils. Given the high permeability of the sandy loamy soils, nutrients may, however, tend to leach over time, and therefore application of fertilizer may be warranted in the future. For established hedges, traditional fertilization techniques, such as the application of a top dressing of well-rotted manure, may be sufficient. For young plants that have been in the ground for one year, an application of granular fertilizer with 50 percent organic nitrogen (such as 5-10-10), applied in early June or late August, may aid in the establishment of replacement hedges. [36]

Proper soil moisture levels are important for both white pine and hemlock, but especially for hemlock which naturally grows in cool, moist conditions. White pine can tolerate occasional dryness, but produces better growth in moist soils. All hedges near competing plantings (such as the birch allee), or positioned on a raised area (such as adjoining a retaining wall or top of a terrace slope), should be monitored for ample ground moisture, especially when young. Special attention should be given to ensure that the hemlock hedges have adequate moisture given the high permeability of the soils and the relatively exposed, windswept site conditions. Hemlock should generally receive one inch of water every 7 to 10 days during dry periods. Watering should be done through application below the hedge, rather than through spray irrigation.[37] If prolonged periods of drought appear typical, the addition of an irrigation system, such as drip-line, may be warranted.

Rainfall and data on humidity, leaf wetness, and soil moisture can be determined through use of the park's weather station located in a field on the adjoining farm property. Remote sensors measuring soil moisture can be added in the future and installed within the hedges in the historic core area.

WINTER CONDITIONS

The upper Connecticut River Valley region occasionally receives major snowstorms that overload the hedges. Accumulation of heavy snows on the flat tops of the hedges can cause them to deflect or break, especially those that have extended lateral branching. There are two options for addressing heavy snow loads: 1). Remove the snow with brooms, rakes, or other tools that will not damage the plants (as is current park practice); and/or 2). Tie up the tops of the hedges in the winter, using rope or burlap around the perimeter. The greater width of burlap provides better support.

The hedges can also be damaged from snow plowing, both through direct physical contact with plows as well as through pushing snow piles into the hedges. The limits of plow areas should be clearly marked with stakes or other devices at the beginning of the snow removal season.

Both hemlock and white pine can be severely injured or killed from salt spray applied along roads in the winter. The salt spray can kill the needles for a considerable distance from the road, and can also change the soil structure and lead to compaction. Snow from salted roads should also not be plowed near the hedges. Salt is a potential problem primarily for the hedges along Saint Gaudens Road, including the horseshoe and parking lot hedges. To avoid this potential damage, alternative de-icing methods such as application of sand should be used on the state and town-maintained road. If this is not possible, protective screening such as a burlap barrier should be installed approximately five feet in front of the hedge and to the full height of the plants to prevent salt drift. Anti-desiccants such as "Wilt-Pruf" do not protect against salt damage because the salt tends to wash away the material.

TRIMMING

One of the critical and most labor-intensive aspects of maintaining the historic character of the hedges is appropriate trimming. Because nearly all of the hedges at Saint-Gaudens were historically trimmed into a rectangular form, with sides perpendicular to the ground and a flat top, the lower canopies are often shaded. This condition requires extra maintenance to ensure that the hedge remains full to ground level. The ideal shape for a hedge from a horticultural perspective is to have the base wider than the top in order to allow maximum sunlight to reach the lower canopy (see Figure 0.7), but for purposes of historic preservation, the existing rectangular profile should be maintained.

White pine and hemlock have different habits that warrant different trimming techniques. The following is a summary of appropriate techniques for each type, as well as for hedges that have a combination of the two.

TRIMMING WHITE PINE HEDGES

To retain the most full and compact canopy possible, white pine requires a careful combination of structural pruning, pinching, and shearing. As with most evergreens, white pine should only be trimmed into wood with live needles, otherwise the branch will die back. White pine also will not develop new growth on the lower part of the one-year twig, and therefore pruning below this point will usually also result in the branch dying back to the whorl of needles below.[38]

Structural pruning, involving removal of dead wood and thinning of the top of the hedge to improve light penetration and reduce moisture, should be undertaken early in the spring before new growth is evident, and also in the fall.

Pinching of young shoots (candles) is the preferred method of trimming for mature white pine hedges because it enables the hedge to be maintained at or close to its existing size for many years. Pinching (also known as candling and a technique common in bonsai) counters the white pine's natural tendency toward leginess and forces denser branching. It is, however, very labor intensive. The practice involves removal or partial removal of 50 percent of the candle with the fingertip or knife before the candles begin to expand into needles, generally in early June (Figure 2.1).This may also be done by hand pruning with shears. Then pinch secondary buds as they emerge. If some additional outward growth is desired, the candles should be pinched back proportionately to the growth reduction desired. Pinching removes the terminal apical shoot, thus forcing the branch to set multiple new bud shoots lower on the branch, which will sprout the following year. This effect is known as "back budding" and is an important means of enhancing the density of the hedge. The earlier the candle is pinched, the more buds will be set.[39]

To further reduce the growth of white pine, consideration should be given to completely removing the central, dominant bud in late winter before any growth begins, and then to follow with pinching as recommended above. Removal of the dominant bud in late winter is a bonsai technique recommended by the U. S. National Arboretum.[40]

Pinching and removal of buds will not produce the relatively crisp profile that was characteristic historically, so these techniques should be followed by light shearing (with hedge trimmers) once the new growth has matured, generally in early July through September. Shearing should not extend beyond the new growth, especially on the sides and lower canopy where the new growth is most likely very thin. After shearing, the cuttings should be cleaned out to reduce the build-up of so-called nests, particularly in the tops of the hedges.[41]

TRIMMING EASTERN HEMLOCK HEDGES

As a random-branching conifer, hemlock generally responds well to shearing because of multiple buds on the branches. However, as with most evergreens, hemlock should only be trimmed into wood with live needles, otherwise the branch will die back. Structural pruning, involving removal of dead wood and thinning of the top of the hedge to improve light penetration and reduce moisture should be undertaken early in the spring before new growth appears. Generally two shearings will produce a denser branching habit than a single shearing. The first should occur just after the bud break/shoot extension, usually in early June, followed by another shearing once secondary shoots extend a few weeks later. After shearing, the cuttings should be cleaned out to reduce the

build-up of nests, particularly in the tops of the hedges. A general pruning and cleaning should be undertaken in the fall.[42]

TRIMMING MIXED WHITE PINE-HEMLOCK HEDGES

Trimming of tapestry hedges containing both white pine and hemlock requires an approach that accommodates each species independently, while also managing competition between the two species, which varies depending on the age of the hedge. In newly planted hedges, care should be taken to prevent dominance of the fast-growing white pine over the slow-growing hemlock. In June, the white pine should be pinched and pruned away from the hemlocks. In older hedges, care should be taken to prevent the shade-tolerant hemlock, which responds easily to shearing, from shading out the foliage of the white pine due to its relative shade intolerance and susceptibility to die-back from over trimming. Hemlock branchlets that grow over and shade white pine should be pruned away in July. Hand pruning is preferred in tapestry hedges because annual shearing often encourages hemlock at the expense of white pine.[43]

WEEDING AND MULCHING

The hedges should be kept free of weeds to limit competition for moisture, nutrients, and sunlight. All hedges should be manually weeded once a year if necessary. Weeds that have invaded the hedges in the past include poison ivy, wild raspberry, lilacs, ground ivy, ferns, and lily-of-the-valley (where part of an historic planting, these plants should of course be retained).[44] Weeds and other volunteer vegetation should also be kept out of the immediate surroundings of the hedges. For example, the Asian honeysuckle, grape, and walnut north of the Lincoln bust hedge should be cleared well back, at a minimum sufficient to prevent a season's growth from encroaching on the hedge.

The use of mulch beneath the hedges can help to suppress weeds and maintain ground moisture. Its application would be especially beneficial to the hedges due to the high permeability of the soils.[45] The mulch should be a natural-looking, dark and medium to fine-textured material to be as inconspicuous as possible. Sheared needles, raked up from annual trimming and seasonal needle drop, make good mulch. Where this is insufficient, consideration should be given to using supplemental pine bark mulch. The lawn line was historically at or near the edge of the hedge; therefore, mulch should be kept within the canopy of the hedge, rather than extended out in an enlarged bed.

CONTROL OF DISEASES AND PESTS

Healthy plants tend to have the greatest resistance to diseases and pests. Therefore, maintaining the health of the white pine and hemlock hedges should be the first line of defense. The hedges to date have not recently experienced any substantial incidents of diseases and pests. Past problems have been observed with white pine weevil, pine blister rust (notably along the road, probably due to the shaded conditions), and spider mite in the hemlock.[46] The greatest threat at present is from hemlock woolly adelgid, native to Japan and China. This pest has is infesting the southern range of the hemlock, notably in the Hudson Valley and Connecticut, where stands of native hemlock as well as ornamental specimens are being lost. In New Hampshire, the pest was first discovered in Merrimack in 1999, and was reported this year in the Connecticut River Valley in Rockingham, Vermont, approximately twenty miles south of Saint-Gaudens. Hemlock stock being shipped into New Hampshire currently is subject to a state quarantine. Bird and other animals are important dispersal agents.[47] For further site-specific information on the pest, see Walasewicz, Stephen A. "Eastern Hemlock and the Hemlock Woolly Adelgid at Saint-Gaudens National Historic Site" (National Park Service, unpublished report, 1995).

A monitoring system should be established to identify hemlock woolly adelgid at Saint-Gaudens, both in the hedges and other ornamentals, as well as in the adjoining forest stands. New Hampshire forest health experts recommend complete removal and disposal of hemlock woolly adelgid-infested trees and ornamentals as the preferred means of controlling the pest. For the hemlock hedges, however, it is recommended that if the pest is found, insecticide be used as a first measure in order to retain existing plant material. The hemlocks in the adjoining woods should also receive treatment. Hemlock woolly adelgid can be controlled through the application of non-toxic dormant oil, which must be applied for complete coverage of the plant. This may be used in conjunction with an insecticidal soap. On larger trees, complete coverage is often difficult, but on the low-scale hedges, it is feasible.[48] Biological control with Japanese lady beetles is being explored in New Hampshire, but results have not been conclusive.[49] A chemical control option, which may pose the risk of environmental contamination and therefore may not be consistent with an integrated pest management approach, is the systemic insecticide, imidacloprid, which is sold under the brands Merit® and Bayer® Trees & Shrub Insect Control. Imidacloprid is generally applied as soil drench or injection.[50]

In addition to diseases and insect pests, hemlocks can also be damaged from animal browsing, although to date nothing extensive has been observed at the site. For white-tailed deer, hemlock has been ranked seventh in winter food

preference. At nearby Marsh-Billings-Rockefeller National Historical Park located fifteen miles to the west in Woodstock, Vermont, hemlock hedges and trees have been extensively damaged by deer browsing. To prevent this, the park erects site-wide winter deer fencing around the managed formal grounds.[51] White pine is generally not impacted by browsing. If deer browsing becomes apparent on the hemlock hedges at Saint-Gaudens, erecting of winter deer fencing should be considered. This fencing could be erected permanently around the perimeter of the entire developed area (in wooded margins and along roadside hedges), or temporarily around a more limited area directly surrounding the hedges. The need for deer fencing may also be necessary if summer browsing becomes a problem in the garden beds.

NURSERY STOCK & PROPAGATION

As part of a sound hedge management program, adequate types and amounts of white pine and hemlock stock should be readily available for renovation and replacement work. Stocking, both through on-site production and availability from outside nurseries, should be determined as part of a program of cyclical hedge maintenance and a long-term replacement plan.

For hedge renovation, including interplanting and infilling gaps, a supply of bare-root, one-foot or less diameter balled and burlapped, and 1.5-gallon container stock should be maintained. For hedge replacement, larger stock should be available in order to more quickly establish the historic form and function of the hedge. Nursery stock in 2 to 7.5 gallon containers (2.5 to 4 feet tall) is best for replanting full hedge sections. If larger plants are necessary, 5 to 6 feet tall balled and burlapped stock should be considered the largest option.[52] In general, the smallest acceptable plant size/nursery stock should be used for hedge replacement for the following reasons:

- The smaller the plant, the easier it is to handle/plant. If the material is small enough to be planted by hand, without equipment, the planting process will result in less disturbance to the surrounding landscape.
- Smaller plants have smaller root balls which require smaller planting holes. This is important to help minimize potential disturbance to archeological resources and adjacent landscape features. In archeologically sensitive areas or to avoid disturbance to adjoining plants such as the birch allee, bare root/linear stock to 1.5 gallon container stock (1 to 2 feet tall) should be used.[53]
- Younger plants will establish more quickly and effectively than larger plants. Two to four year-old plant material usually establishes so quickly that it surpass growth of older material planted at the same time.

- Smaller stock is much less expensive.
- Smaller stock is more adaptable to training/shearing to the desired size and shape, whereas larger nursery stock often experiences considerable die-back in a hedge setting.[54]

For larger stock used in hedge replacement, consideration should be given to using containerized material rather than balled and burlapped. Containerized material will typically have more intact roots than balled and burlapped material because the latter is dug from a field nursery where the roots are severed as part of the harvesting process. In addition, balled and burlapped material normally has a build-up of nursery soil (sometime as much as 12 to 14 inches) at the root flare which needs to be removed at the time of planting.[55]

Hemlock and white pine are generally widely available from commercial nurseries in a range of sizes, both container and balled and burlapped, while young bare-root seedling stock is usually available from state forestry nurseries. The New Hampshire State Forest Nursery, for example, offers white pine seedlings, 2 year (5 to 8 inches) and 3 year (8 to 14 inches). [56]

Production in an on-site nursery has a number of advantages for both white pine and hemlock. In an on-site nursery, white pine can be grown to maximize branching and basal density necessary to produce compact plants needed for hedges. Most white pines available in outside nurseries are intended as trees. In contrast, hemlock is widely produced for use in hedges, but the spread of hemlock woolly adelgid has greatly reduced its availability due to quarantines. The New Hampshire State Forestry Nursery for example is not offering hemlock for sale. While hemlock seedlings may be available through nurseries in Quebec where there is no hemlock woolly adelgid, on-site production in a nursery would ensure continued availability.

The park has recently established a new nursery intended to produce hemlock of size sufficient (5 to 6 feet tall) to use for replacement of entire hedge sections given the problems with hemlock wooly adelgid. Based upon funding and staffing, consideration should be given to expanding the nursery to raise bare-root hemlock for interplanting; and for raising white pine to produce the density needed for hedge replacement, using stock available from outside nurseries. Some limited production could be accomplished through transplanting seedlings that naturally occur on the site. White pine and hemlock could also be raised from seed, but would require additional care that is probably not practical given limited park staffing.

The park nursery is situated on loamy clay soil and is excessively wet in spring and early summer due to surface runoff. It does not have irrigation. It is protected by weed-control fabric covered with mulch and deer-proof fencing. Both white pine and hemlock should be grown in full sun with annual pruning to maximize branching and basal density. Roots should be contained in root control bags or root pruned annually to reduce the amount of transplant shock. Consideration should also be given to raising containerized material, provided an automated watering system is in place to prevent drought. Plants should be moved into the hedges in early spring, and be watered upon installation and during dry weather.[57]

RECORD KEEPING

As part of a plan for managing the hedges, the park should continue to maintain an accurate and detailed record of work undertaken on the hedges, as prescribed in the "Saint-Gaudens National Historic Site, Landscape Preservation Maintenance Program" (Olmsted Center for Landscape Preservation, 1993). This record should follow the hedge organization and terminology outlined in this plan. The park should also organize the record according to the breakdown of the site into "landscape assets" as defined in the Facilities Management Software System (FMSS) anticipated for implementation in the near future. Parks will be required to capture condition assessment information, scheduled/recurring maintenance, deferred maintenance, and work accomplished on landscape resources in FMSS. In addition, any larger cyclic or rehabilitation projects that will need supplemental project funding in order to accomplish must be in the system to compete for NPS funding.

A record sheet should be maintained for each hedge section (H-1 through H-30) to avoid confusion in records for shared hedges, such as the Pan grove and terrace garden hedges. The record should include: a). the hedge name and section number(s); b). notes describing in detail any observations or events associated with the hedge; c). Type of record including measurement, renovation major work/change, replacement, condition/problem, fertilization, and other; and d). Date and initials of the recorder, with reference for any additional information.

Figure 2.1: Candle (new shoot) of white pine showing fifty percent pinching. (Drawing by Christopher L. Dinas, reproduced in Donald Rakow and Richard Weir, *Pruning: An Illustrated Guide to Pruning Ornamental Trees and Shrubs* [Cornell University Cooperative Extension, Bulletin 23, 2005] online at http://ecommons.library.cornell. edu/bitstream, accessed 20 August 2007, 11).

PART 3: INDIVIDUAL HEDGE MANAGEMENT GUIDELINES

The following guidelines, organized by hedge feature, provide detailed recommendations on treatment, renovation, replacement, and maintenance specific to each hedge. Each hedge feature also includes a synopsis of its history and existing condition. The narrative guidelines are illustrated through historic and current photographs (Figures 3.1-3.51) and three plans: existing conditions, recommendations, and replacement sequence (Drawings 1-3). Existing conditions are also summarized in Appendix D and recommendations are prioritized in Part 4.

All measurements are average and approximate. Alternatives are presented in order of appropriateness to the historic character of the landscape (i.e., alternative 1 most appropriate).

WEST MEADOW HEDGE (SECTION H-1)

HISTORY

The west meadow hedge was originally planted in c.1893–94 as part of a system of perimeter white pine hedges lining the north side of Saint Gaudens Road and extending into the main entry of Aspet known as the horseshoe. To the east of the horseshoe, it continued as the cutting garden hedge (H-5) and Caretaker's Cottage hedge (H-28). The hedge was probably in two sections that aligned with the road, separated by an opening that corresponded with a dirt road extending to the barn studio. [58] By 1903, the hedge was ten feet tall, at which height it would have blocked views from the road looking into the site. During this time, there were some trees along the south side of Saint Gaudens Road, but much of this land was open pasture. During World War II, the hedge was let go and became overgrown.

After the end of the historic period, the unmanaged hedge matured into trees, reaching upwards of 18 feet tall by c.1950 and continuing to increase in height thereafter. [59] In c.1972, the trees were removed (although several toward the west end of the hedge were apparently retained) and a replacement hedge of white pine was planted in a single row, in one continuous section that extended inward from the remnant white pines at the west end. By this time, the land across the road had become heavily wooded, casting shadows on the hedge. In 1995, the eastern 30 feet of the hedge adjoining the horseshoe hedge was replaced in white pine. Growth of weeds in the hedge, including poison ivy, was a problem, and much of the lower canopy on the shaded south side (facing the road) died back, including the section replanted in 1995 (Figures 3.1, 3.2). In fall 2006 following an

archeological investigation, the entire hedge was removed. In spring 2007, the hedge was replanted in pure white pine (Figure 3.3).

EXISTING CONDITION

The existing hedge, replanted in 2007, consists of one continuous section planted along the crest of the bank above the road, shifting inward toward the meadow above three large white pine trees at its western end (see Figure 3.3 and Drawing 1). In order to follow the crest of the bank, the hedge was realigned in places up to four feet from the preexisting hedge location. The hedge was replanted using 85, 32-inch balled and burlapped stock, 5 to 6 feet tall, planted 5 feet on center. The plants were raised in central Pennsylvania and purchased through Northern Nurseries, White River Junction, Vermont. [60] The site of the hedge is heavily shaded toward the south due to the tall (upwards of 90 feet) mixed broadleaf and conifer woods that overhang the road. The three large white pine trees at the western end of the hedge are probably remnants from the original hedge. Poison ivy is present in the adjoining meadow.

RECOMMENDED TREATMENT

The historic character of the west meadow hedge is defined by its alignment, use of white pine, and function to screen views of Aspet upon the approach along Saint Gaudens Road. The hedge directs views up the road toward the main entrance at the horseshoe, and delineates the south perimeter of the west meadow. The primary challenge with the management of this hedge is the heavy shade cast by the woods on the south side of the road and by the three white pines on the north side.

Setting

This west meadow hedge was originally established in full sun conditions, although some shading may have been present later in the historic period due to the growth of trees along the south side of the road. Partial clearing of the woods south from the edge of the road to reduce shading would be the preferred treatment for the setting of this hedge. If this is not feasible, shading on the hedge may be lessened by removing branches that overhang the road, and by removing the three white pines adjoining the west end of the hedge on the north side of the road. The declining white pine tree closest to the road opposite the east end of the hedge should be removed entirely (Drawing 2).[61]

Profile and Scale

The historically appropriate profile for this hedge is rectangular. However, in order to enhance the growing conditions for white pine, consideration should be given to battering the meadow (north) side of the hedge in order to increase the amount of light reaching the lower canopy. Given the context of this hedge

remote from the view of most visitors, the change in profile would most likely not affect the historic character of the landscape. This batter should consist of an angle rather than a curve, of less than 20 degrees inward (bottom to top). A batter on the road side is not recommended because it would be conspicuous and would not be consistent with the profile of the other roadside hedges.

The range of appropriate dimensions for this hedge is a mature height of 8 to 12 feet and 4 to 6 feet wide. The width is not a critical factor in the historic character of the landscape. The hedge should, however, match the height of the horseshoe hedge (H-3), which forms a continuation of this hedge.

Location/Alignment

The appropriate alignment for the west meadow hedge is parallel to the road extending from the south end of the horseshoe hedge (H-3). The west half of the hedge, which currently veers inward away from the road, is a non-historic alignment. The following alternatives to this existing alignment would enhance historic character and/or the growing conditions (Drawing 2):

- Alignment Alternative 1 (Preferred): Remove the three mature white pine that are most likely remnants of the original c.1893 hedge, and replant the hedge on alignment with these trees (below the crest of the bank), parallel to the road. The hedge should be aligned sufficiently inward from the edge of the road to provide room for pedestrians to use the shoulder. This alternative would reduce shading on this section of the hedge and restore a consistent setback from the road. Given the position on the lower part of a slope, this alternative may make mowing and trimming of the hedge difficult.
- Alignment Alternative 2: Remove the three mature white pine trees and retain the current hedge alignment, which dates to the early 1970s. While this alternative would not return to the historic alignment, its benefits include improving views of the Vermont ridgeline, decreasing shade, and facilitating maintenance of the hedge at the top of the slope.
- Alignment Alternative 3: Retain the existing three mature white pine trees, and shift the hedge in a curve extending into the field, following the contours of the land. While this alternative would not return to the historic alignment and obscure distant views to the Vermont ridgeline, the impact of this change would not significantly alter the historic character of the overall landscape given its location and setting away from the formal entrance at the horseshoe. The benefits of this alternative are decreased shade, ease of maintenance at the top of the slope, and retention of the existing white pine trees along the road.

Plant Species

This hedge was historically pure white pine. It was never interplanted or replaced with hemlock as were the companion road hedges at the cutting garden and Caretaker's Cottage because it was let go and grew into trees prior to c.1970, and then was replaced twice as pure white pine. Retaining this hedge as pure white pine should be a priority in management of the landscape because of its distinctive character. The ability of the white pines to grow into a full hedge will largely depend on maintaining adequate light levels, which are presently too shaded from the woods along the south side of the road. Retaining these woods would require that the west meadow hedge be managed in the long term as a tapestry white pine-hemlock or pure hemlock hedge.

RENOVATION

Success of the recently replaced white pine hedge will largely depend on the treatment of the woods south of Saint Gaudens Road. If these woods are retained and light levels are not substantially increased, the hedge will most likely require substantial renovation to maintain a full canopy. As evidenced by the plants removed in 2006, white pine does not thrive in these shaded conditions sufficient to produce an evenly compact, full hedge along the road side (see Figures 3.1, 3.2). If a batter is introduced to the profile on the meadow side (see profile/scale above), the likelihood of white pine succeeding on that side may increase. The following renovation strategies would address the loss of side canopy:

- Renovation Alternative 1 (Preferred): Retain the white pine and interplant with more shade-tolerant hemlocks in the weak and bare areas. Although this would be inconsistent for the historical treatment of this hedge, it does follow the historic pattern of hedge development found elsewhere on the site.
- Renovation Alternative 2: Retain the hedge as pure white pine, and interplant with white pine to fill in bare areas. Unless light levels increase through removal of the woods across the road, this alternative will most likely result in bare lower canopy, especially on the road side.

REPLACEMENT

Future replacement of the west meadow hedge would be warranted if it does not respond well to renovation, becomes overgrown (more than 12 to 14 feet tall), or otherwise fails. In a replacement scenario, the west end of the hedge should be realigned as recommended above. Three appropriate alternatives for species composition include:

- Replacement Alternative 1 (Preferred if woods south of road removed): Replant the hedge in pure white pine provided adequate light levels are

maintained, i.e., through removal of trees south of the road. If the white pine becomes well established as a hedge within 5 years but then declines after 15 years due to the shaded conditions, then it may be appropriate to institute a cyclical replacement plan. Cyclical replacement would not be appropriate if the white pine cannot become sufficiently established to form a full, compact hedge within the cycle.

- Replacement Alternative 2 (Preferred if woods south of road are retained): Replant a tapestry white pine-hemlock hedge, with hemlock predominating on the shaded road side and white pine on the sunnier meadow side.
- Replacement Alternative 3: Replant a pure hemlock hedge. This alternative may be warranted if the level of shade continues to decrease due to growth of the woods south of the road. Due to the length and highly visible location of the hedge, this alternative would be considered a rehabilitation treatment.

Replacement Sequencing

Future replacement of the west meadow hedge may be warranted when the adjoining outer portions of the horseshoe hedge (H-3, H-4), cutting garden hedge (H-5), and Caretaker's Cottage hedge (H-28) are replaced to enhance the historic continuity of the roadside hedge system.

MAINTENANCE CONSIDERATIONS

If hemlock is interplanted in a future renovation, the hedge should be pruned to favor the white pine over the more dominant hemlock where the two species intermix. Due to shading, there is the likelihood of dead limbs on the road side in white pine, which should be removed to maintain a well-tended appearance. Past troubles with growth of weeds in this hedge from the adjoining meadow, particularly poison ivy, indicate that weeds will be a problem in the future, causing competition and shading. Consideration should be given to using weed mats and/or mulch beneath this hedge. Mats and mulch would also help to stabilize the slope and prevent erosion.

The road side of the hedge should be monitored for impacts from winter salting and snowplowing. If burning and breakage appear likely, install protective winter screening along the entire length of the hedge on the road side.

HORSESHOE HEDGE (SECTIONS H-2, 3, 4)

HISTORY

The horseshoe hedge was initially planted in c.1893–1894 as three semi-circular sections that bordered the carriage drop-off and front entrance walk to Aspet off Saint Gaudens Road. The hedge was part of a system of perimeter white pine hedges that also included the west meadow hedge (H-1), cutting garden hedge (H-5), and Caretaker's Cottage hedge (H-28). The horseshoe was planted as two taller, outer hedge sections of white pine that screened views of the interior grounds, with an inner hemlock hedge defining the foreground on the entrance island. The outer sections originally widened at the central walk, and the inner section terminated with inward scrolls that either terminated or wrapped around Lombardy poplar trees (Figure 3.4).[62] The lower corners of both the outer sections were also accented by Lombardy poplar. Aside from formalizing the entrance, the overall design of this hedge led the eye up toward the façade of Aspet, and also provided enclosure to the carriage drop-off at the entrance walk.[63] In 1907, the outer sections were 8 to 12 feet tall, and the inner section, 3 feet tall. In later years, hemlock was interplanted to fill in bare spots in the outer sections, which were maintained at roughly the same height, but grew considerably in width.

After the end of the historic period in c.1950, the inner hemlock section became overgrown to 10 feet tall (almost the same height as the upper sections), and extended across most of the island and encroached onto the drive. The outer sections became thin, and were interplanted with hemlock at an unknown time; in the early 1990s, the park interplanted with white pine. In 1996, the park replaced the overgrown inner hemlock section, but did not replant the original terminating scrolls.

EXISTING CONDITION

The outers sections of the horseshoe hedge (H-3, H-4), planted in c.1893–94 with later interplanting, consist primarily of white pine with some hemlock infill, and measure 8 to 12 feet tall and 8 to 14 feet wide, with a rectangular profile (Figure 3.5, Drawing 1). Both are double rows with variable spacing between plants. The opening at the walk (between sections H-3 and H-4) is weak and constricts the walk. Section H-3 (outer west section) is primarily white pine, with some hemlock. It is bare on the lower west side, adjoining a large apple tree, and is weak on the east side (facing drive), where there are young infill white pine. Section H-4 (outer east section) is roughly half white pine, half hemlock, and generally has a full canopy (Figure 3.6). The inner hemlock hedge (H-2), replanted in 1996, is 4 feet tall and 4 feet wide, with a rectangular profile. It is a

single row with 18-inch spacing. It is in good condition with a full, compact canopy (see Figures. 3.5, 3.6).

RECOMMENDED TREATMENT

At this time, the horseshoe hedge warrants renovation rather than replacement because it generally retains its historic character. This character is defined by a formal composition of three interrelated sections that are continuations of the adjoining roadside hedges (H-1, H-5), which respond to the circular form of the drive/turn-around, the off-center entrance walk, and a view of Aspet. The outer sections (H-3, H-4) should be symmetrical and should contrast with the inner section (H-2) in scale and plant materials. The outer hedge sections should screen the interior grounds, with a compact, full canopy.

Although no longer used as the primary visitor entrance to the site, the horseshoe is still a prominent part of the landscape and is clearly visible as visitors enter the site at the visitor parking lot. This hedge therefore warrants a high level of maintenance.

Setting

The opening in the woods south of Saint Gaudens Road provided by the parking lot provides this hedge more light than the other roadside hedges, but portions are shaded due to the height and rectangular profile of the hedge, and also due to adjoining trees. Because of this, some of the white pines are weak. Light levels could be improved by removing adjoining tree limbs that cast shadows on the hedge, including the woods south of the road and apple trees in the lawn. The declining white pine tree closest to the road at the northeast corner of the parking lot should be removed entirely (also recommended for removal for the west meadow hedge, H-1).

Profile and Scale

The historically appropriate profile for this hedge is rectangular, and the range of appropriate dimensions for the outer sections (H-3, H-4) is between 8 and 12 feet (currently near maximum height), and between 4 and 8 feet wide; for the inner section (H-2), 3 to 4 feet high and 3 to 4 feet wide. The outer and inner hedge sections should have a height proportion of roughly 3:1. The hedge slopes upward from the road following the topography, with a change of approximately 5 feet. While the current width of the outer sections (upwards of 10 feet) is not ideal, it does not detract from the spatial character of the landscape because the growth is primarily toward the inside grounds, rather than the drive. The presently constricted opening at the walk should be widened to approximately 4 to 5 feet (slightly wider than the walk).

The scrolls at the end of the inner section should be restored when these poplars are next replaced (in the correct location) to form scrolls (Drawing 2). Although these scrolls may have become inconspicuous by the late historic period due to the outward growth of this hedge, this change was most likely unintentional and therefore restoration of the original design intent is warranted.

If in the future it becomes necessary to replant the outer sections (H-3, H-4), the original plan incorporating semi-rectangular termini flanking the main walk and tapering to the drive/turn-around, should also be restored (see Figure 3.4, Drawing 2).

Location and Alignment

The existing location and alignment of the hedge, except for the loss of the scrolls on the inner hedge and rectangular termini on the outer sections, is appropriate. The hedge should align with the adjoining hedges along the road (H-1, H-5).

Plant Species

The existing species in the horseshoe hedge are appropriate, although there is a greater percentage of hemlock in the outer sections (H-3, H-4) than may have existed in 1940. The inner section (H-2) should remain pure hemlock, while the outer sections should remain predominantly white pine facing the drive. Hemlock may be appropriate for interplanting in shaded areas of the outer sections, particularly on the north (Aspet) side.

RENOVATION

Renovation of the horseshoe hedge should address the weak side canopy and overgrowth at the entrance walk in the outer sections (H-3, 4), as well as the reintroduction of the scrolls on the inner section (H-2).

The outer sections (H-3, H-4) need renovation through interplanting and pruning. The hedge should be carefully pruned to favor white pine over hemlock in order to retain and enhance the proportion of white pine. There are two appropriate alternative treatments for renovation; under both, H-2 is retained as a pure hemlock hedge:

- Renovation Alternative 1 (Preferred): Interplant bare spots on the drive side of H-3 and H-4 only with white pine, in order to retain and increase the percentage of white pine; reduce the amount of hemlock on the drive side in H-4. This alternative would enhance the historic contrast between the outer white pine sections and the inner hemlock section. White pine interplanting, however, may not produce a full side canopy due to the low light levels. The north (lawn) side of the outer sections

may be interplanted with hemlock where heavily shaded. Renovation of H-2 is not necessary at this time.

- Renovation Alternative 2: Manage H-3 and H-4 as mixed white pine-hemlock hedge, with white pine predominating on the drive side. Under this alternative, hemlock would be interplanted on the drive side within the shaded areas to fill in gaps where white pine does not thrive. White pine should be maintained to at least 50 percent of the side canopy facing the drive in order to maintain visual contrast with the inner pure hemlock hedge. Hemlock exists in greater coverage in H-4; introduction of additional hemlock in H-3 would establish symmetry in plant materials between the two outer sections. Renovation of H-2 is not necessary at this time.

REPLACEMENT

At the current time, replacement of the outer sections (H-3, H-4) is not warranted. However, replacement may be appropriate when the hedges can no longer be maintained at or below the current height (approximately 12 feet); when the opening at the main walk can no longer be maintained at an adequate width (equal to or greater than the width of the walk); when a full side canopy cannot be maintained on the drive side (more than 15 percent bare); or when the percentage of white pine falls below 50 percent and thereby no longer presents a visual contrast with the inner hemlock hedge. There are three appropriate alternatives for replanting:

- Replacement Alternative 1 (Preferred): Plant and maintain a pure white pine hedge, preferably when adjoining roadside hedges are replaced (H-1, H-5). The success of white pine in a replacement scenario will be greater than in renovation due to increased light in a shorter hedge and less competition. Plant and maintain H-2 as an all hemlock hedge.
- Replacement Alternative 2: Plant a pure white pine hedge. As the hedge matures and shaded areas thin, infill with more shade-tolerant hemlocks, maintaining at least 50 percent white pine on the inner (drive) side. Plant and maintain H-2 as an all hemlock hedge.
- Replacement Alternative 3: Plant a mixed white pine-hemlock hedge, forming a tapestry with dominant white pine (at least 75 percent of the hedge; this percentage will likely go down as the hedge matures but should not become less than 50 percent). Plant and maintain H-2 as an all hemlock hedge.

Replacement Sequencing

In the long-term, it would be appropriate to coordinate replacement of the outer sections of the horseshoe with replacement of the adjoining west meadow hedge

(H-1) and cutting garden hedge (H-5) to enhance the historic continuity of the roadside hedge system. The inner hemlock hedge (H-2) can be replaced independently from other hedges.

MAINTENANCE CONSIDERATIONS

Due to the slope of the land and competition from adjoining Lombardy poplar and apple trees, the hedge should be lightly fertilized and watered to ensure health and vigor.[64] The apple trees should be pruned annually to reduce shading on the hedge, particularly where they shade white pine. Consideration should be given to adding a layer of mulch to the outer hedges (H-3, H-4) where the lower parts of the hedge are weak in order to discourage weeds and retain ground moisture.

CUTTING GARDEN HEDGE (SECTIONS H-5, 6)

HISTORY

The cutting garden hedge was originally established in c.1893–94 as part of a system of perimeter white pine hedges along Saint Gaudens Road that also included the west meadow hedge (H-1), horseshoe hedge (H-3, H-4), and Caretaker's Cottage hedge (H-28). The hedge (H-5) originally bounded a lawn or meadow south and east of Aspet and south of the stable. In c.1903, the vegetable garden was relocated to this lawn from the present Shaw Memorial, at which time a white pine hedge was most likely added along the north side (H-6), adjoining the stable, and a grove of trees to close off the space on the west side (Figure 3.7). In 1907, the hedge was maintained at 10 feet high. During World War II, the hedge was let go and became overgrown.

After the end of the historic period, the white pine hedge grew into trees. At an undetermined date, H-5, the section along Saint Gaudens Road, and the east half of section H-6 along the stable were replaced as double-row pure hemlock hedge, which tolerated the increasing amount of shade from the woods across Saint Gaudens Road better than white pine. The west end of section H-6, west of the stable, was not replaced until c.1970 when it was replaced using the original white pine species. As part of this replacement, an opening in the west end of the hedge was maintained as a second point of access to the stable and kitchen yard.[65]

EXISTING CONDITION

The cutting garden hedge consists of a pure hemlock section (H-5) along the road and curving inward along the service drive, and a section (H-6) along the north side of the garden adjoining the stable that is planted in pure white pine in its west half, and pure hemlock in the east half (Figures 3.8, 3.9; Drawing 1). The

main entrance to the garden is from the service drive, where a gate spans the two hedge sections.

Section H-5, replanted in c.1950, is approximately 7 to 8 feet tall and reaches 11 feet wide at the service drive entrance. It is a double row with 1 to 3 feet spacing between plants, and has a compact canopy on the garden (north) side and facing the service drive. The branching of the hedge is predominantly toward the garden; during heavy snowfall, this habit causes the hedge to splay. On the road side, the hedge has lost most of its lower canopy, probably a result of low light levels due to the woods on the south side of Saint Gaudens Road, as well as impact from snow plowing and salting (Figure 3.10). The steep slope between the hedge and the road has eroded, exposing the hemlock roots in many places. Section H-5 is also weak on the western end of the garden side due to the shade of the Japanese tree lilac grove (see Figure 3.9).

The hemlock part of section H-6, replanted in c.1950, is approximately 8 to 10 feet tall (to eaves of the stable) and upwards of 12 feet wide. It is a double row with 1 to 3 foot spacing between plants, and has a compact canopy on the garden (south) side and facing the service drive. The white pine part of H-6 is approximately 8 feet tall and 6 feet wide; at its western end, it is weak due to shade from the tree lilacs and possibly from improper pruning, and has a gap at what is most likely a non-historic earthen path (Figure 3.11). It is a single row with 3-foot spacing. There is just one white pine plant on the west side of the path. The rear (north) side of H-6 is bare, but is not visible except at the west end due to concealment by the stable and a wooden lattice fence.

RECOMMENDED TREATMENT

The cutting garden hedge warrants renovation to maintain and enhance its historic character. This character is defined though function as a screen along Saint Gaudens Road and as enclosure along the perimeter of the garden, together with the Japanese tree lilac hedge. From the road side, the hedge should read as a seamless extension of the horseshoe hedge (H-4) and as part of a system of roadside hedges that includes the west meadow hedge (H-1) and the Caretaker's Cottage hedge (H-28). This hedge warrants a high level of care because it is visible upon the new visitor approach via the service drive.

Setting

This hedge was originally established in full sun conditions, although some shading may have been present later in the historic period due to the growth of woods along the stream south of the road. Partial clearing of the woods back from the edge of the road would benefit this hedge by reducing shading. If this is not feasible, branches that overhang the road should be removed to the extent

feasible. In addition, the Japanese tree lilac grove that is shading the south end of the hedge should also be pruned back to reduce the height of the plants near the hedges and remove overhanging branches.

Profile and Scale

This hedge remains in its historic rectangular profile, and its overall scale is appropriate, although overgrown in width. The range of appropriate dimensions is a mature height of 6 to 10 feet and 4 to 8 feet wide. Section H-6 should rise slightly as it turns to the north side of the garden, and be sheared level at approximately the eaves of the stable. Because this hedge encloses a large, informal space, the overgrowth in width (presently upwards of 12 feet) has not impacted the historic character of the landscape. It should not be allowed to extend further toward the garden side due to structural stability of the plants or potential encroachment on the garden beds. The south or road section (H-5) needs to match the height of the adjoining lower end of the horseshoe hedge (H-4), and also be symmetrical in height and profile to the Caretaker's Cottage hedge (H-28) on the opposite side of the service drive entrance. Where they meet at the garden entrance gate, H-5 and H-6 require symmetry in height and profile (as now exists).

Location and Alignment

The cutting garden hedge is in its overall historically appropriate location and alignment. It should align with the horseshoe hedge on the west, and the two sections should be in alignment and symmetrical at the gate on the service drive. The gap and path at the west end of H-6 is probably not historic. The gap breaks the continuity of the hedge, but is not conspicuous in the larger landscape.

Plant Species

This hedge should ideally be maintained as white pine to reestablish unity with the horseshoe (H-2, 3) and west meadow (H-1) hedges. However, unless shading from the woods south of Saint Gaudens Road is eliminated or greatly reduced, the hedge should remain primarily hemlock. Reintroduction of white pine into the less shaded north section (H-6) may be appropriate as part of a renovation or replacement scenario.

RENOVATION

The cutting garden hedge warrants renovation rather than replacement at this time because it is in overall good condition. The hedge requires interplanting and closing of gaps with hemlock or white pine in weak areas facing the garden. On the road section (H-5), there are two alternatives to address the lack of side canopy:

- Renovation Alternative A-1 (Preferred): Plant a line of hemlocks along the road side to restore the side canopy of the hedge, using bare-root stock to minimize disturbance. The infill plantings should be placed within approximately one foot of the outer edge of the existing hedge in order to provide maximum light, and the top of the existing hedge should be cut back as far as possible (approximately 1 foot). The eroded grade should be renovated as noted under Alternative A-2.
- Renovation Alternative A-2: Retain existing bare vertical side of the hedge. Stabilize and raise the slope with new soil to correct prior erosion that has exposed the hemlock roots to improve growing conditions. Due to the steep grade, this will require stabilizing mats or root fiber rolls (or equivalent). A ground cover should also be established to further stabilize the soils.

Renovation of the cutting garden hedge should also address the white pine section of H-6, specifically the gap at its west end and its species composition. The white pine is a c.1970 replanting that restored the original white pine. There are three appropriate alternatives for section H-6:

- Renovation Alternative B-1 (Preferred): Convert the west half of H-6 into a mixed white pine-hemlock hedge through interplanting of hemlock to fill in weak spots. The addition of hemlock to this hedge will help visually unify this part of H-6 with the pure hemlock east half. White pine could be interplanted over time within the hemlock section of H-6, which receives full sun, to provide a more unified tapestry effect to the entire length of this section.
- Renovation Alternative B-2: Retain the west half of H-6 as a pure white pine hedge. Given improvements in light levels through pruning back of the Japanese tree lilac, interplanting of white pine should be successful in this section to fill in existing weak spots.

There are two appropriate alternatives for the gap in H-6:

- Renovation Alternative C-1 (Preferred): Remove the path and interplant the gap in the hedge so that H-6 is one continuous section. Access to this end of the garden would be through the other existing dirt path between the hedge and the Japanese lilac grove. To avoid reoccurrence of this opening in the future, consider extending the wood lattice fence approximately eight feet to the end of the hedge and to the edge of brick walk along the outside of the kitchen hedge.

- Renovation Alternative C-2: Retain the existing path and modify the gap in the hedge into an archway in order to make H-6 into a continuous section.

REPLACEMENT

Replacement of the cutting garden hedge is not warranted at this time. However, it should be considered when it can no longer be maintained at or below its recommended height of 7 to 10 feet, when a moderately full canopy (approximately 90 percent coverage) cannot be maintained through interplanting, or when structural failure occurs (such as due to snow loads). When and if H-5 is replaced, consideration should be given to shifting the alignment approximately one to two feet to the north, away from the top of the slope on the roadside bank.

There are three appropriate alternatives to species composition in replacement of sections H-5 and H-6. Reintroduction of white pine into H-5 and portions of H-6 would reinforce the relationship with the horseshoe, west meadow, and Caretaker's Cottage hedges.

- Replacement Alternative 1 (Preferred if woods south of road retained): Replant sections H-5 and H-6 as a tapestry of hemlock and white pine to replicate probable conditions at the end of the historic period (prior to replacement of H-5 in pure hemlock). White pine would be planted only where there is sufficient light, not evenly throughout the hedge.
- Replacement Alternative 2 (Preferred if woods south of road removed): Replant sections H-5 and H-6 in pure white pine, and interplant or replace with hemlock as the white pine weaken over time due to shade. This alternative would replicate the historic evolution of the hedge, but may not be feasible for H-5 given the heavy shade from the woods south of the road.
- Replacement Alternative 3: Replace section H-5 in pure hemlock, section H-6 in white pine and hemlock as presently exists.

Replacement Sequencing

Replacement of H-5 and H-6 should be undertaken together. In addition, it would be appropriate to coordinate with replacement of the adjoining horseshoe hedge (H-3, H-4), Caretaker's Cottage hedge (H-28), and west meadow hedge (H-1) to) to enhance the historic continuity of the roadside hedge system.

MAINTENANCE CONSIDERATIONS

Due to the uneven branching in H-5 along the road, snow should be removed to avoid breakage of the long branches and deformation of the hedge. Structural reinforcement through cabling and/or staking may be required.

As with the west meadow hedge (H-1), the road side of H-5 should be monitored for impacts from winter salting and snowplowing.[66] Protective winter screening/fencing should be installed along the entire length of the hedge on the road side if new plantings are made along the roadside, as recommended under renovation alternative 2-A.

KITCHEN HEDGE (SECTIONS H-7, 8)

HISTORY

The kitchen hedge was originally planted by c.1893–94 to screen and define the perimeter of the utilitarian kitchen yard. It was probably pure white pine, but hemlocks were planted within the hedge at an early date. As documented in 1903, the hedge consisted of four separate sections: two semi-circular sections on the north side of the yard; a straight section on the southeast side of the yard; and a small semi-circular section on the south side. With redesign of the flower garden (terrace garden) to a north-south orientation in 1903, the northern sections were combined into a full semi-circle (H-8), with the portion adjoining Aspet on the upper terrace extending to a lattice fence/archway facing the new garden. By 1926, the two southern sections had grown together (H-7), forming a semi-circle with a dogleg, and separated from the northern section by a drive or walk. The western end of H-8 on the upper terrace adjoining Aspet appears to have been maintained as a step up from the remainder of the hedge, with branches extending over the lattice fence facing the terrace garden (Figure 3.12). By 1940, the hedge was approximately 8 to 12 feet tall, with the main section at a level below the Aspet sunroom. [67]

After the end of the historic period in c.1950, the kitchen hedge grew in height and width, filling in voids that once existed between it and the terrace garden hedge (H-13). The stepped profile at the upper terrace adjoining Aspet was maintained, although its configuration changed facing the terrace garden. The main access opening in the hedge narrowed, providing space sufficient only for a walk.

EXISTING CONDITION

The kitchen hedge is the most massive hedge at Saint-Gaudens, with overall measurements of 12 to 18 feet tall and upwards of 23 feet in width adjoining the terrace garden hedge; most of the hedge averages 12 to 15 feet in width and has a

rectangular profile. The oldest of the existing plants date to c.1893–94 and consist primarily of hemlock with some white pine mostly visible at the top (Figure 3.13, Drawing 1). The hedge has been extensively interplanted, supplementing the original double rows. The overall canopy is full, although there are weak areas on the south side. The hedge has an open interior understory, dominated by large, bonsai-like trunks and branches (Figure 3.14). The opening between sections H-7 and H-8 is approximately three feet wide, corresponding with a brick walk. A second path extends through the hedge on the upper terrace, to an opening in a lattice screen in the terrace garden.

Section H-7 (south half) extends in a semicircle to the Aspet sunroom, above which it rises approximately 1 to 2 feet. A 15 foot-long dogleg extends off the southeast side of this section. The hedge is weak on its south side due to shading from adjoining apple trees and the Japanese tree lilac grove. The dogleg, consisting of white pine only, has a bare understory due to shading and also most likely to abrasion and compaction from pedestrian traffic on the adjoining brick walk (Figure 3.15). The dogleg was apparently never interplanted with hemlock, except for a recent attempt with large hemlock stock planted deep inside the hedge. These plantings have failed due to the heavy shade.

Section H-8 (north half) extends from the walk in a semi-circle to Aspet. It ascends the upper terrace with a stepped profile that rises approximately 3 feet above the main hedge (Figure 3.16). This section overhangs the lattice screen facing the terrace garden, and lacks a full side canopy. H-8 is contiguous on its west side with the curved hedge section on the middle terrace of the terrace garden (H-13), above which it rises approximately three feet. It diverges from H-13 where it forms the southern wall of a small vestibule at the entrance to the Adams Memorial. A small rectangular projection extends to the north, partially enclosing the east side of the vestibule. Note that the companion projection off the Shaw/Adams hedge no longer exists. Historically both projections were set off with Lombardy poplars. Today, the existing projection is set off with a Swedish columnar aspen which the projection has grown around. The entrance to the vestibule is marked by a replacement poplar tree.

RECOMMENDED TREATMENT

The kitchen hedge warrants renovation to maintain its historic character and remarkable aged plant materials. Its historic character is defined though a distinctive circular alignment, rectangular profile, and tapestry of white pine and hemlock. The hedge continues to define the perimeter of the utilitarian kitchen yard and screen it from the adjoining landscape, including the formal landscape in front of Aspet as well as a portion of the formal terrace garden to the west. The dogleg in H-7, a vestige of an earlier configuration of the hedge, warrants

retention as part of the historic fabric of the hedge despite its loss of side canopy. While overgrown, the existing scale does not detract from the historic character of the landscape due to the relatively large size and informal character of the kitchen yard. It rises above the terrace garden hedge (H-13), but this condition was characteristic during much of the historic period.

For interpretive purposes, consideration should be given to guiding visitors toward existing openings at the walk, Adams vestibule, or dogleg that allow for viewing of the hedge interior with its massive trunks.

Setting

Shading on the kitchen hedge should be minimized to the extent feasible by pruning back the apple trees and Japanese tree lilac that shade portions of the south side of H-7. At the dogleg part of H-7, compaction from pedestrians walking off the adjoining brick walk requires reduction to ensure the health of the hedge.

Profile and Scale

The hedge remains in its historic rectangular profile. The range of appropriate dimensions is a mature height of 8 to 15 feet tall and width of 6 to 15 feet. The hedge should be retained at no more than its existing height and width. If possible, over time the overall height of the hedge should be lowered by approximately one foot to align with the rafters of the sunroom. The upper west end of section H-8 that steps up to the upper terrace adjoining Aspet should be lowered by 1 to 2 feet, and extended north to the fence line, in place of the portion of H-13 (terrace garden hedge) that extends over the fence (Figure 3.17).

Location and Alignment

Although it had a different configuration to its alignment during Augustus Saint-Gauden's lifetime, the kitchen hedge does not warrant restoration to this earlier condition because it appears to have been intentionally managed during the latter historic period to form its current alignment as a semi-circle with a single opening. It was also at one time separate from the terrace garden hedge (H-13), but has since grown together. This change does not detract from the historic character of the landscape.

Plant Species

The kitchen hedge was a mixture of white pine and hemlock for most of the historic period, and therefore should remain as a tapestry. The white pine is currently a minor component of the hedge, visible mostly at the top. The existing canopy of white pine should be retained and expanded if possible.

RENOVATION

The kitchen hedge overall warrants renovation rather than replacement in order to preserve its remarkable aged character. Renovation should fill in gaps and weak areas, which are primarily in the south side and dogleg of H-7, and also aim to gradually reduce the height of the hedge by 1 to 2 feet. The opening at the walk should also be gradually widened (to approximately 4 feet) and realigned with the walk. The west end of H-8 on the upper terrace should be gradually trimmed back into its historic profile as described above (see Figure 3.17). Interplanting of hemlock and white pine has generally been successful, except at the dogleg. There are two approaches to the renovation of the dogleg. Under each, compaction in the understory should be reduced through control of pedestrian traffic.

- Renovation Alternative 1 (Preferred): Interplant with hemlock and white pine (depending on the available light) to reestablish the side canopy and restore the screening function from the formal front of Aspet. The interplantings should be placed at the outer edge of the dogleg to maximize light levels and allow the new plants to more quickly become established. The adjoining tree lilac grove should be pruned back to reduce shading. As with all interplanting, small, bare-root or 1.5-gallon containerized stock should be used despite the size of the opening to minimize disturbance of the existing root systems.
- Renovation Alternative2: Install a lashed-branch fence in the open understory of the dogleg to restore the vertical plane of the hedge. This fence should align one to two feet inside the live side canopy, or set back from the brick walk to not obstruct circulation.

REPLACEMENT

In order to retain its aged plant material, replacement of the kitchen hedge should be a last resort. Replacement may be appropriate if there is extensive damage to the hedge that results in substantial loss of canopy (such as from a storm or snow loads) or if the hedge extends more than 2 to 4 feet above its current height and cannot be pruned back without extensive dieback. Partial replacement may be warranted if damage or overgrowth is limited to discreet areas, such as within the portion of H-8 on the upper terrace or the dogleg.

Replacement of this hedge should maintain it as a tapestry of white pine and hemlock.

Replacement Sequencing

If in the future replacement of this hedge is necessary, it should be coordinated with replacement of section H-13 of the terrace garden hedge (middle terrace)

that adjoins it to the west. Replacement should be undertaken for both sections (H-7, 8) at the same time in order to maintain the symmetry of the kitchen yard (Drawing 3).

MAINTENANCE CONSIDERATIONS

This hedge warrants special attention to watering and fertilizing in order to prolong the life of its aged plants. The hedge may benefit from mulching, which would improve moisture retention and suppress weeds (notably in the thinner south side of H-7).

Additional cabling, staking, and other reinforcement may be necessary to support the long, swooping branches. The hedge should be carefully pruned to favor white pine, and should be cut back from Aspet on both ends approximately one foot to avoid moisture damage and abrasion to the building. The Japanese tree lilac grove and apple tree adjoining H-7 should be routinely cut back from the hedge to reduce shading.

LITTLE STUDIO HEDGE (SECTION H-9)

HISTORY

The Little Studio hedge was originally planted in c.1893–94 as part of a series of white pine hedges that defined garden rooms continuing east of the building. The original spacing and number of plants in the hedge is not known. Positioned on the edge of a terrace, the hedge enclosed the west and north sides of a space framed on the east and south by the studio, and functioned as a screen for a swimming pool. Access to the space was apparently only through the studio. The hedge was retained through the rebuilding of the original studio (Barn Studio) as the Little Studio in 1903–04, and was separated from the adjoining Pan grove hedge by the studio's rear entrance wing (Figure 3.18). During World War II, the hedge was let go and became overgrown.

After the end of the historic period, the hedge grew into massive trees that by the 1960s towered over the Little Studio. The trees were removed and the hedge was replanted in white pine in c.1970. In the replanting, the alignment of both sides was shifted down-slope of the original hedge, perhaps to avoid the remnant tree stumps and roots. This realignment created an opening between the hedge and the building at the east and west ends. Informal paths developed in these openings, providing access for visitors and maintenance purposes.

EXISTING CONDITION

The Little Studio hedge consists of one "L"-shaped section (H-9) of pure white pine, replanted in c.1970, which frames a rectangular open space bounded on the

south and east by the Little Studio (Figures 3.19, 3.20, Drawing 1). A swimming pool, filled with gravel by the park in the 1970s, occupies the space. Two Lombardy poplar adjoin the hedge to the west. The hedge is planted approximately in the middle of the slope; it does not align with the Pan grove hedge to the east (H-10) as it did historically. The west side of H-9 is approximately 10 feet tall, aligning with the entablature on the Little Studio, and six feet wide. The hedge has a single row of white pine set in approximately 3-foot spacing. The north side of the hedge is weak facing the meadow to the north due to shading from the hedge itself. A non-historic opening between the hedge and the Little Studio at the east end contains a non-historic path into the space, which has eroded the bank (see Figure 3.20).

RECOMMENDED TREATMENT

The Little Studio hedge, replanted in c.1970, is in relatively good condition for a white pine hedge, although the north side is weak. However, because the c.1970 replanting was not made in the historic location, the hedge warrants replacement to restore its historic alignment with the Little Studio and the line of hedges extending to the east. This is a good hedge to maintain as pure white pine given the relative lack of shade, and could be used for interpretive purposes to illustrate the original character of most of the hedges at Saint-Gaudens. Because it is not contiguous with the hedges to the east of the studio, the difference in plant materials (pure white pine vs. hemlock or mixed pine-hemlock) does not detract from visual continuity among the hedges.

Setting

The setting of this hedge, unlike most others on the site, remains the same as it was historically. It is in nearly full sun, with some shade from the Little Studio, two Lombardy poplars, and the rectangular profile of the hedge.

Profile and Scale

The appropriate profile for this hedge is rectangular. The range of appropriate dimension is 7 to 10 feet tall, and 4 to 5 feet wide. The width of the hedge historically extended beyond the face of the studio wall on the north side. The hedge is presently at its maximum height. The scale of the hedge relates to the scale of the hedges to the east and to the Little Studio. The height of the hedge should be below the pergola on the west side of the building, and it should match the hedge sections to the east that parallel the birch allee (H-10, 12, 15, 18).

Location and Alignment

The hedge should be at the top of the slope, aligning with the corners of the Little Studio and with the line of hedges to the east along the birch allee (H-10, 12, 15,

18). The hedge historically abutted the northeast corner of the studio without an opening for access (access was historically through the studio only).

Plant Species

The existing plant species in the Little Studio hedge are appropriate. The hedge was originally planted as pure white pine. The environmental conditions are appropriate for maintaining white pine in the future, although as with the existing hedge, the lower canopy will most likely eventually weaken from shading.

RENOVATION

In the short term, the hedge warrants limited renovation to retain and enhance its rectangular profile. Interplanting of white pine on the north side would likely fail due to the level of shade from the existing hedge. Interplanting with hemlock would be not be worthwhile if replacement is scheduled in the short term, as recommended below.

Once the hedge is replanted, it will eventually require renovation to retain its full canopy and screening function. If growing conditions permit, renovation should keep the hedge as pure white pine, but use of hemlock for interplanting would also be appropriate.

REPLACEMENT

The Little Studio hedge should be removed and replanted on its historic alignment using a single row of white pine. The three foot spacing used in the c.1970 replanting appears to be appropriate for the species and site conditions. The position of the hedge at the top of a steep bank may require irrigation during drought periods, especially when the plants are young.

As part of the replanting, the eroded slope at the northwest corner, caused by pedestrian access to the pool terrace, should be restored. Two appropriate alternatives for providing access to the pool terrace as part of the replanting include:

- Replacement Alternative 1 (Preferred): Replant the hedge and provide an opening for access by lawn mowing and hedge trimming equipment. Visitor access to the space should be through the studio, as it was historically. The opening should be kept to the minimum width possible, and be located in the middle of less visible west side. An opening in the middle of the side would better retain the historic enclosed spatial character than would an opening at either end adjoining the building. At the exterior of the opening, the slope may be tapered out to provide an earthen turf ramp to ease access and lessen the likelihood of erosion. As

the hedge matures, the opening should form an archway to further enhance the enclosed spatial character.

- Replacement Alternative 2: Replant the hedge without an access opening. Access for visitors and maintenance would only be through the studio, as it was historically. Bringing mowing and trimming equipment through the studio would be problematic.

Replacement Sequencing

Replacement of this hedge does not warrant sequencing with replacement of other hedges.

MAINTENANCE CONSIDERATIONS

Due to its position at the top of a steep bank, this hedge may warrant irrigation and fertilization to enhance growing conditions.

PAN GROVE HEDGE (SECTIONS H-10, 11)

HISTORY

The Pan grove hedge was planted in c.1893–94 as part of a series of white pine hedges extending east from the Barn Studio. The hedge enclosed three sides of a garden featuring a sculpture of Pan positioned in front of a small marble pool, exedra, and a grove of paper birch. The east side of the hedge also served as the west side of the flower garden (terrace gardens). By 1903, the west side of the hedge adjoining the studio was removed, probably as part of the construction of the Little Studio.[68] With increasing shade caused by maturation of the birch in the Pan grove, the white pine began to weaken (Figure 3.21). In c.1925, the rear section of hedge (H-10) had been replanted in pure hemlock, and in c.1930, the east section (H-11) adjoining the terrace garden was also replaced in pure hemlock. By c.1940, most of the hedge was maintained around 7 feet in height.[69]

After extension of the birch allee to the north of the Pan grove in the late 1960s, the shade on H-10 became denser, and as a result the hemlock grew weaker. A desire path developed through H-10 adjoining the Little Studio to provide access to the birch allee and adjoining meadow.

EXISTING CONDITION

The Pan grove hedge consists of two hedge sections (H-10, H-11) of pure hemlock that together with the Little Studio enclose a garden room that is open to the south (Figure 3.22, Drawing 1). It is clipped in a rectangular profile. Most of the hedge is heavily shaded by the mature birch in the Pan grove and by the non-historic birch allee extension to the rear (north). The hedge is planted in a single row with variable spacing of between 2 and 5 feet.

Section H-10, located on the north side of the Pan grove, is upwards of 10 feet tall and 13 feet wide, and it aligns in height and placement with the north side of the terrace garden hedge (H-12). Section H-10 has a bare understory that no longer provides a sense of enclosure to the Pan grove space (Figure 3.23). A non-historic unpaved desire way leads through an arched opening in this section to the birch allee. This well-used path provides access for visitors to the birch allee and meadow to the north.

Section H-11, on the east side of the Pan grove, is 7 to 10 feet tall (the shorter section due to rise in grade at the south end) and 13 feet wide, and aligns in height with sections H-11 and H-12. It is full on the Pan grove side because it receives ample light through the high understory of the birch trees (see Figure 3.22). It is overgrown to the south, where it extends over the brick walk, as well as on the east side in the terrace garden.

RECOMMENDED TREATMENT

The Pan grove hedge is part of a series of adjoining hedges (with portions of the terrace gardens, Adams, and Shaw hedges) that warrant replacement due to loss of canopy and overgrowth. The existing weak condition of the hedge, particularly the lack of side canopy in H-10, detracts from the historic spatial enclosure of the garden room. The east side of the hedge (H-11) is in good condition on the Pan grove side, but due to extensive overgrowth in width on the terrace garden side, warrants replacement. The hedge has a non-historic opening to the birch allee that in its existing condition detracts from the historic spatial character of the Pan grove (see recommendations for renovation and replacement).

Setting

The section at the west end of birch allee consisting of six birch trees (three on the north side of the walk and three on the south side) is a non-historic extension planted in the late 1960s that warrants removal to reduce shading on H-10. The birch trees in the Pan grove are identified in the CLR for replacement due to their poor condition and need to restore the even-age character of the stand.[70]

Profile and Scale

The existing rectangular profile and 10-foot height of the Pan grove hedge is appropriate. The appropriate range of dimension is from approximately 7 to 11 feet tall and 4 to 6 feet wide. The height should remain below the adjoining pergola on the east side of the Little Studio, and should align with the height of the adjoining terrace garden hedge and with all of the hedge sections bordering the birch allee (H-12, 15, 18). The top of the hedge should remain level across both sections, including the portion of the hedge that extends onto the rise to the

brick walk (middle terrace). The east side of section H-12 facing the terrace garden is overgrown in width, and its south end is overgrown onto the east-west walk on the middle terrace. It should align with the toe of the slope on the middle terrace.

Location and Alignment

The overall location and alignment of the Pan grove hedge is appropriate. H-10 should align with H-12 in the terrace garden, and H-11 should align with H-14 and the beds in the lower terrace. Sections H-11 and H-10 are not exactly perpendicular.

Plant Species

While this hedge was originally white pine, both sections were replanted in hemlock during the historic period. Reintroduction of white pine would reestablish its historic continuity with adjoining hedges, but may not be feasible due to shading.

RENOVATION

Given the recommended replacement of the Pan grove hedge, renovation should be limited to minor, short-term intervention to enhance the historic character of the landscape. Interplanting would not be worthwhile in the context of recommended planned replacement and existing heavily shaded conditions in H-10.

To enhance the spatial enclosure of the garden room in the short-term, consideration should be given to installing a temporary lashed branch fence in the interior side of H-10 to reestablish the enclosed spatial character and prevent visitor access through the hedge. Such fencing would be a compatible contemporary addition to the landscape based on probable historic precedent in the terrace garden. In addition, the understory should be cleaned and mulched to improve growing conditions. If it is necessary to maintain the non-historic opening, it should be formalized into an archway to provide unobstructed passage.

REPLACEMENT

Replacement of the Pan grove hedge should be considered a priority given the poor condition of section H-10 and its impact on the historic spatial enclosure of the garden room. Replanting this hedge should be undertaken at the same time as the replanting of the birch in the Pan grove in order to avoid impacts on root systems and to take advantage of additional light that will be available to the hedge when the birch trees are small. As part of the replacement of this hedge, the non-historic extension of the birch allee to the north of section H-10 should be

removed to reduce shade on section H-10. This section is the only hedge at the site in full shade, from trees on both sides.

In replacement, there are three appropriate alternatives for the treatment of plant species (all alternatives should be coordinated with treatment of the terrace garden hedge/shared section H-11):

- Replacement Alternative A-1 (Preferred): Replant the hedge as a tapestry of hemlock and white pine to recall the original character of the hedge (white pine), and to relate to the tapestry hedges in the adjoining terrace garden. White pine may not be evenly distributed through the hedge.
- Replacement Alternative A-2: Replant the hedge in pure white pine, and interplant or replace with hemlock as the white pine weaken over time with the growth of the birch trees. This alternative would replicate the historic evolution of the hedge.
- Replacement Alternative A-3: Replant the hedge in pure hemlock, replicating the existing plant species and conditions in c.1940.

As part of replacement, treatment of the existing non-historic opening in section H-10 to the birch allee warrants consideration. The existing opening, together with the worn, unpaved desire way, detracts from the historic enclosed spatial character of the garden room and is furthering the decline of the hedge through compaction and abrasion. The closing of the adjoining opening behind the bench in the terrace garden hedge (H-12) has led to increased use of the opening in the Pan grove hedge. There are several appropriate alternatives for treatment of this opening:

- Replacement Alternative B-1 (Preferred): Remove the existing opening in section H-10 to restore the historic enclosure. Use the Adams Memorial opening as the primary access between the birch grove and the main gardens to the south. Implementation of this alternative was initiated in August of 2008.
- Replacement Alternative B-2: Retain the existing opening in section H-10 in its existing location. Formalize the opening into an archway and provide a mulched path bed with inconspicuous edging to reduce impacts on the hedge.
- Replacement Alternative B-3: As a contemporary addition, shift the opening to the middle of the hedge (H-10) to reflect the historic symmetry of the Pan grove. As with alternative 1-B, the opening should be formalized into an archway and include a mulched path bed with inconspicuous edging to reduce impacts on the hedge.

Replacement Sequencing

Both sections of the Pan grove hedge should be replaced at the same time, and should be undertaken together with replacement of H-14, which is the mirror of H-11 in the terrace garden hedge (see terrace garden hedge replacement).

MAINTENANCE CONSIDERATIONS

Following replacement of the Pan grove, the canopy of the birch trees should be kept high and away from the hedge to reduce shading as much as possible.

TERRACE GARDEN HEDGE (SECTIONS H-11, 12, 13, 14)

HISTORY

Portions of the terrace garden hedge were initially planted in c.1893–94 as part of a series of white pine hedges extending east from the Barn Studio. The hedge originally enclosed four sides of an east-west oriented flower garden corresponding with the space now occupied by the lower terrace and the adjoining Adams Memorial. The flower garden was accessed at its east end from the vegetable garden (Shaw Memorial). With redesign of the flower garden into the north-south oriented terrace garden in 1903, the south side of the hedge was removed and two new hedge sections were planted along the east side: one on the lower terrace (H-14) and one on the middle terrace (H-13). The north wall of the hedge on the lower terrace was modified with the addition of two hemlocks flanking a circular bench on axis with the length of the garden (Figure 3.25). The middle terrace hedge was planted with a concave alignment that followed the curved outline of the adjoining flower bed, in the middle of which was a statue of Hermes (Figure 3.26). By the 1920s, the north hedge section (H-12) was adorned with Zodiac heads positioned on square posts, and the middle terrace hedge (H-13) extended over the brick east-west walk, forming an arched opening. Around this time, the white pine began to fail on the original hedge sections due to shade from the Pan grove. The west wall of the hedge adjoining the Pan grove and the north wall (H-11, 12) were replanted in hemlock in c.1930 on the preexisting alignment, but not following the redesign of the garden plantings according to a c.1928 plan by Ellen Shipman (see Figure 3.24). Note that the existing north wall (H-12) aligns to that shown in Figure 3.25 and not as depicted in the plan by Ellen Shipman (Figure 3.24) and the Shipman plan does not show the two projections flanking the bench. (If replanted as per the c.1928 Shipman plan, the section would have been replanted at a later date when the projections were restored.) The younger pines in the sunnier south-facing sections (H-13, 14) were not replaced, but were interplanted with hemlock over time. The hedge was maintained around 7 feet in height. In c.1948, an opening was made in the east hedge section on the lower terrace (H-14) to provide access to the former cutting garden (Adams Memorial), where the Seated Lincoln was positioned.[71]

At some point after the planting of the birch allee in c.1948–50, the semi-circular white bench was removed and an opening was made through the north hedge section (H-12). In c.1972, the opening in the east section of the lower terrace (H-14) was closed with installation of the Adams Memorial. In the 1980s, the bench within H-12 was reconstructed and the access to the birch allee was closed, but the opening in the hedge was retained. The overall height of the hedge was maintained, but it became overgrown in width, extending over flowerbeds and walks. Sections became weak with the loss of lower canopy due to shade and improper shearing/pruning.

EXISTING CONDITION

The terrace garden hedge consists of four hedge sections (H-11 to H-14) of hemlock and white pine that together partially enclose the terrace garden (Drawing 1). Sections H-11, H-12, and H-14 frame three sides of the lower terrace, while H-13 frames the east side of the middle terrace, together with a portion of the kitchen hedge (H-8) on the upper terrace. The terrace garden hedge is clipped in a rectangular profile, and is mostly in full sun, except where shaded by the Pan grove birch and birch allee, and by other hedges. H-11 and H-14 are shared hedge sections with the Pan grove hedge and the Adams hedge.

Section H-11, framing the west side of the lower terrace, is pure hemlock planted in c.1930, measuring 7 to 10 feet tall (the shorter section due to rise in grade at the south end) and 13 feet wide, with a single row and 1 to 4 feet between plants (Figure 3.27). The hedge aligns in height with adjoining sections H-10 and H-12. It is overgrown in width, extending over the adjoining flowerbed and brick walk to the south. The hedge is full on top but weak on the terrace garden side.

Section H-12, framing the northern side of the terrace garden, consists of two separate parts of pure hemlock planted in c.1930, measuring 10 feet tall and 6 to 10 feet wide. The height of the hedge corresponds with the base of four Zodiac heads positioned on wood posts. In plan, this section features two projections that frame a reconstructed historic curved bench. A non-historic opening in the hedge, obstructed by the bench, leads to the birch allee. This section is full on the extensions around the curved bench, but weak on the rear section and facing the birch allee (Figure 3.28).

Section H-13, framing the eastern side of the middle terrace, consists of white pine planted in c.1903 with later hemlock interplanting. It measures 8 to 10 feet tall and approximately 6 to 8 feet wide. In plan this section presently forms two convex curves that meet in the middle on alignment with the statue of Hermes (Figure 3.29). The hedge has a non-historic inward batter toward the base. At the south end and to the rear, this hedge is contiguous with the kitchen hedge (H-8),

which is approximately 3 to 5 feet taller (see Figure 3.16). At the north end, this hedge is contiguous with H-14 (east side of lower terrace) and H-16 (Adams hedge). H-13 engages these hedges by extending over the brick walkway, forming an arched opening. It is approximately 3 feet taller than H-14, but is level with H-16. Section H-13 is weak where the two convex curves meet; recent hemlock interplanting here has failed in part.

Section H-14, framing the eastern side of the lower terrace as well as the west side of the Adams Memorial, consists of mixed white pine and hemlock, originally planted in 1903 and later interplanted. It is 8 to 10 feet tall and 12 feet wide, with a single row and white pine interplanting on the Adams side. It is full on the top and south end, but weak on both the terrace garden and Adams side.

RECOMMENDED TREATMENT

The terrace garden hedge is part of a series of adjoining hedges (with portions of the Pan grove, Adams, and Shaw hedges) that warrant replacement due to loss of canopy, overgrowth, and misalignment. The condition of the hedge, particularly the overgrowth of H-11 and 12 onto the adjoining flowerbeds, opening in H-12, and the lack of side canopy in H-14, detract from the historic character of the landscape. Section H-12 warrants renovation in the short-term because it is overall in good condition, except on the north side under the birch allee. When the birch allee is replaced in 5 to 15 years, consideration should be given to replacing H-12. Section H-13 is also in fair condition and warrants renovation rather than replacement due in part to integration with the Kitchen and Adams hedges (these adjoining hedges are not recommended for replacement in the near future).

Overall, treatment of the terrace garden hedge should emphasize symmetry and the relationship of the hedge to the interior layout of the garden, as redesigned according to plans by Ellen Shipman through c.1946. A full canopy is critical on the garden side, but is less critical on the north side beneath the birch allee.

Setting

Shading from adjoining birch trees should be reduced to the extent feasible by raising the canopy. The birch trees in the Pan grove are identified for replacement in the near future due to their poor condition and need to restore the even-age character of the stand. The birch allee is scheduled for replanting in the next 5 to 15 years.

The outward growth of the terrace garden hedge has infringed on the adjoining perennial beds. This growth has not only narrowed the beds, but has also

hampered maintenance and has caused crowding in the beds in summer and early fall when the perennials are at the peak of the growth and bloom.

Profile and Scale

The profile of the lower terrace hedge sections—rectangular and projecting around the circular bench—is correct. The south face of the projections around the bench should also be rectangular, as they are now. The appropriate range of dimensions is from approximately 7 to 11 feet tall and 4 to 6 feet wide, extending to approximately 10 feet to either side of the bench. H-11 and H-14 cannot be brought back to their appropriate width without extensive dieback due to extent of overgrowth (more than 5 feet in H-11, approximately 2 feet in H-14). Section H-12 is presently adorned with four Zodiac heads positioned on white posts. These posts should be adjusted as necessary to the height of the hedge so that the Zodiac heads appear to float on top.

On the middle terrace, the overall alignment of H-13 is correct, but the sides should have a rectangular profile rather than the existing inward batter (vase shape). The appropriate range of dimensions is approximately 6 to 8 feet tall and 3 to 6 feet wide. While the hedge is much wider than it was historically, this growth is primary on the east side, outside of the garden. The extension of the hedge over the east-west brick walkway to form an arch and the intersection of H-14 and H-16 (Adams) is historic and should be retained.

Location and Alignment

The section of H-12 at the circular bench should extend to the front of the bench and align with the curved sides, as it does now. The opening in section H-12 to the rear of the curved bench, introduced after c.1950 should be filled in. Although this opening may have been introduced with the birch allee at the end of the historic period, the garden is being managed for its character as redesigned by Ellen Shipman according to c.1928 and c.1941 plans.

The sides of Sections H-11 and H-12 should align with the flowerbeds and extend no further than approximately 2 feet from the brick edging, allowing a grass strip to be maintained between the hedge and the bed (Drawing 2). The south ends of H-11 and H-14 should align with the toe of the slope (base of middle terrace). It is not appropriate to return the opening to the Adams Memorial in H-14, which was introduced at the very end of the historic period, because the seated Lincoln is no longer present and because the opening would detract from the Shipman design of the garden.

The middle terrace hedge (H-13) is in its correct location, but is out of its historic alignment and needs to be reshaped. The hedge should have a concave alignment

flanked by straight sections (rather than the existing double convex form) that mirrors the shape of the flowerbed in front, with Hermes as the center point (see Figure 3.17). The hedge should extend to the base of the upper terrace, as it does now.

Plant Species

While portions of the terrace garden hedge (H-11, 12) were replaced in hemlock during the historic period, it would be appropriate to reintroduce white pine in order to enhance the continuity among the four sections of hedge. The amount and distribution of white pine should be based on adequate light levels. The projections around the circular bench should remain pure hemlock in order to retain the crisp profile of this hedge section.[72]

RENOVATION

Renovation is not recommended for sections H-11 and 14 of the lower terrace garden hedge given the need for replacement in the short term. Due to the extent of overgrowth in width (approximately 2 to 6 feet), renovation is not feasible for these sections because pruning would extend into deadwood where new growth would not be possible. Section H-12 is in good condition in the projections around the curved bench and warrants renovation in the short term through interplanting on the front (south) side. Interplanting on the north side may not be successful due to the shade from the birch allee. Renovation is also warranted for section H-13 on the middle terrace to return its historic alignment and fill in weak areas of its canopy. This hedge should be renovated through interplanting of white pine and/or hemlock depending on available light to maintain it as a tapestry. The south front of the hedge should be gradually returned to its rectangular profile and concave alignment, following the outline of the adjoining flowerbed (see Figure 3.17).

REPLACEMENT

Replacement of the lower sections of the terrace garden hedge (H-11, H-14) should be considered a priority given their weak and overgrown conditions, which impact the symmetry and formality of the garden. As the preferred replacement alternative for the Pan grove hedge, section H-11 should be replanted at the same time as the replanting of the birch in the Pan grove in order to avoid impacts on root systems and to take advantage of additional light that will be available to the hedge when the birch trees are small. H-14 should be replaced at the same time as H-11 in order to enhance the symmetry of the garden's lower terrace. Replacement of H-12 is not warranted in the short term, but may be appropriate when the birch allee is replaced in the next 5 to 15 years.

In replacement of the hedge sections on the lower terrace, there are three appropriate alternatives for plant species, except for the projections around the curved bench which should remain hemlock because white pine would not produce the historically crisp profile of this section. All alternatives should be coordinated with treatment of the adjoining Pan grove and Adams hedges:

- Replacement Alternative 1 (Preferred): Replant the projections of H-12 in hemlock and the remainder with sections H-11 and H-14 as a tapestry of white pine and hemlock to enhance the continuity. Under this alternative, the sections of H-11 and H-12 in the shade of the birch would be primarily hemlock.
- Replacement Species Alternative 2: Replant sections H-11, 12, and 14 in pure hemlock due to existing shaded conditions and to enhance the continuity of the lower terrace.
- Replacement Species Alternative 1: Replant sections H-11 and 12 in pure hemlock, and Section 14 in a tapestry of hemlock and white pine to replicate existing species composition.

Replacement of the south end of section H-14 will impact the intersection of H-13 (see Figure 3.17). Historically, H-14 projected west from H-13 at this point, so it is appropriate to replant H-14 in front of H-13. This area of replanting should be kept narrow (1 to 2 feet) since H-13 is overgrown in width, to limit the projection of H-14 into the lower terrace sufficient to maintain a grass strip approximately 2 feet wide between the flowerbed and the hedge. With replanting of H-14, a part of the interior bare canopy of H-13 will be exposed adjoining the brick walk, given that H-14 is also overgrown in this direction and should be pulled back (north) from the walk. Here, interplanting or repositioning of hemlock should be used to fill in the gap.

Replacement Sequencing

There are two alternatives for sequencing replacement of the hedges in the lower terrace garden with respect to surrounding hedges and the birch allee (Drawing 3):

- Sequencing Alternative 1—Partial Replacement (Preferred): Replace sections H-11 and 14 in the short term at the time the birch trees in the Pan grove are replaced (expected within 5 years), but before birch allee is replaced (expected within 5 to 15 years). Section H-12 would be retained and would be replaced later when the birch allee is replaced. This alternative will allow for the restoration of the flowerbeds in the terrace garden in the short term and would limit the visual impact of replacement in the short term.

- Sequencing Alternative 1—Delayed Replacement: Delay replacement of sections H-11, 12, and 14 until the birch allee is replanted (expected within 5 to 15 years). By coordinating replacement with the birch allee, this alternative would perpetuate the existing overgrown conditions for a number of years, but would establish a uniform size and age for the three hedge sections when they are replaced.

MAINTENANCE CONSIDERATIONS

The canopy of the trees in the Pan grove and birch allee should be raised to the extent feasible to reduce shade on the west and north sides of the terrace garden hedge (and all other sections along the birch allee).

ADAMS HEDGE (SECTIONS H-14, 15, 16, 17)

HISTORY

Most of the Adams hedge was initially planted in c.1893–94 as part of a series of white pine hedges extending east from the Barn Studio. The hedge originally enclosed the east end of the flower garden, which was accessed through an opening from the vegetable garden (Shaw Memorial). With redesign of the flower garden in 1903, a new white pine hedge section was planted to separate the lower terrace into two rooms, forming a square area used as a cutting garden (see Figure 3.26). The cutting garden was accessed through the original opening from the vegetable garden. Most of the hedge was maintained around 7 to 8 feet in height.

In c.1948 following the period of neglect that began during World War II, the cutting garden use was removed and the space converted to display the Seated Lincoln (Figure 3.30). At this time, the original opening to the east was removed and a new opening to the terrace garden made in the west side of the hedge, opposite Lincoln. Portions of the hedge, notably H-17, had become overgrown, reaching upwards of 12 feet tall (see Figure 3.30).[73]. Section H-15 was probably replaced in pure hemlock around the time the birch allee was planted in c.1950 or soon thereafter. As the white pine thinned in other sections, hemlock was interplanted. In c.1972 with removal of the Seated Lincoln and installation of the Adams Memorial, the opening to the terrace garden was closed and two new opening were added in the north and south sides of the hedge. As the birch allee matured and the plantings around the Adams Memorial grew, portions of the hedge died back due to shade.

EXISTING CONDITION

The Adams hedge consists of four hedge sections of hemlock and white pine that enclose a small, square garden room. The hedge is clipped in a rectangular

profile. Most of the hedge is in full sun, but it is shaded by the birch grove to the north, two magnolias flanking the Adams Memorial, and the hedges themselves.

Section H-14 is a shared hedge with the terrace garden to the west. It is mixed white pine and hemlock, originally planted in c.1903 and later interplanted (see Figure 3.27). This section has a single row, and is 8 to 10 feet tall and 12 feet wide, with recent white pine interplanting on the Adams side that is not thriving apparently due to shade. It is full on the top but weak on the Adams and terrace garden sides.

Section H-15, framing the north side of the Adams Memorial, is pure hemlock replanted in c.1950. It is 8 to 10 feet tall, and 6 feet wide, with a non-historic opening and brick steps leading to the birch allee. The hedge is weak facing both the Adams and birch allee and at the pass-through, with an area of recent die-back apparently due to heavy shade from the magnolias that flank the Adams Memorial (Figure 3.31).

Section H-16, framing the south side of the Adams Memorial, is mixed white pine and hemlock planted in c.1893–94 with later interplanting. To the south, it frames the north wall of the Adams vestibule. This section has a single row with later infill along the hedge, and is 10 feet tall, 6 feet wide, with a non-historic arched opening from the Adams vestibule. It rises above adjoining section H-14, is level with the adjoining H-13 (terrace garden hedge), and is lower than H-17 (Adams-Shaw divide). Section H-16 has a mostly full canopy with weak areas around the arched opening and in the shade of the magnolia (Figure 3.32).
Section H-17, forming the east wall of the Adams Memorial and the divide with the adjoining Shaw Memorial, is mixed white pine and hemlock planted in c.1893–94 with later interplanting. It is a double row with infill along the edges (see Figures. 3.31, 3.32). This section rises above all other adjoining hedge sections at 18 feet tall. It consists of several very large, aged hemlock trees, with an overall width of 10-12 feet. The hedge is weak on the Adams side, with approximately three-quarters of its side canopy lost due primarily to heavy shade from the adjoining magnolia trees flanking the Adams Memorial.

RECOMMENDED TREATMENT

The Adams hedge is a part of a series of interconnected hedges (with portions of the Pan grove, terrace garden, and Shaw hedges) that warrant partial replacement. The east and west sides of the Adams hedge (H-14, 17) warrant replacement in the short term due to loss of side canopy and overgrowth in height. The north side, section H-15, warrants replacement due to loss of side canopy, but this should not be undertaken until the birch allee is replaced within 5 to 15 years. The south side, section H-16, is generally full and healthy and does

not warrant replacement at this time due in part to its connection with the kitchen and terrace garden (H-13) hedges, which are not recommended for replacement. While the interior landscape of the Adams memorial is not historic, treatment of the hedge still warrants enhancement of its historic character and return of a full side canopy that screens and defines the space.

Setting

Shading on this hedge should be reduced to the extent feasible by pruning up the canopy of the birch allee and removing the magnolias or replacing them with smaller trees, as recommended in the CLR Volume III (treatment). The birch allee is scheduled for replacement in the next 5 to 15 years, while the magnolias are recommended for replacement in the near future.[74]

Profile and Scale

The rectangular profile of this hedge is correct. The height and width are larger than during the historic period, making the space feel smaller than intended. The appropriate range of dimensions for this hedge is from approximately 7 to 11 feet tall and 4 to 6 feet wide. Sections H-16 and 17 should be approximately the same height and approximately 2 to 3 feet taller than sections H-14 and 15.

Location and Alignment

The existing location and alignment of this hedge is generally correct. The northern extension of H-17 over H-15 and H-18 (facing the birch allee) and over H-16 and 21 to the south appears to be a non-historic condition, and therefore this extension should be removed and the hedge kept to the interior sides of the adjoining hedges (Figure 3.33).

Section H-16 should align in height with section H-21 in the Shaw hedge and H-13 on the middle terrace of the terrace garden hedge, as it does now. Sections H-14 and H-15 should align in height with adjoining sections H-12 and H-15 bordering the birch allee. There are two alternatives for the alignment of section H-17 (see Figure 3.33):

- Alignment Alternative 1 (Preferred): Align H-17 at a height level with the sections to the north (H-15, 17), and below the hedges to the south (H-16, 21). This would make H-17 consistent in height with the other north-south hedge sections (H-11, 14, 19) and with the treatment of H-19 replaced in 1996. It would create a lower backdrop to the Adams Memorial.
- Alignment Alternative 2: Align H-17 at a height level with the sections to the south (H-16, 21), rising above the hedges to the north (H-15, 17).

This would make H-17 taller than the other north-south hedge sections (H-11, 14, 19), providing a higher backdrop to the Adams Memorial.

The two openings in the Adams hedge in H-15 and H-17 are non historic, but are appropriate to retain as contemporary additions necessary in the existing configuration of the Adams Memorial. The opening in H-15 to the birch allee should be converted into an arched opening to make the opening less conspicuous in the hedge. It is not necessary or appropriate at this time to reintroduce the historic opening in H-17 to the Shaw Memorial (former bowling green), given the existing location of the Adams Memorial. It is also not appropriate to return the opening to the terrace garden in H-14, which was introduced at the very end of the historic period. The garden is being managed for the character as designed by Ellen Shipman in c.1928 and c.1941 plans, which did not include this opening.

Plant Species

The Adams hedge was originally pure white pine, but sections were replaced or interplanted with hemlock during the historic period. Reintroduction of white pine into pure hemlock section H-15 in order to create a tapestry effect would be appropriate, but only feasible on the south side. A tapestry of white pine and hemlock in all sections of this hedge would enhance the continuity among the four sections of hedge.[75]

RENOVATION

Renovation is recommended for H-16, and should be considered for H-15 in the short term to reestablish the side canopy lost through shading from the magnolias. Sections H-14 and H-17 are recommended for replacement. Renovation of H-17 is not feasible given the extent of overgrowth in height (approximately 6 feet) and substantial loss of side canopy. Hemlock is the only feasible plant material to use in interplanting in H-16 given the shaded conditions. As with other tapestry hedges, renovation should maintain or increase the existing canopy of white pine, which is primarily at the top of the section.

REPLACEMENT

Replacement of sections H-14 and 17 in the Adams hedge should be considered a priority in the short term given the weak and overgrown conditions; H-14 warrants replacement as a shared section with the terrace garden hedge. While H-17 has a number of very large, old specimen hemlocks, the value of this particular hedge in defining and unifying the spatial character of the Adams and Shaw Memorials is more significant than its aged plant material. H-15 should be replaced when the birch allee is replaced within the next 5 to 15 years.

In replacement, there are three appropriate alternatives for the treatment of plant species. All alternatives should be coordinated with treatment of the adjoining terrace garden and Shaw hedges.

- Replacement Alternative 1 (Preferred): Replant sections H-14, 15 and 17 as a tapestry of hemlock and white pine to establish species continuity with existing section H-16 on the south side, which is a tapestry of white pine and hemlock. White pine would be planted only where there is sufficient light, not evenly throughout the hedge (i.e., not on the north side of H-15).
- Replacement Alternative 2: Replant sections H-14, 15, and 17 in pure white pine, and interplant or replace with hemlock as the white pine weakens over time due to shade. This alternative would replicate the historic evolution of the hedge.
- Replacement Species Alternative 3: Replant sections H-14, 15, and 17 in pure hemlock due to existing shaded conditions.

Replacement of H-14 and H-17 will result in exposing bare/interior sides of H-16 (not to be replaced) due to the change in width of the replanted hedge sections. It is recommended that these areas be addressed by interplanting hemlock and/or repositioning branches.

Replacement Sequencing

There are two alternatives for sequencing replacement of the Adams hedges with respect to surrounding hedges and the birch allee (Drawing 3):

- Sequencing Alternative 1—Partial Replacement (Preferred): Replace sections H-14 and 17 in the short term at the time the birch trees in the Pan grove are replaced (expected within 5 years), but before birch allee is replaced (expected within 5 to 15 years). Section H-15 would be retained and would be replaced later when the birch allee is replaced. This alternative would limit the visual impact of replacement in the short term.
- Sequencing Alternative 1—Delayed Replacement: Delay replacement of sections H-14, 15, and 17 until the birch allee is replanted (expected within 5 to 15 years). By coordinating replacement with the birch allee, this alternative would perpetuate the existing overgrown conditions for a number of years, but would establish a uniform size and age for the three hedge sections when they are replaced.

MAINTENANCE CONSIDERATIONS

The canopy of the trees in birch allee should be raised to the extent feasible to reduce shade on section H-15 (and all other sections along the birch allee).

SHAW HEDGE (SECTIONS H-17, 18, 19, 20, 21)

HISTORY

The Shaw hedge was initially planted in c.1893–94 as part of a series of white pine hedges extending east from the Barn Studio. The hedge originally enclosed a vegetable garden, and was accessed from an opening at its east end. The hedge also had an opening in its west wall to the flower garden, later the cutting garden (present Adams Memorial). A dogleg extended off the southeast corner to the edge of the service drive. In c.1903, the vegetable garden was moved to the present cutting garden, and the space was redesigned for use as a bowling green. After 1907, Lombardy poplars were planted next to the hedge to flank the east opening (Figure 3.34). As the white pine aged and became thin, the openings and bare spots were interplanted with hemlock. The hedge was maintained at approximately 7 feet in height.

During World War II, maintenance was curtailed, and sections of the hedge, notably H-17 and H-19 became overgrown. After the site was reopened in c.1948 the hedge was renovated and section H-18 was replaced in pure hemlock, probably at the time the birch allee was planted or soon thereafter. With installation of the Seated Lincoln in the adjoining cutting garden in c.1948, the opening in the west side of the hedge was closed. [76] In 1959, a plaster cast of Saint-Gaudens' Shaw Memorial, housed in a tall protective shed, was placed at the east end of the hedge space. Around this time, new openings were created in the north and south sides of the hedge, and the old opening to the rear (east) of the Shaw Memorial was closed with two white pines. In 1997, the plaster cast and shed were replaced by an open-air bronze. At this time, the overgrown east side of the hedge, H-19, and the adjoining part of the north side extending to the opening were replaced in pure hemlock, and the original eastern opening was restored. Replanting of the two poplar trees at the east opening was planned at this time but this was later abandoned.

EXISTING CONDITION

The Shaw hedge consists of four hedge sections of hemlock and white pine that enclose a long, rectangular garden room on all sides, plus a fifth section that forms a dogleg that is an eastern extension of the south section, H-21. The hedge is clipped in a rectangular profile. Most of the hedge is in full sun, but it is shaded by the birch allee to the north as well as the hedges themselves.

Section H-17, forming the west wall of the Shaw as well as the east wall of the Adams Memorial, is mixed white pine and hemlock planted in c.1893–94 with later interplanting (Figure 3.35). It is a double row with infill along the edges. This section rises above all other adjoining hedge sections at 18 feet tall. It consists of several very large, aged hemlock trees, with an overall width of 10-12 feet. The hedge is full on the Shaw side, with the canopy formed by long, sweeping hemlock branches. On the Adams side, the section has lost most of its side canopy.

Section H-18, forming the north side of the Shaw along the birch allee, is pure hemlock planted in c.1950 (Figure 3.36). It is a single row with plants spaced between 2 and 6 feet. The section is 8 to 10 feet tall and 8 feet wide, and the east end of the section abuts a non-historic opening. It aligns in height with the adjoining north side of the Adams hedge (H-15), but is approximately 5 feet lower than the Adams-Shaw divide (H-17). The section has a full and dense canopy on the Shaw side, but a thinner side canopy on north side mostly due to shading from the birch allee (Figure 3.37).

Section H-19, forming the east end of the north side and the east side of the Shaw, is pure hemlock planted in 1997. It is a single row with plants spaced 3 feet apart. The section is 8 feet tall and 4 feet wide, with a historic opening in the middle of the east side. It aligns in height with H-18, but is approximately 2 feet lower than the south side of the hedge (H-21). The section has a dense and full canopy, except on the north side beneath the shade of the birch allee, which has recently died back (see Figure 3.37).

Section H-20 is the 25 foot-long dogleg that extends east of and in alignment with the south side of the Shaw hedge (H-21), extending to the service drive (Figure 3.38). It is primarily white pine planted in c.1893–94, with hemlock toward the west end, a single row, and infill plantings along the edges. The section is 10 feet tall and 5 feet wide, and is in alignment with the height of H-21, but lower than H-19. It is weak along the bottom, and recent infill plantings have not filled out. The hedge terminates the view looking up (north) along the service drive.

Section H-21, forming the south side of the Shaw hedge except for the dogleg, is mixed hemlock and white pine dating to c.1893–94 with later infill plantings (see Figure 3.36). The section is a double row with the primary plants spaced 2 to 4 feet apart. The section is 10 feet tall and 6 to 8 feet wide, with a dense, full canopy. It is in alignment with the height of the dogleg (H-20) and south side of the Adams hedge (H-16), but is approximately 5 feet lower than the Adams-Shaw divide (H-17). The sunnier south side is predominantly white pine, while the

interior north side is primarily hemlock. A non-historic opening is located in the western third of the section.

RECOMMENDED TREATMENT

The Shaw hedge is part of a series of adjoining hedges (with portions of the Pan grove, terrace garden, and Adams hedges) that may warrant partial replacement due to loss of canopy and overgrowth. The hedge should fully enclose the space and screen outward views, and the dogleg (H-20) should screen views looking up the service drive. The hedge is presently in good condition on the inside and southern outer side, and moderately weak on the north side in the shade of the birch allee. Section H-17 that forms the divide with the Adams Memorial is the only part of the hedge that presently warrants substantial change in appearance. The hedge is overgrown in height, and has a full but weak side canopy in the Shaw (it has lost most of its side canopy on the Adams side). The replacement of section H-19 in 1997 returned the east end of the hedge, which had similar issues to H-17, to its historic character as a shorter hedge that aligns with the north side.

The Shaw hedge, although modified since the historic period with the addition of the Shaw Memorial, loss of opening in H-17, loss of white pine, and addition of two new openings, retains much of its historic character as long, unadorned rectangular space enclosed by hedges.

Setting

Shading on this hedge should be reduced to the extent feasible by pruning up the canopy of the birch allee. The birch allee is scheduled for replanting in the next 5 to 15 years.

Profile and Scale

The rectangular profile of this hedge is correct. The scale of the hedge is larger than it was during the historic period, but is overall in the correct proportions, except for section H-17, which is overgrown in height. The appropriate range of dimensions for this hedge is from approximately 7 to 11 feet tall and 4 to 6 feet wide. Sections H-17, 20, and 21 should be approximately the same height and about 2 feet taller than sections H-18 and 19.

Location and Alignment

The existing location and alignment of this hedge is generally correct. Although all 5 sections of the hedge were originally about the same height, by the latter historic period H-17 and 21 had grown taller than the other two sides. The extension of H-17 over H-15 and H-18 to the north (facing the birch allee) and over H-16 and 21 to the south, appears to be a non-historic condition. These

extensions should be removed and the hedge kept to the interior face of the adjoining hedges (see Figure 3.33).

Section H-18 and 19 should align in height with section H-15, H-12, and H-10 in the adjoining hedges to the west that flank the birch allee; H-20 and 21 should align with H-16 to the west, as it does now. There are two alternatives for the height alignment of section H-17 (Figure 3.33; also discussed under Adams):

- Alignment Alternative 1 (Preferred): Align H-17 at a height level with the sections to the north (H-15, 17), and below the hedges to the south (H-16, 21). This would make H-17 consistent in height with the other north-south hedge sections (H-11, 14, 19) and with the treatment of H-19 replaced in 1996.
- Alignment Alternative 2: Align H-17 at a height level with the sections to the south (H-16, 21), rising above the hedges to the north (H-15, 17). This would make H-17 taller than the other north-south hedge sections (H-11, 14, 19).

The openings in the Shaw hedge in H-18 and H-21 are not historic, but are appropriate to retain as contemporary additions necessary for the existing access to the Shaw Memorial. Both openings should be converted to arches to make them less conspicuous in the hedge if possible; however, the opening between H-18 and H-19 may be too wide and low to provide an arch. The opening in H-19, reintroduced in 1997, should be retained as a break in the hedge.

Plant Species

The Shaw hedge was originally pure white pine, but sections were replaced or interplanted with hemlock probably in response to the lack of management that began during World War II as well as the planting of the birch allee in c.1950. Reintroduction of white pine into portions of the hedge to create a tapestry effect would be feasible. A tapestry of white pine and hemlock in all sections of this hedge would enhance the continuity among the four sections (currently H-18 and H-19 are pure hemlock, the others are a tapestry).[77]

RENOVATION

Renovation is recommended for all sections of the Shaw hedge except for H-17 (H-18 and a portion of H-19 may be replaced at a later date along with the birch allee). Presently the hedge is marked by misalignment in width and height in several sections, and by variation in plant material from all hemlock to a tapestry of white pine and hemlock. Renovation should aim to align the sections where appropriate and to enhance the continuity in plant materials.

Sections H-18 and 19 should be renovated to fill in weak areas on the north side beneath the birch allee and to maintain a full canopy on the south side. The south side of these sections should be gradually pruned so that both sections align to either side of the opening. Although an arched opening would be desirable, there is there is insufficient height given the grade change. There are two alternatives for renovating plant materials in these sections:

- Renovation Alternative 1 (Preferred): Convert H-18 and H-19 into a tapestry by interplanting with white pine on the sunny sides in order to enhance the historic uniformity of the hedge. Maintain the shaded north side of H-18 beneath the birch allee in hemlock.
- Renovation Alternative 2: Retain H-18 and H-19 in pure hemlock, using only hemlock to interplant weak areas.

Sections H-20 and H-21 should be renovated to retain a white pine-hemlock tapestry, with pine dominating where feasible.[78] Hemlock should be interplanted on the north side of the dogleg, where previous white pine interplanting has failed. As with other tapestry hedges, renovation should maintain or increase the existing canopy of white pine.

REPLACEMENT

As recommended for the Adams hedge, replacement of section H-17 should be considered a priority given its weak and overgrown conditions. Due to the extent of overgrowth in height (approximately 6 feet) and substantial loss of side canopy, renovation of H-17 is not feasible. While H-17 has a number of very large, old specimen hemlocks, the value of this hedge in defining and unifying the spatial character of the Adams and Shaw Memorials is more significant than its aged plant material.

In addition to H-17, it may be appropriate to replace H-18 and the northern portion of H-19 at the time the birch allee is replaced (within 5 to 15 years), if the northern face of these sections cannot be adequately renovated to form a relatively full side canopy, or if the hedge otherwise fails or becomes overgrown to the point where it cannot be pruned back.

In replacement, there are three appropriate alternatives for the treatment of plant species. These should be coordinated with replacement of the Pan grove, terrace garden, and Adams hedges.

- Replacement Alternative 1 (Preferred): Replant sections H-17, 18, and 19 as a tapestry of hemlock and white pine to reintroduce white pine and enhance the continuity of the hedge sections, particularly with H-21.

White pine would be planted only where there is sufficient light, not evenly throughout the hedge.

- Replacement Alternative 2: Replant sections H-17, 18, and 19 in pure white pine, and interplant or replace with hemlock as the white pines weaken over time due to shade. This alternative would replicate the historic evolution of the hedge.
- Replacement Alternative 3: Replant sections H-17, 18, and 19 in pure hemlock due to existing shaded conditions and to ease maintenance.

Replacement of H-17 will result in exposing bare/interior sides of H-21/16 (not to be replaced) and H-15/16 (if not replaced) due to the change in width of the replanted hedge sections. It is recommended that these areas be addressed by interplanting hemlock.

Replacement Sequencing

There are two alternatives for sequencing replacement of the Shaw hedges with respect to surrounding hedges and the birch allee (Drawing 3):

- Sequencing Alternative 1—Partial Replacement (Preferred): Replace sections H-17 in the short term at the time the birch trees in the Pan grove are replaced (expected within 5 years), but before birch allee is replaced (expected within 5 to 15 years). Sections H-18 and H-19 (part) would be retained and replaced later when the birch allee is replaced. This alternative would limit the visual impact of replacement in the short term.
- Sequencing Alternative 2—Delayed Replacement: Delay replacement of section H-17 until sections H-18 and H-19 (part) are replaced along with the birch allee (expected within 5 to 15 years). By coordinating replacement with the birch allee, this alternative would perpetuate the existing overgrown conditions for a number of years, but would establish a uniform size and age for the hedge sections when they are replaced.

MAINTENANCE CONSIDERATIONS

The canopy of the trees in the birch allee should be raised to the extent feasible to reduce shade on sections H-18 and 19 (and all other sections along the birch allee).

The dogleg (section H-20) should be protected from possible damage from snowplowing along the service drive. Parking in the area to the south of this section and H-21 should be kept well away from the hedge to avoid soil compaction.

GALLERIES ENTRANCE HEDGE (SECTIONS H-22, 23)

HISTORY

As part of the construction of the new galleries in 1948 based on plans by John W. Ames prepared for the Trustees of The Saint-Gaudens Memorial, two hemlock hedges were planted to enclose the western and southern side of the circular entrance courtyard situated between the two wings (Picture Gallery and New Gallery/Atrium). The hedges were clipped into two cones that extended to linear sections with rectangular profiles (Figure 3.39). The southern hedge originally wrapped around the Farragut Memorial base, which formed the southwestern side of the circular courtyard. By the mid-1960s, twelve years after planting, the cones were approximately 10 feet tall while the linear sections were approximately half that height. The linear part behind the Farragut base stepped up to 10 feet tall.[79] These dimensions most likely reflected the historic design intent.

With construction of the Farragut pavilion in 1986 and shifting of the sculpture to the east, the adjoining section of hedge was removed. By 1992, the hedges had become overgrown and were replanted in-kind. The northern half of the north section adjoining the Atrium was not replanted, probably due to shade from the adjoining birch trees. The linear parts of the replanted hedge were eventually sheared with a battered profile, similar to the cones, and were maintained at the height of the wall of the Farragut pavilion, which reduced the height ratio with the cone to approximately 4:5 from 1:2.

EXISTING CONDITION

The galleries entrance hedge is comprised of two nearly symmetrical sections of hemlock hedge, replanted in 1992 (Figure 3.40, Drawing 1). Each consists of a cone with a contiguous lower linear section with convex (battered) sides. The hedge encloses and frames the circular entrance courtyard to the galleries (New Gallery and Picture Gallery), and are thus semi-circular in plan. The cones of both sections are 10 feet tall and the linear sections, 8 to 9 feet tall. H-22, the north section, is 7 feet long overall, while the south section, H-23, is 10 feet long. Section H-22 is partly shaded by mature birch adjoining the Atrium, and appears to be missing the north end of its linear section (Figure 3.41). Section H-21 is situated above a retaining wall, and aligns in height with the wall of the Farragut pavilion. Both sections have a full canopy with minor bare areas on the lower interior sides.

RECOMMENDED TREATMENT

The galleries entrance hedge warrants renovation to enhance its historic character. The hedge was designed to symmetrically enclose the open west side

of the courtyard and provided a beckoning character to the entrance, marked by flanking hedge cones clearly visible from across the adjoining lawn/meadow. Until recently, this hedge was not considered historic, but in keeping with recognition of the historic significance of the galleries and the early period of stewardship by the Trustees, it should be managed as part of the overall historic design of the complex.

Setting

The introduction of the Farragut pavilion in 1986 altered the historic setting of the hedges, but the retention of the circular courtyard and facing an open meadow remains. The adjoining birch should be pruned up as far as possible to reduce shade on the hedge. Lowering the height of the linear sections would increase the amount of light reaching the interior base of the hedge.

Profile and Scale

The hedge is currently not consistent with its historic profile and scale. The range of appropriate height for this hedge is 7 to 10 feet tall for the cones and 3.5 to 5 feet for the linear parts, at a cone-linear proportion of between 1:2 and 2:3. At a current height of 10 feet and 8 feet, the cones and linear sections are out of their historic proportions. The linear part of H-23 should be lower than the height of the Farragut pavilion wall. The linear sections should allow views out from the courtyard (views are presently blocked). The linear sections should be maintained with a rectangular rather than convex (battered) profile.

Location and Alignment

The hedge remains in its historic location and alignment, except for the loss of the north end of H-22 and the south section of H-23 (replaced by the Farragut pavilion). The cones should not extend into the walk, beyond the stone hitching posts that flank the entrance. H-22 should extend farther north to the edge of the courtyard circle (but not along the walk into the Atrium). The interior side of H-23 aligns with the adjoining retaining wall, while the interior side of H-24 aligns with the adjoining herbaceous border.

Plant Species

The existing plant species is appropriate. The hedge was historically pure hemlock, and was replanted in pure hemlock in 1992. There is no need to alter the plant species.

RENOVATION

At this time, the galleries entrance hedge warrants renovation rather than replacement. Renovation should be undertaken to enhance the historic character of the hedge and growing conditions (Drawing 2). First, gradually reduce the

height of the linear section to approximately 5 to 7 feet (one-half to two-thirds existing height), depending on the amount of live wood. Maintain the cones at their existing height (10 feet) and profile, following the proportions shown in a 1966 photograph (see Figure 3.39). Second, gradually change the profile of the linear sections from convex (battered) to rectangular. Third, extend the linear section of H-22 with new plantings north along the circular edge (to where the walk to the Atrium intersects), approximately four feet. The overhanging limbs of the birch should be pruned up to decrease shade on this section.

Since these are contemporary replacement plants, preservation of the plant material is not a priority.

REPLACEMENT

Replacement of the galleries entrance hedge may be warranted if the hedges cannot be renovated as prescribed, become further overgrown, or if they become weak or are damaged. Both hedge sections should be replaced in its entirety (cones and linear sections) at the same time to ensure symmetry. Within a few years of anticipated replacement for the cones, specimens in the park nursery should be sheared into cones and allowed to grow to the minimum height of approximately 7 feet.

Replacement Sequencing

The galleries entrance hedge does not require sequencing with other hedges in the park. Both hedge sections should, however, be replaced at the same time.

MAINTENANCE CONSIDERATIONS

Section H-23 should be monitored for ample ground moisture due to its position on raised grade adjoining a retaining wall.

In the past as the first generation of plant materials aged, it was necessary to tie up the west side of the hedge due to uneven growth toward the sunnier (west) side.[80] This situation should be avoided by shearing and pruning to maintain even branching.

LINCOLN BUST HEDGE (SECTIONS H-24, 25)

HISTORY

The hedges lining the walk to the Lincoln Bust and framing the adjoining area next to the Picture Gallery are in an area originally designated as the “East Garden” in initial plans for the new galleries designed by John W. Ames in c.1946 for the Trustees of the Saint-Gaudens Memorial.[81] Most likely soon after the buildings were completed in 1948, a bust from the statue was installed in the East

Garden, on axis with a walk extending from the Atrium. The walk was lined by hemlock hedges that were maintained at the height of the sculpture pedestal, approximately 5 feet tall (Figure 3.42). Hemlock hedges were also planted to frame the adjoining space between the walk and the Picture Gallery. The function of this adjoining room is not known, although it may have been intended as additional display space for sculpture.

In c.1998, section H-24 bordering the walk to the Lincoln bust was replaced in-kind. In 2006, the portion of H-25 adjoining the Picture Gallery was removed because it was weak and was leading to the deterioration of the north side of the Picture Gallery.

EXISTING CONDITION

The Lincoln bust hedge is comprised of two adjoining sections of hemlock hedge (H_24, 25) clipped in a rectangular profile (Figure 3.43, Drawing 1). The hedge is situated in a triangular space between the buildings and mature woods that extend across the steep bank that leads to Blow-Me-Down Brook. Section H-24 is 'U'-shaped and frames the narrow 20 foot-long walk leading from the Atrium to the Lincoln bust. Replaced in c.1998, it is 5 feet tall (matching the height of the sculpture pedestal) and 2 feet wide, with a single row and 2 feet spacing between plants. It has a full but thin canopy facing the walk. The north and east (exterior) sides, which are not visible to the public, are mostly bare. These sides of the hedge apparently died off due to shade created by overgrowth of successional trees, vines, and shrubs (grape, honeysuckle, and walnut), which are now cut back from the hedge. Section H-25 frames the east side of the adjoining room to the south, between the Atrium and the Picture Gallery (Figure 3.44). It is 6 feet tall and 4 feet wide, with a single row and 2 foot-spacing between plants. It has a full but thin canopy except on the north side, which is not visible to the public. This side may have died back from competing vegetation, or from shade.

RECOMMENDED TREATMENT

The Lincoln bust hedge warrants renovation to enhance its historic character. The hedge defines the narrow walk to the sculpture, and borders an adjoining outdoor room on three sides. The hedge should have a full canopy on the visible sides to provide a uniform sense of enclosure to the two spaces and screen the surrounding scrubby vegetation, while allowing views into the canopy of adjoining woods. The hedge historically concealed the stone foundation of the Picture Gallery and did not extend above the window sills. Replanting of this part of H-25 would enhance the historic character of this hedge, but not replanting it may be appropriate as a contemporary alteration to address conservation of the Picture Gallery building and for possible redesigns for accessibility.

Until recently, this hedge was not considered historic, but in keeping with recognition of the historic significance of the galleries and the early period of stewardship by the Trustees, it should be managed as an integral part of the overall historic design of the complex.

Setting

The hedge is shaded by the Picture Gallery and Atrium to the south and west, and by tall deciduous woods to the east. Directly north of H-24 is an area of scrubby successional vegetation (Asian honeysuckle, grape, and walnut), that has previously encroached on the hedge, but is now cleared back. This vegetation should be kept back from the hedge, and should be kept at a low scale rather than be allowed to mature into woods to prevent shading on the hedge.

Profile and Scale

Section H-24, defining the walk to the Lincoln bust, is in its historic profile and scale. It should remain narrow at 2 to 3 feet wide, and level with the base of the sculpture pedestal at approximately 5 feet tall. Section H-25, which extends a short distance behind H-24, is overgrown by about one foot in height.

Location and Alignment

The hedge is in its historically appropriate location, except for the south part of H-25, which was removed in 2006. In height, H-24 should align with the height of H-25.

Plant Species

The existing plant species is appropriate. The hedge was historically pure hemlock, and section H-24 was replanted in pure hemlock in c.1998. There is no historic or current need to alter the plant species.

RENOVATION

The Lincoln bust hedge warrants renovation rather than replacement at this time because it is in overall good condition and in keeping with its historic character. Although the rear (north and east) sides of H-24 and H-25 are mostly bare, these sides are not visible to the public and they therefore do not warrant renovation (such as interplanting). There are two appropriate alternatives for renovation of this hedge (Drawing 2):

- Renovation Alternative 1 (Preferred): Enhance the historic configuration of the hedge by replanting the south part of H-25 along the Picture Gallery that was removed in 2006. This part should be moved 2 to 3 feet away from the building to reduce moisture on the stucco and stone building. In order to accommodate a possible accessible walkway

from the east side of the building, the replanting may include an opening at the corner of the two hedge parts. As in alternative 1, interplant weak areas in the existing sections with hemlock, and lower the height of H-25 so that it matches the height of H-24.

- Renovation Alternative 2: Retain the hedge in its existing configuration without the section of H-25 along the Picture Gallery, and interplant weak areas in the existing hedges with hemlock. Lower the height of H-25 (east side) so that it matches the height of H-24.

REPLACEMENT

Future replacement of the Lincoln bust hedge may be warranted if the hedges become overgrown and cannot be pruned back to their historic dimension; or if they become weak, such as through die-back from shading caused by adjoining vegetation. Die-back on the sides not visible to the public should not alone be considered reason for replacement. H-24 should be replaced as a whole and together with H-25 to maintain the symmetry of the landscape.

Replacement Sequencing

The Lincoln bust hedge does not require sequencing with other hedges in the park.

MAINTENANCE CONSIDERATIONS

The east part of Section H-25 should be monitored for ample ground moisture due to its position on the top of a steep slope. If replanted, the south section of H-25 should be protected from damage due to snow sliding off the roof.

The vines, shrubs, and other scrubby vegetation in the area north of H-24 should be kept back from the hedge. The die-back of the north side of the hedge is most likely due to this vegetation growing into and shading the hedge.

VISITOR CENTER HEDGE (SECTION H-26)

HISTORY

A new hemlock hedge was planted by the NPS in c.1967 to the south of the new galleries to conceal a maintenance building constructed east of the Caretaker's Cottage in 1967. The hedge was known as the maintenance building hedge prior to conversion of that building to the park's new visitor center in 2003.

EXISTING CONDITION

The visitor center hedge is a pure hemlock hedge planted in c.1967. It is approximately four feet tall, four feet wide, and 150 feet long, and is clipped into a rectangular profile and has two staggered rows with one-foot spacing between

plants (Figure 3.45). It is in excellent condition, with a compact, full canopy. The hedge screens views from the visitor center (former maintenance building) to the north and west.

RECOMMENDED TREATMENT

The visitor center hedge may require treatment to address reconfiguration of parking at the visitor center and/or to improve the visual connection between the visitor center and the birch allee. Details of these treatment alternatives are discussed in CLR Volume III. As a non-historic hedge, the appropriate setting, profile and scale, location and alignment, and plant species, along with renovation or replacement strategies, will depend on the treatment alternative selected, and on the relationship to the surrounding historic landscape rather than the hedge.

CARETAKER'S COTTAGE HEDGE (SECTIONS H-27, 28)

HISTORY

The south side of the Caretaker's Cottage hedge was initially planted in c.1893–94 as part of a system of perimeter white pine hedges along Saint Gaudens Road that also included the west meadow hedge (H-1), horseshoe hedge (H-3, 4), and cutting garden hedge (H-5). The hedge curved around the service drive, matching the cutting garden hedge on the opposite side. With construction of the Caretaker's Cottage between 1917 and 1926, the hedge was extended in white pine to the north and east to screen the yard surrounding the building. Over the years as the hedge matured and areas became shaded, hemlock was interplanted. Openings in the hedge included one at the main entrance walk to the cottage; a second opening with gates to the north of the building was added prior to 1965. By the end of the historic period in c.1950, the hedge was probably maintained between 6 and 8 feet in height.

By the mid-1960s, the older section of the hedge extending along the service drive was being maintained at about the height of the eaves of the Caretaker's Cottage (Figure 3.46). In later years, this section grew upwards of 12 feet, concealing all but the upper gable of the cottage when looking from the exterior of the hedge. In c.1980, the section along the road (all or part of H-28) was replanted in hemlock.[82] This section did not develop strongly most likely due to shade from the woods across the road. In c.2000, a small section of the hedge near the curve along the service drive was replaced due to snow damage.

EXISTING CONDITION

The Caretaker's Cottage hedge consists of two hedge sections of hemlock and white pine bordering Saint Gaudens Road and enclosing the yard surrounding

the building and its adjoining garage east of the service drive (Drawing 1). The hedge is clipped in a rectangular profile.

Section H-27, forming the north and west sides of the hedge extending around the curve at the corner of the service drive and Saint Gaudens Road, is mixed white pine and hemlock planted between c.1917 and 1927 with later infill (Figures. 3.47, 3.48). It is 10-12 feet tall and 10 feet wide, planted in a single row with 1 to 3 feet spacing between plants. It is taller than the companion cutting garden hedge on the opposite side of the service drive (see Figure 3.48). The section has three openings: one at the entrance walk to the Caretaker's Cottage, a second to the north of the cottage that is closed by a gate, and a third non-historic narrow arched opening near the east end of the hedge. It has a dense canopy that is mostly full but has some bare spots between the hemlock and white pine. The southeast end of the section, adjoining H-28, was replanted in hemlock in c.2000 as a result of damage from snow.

Section H-28, extending along Saint Gaudens Road, is pure hemlock replanted in c.1980 (Figure 3.50). It ranges from 8 feet tall at section H-27 to 5 feet tall to the rear of the garage and visitor center, and averages 4 feet wide. The hedge is full facing the Caretaker's Cottage yard, but is weak on the remainder of the hedge, with gaps and bare areas. The hedge is heavily shaded from the woods south of the road as well as several adjoining trees on the north side, and is situated at the top of a steep bank that is eroding.

RECOMMENDED TREATMENT

The Caretaker's Cottage hedge warrants partial renovation and replacement to restore its historic character. The Caretaker's Cottage hedge is more visible to visitors than it was historically due to conversion of the 1967 maintenance building into a visitor center, and the concurrent use of the service drive as the main visitor pedestrian entrance. The hedge provides screening of the cottage and garage, encloses the cottage yard, and delineates the perimeter of the site along Saint Gaudens Road. From the road side, the hedge should read as part of a continuous system of perimeter hedges that includes the west meadow hedge (H-1), horseshoe hedge (H-2, 3, 4), and the cutting garden hedge (H-5).

Setting

This hedge was originally established in full sun conditions, although some shading may have been present later in the historic period due to the growth of trees south of the road and to the east. Partial clearing of the woods back from the edge of the road to reduce shading on the hedge (H-28) should be undertaken to improve growing conditions, but has not been identified by the park as a feasible alternative in the short term. Shading on the hedge should also

be reduced by removal or trimming of several specimen trees and volunteer shrubs directly alongside it.

Profile and Scale

The hedge is in its correct rectangular profile, but H-27 is overgrown in scale. The hedge should be level across the two sections. Presently the hedge slopes upward along the foot of the service drive with the slope of the land. The appropriate range of dimensions for the hedge is approximately 5 to 7 feet tall, and 3 to 6 feet wide. It should match the height of the cutting garden hedge, so that the both are symmetrical to either side of the service drive, and so that H-28 reads as a continuation of the series of roadside hedges.

Location and Alignment

The hedge is in its historic location and alignment. Section H-28 along the road curves inward at the cottage and outward at the garage; it is assumed the c.1980 replanting followed a pre-existing alignment. The arched path opening in H-27 was probably added after the historic period.

Plant Species

Both sections of the hedge were originally planted as pure white pine. Hemlock had most likely been interplanted during the historic period. H-26 was replaced in c.1980 in pure hemlock, probably replacing the original white pine that had become overgrown or interplanted with hemlock. If in the long-term the woods south of the road are removed, it would be appropriate to return to white pine or tapestry of white pine/hemlock.

RENOVATION

The road side (section H-28) of the Caretaker's Cottage hedge warrants renovation because it is in overall good condition given the existing shaded condition. It should be interplanted with hemlock to fill in bare spots and weak areas, especially on the road side. Competing vegetation on the road side that is shading the hedge should be removed, and the woods across the road and to the east should be pruned back to the extent feasible to reduce shading. The basswood at the corner of the service drive and Saint Gaudens Road should be removed as well as the white birch and plum trees growing within the hedge near its eastern end. Its heavy shade, in addition to the shade cast by the woods across the road, is causing dieback on the existing hemlock. Section H-27 does not warrant renovation at this time because it is recommended for replacement (see below).

REPLACEMENT

Section H-27 is recommended for complete replacement in the short term due to its overgrown condition that is out of scale with the Caretaker's Cottage and disrupts the symmetry and continuity of the hedges (H-5, H-6) along the service drive and Saint Gaudens Road. At approximately 5 feet overgrown, it is not possible to cut back the hedge without causing significant dieback. In addition, consideration should be given in the long term to replacing H-28 to reestablish its historic species composition of white pine and hemlock. There are three appropriate alternatives for replacement of these sections:

- Replacement Alternative 1 (Preferred if woods south of road retained): Replant sections H-27 and H-28 as a tapestry of hemlock and white pine to replicate probable conditions in c.1940 (prior to replacement of H-28 in pure hemlock). White pine would be planted only where there is sufficient light, not evenly throughout the hedge.
- Replacement Alternative 2 (Preferred if woods south of road removed): Replant sections H-27 and H-28 in pure white pine, and interplant or replace with hemlock as the white pine weaken over time due to shade. This alternative would replicate the historic evolution of the hedge, but may not be feasible for H-5 given the heavy shade from the woods south of the road.
- Replacement Alternative 3: Replace section H-28 in pure hemlock, section H-27 in white pine and hemlock as presently exists.

Replacement Sequencing

Replacement of H-27 and H-28 should be undertaken together if the woods south of the road are removed; if not, H-27 should be replaced and H-28 renovated. It would also be appropriate to coordinate with replacement of H-28 with replacement of the outer portions of the horseshoe hedge (H-3, H-4), cutting garden hedge (H-5), and Caretaker's Cottage hedge (H-28) to enhance the historic continuity of the roadside hedge system.

MAINTENANCE CONSIDERATIONS

Consideration should be given to using mulch beneath H-28 (roadside section) to enhance moisture retention, given its location at the top of a bank. The bank should be kept clear of weeds and woody vegetation that compete with the hedge for light and nutrients. H-28 should also be monitored for impacts from winter salting and snowplowing. If burning and breakage appear likely, install protective winter screening along the entire length of the hedge. To correct erosion on this steep grade, stabilization mats or root fiber rolls are required. A ground cover should be established to further stabilize the soil on the steep slope.

PARKING LOT HEDGE (SECTIONS H-29, 30)

HISTORY

The parking lot hedge was planted by the Trustees of The Saint-Gaudens Memorial in c.1930, shortly after the terrace garden had been improved and as the site was opening up to public visitation. The hedge was white pine and featured two symmetrical, rectangular sections that aligned with the horseshoe hedge across the road. The ends of the hedge were accented by Lombardy poplar. The hedge was maintained at approximately 6 feet tall by c.1940, and had reached approximately 7 feet by the end of the historic period in c.1950.[83]

By the 1980s, the white pine hedge was in poor condition due to shade from the adjoining woods, competition from weeds, and salt damage.[84] In c.1988, the hedge was replanted in hemlock; the Lombardy poplars were also replanted.[85]

EXISTING CONDITION

The parking lot hedge, consisting of two symmetrical sections flanking the entrance to the parking lot parallel to Saint Gaudens Road, is pure hemlock planted in c.1988 (Figure 3.51). Each section is 5 to 6 feet tall and 3 feet wide, and is planted in single rows. The hedges are in part shade from the adjoining woods, and each section is flanked on the road side by two Lombardy poplar. Overall the hedges have a full, dense canopy, except for the more heavily shaded interior southwest end of H-30.

RECOMMENDED TREATMENT

The parking lot hedge is in good condition and requires minimal renovation. The hedge was designed to frame the parking lot and partially screen it from view of the approach to Aspet. It was originally planted as pure white pine accented by four Lombardy poplar, apparently to reflect the plant materials of the horseshoe hedge across the road. The entrance to the lot and space between the two hedge sections corresponds with the inner section of the horseshoe hedge (H-2) and the surrounding island in the drive. Long-term treatment should explore reintroducing white pine into this hedge.

Until recently, this hedge was not considered historic, but in keeping with recognition of the historic significance of the early period of stewardship by the Trustees, it should be managed as an integral part of the historic landscape.

Setting

The setting of the hedge has changed since the historic period through the growth of the surrounding woods, which partially shade the hedge. The most heavily shaded part is the west end of H-30. Overhanging limbs in the woods, and

the white pine that extends over the road near the west end of H-30, should be removed to reduce shading. Removal of this white pine will release the suppressed westernmost Lombardy poplar. Once the white pine is removed, consideration should be given to planting hemlock (naturalized/not sheared) in the understory south and west of the hedge to screen the view of the parking lot upon the approach on Saint Gaudens Road. Naturalized hemlocks exist along much of the border of the parking lot. Such plantings would be especially needed if the parking lot is expanded to the south.[86]

Profile and Scale

This hedge is in its correct profile and scale. It was historically maintained with a rectangular profile. The range of appropriate dimension is from 5 to 7 feet (sufficient to screen cars), and from 3 to 4 feet wide.

Location and Alignment

The hedge is in its historically appropriate location and alignment. The symmetry of the hedge reflects the configuration of the horseshoe hedge across the road, with the H-29 and 30 corresponding with the end of the inner horseshoe hedge/entrance island.

Plant Species

While the existing hemlocks are not the historic plant species for this hedge, the increased shade makes maintenance of a pure white pine hedge problematic. In future renovation or replacement, it would be appropriate to consider a mixed white pine-hemlock hedge to reintroduce white pine into this hedge and maintain a visual connection with the plant species in the horseshoe and other roadside hedges.

RENOVATION

At this time, the parking lot hedge does not warrant renovation, except to fill in weak areas at the south end of H-30 once the adjoining trees are trimmed back and removed to decrease shade. If the hedge further weakens and develops weak areas, there are two alternatives for renovation:

- Renovation Alternative 1 (Preferred): Convert the hedge to a mixed hemlock-white pine hedge by interplanting white pine into the least shaded areas of the hedge.
- Renovation Alternative 2: Retain the hedge as pure hemlock by interplanting only with hemlock.

REPLACEMENT

At this time, the parking lot hedge does not warrant replacement. Replacement would be warranted to return the hedge to its historic species composition, if issues with shading are addressed. Replacement would also be appropriate if the hedges become overgrown and cannot be pruned back to its historic dimension; or become weak through die-back from shading or winter damage. There are two alternatives for replacement:

- Replacement Alternative 1 (Preferred): Replant a pure white pine hedge to replicate historic conditions, and then interplant with hemlock as it thins in shaded areas. This alternative would depend on enhancing existing light levels.
- Replacement Alternative 2: Replant a mixed hemlock-white pine hedge, with the white pine limited only to the sunniest parts of the hedge.
- Replacement Alternative 4: Replant a pure hemlock hedge.

Replacement Sequencing

This hedge does not require sequencing with the replacement of other hedges.

MAINTENANCE CONSIDERATIONS

As noted under treatment of the setting, the white pine tree off the south end of section H-30 should be removed entirely to reduce heavy shading of the hedge.

As with the other hedges along the road, the parking lot hedge should be monitored for impacts from winter salting and snowplowing. If burning and breakage occur, install protective winter screening.

Figure 3.1: West meadow hedge, view looking east along Saint Gaudens Road showing character of c.1970 plants thirty-six years after planting, 2006. Note bare side canopy on the road side (right) and lack of even canopy (Olmsted Center for Landscape Preservation).

Figure 3.2: View looking west along Saint Gaudens Road showing site of west meadow hedge, 2006. The uphill alignment most likely dates to the c.1970 replanting. The mature white pines in the background are probably remnants of the original (c.1893-94) hedge (SUNY ESF).

Figure 3.3: View looking southwest at the newly planted white pines in the west meadow hedge, 2007. Note height of adjoining woods along the south side of the road (Saint-Gaudens National Historic Site).

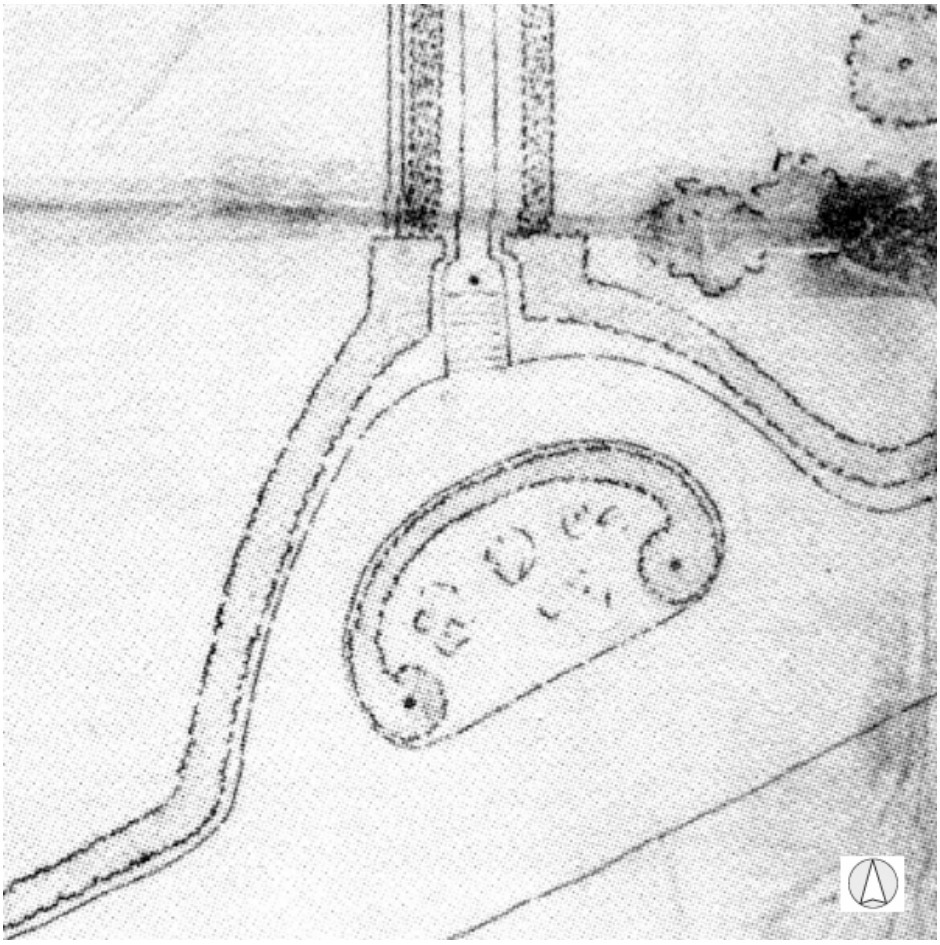

Figure 3.4: Detail of a 1904 plan of the grounds showing original design intent of the horseshoe hedge, showing scrolls on inner hedge and semi-rectangular termini of outer hedges at walk to Aspet. These details were apparently unintentionally lost as the hedge grew in width in later years (Saint-Gaudens National Historic Site).

Figure 3.5: Horseshoe hedge, general view looking east along Saint Gaudens Road showing inner and outer sections, 2007 (SUNY ESF).

Figure 3.6: Horseshoe hedge, detail of east side of outer section (H-3) showing tapestry of white pine and hemlock, 2007 (SUNY ESF).

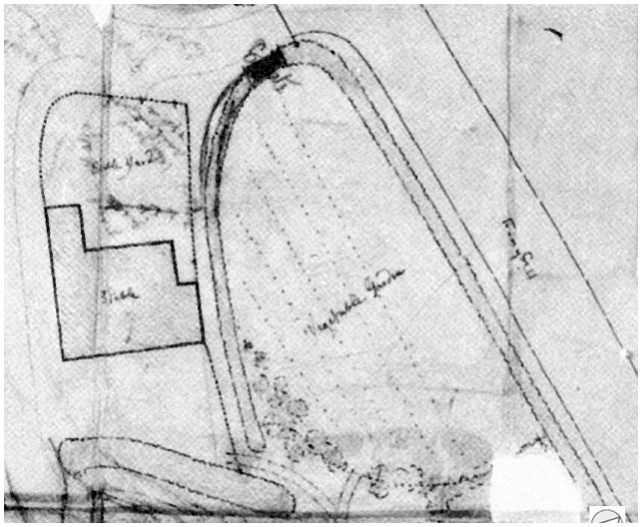

Figure 3.7: Detail of a 1904 plan of the grounds showing plan of cutting garden hedge following relocation of vegetable garden. Note lack of opening/passage through south end of hedge on north (left) side and continuation of fence line to the kitchen hedge (Saint-Gaudens National Historic Site).

Figure 3.8: The cutting garden hedge, view looking east showing the opening at the service drive and the change from hemlock to white pine in section H-6 (left), 2006 (Olmsted Center for Landscape Preservation).

Figure 3.9: The cutting garden hedge, view looking west showing generally full side canopy on garden side of section H-5, with Japanese tree lilac grove in the background, 2006 (SUNY ESF).

Figure 3.10: The cutting garden hedge, view looking northeast at bare understory of section H-5 facing Saint Gaudens Road, 2006. The gray sediment is left over from winter snowplowing (Olmsted Center for Landscape Preservation).

Figure 3.11: The cutting garden hedge, view looking northwest at the gap in the west end of section H-6, 2006. Note the Japanese tree lilac hedge at left and the kitchen hedge in the background (SUNY ESF).

Figure 3.12: The kitchen hedge, view looking south at Aspet with section H-8 extending over the lattice fence facing the terrace garden, c.1946 (Detail of a photograph, courtesy of Dartmouth College Library, also reproduced in Cultural Landscape Report, vol. 1, 137).

Figure 3.13: The kitchen hedge, view looking east from the second floor of Aspet showing general conditions, 2007 (SUNY ESF).

Figure 3.14: The kitchen hedge, view looking through the interior showing massive branching of aged hemlocks, 2006 (SUNY ESF).

Figure 3.15: The kitchen hedge, view looking northeast at the dogleg portion of H-7, 2006 (SUNY ESF).

Figure 3.16: The kitchen hedge, view looking southeast at section H-8 extending above the terrace garden hedge (H-13) and stepping up adjacent to Aspet on the upper terrace, 2006 (SUNY ESF).

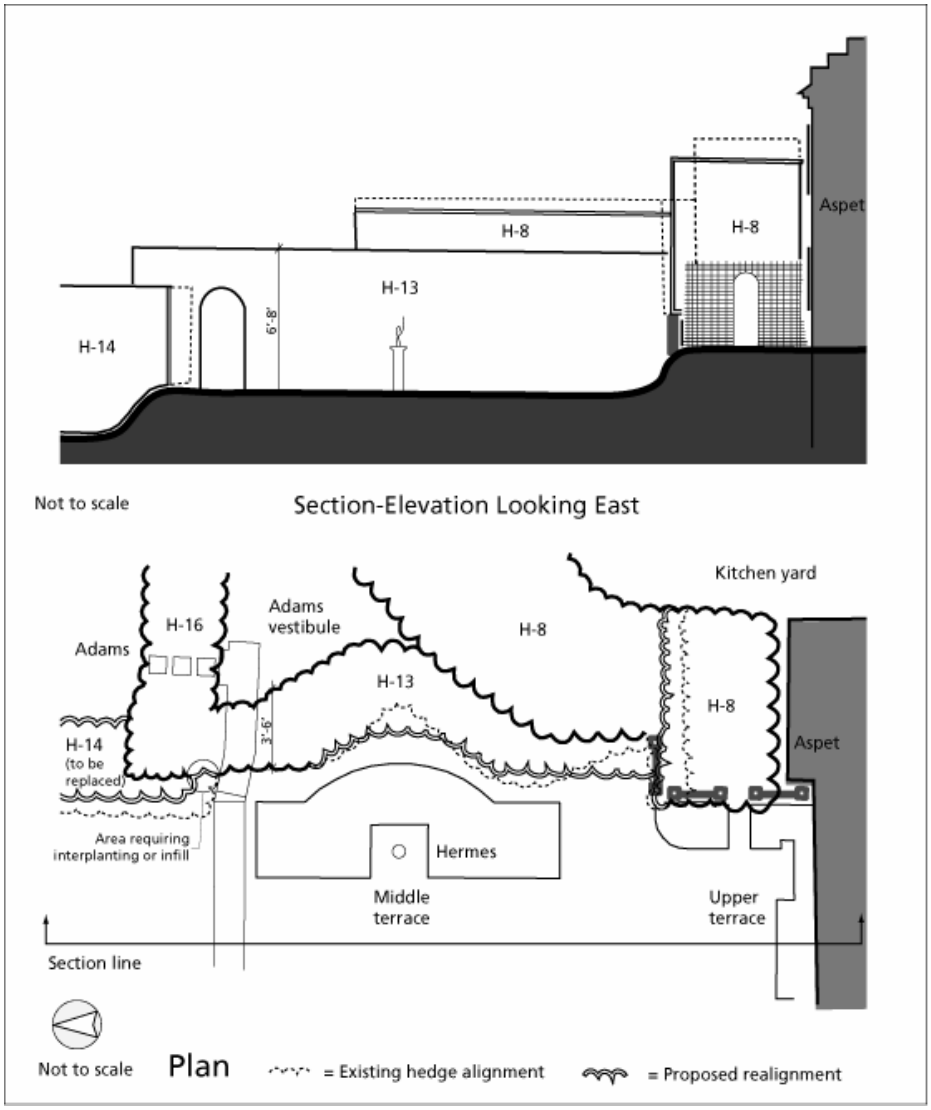

Figure 3.17: Plan and section-elevation detail of intersection of kitchen and terrace garden hedges showing proportional relationships (SUNY ESF).

Figure 3.18: The Little Studio and Pan grove hedges, view looking south with Augustus, Augusta, and W. G. K Redmond in the foreground, c.1905. Note alignment in height of Little Studio and Pan grove hedges (Saint-Gaudens National Historic Site, photograph 868).

Figure 3.19: The Little Studio hedge, view looking southeast, 2006 (SUNY ESF).

Figure 3.20: The Little Studio hedge view looking west showing non-historic alignment and opening, 2006. (SUNY ESF)

Figure 3.21: The Pan grove, view looking north showing thinning white pine hedge in background, 1924. These hedges were replaced with hemlock shortly after this photograph was taken (From *House and Garden*, June 1924, reproduced in CLR volume 1, page 99).

Figure 3.22: The Pan grove hedge, view looking northeast at section H-11 that forms the divide with the terrace garden, 2006 (SUNY ESF).

Figure 3.23: The Pan grove hedge, view looking north at section H-10 showing weak canopy and non-historic opening/path, 2006 (SUNY ESF).

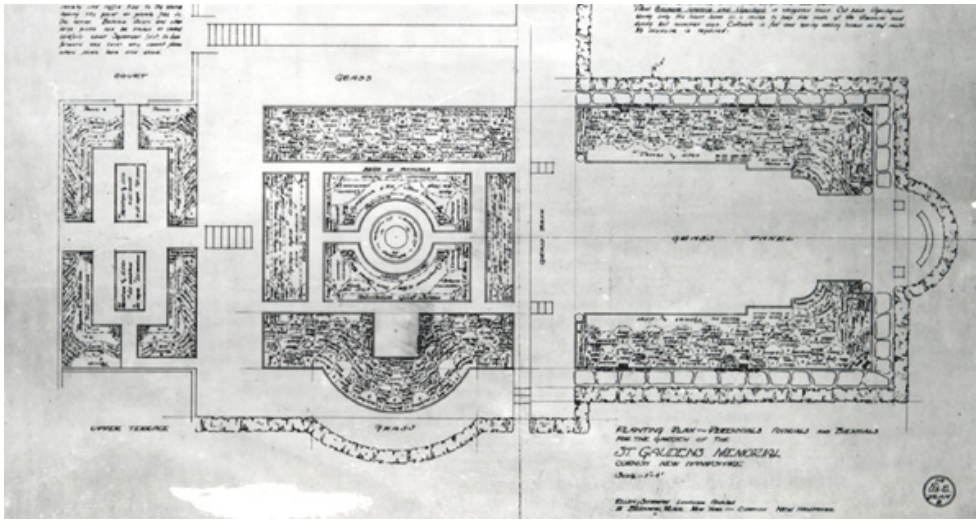

Figure 3.24: Plan of the terrace garden hedge as shown on "Planting Plan for the Garden of the St. Gaudens Memorial" by Ellen Shipman, c.1928 (Saint-Gaudens National Historic Site, document 1492g).

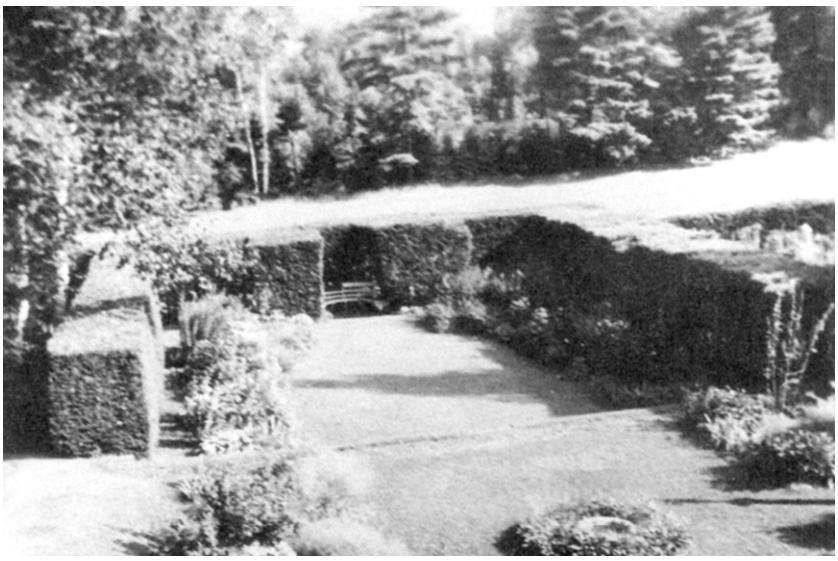

Figure 3.25: The lower sections of the terrace garden hedge following final modifications to garden layout, c.1946. Sections H-11 and H-12 are pure hemlock, H-14 appears to be primarily white pine. Note grass strip between bed and section H-11 (courtesy of Dartmouth College Library, also reproduced in CLR volume 1, 138).

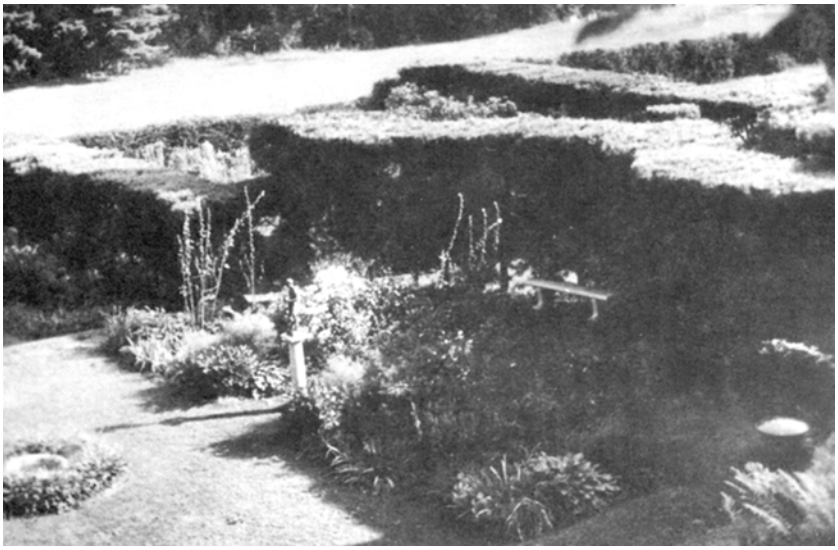

Figure 3.26: The middle section of the terrace garden hedge (H-13) showing concave alignment that parallels the alignment of the flowerbed, c.1946. Note lower height of Adams hedge in background (courtesy of Dartmouth College Library, also reproduced in CLR volume 1, 140).

Figure 3.27: Overview of the terrace garden hedge on the lower terrace looking north form the second floor of Aspet, 2006. Note the Pan grove hedge to the left and Adams hedge to the right (SUNY ESF).

Figure 3.28: The terrace garden hedge, view looking north at a detail of H-12, 2006. Note curved alignment around bench, recess around post, and weak side canopy (SUNY ESF).

Figure 3.29: Section H-13 of the terrace garden looking northeast from the upper terrace, 2006. Note inward batter toward the base and convex alignment (SUNY ESF).

Figure 3.30: The Adams hedge, view looking northeast from the terrace garden showing seated Lincoln installed in c.1948, photographed 1965. Note height of hedge section H-17 to the rear of Lincoln (Saint-Gaudens National Historic Site, photograph 213).

Figure 3.31: The Adams hedge, view looking northeast at sections H-15 and 17, 2006. Note weak canopy and recent dieback from shade of the magnolia tree, and shade cast from adjoining sections (SUNY ESF).

Figure 3.32: The Adams hedge, view looking southeast at sections H-16 and 17, 2006 (SUNY ESF).

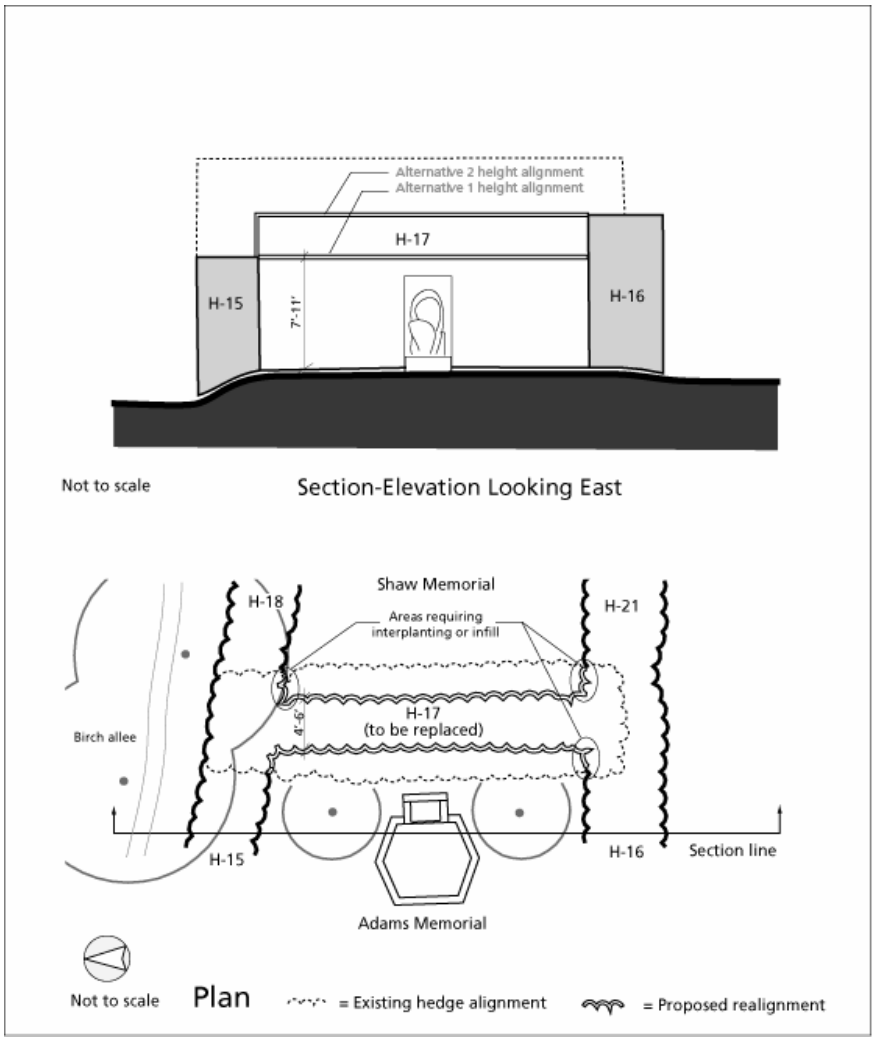

Figure 3.33: Plan and section-elevation detail of H-17 and adjoining sections in the Adams and Shaw hedges showing proportional relationships (SUNY ESF).

Figure 3.34: The Shaw hedge, historically the bowling green, view looking west through opening flanked by Lombardy poplar, c.1919 (courtesy of Dartmouth College Library, also reproduced in CLR volume 1, 107).

Figure 3.35: The Shaw hedge, view looking west at section H-17, the divide with the Adams hedge, 2006. Note openings in canopy and difference in height with H-18 at right (SUNY ESF).

Figure 3.36: The Shaw hedge, view looking east showing H-18 and 19 to the left and background, and H-21 to the right, 2006 (SUNY ESF).

Figure 3.37: The Shaw hedge, view looking west showing a representative view of the relationship between the hedges and birch allee, 2007 (SUNY ESF).

Figure 3.38: The Shaw hedge, view looking south at dogleg (H-20) showing weak lower canopy, 2006 (SUNY ESF).

Figure 3.39: The galleries entrance hedge, planted in c.1948, view looking northeast showing proportional relationship between cones and linear sections,1965 (Saint-Gaudens National Historic Site, photograph 871b).

Figure 3.40: The galleries entrance hedge, view looking northeast with Farragut pavilion at right, 2006. Note height of linear section compared with cones. (SUNY ESF).

Figure 3.41: The galleries entrance hedge, view looking southwest from interior of courtyard, 2006. The missing north end of section H-23 is in the foreground (SUNY ESF).

Figure 3.42: The Lincoln bust hedge, view looking east from Atrium, c.1965 (Saint-Gaudens National Historic Site, photograph 1270).

Figure 3.43: The north side of the Lincoln bust hedge, view looking east from Atrium showing encroachment of volunteer vegetation, 2006 (SUNY ESF).

Figure 3.44: The Lincoln bust hedge, view looking east at sections H-25 and 26, 2006. The site of the south leg of H-26 removed in 2006 is the bed at right (SUNY ESF).

Figure 3.45: The visitor center hedge, view looking east with visitor center in the right background and Farragut pavilion to the left, 2006 (SUNY ESF).

Figure 3.46: The Caretaker's Cottage hedge, view looking east from the stable showing height after the historic period, c.1970. Note that the hedge was lower than the eaves of the cottage (Saint-Gaudens National Historic Site, photograph 20).

Figure 3.47: The Caretaker's Cottage hedge, view looking east from the stable, 2006. Note existing height above eaves of the cottage and mixed white pine-hemlock (SUNY ESF).

Figure 3.48: The Caretaker's Cottage hedge, view looking north up the service drive, 2006. Note difference in height compared to cutting garden hedge to left of drive (SUNY ESF).

Figure 3.49: The Caretaker's Cottage hedge, view looking west of interior of H-27 showing relationship to scale of cottage, 2006 (SUNY ESF).

Figure 3.50: The Caretaker's Cottage hedge, view looking west from the east end of the hedge along Saint Gaudens Road, 2006 (SUNY ESF).

Figure 3.51: The parking lot hedge, view looking east along Saint Gaudens Road, 2007. The white pine at the right is recommended for removal because of the heavy shade it casts on this hedge (and Lombardy poplar) and the horseshoe hedge (SUNY ESF).

PART 4: SUMMARY OF RECOMMENDATIONS AND PRIORITIES

In his 1987 hedge management plan, William Noble concluded, "I have no doubt that if a long term management and restoration plan is adopted, and skilled labor is assigned to the project, that these hedges will take their place among the prominent landscape features in American gardens from the turn of the century."[87] In the twenty years since, the park has made great strides toward improving the condition of the hedges through improved pruning, shearing, and replanting. Today, the hedges are overall in good condition, but several management challenges remain aside from staffing and funding limitations, in particular how to plan for hedge replacement and how best to retain the historic species composition. Building on the prior hedge studies and the Cultural Landscape Report, Volume III, this plan provides direction for hedge management that balances the original design intent, subsequent changes made during the historic period, and changed environmental conditions toward the overall goal of preserving and enhancing the historic character of the landscape.

The recommendations provided in this report generally pertain to the following hedge maintenance, renovation, and replacement strategies:

- Perpetuate the historic design intent of the hedges, including intentional changes made through c.1940 and changes through c.1950 related to the addition of the birch allee and the Galleries
- Retain historic (pre-1950) plant materials where compatible with the design intent of the landscape
- Maintain and enhance the cover of white pine in historically white pine hedges; reduce shading on white pine to the extent feasible
- Maintain hemlock in historic tapestry hedges
- Employ interplanting with white pine and hemlock to reestablish weak side canopies where feasible
- Return hedges to their historic alignment and profile through renovation or replacement
- Protect and monitor the hedges from diseases, pests, and winter damage
- Have available an ample supply of replacement and interplanting stock

HEDGE & HEDGE-RELATED TREATMENT PRIORITIES

As discussed in the body of the report, the following treatment tasks (changes) are priorities to enhance the historic character of the hedges (Drawing 2):

- Trim or remove woods along south side of Saint Gaudens Road to enhance light levels on roadside hedges
- Return Little Studio hedge (H-9) to its historic alignment
- Remove non-historic extension of birch allee to enhance growing conditions of the Pan grove hedge (H-10)
- Reestablish spatial enclosure provided by hedges to the Pan grove, including removal or redesign of opening to birch allee (H-10, 11)
- Close opening to birch allee in terrace garden hedge (H-12)
- Reduce width of terrace garden hedge (H-11, 14) to reestablish adjoining flowerbeds
- Match alignment of terrace garden hedge (H-13) to adjoining flowerbed.
- Reduce height of shared Adams-Shaw hedge section (H-17)
- Convert non-historic hedge openings to archways
- Match height of cutting garden and Caretaker's Cottage hedges (H-5, 28) to either side of service drive
- Lower Caretaker's Cottage hedge (H-27) to height below eaves of cottage
- Lower Galleries entrance hedge and extend missing part (H-22, 23)
- Lower height of kitchen hedge and address bare understory of dogleg (H-7, 8)
- Increase width of entrance walk opening in horseshoe hedge (H-3, 4)
- Extend inner ends of horseshoe hedge (H-2) into scrolls

REPLACEMENT PRIORITIES

As discussed in the body of the report, the following hedge replacement tasks should be considered priorities within the noted timeframe (Drawing 3):

Short term (1 to 5 years)

- Replace Pan grove hedge and shared sections of the terrace garden, Adams and Shaw hedges when the Pan grove birch are replaced (H-10, 11, 14, 17)
- Replace Little Studio hedge (H-9)
- Replace Caretaker's Cottage hedge (H-27)

Mid-term (5 to 15 years)

- Replace north sections of terrace garden, Adams, and Shaw hedges when the birch allee is replaced (H-12, 15, 18, 19)

Undetermined time frame

- Replace roadside hedges when the woods south of Saint Gaudens Road are cleared back to increase light levels (H-2, 3, 5, 28)

ENDNOTES

1. U. S. Department of Agriculture, *Soil Survey of Sullivan County, New Hampshire* (Washington, D. C.: Soil Conservation Service, 1984), 2.

2. S*oil Survey*, 55, map 9.

3. Races and Hybrids of white pine: Eastern white pine is represented in the United States by the typical variety, *Pinus strobus* var. *strobus.* Chiapas white pine, *P. strobus* var. *chiapensis,* is native in the mountains of southern Mexico and Guatemala. Four horticultural varieties have been recognized in Connecticut (68).Eastern white pine crosses readily with western white pine *(Pinus monticola),* Balkan pine *(P. peuce),* blue pine *(P. griffithii),* and Japanese white pine *(P. parviflora)*. It can also be crossed with limber pine *(P. flexilis)* and Mexican white pine *(P. ayacahuite)* (21). The cross *P. strobus* x *griffithii is* more vigorous than *P. strobus* in Northern Ohio and more winter hardy than *P. griffithii*. USDA Forest Service, *Silvics of North America, Volume 1: Conifers* (Agriculture Handbook 654, December 1990), s. V. *Pinus strobus* (online at (http://www.na.fs.fed.us/pubs/silvics_manual/Volume_1/pinus/strobus.htm), 21, 35, 68.

4. "The White Pine and the hemlock are two of our most common evergreen trees in the East, and both make excellent clipped hedges." Donald Wyman, Hedges, Screens & Windbreaks (New York: Whittlesey House, 1938), 188.

5. W. T. Macoun, *Hedges and Their Uses* (Ottawa: Dominion of Canada Department of Agriculture, Bulletin 142, 1931), 28.

6. Wyman, 188; Olmsted Center for Landscape Preservation, "Preservation Maintenance Plan for Saint-Gaudens National Historic Site" (National Park Service, unpublished report, 1993), hedge section, 5; *Silvics of North America, Volume 1: Conifers*, s. V. *Pinus strobus*. For further information, consult the manual online at http://www.na.fs.fed.us/spfo/pubs/silvics_manual/Volume_1/pinus/strobus.htm

7. Preservation Maintenance Plan, hedge section, 5-6; *Silvics of North America, Volume 1: Conifers*, s. V. *Tsuga canandensis*. For further information, consult the manual online at
http://www.na.fs.fed.us/spfo/pubs/silvics_manual/Volume_1/tsuga/canadensis.htm
The existing hemlock hedges at Saint-Gaudens have not been damaged, but severe deer browsing on foliage and bark stripping has occurred in the park's old nursery.

8. Donald J. Leopold, Ph. D., "Examination of Hedges at Saint-Gaudens" (Unpublished report, 23 January 2007), 1.

9. Diane Kostial McGuire and Barbara Harrison Watson, Landscape Architects—Horticultural Consultants, 85 East India Row, Boston, "Historic Hedge Maintenance Manual for Saint-Gaudens National Historic Site" (Unpublished report prepared for the National Park Service, c.1987).

10. William Noble, "Hedge Restoration Manual for Saint-Gaudens National Historic Site" (National Park Service, unpublished report, c.1987).

11. Margaret Coffin, "Saint-Gaudens National Historic Site, Landscape Preservation Maintenance Program" (Unpublished report, National Park Service Olmsted Center for Landscape Preservation, 1993), CRBIB 403095.

12. Margaret Coffin and Kristin Claeys, "Historic Plant Inventory for Saint-Gaudens National Historic Site, May 1995" (Unpublished report, National Park Service Olmsted Center for Landscape Preservation, 1995), CRBIB 403093.

13. James Haaf, Gardener, Saint-Gaudens National Historic Site, "Hedge Maintenance Summary 1994–2006" (unpublished report, 2007).

14. Lisa Mausolf, "Saint-Gaudens National Historic Site, National Register of Historic Places Nomination Form" (Draft prepared for the New Hampshire Division of Historic Resources, September 1998).

15. Lisa Nowak, "Cultural Landscape Report for Saint-Gaudens National Historic Site, Volume II: Analysis & Evaluation" (Draft report, National Park Service, Olmsted Center for Landscape Preservation, 2007).

16. Robert R. Page, Cathy A. Gilbert, and Susan A. Dolan, *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques* (Washington, D. C.: National Park Service, 1998, second printing 2005), 134.

17. General Management Plan, 1996, 19.

18. GMP, 1996, 20.

19. Jan Haenraets, Joel Smith, Lisa Nowak, Margie Coffin Brown, "Cultural Landscape Report for Saint-Gaudens National Historic Site, Volume III: Treatment Plan" (Draft report, National Park Service, Olmsted Center for Landscape Preservation, December 2006), 13.

20. Noble, 13.

21. Leopold, 3.

22. Leopold, 1.

23. Coffin, "Preservation Maintenance Program," hedge section, 7.

24. Coffin, "Preservation Maintenance Program," hedge section, 2; Haaf, "Hedge Maintenance Summary 1994–2006." Vinyl-coated wire should not be confused with "wire in hose" which can be damaging to plants.

25. Macoun, 8.

26. Marion Pressley and Cynthia Zaitzevsky, *Cultural Landscape Report for Saint-Gaudens National Historic Site: Volume 1: Site History and Existing Conditions* (Boston: National Park Service North Atlantic Region, 1993), 97.

27. E-mail, William A. Griswold, Ph.D., Archeologist, National Park Service-Northeast Regional Archeology Program, to Margie Coffin Brown, Olmsted Center for Landscape Preservation, 17 October 2006.

28. Leopold, 2007, 3. If disease and pest-resistant strains of Eastern hemlock or white pine are developed in the future, it may be appropriate to employ them at Saint-Gaudens provided they retain the same visual qualities as the species.

29. *Silvics of North America: Volume 1: Conifers,* s. V. "white pine."

30. Four to five-foot 'Compacta' @ $250 each (wholesale, Northern Nursery, 11/07/07)

31. Macoun, 4.

32. Leopold, "Examination of Hedges," 1.

33. E-mail, Donald J. Leopold, Ph.D., to John Auwaerter, 28 February 2007.

34. Table, hedge nutrients, 1987–1998, Saint-Gaudens National Historic Site.

35. Table, hedge nutrients, 1987–1998, Saint-Gaudens National Historic Site. These samples were taken from around the hedges between Aspet and the Little Studio. Soils in the remote west meadow hedge away from managed garden and lawn areas were not tested.

36. Coffin, Preservation Maintenance Program, hedge section, 3.

37. Leopold, "Examination of Hedges," 2; Olmsted Center Preservation Maintenance Guide, hedge section, 3; Olmsted Center for Landscape Preservation, "Marsh-Billings-Rockefeller National Historical Park: Stabilization and Maintenance Guidelines for the Mansion Grounds" (Unpublished report, 2001), section House Grounds, "Perimeter Hedge of Canadian Hemlock."

38. Wyman,188.

39. Richard W. Harris, James R. Clark, and Nelda P. Matheny, *Arboriculture* (Upper Saddle River, NJ: Prentice Hall, 2004.), 378; Bill Noble, "Grounds Maintenance at Saint-Gaudens," interview by Margaret Coffin, Olmsted Center for Landscape Preservation, May 12, 26, and 27, 1993, included as appendix in Coffin, Preservation Maintenance Program. Coffin provided the following account of Noble's recommendations and experience in maintaining the hedges since the 1980s:
It is very important that staff know how to prune candles of pines—both timing and the amount to pinch off. Bill recommends pruning pine hedges while candle is still enlarging. Pinch off half of the new growth when the new candles are two-thirds extended. Bill has been taking off two-thirds of the candle. The earlier it is done the more buds the candle will set. The later it is done the fewer candles will set. So if you want a denser side you would prune early when the candles are half extended. If you want fewer buds to set, such as on the tops where light penetration is important, you would prune later…Top most candle becomes the dominant candle that will exercise control over all others. Prune dominant candle to keep it confused. Growth regulators only have a temporary effect but roots continue to grow so when stop applying growth regulators get a flush of growth [sic].

40. James Haaf, communication with John Auwaerter, 19 March 2008.

41. Coffin, Preservation Maintenance Program, hedge section, 2.

42. Coffin, Preservation Maintenance Program, hedge section, 2; Charlie Pepper, Deputy Director, Olmsted Center for Landscape Preservation, e-mail to John Auwaerter, 20 August 2007.

43. Coffin, Preservation Maintenance Program, hedge section, 3; Noble, 14.

44. Noble, 15.

45. Noble, 26.

46. Noble, 26-27.

47. University of New Hampshire Cooperative Extension, "Hemlock Woolly Adelgid" (Online article, http://extension.unh.edu/Pubs/HGPubs/hwa.pdf, August 2004, accessed 26 March 2007).

48. Leopold, 3; Cooperative Extension, "Hemlock Woolly Adelgid."

49. Cooperative Extension, "Hemlock Woolly Adelgid."

50. Lee Townsend, Extension Entomologist and Lynne Rieske-Kinney, Associate Professor, Forest Entomologist, "Meeting the Threat of the Hemlock Woolly Adelgid" (Online article, University of Kentucky College of Agriculture website, http://www.ca.uky.edu/entomology/entfacts/ef452.asp, May 2006, accessed 17 August 2007).

51. *Silvics of North America*, s.V. "white pine;" personal observation of author.

52. Balled & burlapped hemlock up to 22 feet tall and white pine to 14 feet are available commercially. For example, see Merwine Farms & Nursery, Brodheadsville, PA, www.merwinefarms.com.

53. Pepper to Auwaerter, 16 August 2007.

54. Charlie Pepper, Deputy Director, Olmsted Center for Landscape Preservation, e-mail to John Auwaerter, 16 August 2007.

55. Pepper to Auwaerter, 16 August 2007.

56. New Hampshire State Forest Nursery website, http://www.dred.state.nh.us/nhnursery/seedlings.htm.

57. Olmsted Center, "Preservation Maintenance Plan," hedge section, 7.

58. Noble, 44, 1903 and 1907 plans. The CLR does not indicate that the hedge was in two sections. The alignment parallel to the road at the west end is suggested by existing mature white pines that are most likely remnants of the original hedge.

59. CLR, Volume 1, 173.

60. James Haaf, Gardener, Saint-Gaudens National Historic Site, e-mail to John Auwaerter, 17 August 2007.

61. This white pine is identified for removal in Noble, "Recommendations by Section, September 1987." Plan

62. Drawing of Aspet, c.1904 (Saint-Gaudens National Historic Site), CLR Volume 1, 52.

63. Noble, 42.

64. Noble, 43.

65. Photograph of Stable, 1966, CLR Volume 1, figure 94, 163. This photos shows the west side of H-6 as trees, apparently hemlock. In his 1987 plan of the hedges, William Noble indicates there was a gap at the east end of Section H-6; the CLR site history (Volume 1), 1907 and 1926 period plans, do not show this gap.

66. Noble, 48.

67. Circa 1885–1890 photographs, CLR Volume 1, 8-9, 131, 137; French & Bryant survey, 1903, CLR Volume 1, 28; CLR 1926 and 1965 period plans.

68. Noble, 9.

69. CLR Volume 1, 99; figure 82, 138.

70. CLR Volume III (December 2006 draft), 76.

71. CLR Volume 1, figure 82, 138.

72. Noble recommended in his 1987 study that the terrace garden hedge be all pine because of the important location of this hedge and the available documentation, but also noted that a hedge composed of two different plant materials might be acceptable. Noble, 45.

73. CLR Volume 1, 1965 period plan.

74. CLR Volume III (Dec. 06 draft), 77.

75. Noble, 45.

76. CLR Volume 1, 1965 period plan.

77.. Noble, 45.

78. Noble, 47.

79. CLR Volume 1, Figure 68, 121, Figure 72, 127.

80. Noble, 49.

81. CLR Volume 1, Figure 70 (Ames plan for new galleries, c.1946), 125.

82. Noble, 48. Noble (1987) described the hedge as a "mixed pine and hemlock hedge with a new planting of hemlock along the road."

83. CLR Volume 1, 1965 period plan. This plan indicates the parking lot hedge was 7' tall.

84. Noble, 44.

85. CLR Volume 1, 1990 period plan.

86. CLR Volume III, "Parking Lot Configuration," figure 1B.19.

87. Noble, 51.

Hedge Management Plan

Saint-Gaudens
National Historic Site
Cornish, New Hampshire

Existing Conditions

National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

in cooperation with:

Department of Landscape Architecture
SUNY College of Environmental
Science and Forestry
Syracuse, New York

SOURCES

1. Aerial Photograph, SAGA-2004
2. CLR Site History Existing Condition Plan, 1990
3. Field Survey, August 2005, November 2006, January 2007

DRAWN BY:

Joel Smith, OCLP
ArcMap GIS 8.3 and Auto CAD, December 2006
Revised by John Auwaerter, SUNY ESF
Adobe Illustrator CS2, February 2007

LEGEND

- Hedge, showing section divide
- Separated hedge section
- H-5 — Hedge section identification
- Shrub
- Deciduous tree
- Coniferous tree
- Herbaceous bed
- Gates, fence
- Walk
- Drive/street
- Building
- 1’ contours

NOTES

All hedges shown in approximate scale and location. Individual hedge plants not shown.

Drawing 1

Blow-Me-Down Brook
Park boundary
New Gallery
Atrium
Lincoln bust
H-24
H-25
Picture Gallery
Galleries entrance
H-22
H-23
Farragut Monument
Birch Allee
H-9
H-10
H-12
H-15
H-18
Pool
Little Studio
Pan grove
Adams mem.
H-17
H-11
H-14
Lower terrace
Terrace
Shaw memorial
H-19
H-16
H-21
H-20
Pan pool
garden
Adams vestibule
H-13
Middle terrace
H-8
Upper terrace
Kitchen yard
Stable
Aspet
H-7
H-6
West meadow
Cutting garden
Japanese tree lilac grove
Apple trees
H-5
Visitor entrance route
Stream
H-4
H-2
Horseshoe
H-3
Apple trees
Saint Gaudens Road
H-29
Information kiosk
H-1
H-30
Visitor parking lot
See Inset
matchline
Stream
Mixed woods, 80’-90’ tall
Service Drive
H-26
Visitor center
H-27
Caretaker's Cottage
Garage
H-28
Mixed woods, 80’-90’ tall

Hedge Typology

- Architectural hedges
- Screening/perimeter-defining hedges
- Non-historic hedge

Hedge Key

H-1	West Meadow hedge
H-2, 3, 4	Horseshoe hedge
H-5, 6	Cutting Garden hedge
H-7, 8	Kitchen hedge
H-9	Little Studio hedge
H-10, 11	Pan Grove hedge
H-11, 12, 13, 14	Terrace Gardens hedge
H-14, 15, 16, 17	Adams hedge
H-17, 18, 19, 20, 21	Shaw hedge
H-22, 23	Galleries entrance hedge
H-24, 25	Lincoln Bust hedge
H-26	Visitor Center hedge
H-27, 28	Caretaker’s Cottage hedge
H-29, 30	Parking lot hedge

0 50 100 Feet

Inset
matchline
West Meadow
H-1
Saint Gaudens Road
0 50 100 Feet

Hedge Management Plan

Saint-Gaudens
National Historic Site
Cornish, New Hampshire

Treatment Recommendations

National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

in cooperation with:

Department of Landscape Architecture
SUNY College of Environmental
Science and Forestry
Syracuse, New York

SOURCES

1. Aerial Photograph, SAGA-2004
2. CLR Site History Existing Condition Plan, 1990
3. Field Survey, August 2005, November 2006
   January 2007

DRAWN BY:

Joel Smith, OCLP
ArcMap GIS 8.3 and Auto CAD, December 2006
Revised by John Auwaerter, SUNY ESF
Adobe Illustrator CS2, February 2007

LEGEND

- Hedge, showing section divide
- Separated hedge section
- H-5 — Hedge section identification
- Shrub
- Deciduous tree
- Coniferous tree
- Herbaceous bed
- Gates, fence
- Walk
- Drive/street
- Building
- 1′ contours

NOTES

All hedges shown in approximate scale and location. Individual hedge plants not shown.

Drawing 2

Hedge Key

H-1	West Meadow hedge
H-2, 3, 4	Horseshoe hedge
H-5, 6	Cutting Garden hedge
H-7, 8	Kitchen hedge
H-9	Little Studio hedge
H-10, 11	Pan Grove hedge
H-11, 12, 13, 14	Terrace Gardens hedge
H-14, 15, 16, 17	Adams hedge
H-17, 18, 19, 20, 21	Shaw hedge
H-22, 23	Galleries entrance hedge
H-24, 25	Lincoln Bust hedge
H-26	Visitor Center hedge
H-27, 28	Caretaker's Cottage hedge
H-29, 30	Parking lot hedge

0 50 100 Feet

Inset

matchline

West Meadow

H-1

Alt. 3: Realign, retain trees

Alt. 2: Retain alignment, remove trees

Saint Gaudens Road

Alt. 1: Restore alignment, remove trees

0 50 100 Feet

Hedge Management Plan

Saint-Gaudens
National Historic Site
Cornish, New Hampshire

Preferred Replacement Sequence

National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

in cooperation with:

Department of Landscape Architecture
SUNY College of Environmental
Science and Forestry
Syracuse, New York

SOURCES

1. Aerial Photograph, SAGA-2004
2. CLR Site History Existing Condition Plan, 1990
3. Field Survey, August 2005, November 2006, January 2007

DRAWN BY:

Joel Smith, OCLP
ArcMap GIS 8.3 and Auto CAD, December 2006
Revised by John Auwaerter, SUNY ESF
Adobe Illustrator CS2, February 2007

LEGEND

- Hedge, showing section divide
- Replacement sequence color code
- H-5 — Hedge section identification
- Shrub
- Deciduous tree
- Coniferous tree
- Herbaceous bed
- Gates, fence
- Walk
- Drive/street
- Building
- 1′ contours

NOTES

All hedges shown in approximate scale and location. Individual hedge plants not shown. Conditions assume implementation of treatment. Replacement coordination indicated by color scheme.

Drawing 3

Replacement Priority 4: Little Studio hedge
Replacement Priority 1 (coordinate with Pan grove replacement): H-10, 11, 14, 17
Replacement Priority 2 (coordinate with birch allee replacement): H-12, 15, 18, 19 (part)
Replacement Priority 3: H-277
Replacement Priority 5: H-25

Blow-Me-Down Brook
Park boundary
New Gallery
Atrium
Lincoln bust
H-24
H-25
Picture Gallery
Galleries entrance
H-22
H-23
Farragut Monument
H-26
Visitor center
Garage
Caretaker's Cottage
H-27
H-28
Mixed woods, 80′-90′ tall
Visitor entrance route
Stream
Birch allee
H-9
Pool
Little Studio
H-10
H-12
H-15
H-18
Pan grove
H-11
H-14
Lower terrace
Terrace
Adams Mem.
H-17
Shaw Memorial
H-19
H-16
H-21
H-20
Pan pool
garden
H-13
Middle terrace
Adams vestibule
H-8
Upper terrace
Kitchen yard
Stable
Aspet
West meadow
H-7
H-6
Cutting garden
H-5
H-4
H-2
H-3
Horseshoe
Saint Gaudens Road
H-29
Information Kiosk
H-1
H-30
Visitor Parking Lot
See Inset
matchline
Stream
Mixed woods, 80′-90′ tall

Inset
matchline
West Meadow
H-1
Saint Gaudens Road
0 50 100 Feet

Blues: Priority 1 (1-5 years)
Greens: Priority 2 (5-15 years)
Yellows: Priority 3 (undetermined timeframe)
Replacement not warranted at this time

Hedge Key

H-1	West Meadow hedge
H-2, 3, 4	Horseshoe hedge
H-5, 6	Cutting Garden hedge
H-7, 8	Kitchen hedge
H-9	Little Studio hedge
H-10, 11	Pan Grove hedge
H-11, 12, 13, 14	Terrace Gardens hedge
H-14, 15, 16, 17	Adams hedge
H-17, 18, 19, 20, 21	Shaw hedge
H-22, 23	Galleries entrance hedge
H-24, 25	Lincoln Bust hedge
H-26	Visitor Center hedge
H-27, 28	Caretaker's Cottage hedge
H-29, 30	Parking lot hedge

0 50 100 Feet

REFERENCE LIST

Coffin, Margaret. "Saint-Gaudens National Historic Site, Landscape Preservation Maintenance Program." Unpublished report, National Park Service Olmsted Center for Landscape Preservation, 1993. CRBIB 403095

Coffin, Margaret and Kristin Claeys. "Historic Plant Inventory for Saint-Gaudens National Historic Site, May 1995." Unpublished report, National Park Service Olmsted Center for Landscape Preservation, 1995. CRBIB 403093.

Coffin, Margaret and Regina M. Bellavia. *Guide to Developing a Preservation Maintenance Plan for a Historic Landscape*. Boston: National Park Service Olmsted Center for Landscape Preservation, 1998 revised edition.

Haenraets, Jan, Joel Smith, Lisa Nowak and Margie Coffin Brown. *Cultural Landscape Report for Saint-Gaudens National Historic Site: Volume III: Treatment*. Unpublished report, National Park Service Olmsted Center for Landscape Preservation, Draft December 2006.

Harris, Richard W., James R. Clark, and Nelda P. Matheny. *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*. Upper Saddle River, NJ: Prentice Hall, 2004.

Leopold, Donald J., Ph.D., Professor of Forest and Environmental Biology, SUNY College of Environmental Science and Forestry. "Examination of Hedges at Saint-Gaudens." Unpublished report on existing conditions of hedges, 23 January 2007.

McGuire, Diane Kostial and Barbara Harrison Watson. "Historic Hedge Maintenance Manual for Saint-Gaudens National Historic Site." Unpublished report prepared for National Park Service, c.1987.

Noble, William. "Hedge Restoration Manual for Saint-Gaudens National Historic Site." Unpublished report, Saint-Gaudens National Historic Site, 1987.

Nowak, Lisa et al. *Cultural Landscape Report for Saint-Gaudens National Historic Site: Volume II* [Analysis & Evaluation]. Unpublished report, National Park Service Olmsted Center for Landscape Preservation, Draft 2007.

Olmsted Center for Landscape Preservation. "Marsh-Billings-Rockefeller National Historical Park: Stabilization and Maintenance Guidelines for the Mansion Grounds." Unpublished NPS report, 2001.

Page, Robert R., Cathy A. Gilbert, and Susan A. Dolan. *A Guide to Cultural Landscape Reports*: *Contents, Process, and Techniques*. Washington, D. C.: National Park Service, 1998, second printing 2005.

Pressley, Marion and Cynthia Zaitzevsky. *Cultural Landscape Report for Saint-Gaudens National Historic Site: Volume 1: Site History and Existing Conditions*. Boston: National Park Service North Atlantic Region, 1993.

Rakow, Donald and Richard Weir. *Pruning: An Illustrated Guide to Pruning Ornamental Trees and Shrubs*. Cornell University Cooperative Extension, Bulletin 23, 2005, online at http://ecommons.library.cornell.edu/bitstream/1813/3573/2/Pruning+-+An+Illustrated+Guide+to+Pruning+Ornamental+Trees+and+Shrubs.pdf (accessed 20 August 2007)

USDA Forest Service, *Silvics of North America*, volume 1: Conifers (Agriculture Handbook 654, December 1990),

University of New Hampshire Cooperative Extension. "Hemlock Woolly Adelgid." Online article, August 2004, http://extension.unh.edu/Pubs/HGPubs/hwa.pdf, accessed 26 March 2007.

Walasewicz, Stephen A. "Eastern Hemlock and the Hemlock Woolly Adelgid at Saint-Gaudens National Historic Site." National Park Service, unpublished report, 1995.

APPENDICES

APPENDIX A. EXAMINATION OF HEDGES AT SAINT-GAUDENS, JANUARY 2007

Donald J. Leopold, Ph.D.
Distinguished Teaching Professor and Chair
Faculty of Environmental and Forest Biology
SUNY College of Environmental Science and Forestry
Syracuse, New York

On Tuesday January 9 I examined the hedge and allee plantings at Saint-Gaudens. The hedges generally appeared very healthy, i.e., I did not observe any serious cases of dieback caused by insects, pathogens, salt, or any other possible biotic or abiotic causes. All cases of thinning in the eastern hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*) hedges appear caused by shading of the lower portions of the hedges by either the upper extremely dense portions of the hedges, or by plantings adjacent to the hedges.

The practice of planting smaller eastern hemlock along the edge of thinning hedges is a sound solution to filling in gaps. However, it is important during planting to minimize disturbance to the root systems of the mature hedge plants. Planting balled and burlapped stock will likely cause greater root disturbance than using smaller and bare-root nursery stock. I recommend avoid planting balled and burlapped stock greater than one foot in diameter for infilling purposes.

I recommend producing on the Saint-Gaudens site, eastern hemlocks of suitable size for infilling purposes, because of concerns about transporting hemlock woolly adelgid on hemlock shipped from other states, and to provide the most flexibility relative to size of hemlock to be planted. Based on information from Musser Forests (http://www.musserforests.com), a large nursery in Pennsylvania which grows and sells bare root eastern hemlock, their five year old hemlocks (transplanted at least once from the original seedbeds) range from 15 to 30 inches in height. I recommend that hemlocks grown for infilling purposes be a minimum of 24 inches in height and be planted as bare-root specimens in the late spring or early fall.

If it is not practical to collect the cones and seeds from eastern hemlock locally, seeds can be ordered from seed nurseries like F.W. Schumacher Co., Inc. (http://www.treeshrubseeds.com/) in Sandwich, Massachusetts. Eastern

hemlock seeds require a two to four month cold stratification period to germinate. Many additional details on the seed ecology of this species are given on Schumacher's web site.

Shading caused by adjacent plantings should be minimized by proper maintenance of competing plants adjacent to the hedges. Where two saucer magnolias are shading the hedge at the Adams Memorial there are numerous alternatives to saucer magnolia that will not require as much regular maintenance and will likely be more functional at this location. Some suggestions of native (to eastern U.S.) small trees that should thrive here include alternate leaf dogwood (*Cornus alterniflora*), red buckeye (*Aesculus pavia*), serviceberry (*Amelanchier arborea*), American hornbeam (*Carpinus caroliniana*), and Carolina silverbell (*Halesia carolina*). Highly ornamental, non native small trees include the three flowered maple (*Acer triflorum*) and paperbark maple (*A. griseum*). Some large native shrubs that might be suitable include witch-hazel (*Hamamelis virginiana*), fringetree (*Chionanthus virginicus*), and chokecherry (*Prunus virginiana*). Additional suggestions of trees and shrubs in any of these categories can be provided.

Shading of the hedges from adjacent non-hedge plantings needs to be minimized, especially where the hedges have a northern aspect. For example, Asian honeysuckle and grape vines are shading the Lincoln bust hedge (H-24/25). Since the Asian honeysuckle and grape likely were not planted, these and other plants that arise on their own should be removed or significantly cut back so that they do not shade the hedges.

There are some places where one planting to some degree shades another planting. The thinning of the hemlock hedge along the birch allee in the Pan Grove (H-10) is likely due to the birch canopy. Future birch plantings could be limbed up to some extent, which should allow more light to the hedge and not adversely affect the birch. Replacement hemlocks might survive in the shade currently produced by the mature birch but they may not grow dense enough to provide the infilling needed in this hedge.

For the road hedge (H-1) we observed intense shading from a large white pine on the other side of and close to the road. Removing this white pine would allow sufficient light to the hedge in this area. Other white pines along this road should be limbed up when possible to maximize light to the hedges. Alternatively, the hedge, when replanted, could be shifted further from the road and away from the shade of the mature white pines.

Current maintenance of the hedges generally appears adequate. However, I suggest these two additional practices that might further enhance the health of these plantings: (1) removing all sheared branches soon after trimming; and, (2) on the white pine hedges where their size is maximum for the area, hand prune the individual "candles" during the appropriate brief window of time. The practice of watering the hedges during drought periods, especially newly planted areas, should continue.

In cases where white pine and hemlock are intermingled in hedges, hand pruning would also better facilitate favoring white pine, which is important because the hemlock is much more shade tolerant than the white pine, and its branches will eventually shade out the foliage of white pine. Hand pruning the white pine shoots while they expand but before they set bud will allow for maximum growth reduction while not cutting into white pine branches beyond the point where they can recover.

It may be desirable to lower the height of some hedges by more than one foot. Based on my observations at Saint Gaudens, the hemlock shoot system on the top of the hedges generally seemed dense and healthy for the top 12 to 18 inches. I believe that shearing 12 to 18 inches from the top of hemlock hedges should not damage the hedge as long as shearing is restricted to areas above the point at which dense, healthy foliage is absent.

With the increasing threat by the hemlock woolly adelgid, these hedges will need to be examined annually to ascertain whether the adelgid is present. With the abundant hemlock naturally throughout this region, its extensive use as a landscape plant, and visitors coming from infested areas, it is critical to be vigilant. Should the adelgid be found on any plantings, the recommended treatments at that time should be implemented. Currently, a dormant oil spray is effective on planted hemlocks but the hemlocks in the woodlands of the property should receive attention as well.

The only other hemlock species native to the eastern U.S. (i.e., Carolina hemlock, *T. caroliniana*) is also susceptible to hemlock woolly adelgid, and its texture and needle alignment along the twigs are quite different than eastern hemlock. The two western U.S. native hemlocks (mountain hemlock, *T. mertensiana* and western hemlock, *T. heterophylla*) are not as cold hardy as eastern hemlock, a potential issue at the location of Saint-Gaudens. The two Japanese hemlock species (i.e., *T. sieboldii* and *T. diversifolia*) have coevolved with this insect and are apparently not seriously affected by it. However, these hemlock species are not readily available and neither are as cold hardy as eastern hemlock. Additionally, all of these alternative hemlock species have a slightly to noticeably coarser texture than eastern hemlock.

The paper birch (*Betula papyrifera*) allee appears to be reaching an overmature and senescing state. While paper birch is known to reach 140 years of age, it typically does not live beyond 80 years (Hardin et al. 2001). During my visit, I observed recently planted river birch in openings created by dead paper birch. River birch will live much longer than the white bark birches but its bark is typically a salmon-pink, later with increasing stem diameter becoming quite dark although the bark of the variety, Heritage, has much white throughout. In a few cases, gray birch was planted decades ago among the paper birch.
Because paper birch is greatly shade intolerant, this allee should be totally replanted within the next 5 to 20 years. Replacing each of the senescing stems as they die rather than all at once will place the newly planted paper birch at a great disadvantage if shaded by remaining larger specimens. Paper birch is naturally single stemmed but is often grown as clumped specimens in nurseries. Gray birch (*B. populifolia*) is naturally clumped but is smaller and does not typically have the creamy white and exfoliating bark of paper birch. In fact, with age, gray birch bark becomes quite grayish, as the common name suggests. European white birch (*B. pendula*) has creamy white bark and can be grown in clumps, but like paper birch is very susceptible to the bronze birch borer and is very shade intolerant. Regardless of which white-bark birch is used, none should be expected to remain functional much beyond 75 years.

The Pan Grove birch are likely near their life expectancy, i.e., they could die/fall over in the next few years, or stand for another five to ten years. Currently, these birch are quite picturesque, but their liability increases as they age further. These trees had signs of heart rot, which undermines the integrity of the tree and makes predicting how long they will remain standing difficult because future weather events (especially snow, ice, and wind) may more readily topple these trees in their senescing state. Because of this species' shade intolerance, replanting individuals as each die would disfavor the newly planted trees. And it is likely that one or more of the senescing trees in this grove will eventually fall down if not cut beforehand, damaging adjacent hedges and any new plantings.

LITERATURE CITED

Hardin, J.W., D.J. Leopold, and F.M. White. *Harlow and Harrar's Textbook of Dendrology*, 9th edition. Boston, MA: McGraw Hill, 2001

APPENDIX B. HEDGE MAINTENANCE SUMMARY, 1994-2008

Compiled by James Haaf, Gardener, Saint-Gaudens National Historic Site

FERTILIZATION

Applications by hand as top dress, broadcast.

1994	Oct	2-3-3 organic blend, granular, all hedges,	1550 lbs total
1996	Apr	5-1-9 organic blend, granular, all hedges,	2113 lbs total
1998	May	5-1-9 organic blend, granular, all hedges,	1663 lbs total

1 – North Country Organics, Bradford VT, www.norganics.com

PRUNING / SHEARING

Months given indicate date started. Some exact dates available if needed.

1994	June	pinch pine candles	shear hemlock
1995	June	pinch pine candles	
	July	shear hemlock	
1996	June	pinch pine candles	shear hemlock
1997	June	pinch pine candles	shear hemlock
1998	May	pinch pine candles	
	June	shear hemlock	
1999	Mar-Aug	prune / shear pine	shear hemlock
2000	July	shear all	
2001		shear all	
2002		shear all	
2002		shear, few sections (mainly tops) not sheared	
2003		shear all	
2004	July-Sept	shear all @ 400 hours	
2005	July-Sept	shear all @ 403 hours	
2006	July-Aug	shear all @ 418 hours	
2007	July-Aug	shear all @ 442 hours	
2008	July-Aug	shear all @324 hours	

DEADWOOD REMOVAL

Removal of deadwood, thinning tops and removing debris from tops.

1996	Jan	Kitchen Yard hedge, 90%
1997	Apr	Shaw/Adams south side hedge, 100%
		Admin. Bldg. hedge, 20%
		Outer Horseshoe Hedge, 50%
1999	Nov	Shaw/Adams north side hedge, 100%

REMOVAL / REPLACEMENT / INTERPLANTING

Light fertilization with transplanting. Soils not amended. Mulching of transplants rare but planned for 2007 Roadside hedge.

1994	May	13 pine inplanted, Admin. Bldg. hedge
	Sept	8 pine inplanted, various sections
1995	Sept-Oct	16 pine inplanted, various sections
		7 hemlock inplanted, various sections
1996	Sept	Inner Horseshoe hedge removed / replaced with 34 hemlock
	Oct	9 hemlock inplanted, various sections
1997	June	Shaw Memorial hedge NE corner & E end removed / replaced with 14 hemlock
1997	Sept	1 pine inplanted
		13 hemlock inplanted, various sections
1998	Apr	Lincoln bust hedge removed / replaced with 25 hemlock
1998		2 pine inplanted
		6 hemlock inplanted, various sections
2000	May	3 hemlock inplanted, Shaw Memorial hedge
2001	May	replace 11 hemlock Admin. Bldg. hedge
		6 hemlock inplanted, various sections 8/
2006	Aug	remove 178 pine, Roadside hedge
	Oct	remove 45 ft. pine, Picture Gallery north hedge
2007	May	replant of Roadside hedge, 85 pine @ 5-6 ft.

IRRIGATION

Only applied with transplants or newly planted sections.
Application most common through drip hose at tree base. Some spray emitters installed with isolated transplants.

CABLING

Mechanical support of long or week limbs. Also used to reposition limbs and foliage.
"Wire in hose" which damages bark replaced in 1995 with woven fabric Arbor Tape and Tree Slings. Can result in limb breakage with heavy snow storms. Practice of cabling has diminished since about 2000.

OTHER

Wilt-Prof anti-desiccant spray applied to new transplants

1997 Oct
1998 Nov
2001 May

Weed removal from hedges, herbaceous and woody species

2004 Shaw hedge 70%

Admin. Bldg hedge 50%

Cutting Garden hedge 50%

Outer Horseshoe 50%

APPENDIX C. SEASONAL CALENDAR FOR HEDGE MANAGEMENT

NOVEMBER-FEBRUARY

- Remove dominant bud from white pine hedge sides
- Protect hedges from winter damage
    - Erect temporary deer fencing if necessary
    - Erect winter protective fencing where necessary (salt, plowing)
        - Eliminate/reduce salt use along roads
        - Mark boundaries of plowing
    - Reduce snow load on tops of hedges
        - Remove manually
        - Tie up weak/wide hedges

MARCH

- Undertake structural pruning
    - Remove dead wood
    - Thin top of hedge to improve light/air penetration

- Initial white pine trimming
    - Remove central, dominant bud to limit growth to a minimum if necessary (a bonsai technique recommended by the U.S. National Arboretum)

APRIL-MAY

- Interplant with young bare-root stock to fill in voids (before growth begins)

- Cable & reposition branches
    - Add support to weak branches
    - Reposition branches to fill in weak areas

- Inspect for pest and disease damage

JUNE

- Pinch white pines candles (shoots)
    - Remove 50% of candle before expanding into needles

- First shearing of hemlock
    - Shear after bud break/shoot extension
    - Clean out cuttings from within and below hedges

- Prune white pine away from hemlock in newly established tapestry hedges

- Fertilize young hedges
    - Apply granular 50% organic nitrogen (e.g., 5-10-10) to plants in the ground more than one year

- Inspect for pest and disease damage

JULY-AUGUST-SEPTEMBER

- Prune hemlock branchlets shading white pine in tapestry hedges

- Second shearing of hemlock, first (only) shearing of white pine (early July)
    - Light shearing to establish a crisp profile
    - Clean out cuttings from within and below hedges

- Fertilize established hedges
    - Test soil for nutrients and pH and if necessary add:
        Top dressing of well-rotted manure
        Supplemental granular fertilizer (5-10-10)
        Lime

- Fertilize young hedges (late August)
    - Apply granular 50% organic nitrogen (e.g., 5-10-10) to plants in the ground more than one year

- Weed and mulch all hedges

- Water during dry periods, 1" water every 7-10 days minimum

- Inspect for pest and disease damage

OCTOBER

- Undertake structural pruning
    - Remove dead wood
    - Thin top of hedge to improve light/air penetration

- Cable & reposition branches
    - Add support to weak branches
    - Reposition branches to fill in weak areas

- Inspect for pest and disease damage

APPENDIX D: HEDGE DOCUMENTATION BY SECTION

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing Stock Type *	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes
West Meadow Hedge / Horseshoe Hedge	**H-1**	White pine	Rectangular	H: n/a W: n/a L: 400' Extended to end of West Meadow.	Heavy shade from woods on south side of road and grove of pine on north side Competition from weeds?	Probably balled & burlapped	Single; 200 +; n/a	c.1893-94; Replanted c.1972, partial 1992; removed 2006; replanted 2007	n/a Hedge had good growth on north side, weak on road side. Was prone to weeds/poison ivy.	May have been planted as 2 sections, west end farther in from road. C.1972 replanting probably positioned farther away from road.
	H-2 (inner)	Hemlock	Rectangular	H: 4' W: 4' L: 65'	Part sun; shaded to north by taller outer hedges.	Probably bareroot	Double staggered; 60; 18"	c.1893-94, replanted 1996	Excellent	Ideal height—proportional to H-3, H-4
	H-3 (outer-west)	White pine, hemlock infill	Rectangular; slopes up toward steps	H: 8-12' W: 8-12" L:80'	Sun to part shade; ground slopes to the south; shade from apple tree to west, woods south of road.	Probably bareroot	Double and infill; 50, plus infill plants; 1-8'	c.1893-94 with later interplanting	Good; thin toward bottom; bare on west side below apple tree.	Infill white pine, early 1990s.
	H-4 (outer-east)	White pine, hemlock infill	Rectangular; slopes up toward steps	H: 8-12' W: 10-12' L: 80'	Sun to part shade; ground slopes to the south; shade from woods south of the road.	Probably bareroot	Double and infill; 50, plus infill plants; 1-5'	c.1893-94, with later interplanting	Good; bare below apple trees on east side.	A few very large hemlocks within hedge.

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing Stock Type *	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes, Photo #
Cutting Garden Hedge / Kitchen Hedge	**H-5 (road side)**	Hemlock	Rectangular	H: 7-8' W: 9' along road, 11' at gate L:	Sun/shade from trees on south side of road; on top of bank sloping down to road	Not known.	Double; 120; 1-3'	c.1893-94 Replanted in hemlock c.1950	Good on garden side; bare on road side; soil eroded/roots exposed along road.	Uneven branching—lopsided toward garden; splays under snowload.
	H-6 (stable side)	Hemlock (east), white pine (west)	Rectangular	H: 8-10' W: 8-12' L:	Sun; shaded on north side; backs up (north side) to stable and lattice fence.	Not known.	WP:single, 16, 3' Hem: double, 40, 3'	c.1903; hemlock part replanted c.1950; White pine part replanted c.1970	Good on garden side; bare on north side (but not visible)	White pine section had grown into trees by 1966. West end shaded by lilacs.
	H-7 (south circle and dogleg)	Hemlock, white pine	Rectangular	H: 12' W: 12'-21' L:	Sun; some shading from lilacs to south. Compaction along path at dog-leg.	Not known.	Double and infill; 50; 2'-8'	c.1893-94 , with later interplanting	Good; bare on dog-leg (compaction from adjoining path)	Most of largest, trees are hemlock; Recent interior hemlock infill failed.
	H-8 (north circle)	Hemlock, white pine	Rectangular	H: 12'-18' W: 12'- 23' L:	Sun; intersects H-13 (Flower Garden hedge); banked near house; southwestern corner part of Flower Garden hedge.	Not known.	Double and infill; 38; 2'-10'	c.1893-94, with later interplanting	Good	Most of largest, trees are hemlock; Walk extends through section adjacent to Aspet.

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing Stock type	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes, Photo #
Little Studio Hedge	**H-9**	White pine	Rectangular; aligns with entablature on studio	H: 8-10' W: 6' L:	Sun; shaded on north side; steep bank to north.	Probably nursery (potted or b & b)	Single; 23; 3'	c.1893-94 Replaced c.1970	Fair; bare on north side due to shade	Had grown into large trees by 1946; replacement not planted in historic alignment.
Pan Grove Hedge	**H-10** **(north Pan Grove)**	Hemlock	Rectangular	H: 10' W: 6' L: Height aligns with H-11, H-12.	Shade from birch allee & pan grove. Path cuts through west end (access necessary)	Probably nursery (potted or b & b)	Single; 9; 2'-5'	c.1893-94 (white pine), replaced with hemlock by 1920s.	Poor; bare on both sides; provides minimal screening.	Originally white pine, changed to hemlock early.
Terrace Garden Hedge	**H-11** **(Flower Garden/Pan Grove divide)**	Hemlock		H: 7'-10' W: 13' L: Height aligns with H-10, H-12	Part sun/shade from pan grove; bank at south end (approx. 3')	Probably nursery (potted or b & b)	Single; 25; 1'-4'	c.1893-94, replaced with hemlock c.1930;	Fair Full on Pan Grove side, bare spots on Flower Garden side	Extending over perennial beds, brick walk.
	H-12 **(north Flower Garden)**	Hemlock	Rectangular; extends out to either side of bench; zodiac posts set in niches.	H: 10' W: varies L: Height kept even with zodiac heads/posts	Part sun/shade from birch allee. At head of Flower Garden	Probably nursery (potted or b & b)	Double; 16, plus small infill; 1-4'	c.1893-94, replaced with hemlock c.1930.	Good, bare spots in post niches.	Opening behind bench post 1946 (CLR Fig 82) Bench reintroduced 1980s.

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing Stock type *	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes, Photo #
Terrace Garden Hedge, con.'t. / Adams Hedge	**H-13 (middle terrace)**	White pine, hemlock infill	Rectangular. Curves inward—not in alignment with flower bed; arches over brick walk	H: 8' W: 6-8' L: Level with height of H-16.	Sun; shaded rear/adjoins H-18; also H-14 & H-16.	Probably nursery (potted or b & b)	Single; 19; 1'-3'	c.1903; later interplanted with hemlock	Good; some openings behind Hermes; infill hemlock struggling.	Hedge on top of bank at east end against house is part of Kitchen Hedge/H-8.
	H-14 (Adams/Flower Garden divide)	White pine, Hemlock intermixed	Rectangular	H: 8' W: 12' L:	Sun/shade (Adams or east side shaded toward H-16)	Probably bareroot and nursery (potted or b & b)	Double; 15; 2'-6'	c.1893-94, with later interplanting	Fair; bare spots on Flower Garden side (white pine)	Post-c.1946 opening to Flower Garden closed with pines in c.1972
	H-15 (north Adams)	Hemlock	Rectangular	H: 8' W: 6' L: 40' Height aligns with H-14, lower than H-17.	Sun/shade from birch allee; shade from magnolias.	Probably nursery (potted or b & b)	Single; 16 2-6'	c.1893-94, replanted in hemlock c.1950	Poor; weak north side; recent dieback on south side due to shade from magnolia.	Opening/walk to birch allee introduced in c.1972.
	H-16 (south Adams)	White pine, hemlock	Rectangular, arch over walk	H: 11' W: 6' L: 40'	Sun/shade on north side.	Probably bareroot	Single; 18 (most of hedge from 4 large plants); 2'-6'	c.1893-94 with later interplanting	Fair; bare below magnolia.	Opening/walk introduced in c.1972. Higher than H-15, lower than H-17.

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing Stock Type *	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes, Photo #
Shaw Hedge Adams , con't.	**H-17 (Adams/Shaw divide)**	Hemlock, white pine	Rectangular; tallest hedge.	H: 15' W: 10-12' L: 35'	Sun/shade from magnolias in Adams; magnolias planted c.1995.	Probably bareroot	Double, plus infill; 11 (most 4 large trees) 2'-8'	c.1893-94 with later interplanting	Poor, bare on Adams side in shade of magnolias; fair on Shaw side)	Failed recent infill hemlock on Adams side. High branches swoop to ground on Shaw side.
	H-18 (north Shaw)	Hemlock	Rectangular	H: 8' W: 8'-10' L: 130'	Sun/shade north side from birch allee	Probably nursery (potted or b & b)	Single; 51; 1'-3'	c.1893-94, replaced with hemlock c.1950	Good; bare spots on north side in shade of birch allee	On 1'-2' berm Branching primarily toward inside.
	H-19 (east/northeast Shaw)	Hemlock	Rectangular	H: 8' W: 4' L: 60'	Shaded north side from birch allee	Nursery (potted or b & b)	Single; 18; 3'	c.1893-94, north side replaced in c.1950,entire section replaced in 1997.	Good; some bare spots on north side beneath birch allee.	East side replaced hedge consisting of two aged white pines, 18' tall. East opening reintroduced in 1997 replanting.
	H-20 (Shaw dogleg)	White pine, hemlock	Rectangular	H: 10' W: 5' L: 25'	Sun/part shade north side.	Probably bareroot	Single; 6 plus 16 infill; 2'-4'	c.1893-94, with later interplanting.	Good; bare spots lower	At head of service drive.
	H-21 (south Shaw)	Hemlock, white pine	Rectangular	H: 10' W: 6'-8' L: 175' .	Sun/part shade north side and towards west end.	Probably bareroot	Double; 55; 2'-4'	c/1893-94, with later interplanting	Good	Mostly hemlock on north side; white pine at top and south face. Shearing damage to white pine. Taller than H-18 (north Shaw)

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing Stock Type *	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes, Photo #
Galleries Entrance Hedge	**H-22**	Hemlock	Convex hedge and cone	H: 8' W: 4' base L:7' Cone: radius 4' at base, H: 10'	Moderate shade	Probably nursery (potted or b&b)	Single 4 (1 cone) 2'	c.1948; replaced 1993.	Good	Historically greater difference in height between cone and hedge. Taller section of hedge to south/east removed for Farragut.
	H-23	Hemlock	Convex hedge and cone	H: 8' W: 4' base L: 10' Cone: radius 3' at base, H: 10'	Moderate shade	Probably nursery (potted or b&b)	Single 4 (1 cone) 2'	c.1948; replaced 1993	Fair, bare spots on inner side.	Historically greater difference in height between cone and hedge
Lincoln Bust Hedge	**H-24**	Hemlock	Rectangular, U-shape in plan	H: 5' W: 3' L: 45' (20' sides, 5' back)	Part sun/shade. Shrubby vegetation to north shading north side of hedge.	Probably nursery (potted or b&b)	Single; 24; 2'	c.1948; replaced c.1998.	Good; north side bare (not visible)	Bare north/east sides due to shade from adjoining vegetation.
	H-25	Hemlock	Rectangular	H: 6' W: 4' L: 21'	Part sun/shade. At top of steep bank; encloses space to south of Lincoln bust and north of Picture Gallery.	Probably nursery (potted or b&b)	Single; 12; 2'	c.1948; partial removal 2006	Good; east side bare (not visible)	Adjoining section next to Picture Gallery removed in 2006.

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing Stock Type *	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes, Photo #
Visitor Center Hedge	**H-26**	Hemlock	Rectangular	H: 4'-5' W: 4' L: 130'	Sun	Probably nursery (potted or b&b)	Single, staggered; 130; 1'	c.1967	Excellent	
Caretaker's Cottage Hedge	**H-27**	White pine, hemlock	Rectangular	H: 10'-12' W: 10' L: 210'	Sun, part shade north side and north of cottage	Probably bareroot	Single; 58; 1'-3'	c.1917-1927, with later interplanting; replacement at curve in c.2000 due to snow damage.	Good	Originally pure white pine. Hedge is higher than eaves of cottage. Pedestrian sight lines an issue at curve in drive.
	H-28	Hemlock	Rectangular	H: 5'-6' W: 4' L:	Shade from woods across road and two trees adjacent to hedge along road.	Probably bare root (white pine) and nursery (hemlock)	Single; 115; 1'-3'	c.1893-94; replacement c.1980.	Fair; hemlock weak on Saint-Gaudens Road side west half; openings in hedge near garage.	Originally white pine.

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

Hedge Feature	Hedge Section	Species	Shape	Dimensions (H, W, L)	Setting	Existing stock Type *	Rows; # Plants; Spacing (within row)	Age	Condition	Other Notes, Shown in Figure #
Parking Lot Hedge	**H-29**	Hemlock	Rectangular	H: 6' W: 3' L:	Partial shade. Bordered by tall woods to east, west, and south (bordering parking lot)	Probably nursery (potted or b&b)	Single, ?, 2'-3'	c.1930, replanted c.1988	Good	Originally pure white pine
	H-30	Hemlock	Rectangular	H: 6' W: 3' L:	Partial shade. Bordered by tall woods to east, west, and south (bordering parking lot)	Probably nursery (potted or b&b)	Single, ?, 2'-3'	c.1930, replanted c.1988	Good	Originally pure white pine

Sources: Noble report 1987; Field notes from Maciej Konieczny, Olmsted Center intern, 2006; field notes by author, 9 November 2006

* = Provided to determine previous level of disturbance for potential archeological assessment needed for replanting

National Park Service
U.S. Department of the Interior

Olmsted Center for Landscape Preservation
Boston National Historical Park
Charlestown Navy Yard, Quarters C
Boston, MA 02129
Phone: 617.241.6954
Fax: 617.241.3952
www.nps.gov/oclp/