



The **ARNOLD**
ARBORETUM
of HARVARD UNIVERSITY

LANDSCAPE MANAGEMENT PLAN



SPRING 2011 - 3RD EDITION

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Front Cover (L–Clockwise): Gate area Peters Hill gate, Jill K. Conley; *Prunus* flowers, Bradley Rosaceous Collection, Jon Hetman; Winter Faxon Pond, Arnold Arboretum Archives

Back Cover (L–Clockwise): *Davidia involucrata*, Jill K. Conley; *Phellodendron*, near Meadow Road, Arnold Arboretum Archives; *Acer rubrum*, Robert Mayer

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Introduction

STATEMENT OF PURPOSE

This edition of the Landscape Management Plan is the result of the continuing work of the Horticulture Department of the Arnold Arboretum. It is a detailed game plan that communicates the shared goals and priorities collectively developed by the horticulture team. The Plan's goal is to maintain exemplary standards of horticultural care and management that provide optimal growing conditions for our collections, enhance the ecological health of the Arboretum environment, and present a landscape of outstanding quality for visitors, students, the surrounding community and other key constituencies.

MANAGEMENT APPROACH: ORGANIZATION AND TERMS

Addressing the full range of biotic and abiotic elements that comprise the Arnold Arboretum environment, analysis has included botanical collections, natural areas, soils, pests and diseases, hardscape and perimeter elements, and visitor needs and impacts. Management activities are organized within a geographical framework that divides the landscape into regions and zones:

Regions: The landscape is organized into 7 regions broadly defined by topography (Bussey, Hemlock, Weld and Peters Hill), landscape type (natural areas vs. collections areas vs. urban wild) and management needs. Regions facilitate the broader-scale assignment of tree-work, spraying, and hardscape and perimeter maintenance.

Zones: The plan organizes the landscape into 70 management zones that provide a structure for staff assignment and identify specific care needs and projects for collections and landscape areas. Zones encompass areas that are contiguous and share similar challenges, collections themes or management requirements. Zones are treated as a unit with common specifications for daily, monthly and annual care. Specifications are written to attain targeted standards of care and presentation.

The following information is provided to guide the care and management of each zone:

Management Priority: Zones are designated as “high”, “moderate” or “low” priority based upon their relative importance within a given year, as determined by the Manager of Horticulture. Priorities may vary annually, depending on special projects, particular landscape issues (e.g., pest outbreaks, winter damage, etc.) and larger organizational needs.

Management Intensity: The amount of resources (staff time, equipment and materials, team support, etc.) needed to maintain a given zone at the desired standard is designated as:

High: Intensive care requirements stemming from design (Leventritt Garden, Bradley Collection), visual prominence (Hunnewell Building landscape) or care needs (Lilac Collection).

Moderate: Areas comprising tree collections (*Tilia*, *Fagus*, etc.) or lower-care shrub beds (legume beds).

Low: Natural areas (North Woods) and urban wilds (Mesa) requiring lesser amounts of care.

Introduction cont.

Area Profile: A general profile of each area describes distinguishing characteristics, unique resources, history and special challenges.

Special Priorities: Tasks and projects of high priority that require ongoing attention and commitment.

Annual Care Plan: All tasks needed to maintain an area are listed by season, in descending order of priority.

Noxious Weeds: Extant weed species requiring management.

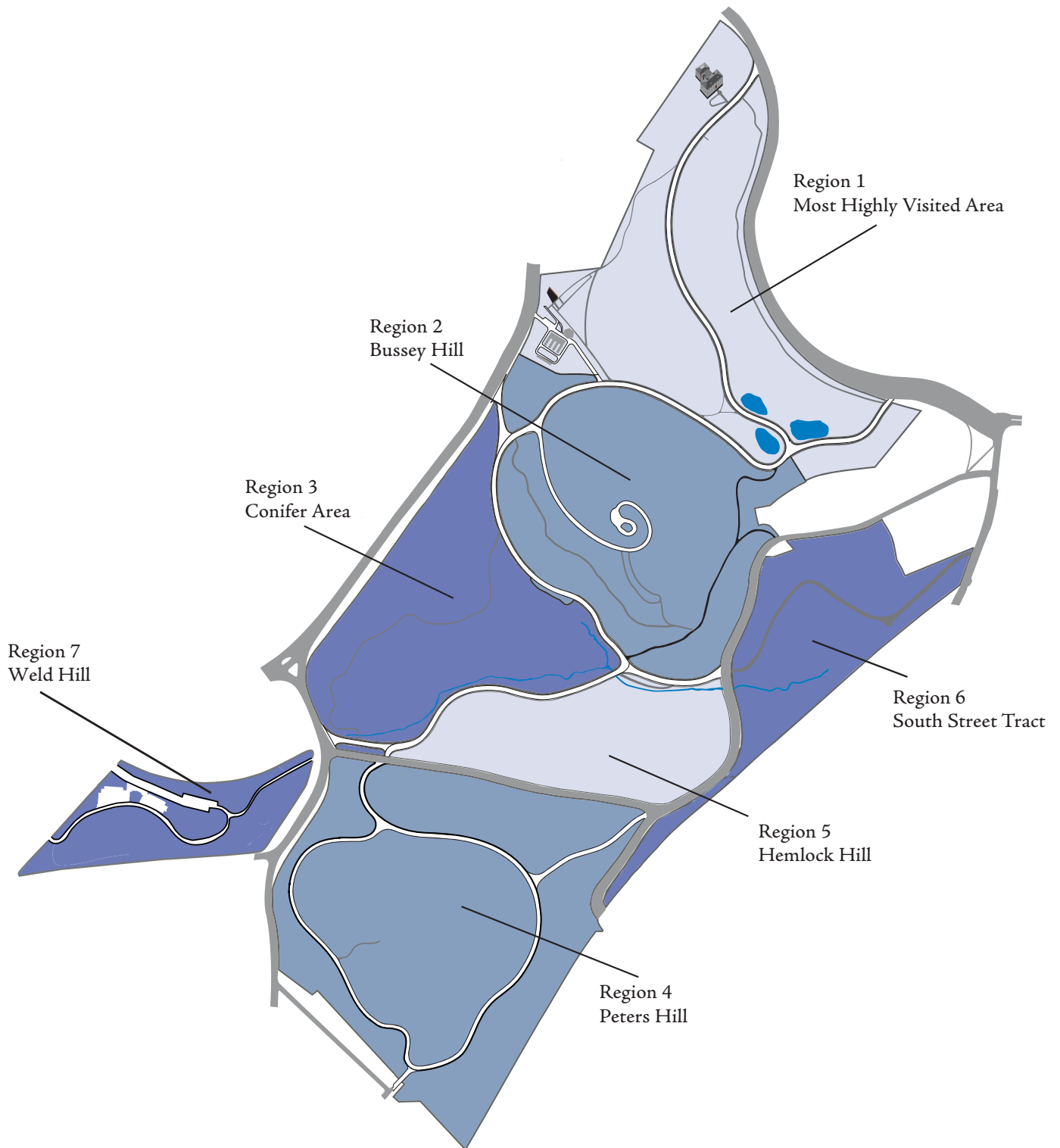
Pests and Diseases: Pests and diseases that are currently a problem or may be in the future.

Curation: Curatorial plans or priorities within a zone.

Long-Term Projects/Tasks: Projects and tasks to be accomplished by Arboretum staff, within the annual operating budget, are listed for each zone within a 2–5 year time frame. These include landscape improvements, plant acquisition, vegetation management, restoration projects, and pest and disease abatement.

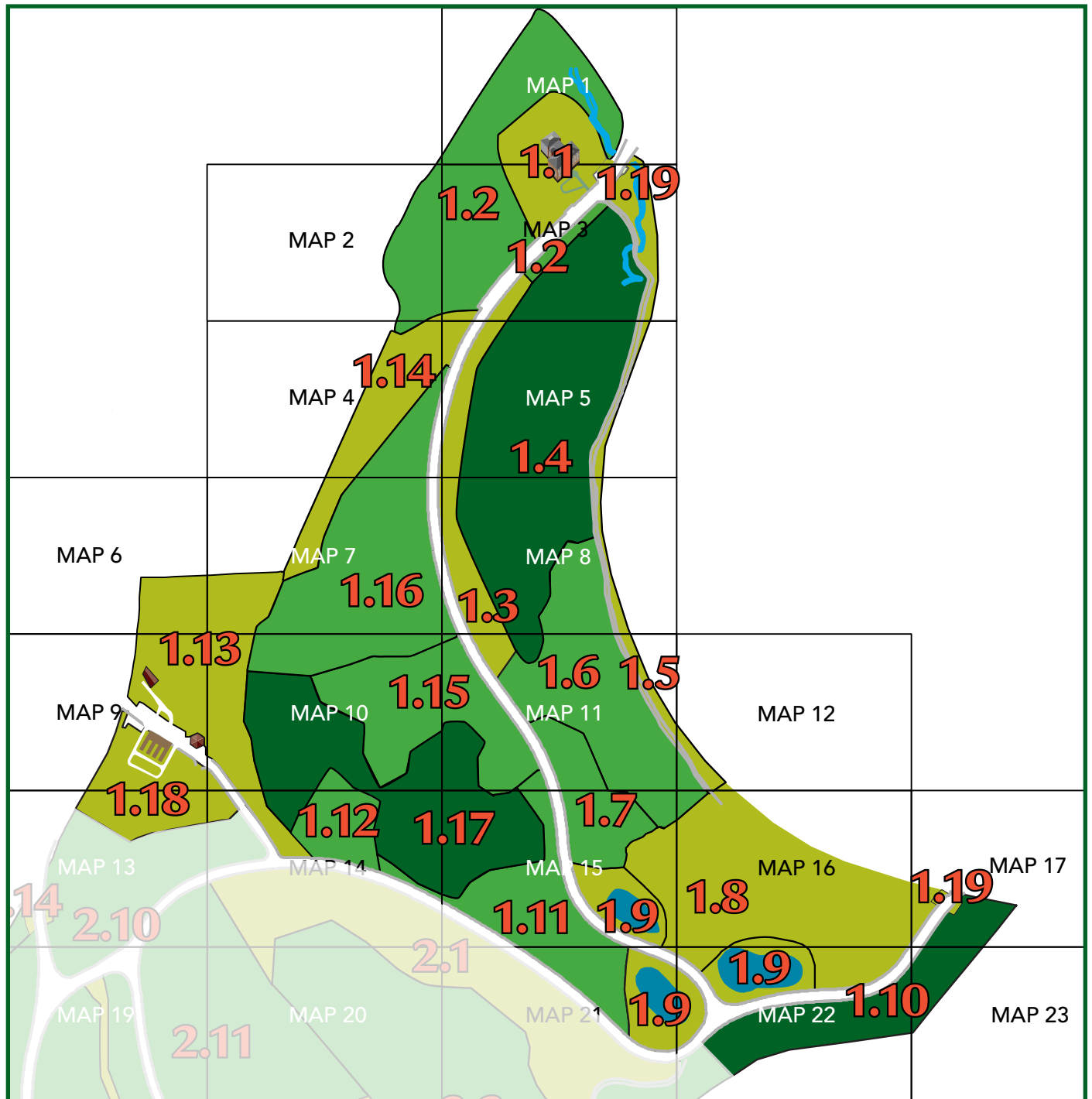
Capital Projects: These larger projects require capital investment outside the operating budget. They include hardscape design and construction, irrigation and other projects to be completed within 3–5 years.

Arnold Arboretum Map





REGION 1 MAP



Region 1—Most Highly Visited Area

	<u>Zone</u>	<u>Priority</u>	<u>Intensity</u>
1.1	Hunnewell Visitor Center Area	High	High
1.2	Landscape Surrounding the Visitor Center	Moderate	Moderate
1.3	Azalea Border along Meadow Road	High	Moderate
1.4	The Meadow	Low	Low
1.5	Willow Path & the Arborway Wall Edge	High	Moderate
1.6	The <i>Acer</i> Collection	Moderate	Low
1.7	North Woods with Accessions	Moderate	Low
1.8	Bradley Rosaceous Collection	High	High
1.9	The Three Ponds: Dawson, Faxon, Rehder	High	High
1.10	Mass State Lab Slope & Forest Hills Gate Area	Low	High
1.11	Legumes, including Shrubs	Moderate	Moderate
1.12	<i>Zelkova</i> and Area Below the Esker	Moderate	Low
1.13	Leventritt Shrub and Vine Garden	High	High
1.14	Linden Path	Moderate	Moderate
1.15	<i>Leitneria</i> Bowl to Bamboo	Moderate	High
1.16	<i>Aesculus</i> , <i>Tilia</i> , <i>Phellodendron</i> and <i>Cornus</i>	Moderate	Moderate
1.17	North Woods	Low	Moderate
1.18	Dana Greenhouse, Nurseries and Bonsai	High	High
1.19	Main Gate (Hunnewell Building) & Forest Hills Gate	High	Moderate

1.1 Hunnewell Visitor Center Area

High Priority

High Intensity



Hunnewell Visitor Center. Arnold Arboretum Archives



Aerial view Hunnewell Building. Jay Connor.

AREA PROFILE

The Hunnewell Building Visitor Center landscape serves as the principal gateway to the Arboretum for arriving visitors and is the first impression of many first-time guests, students and visitors. Because of its strong image-making value, this area will receive the highest standard of maintenance. The care and presentation demands of its diverse landscape areas—Arborway Gate, turf around magnolias, high-quality accessions, bed plantings in front of building—require constant diligence.

SPECIAL PRIORITIES

Keep the front gate and all beds completely free of litter through daily sweeps through area. Summer nighttime activity requires daily sweeps. Weed control around entry drive and gates as well as steps and mulch beds in landscape facing building. Provide supplemental irrigation as needed to establish shrub plantings in front of pillars. Turf should be maintained to the Arboretum's highest standard, mostly free of broadleaf weeds and reseeded as needed.

ARBORICULTURE

Due to its close proximity to the Hunnewell Building, this zone has a high management intensity level. Frequent visits throughout the year will be necessary to maintain the high standard of maintenance this zone warrants, especially the magnolias that decorate the front and sides of the Hunnewell Building. Because several specimens are of advanced age or otherwise in decline, frequent visits will be required to remove dead or dying branches. However, due to the trees' smaller stature and numbers, the visits to Zone 1.1 should not require much time.

Annual Care Plan

ALL SEASONS

- Remove weeds from all display beds and mulched areas around trees. Also keep pavement cracks and edges weed-free.
- Maintain clean edge to turf along entry paths to Hunnewell Building.
- Provide supplemental irrigation, as needed, to all plantings.
- Monitor newly planted accessions, investigate problems, and take appropriate action.
- Chip brush.
- Apply herbicides around gates, pavement areas and edges as needed.
- Prune all dead wood within reach.
- Keep fence areas free of weed vines.
- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- Adjust sprinkler system, as needed.

SPRING

- Aerate all grass areas (or in Fall). NOTE: Be aware of irrigation lines.
- Apply soil amendments, if needed.
- Test irrigation system.
- Winterize turf.
- Remove leaf litter from shrub beds.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings around trees. Apply double-ground mulch at a depth of 2” to all trees.
- Top dress and seed lawn areas where needed.
- String trim grass from edges of pavement every other week.
- Aerate and de-thatch all grass areas, as needed.

SUMMER

- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings around trees. Apply double-ground mulch at a depth of 2” to all trees.
- Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- String-trim grass from edges of pavement every other week.
- Prune vines on facade of the visitor center and away from doors of garage.

FALL

- Aerate all grass areas (or in Spring).
- Apply soil amendments, if needed.
- Fertilize turf.
- Remove leaf litter from shrub beds and lawn.
- Top dress and seed lawn areas where needed.
- Cut back herbaceous material.
- Winterize irrigation system.
- Prune vines on the building. Prune them away from windows and keep them below the dentil brick work.
- Install pathway markers for snow removal.
- String trim grass from edges of pavement every other week.
- Prune vines on facade of the visitor center and away from doors of garage.

WINTER

- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- Refer to Snow Removal Operations (Appendix B).
- Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand pull	Spring
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Broadleaf weeds (beds)		Glyphosate, Glufosinate-ammonium, Hand pull	Spring, Summer
Broadleaf weeds (turf)		Triclopyr, Dicamba	Spring, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development: Evaluate all herbaceous plantings, including the 'Jennie Quigley' memorial planting in the beds around the building. Marginally expand magnolia holdings that possess ornamental and research potential. Evaluate thematic collection to identify appropriate planting scheme(s) for this central location. Particular emphasis likely to be the theme of biogeography, including east-west disjuncts, so as to support interpretive use of Hunnewell Building landscape. Collaborate with the Manager of Visitor Education in developing interpretive themes and plantings.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ Replant shrub beds as needed to maintain themes and accessions.
- ✦ Monitor herbaceous layer, maintain balance between *Cimicifuga*, *Xanthorhiza* and *Aruncus*.
- ✦ Monitor *Ranunculus repens*. Reduce colony if necessary.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ Restoration and renovation of Arborway Gate area.
- ✦ Replace parking bumpers in front of building.
- ✦ Replace front of building with pervious pavement.

NOTES

1.2 Landscape Surrounding the Visitor Center

Moderate Priority

Moderate Intensity



Magnolia on Visitor Center landscape. Jill K. Conley.



Visitor Center landscape. Sylvia Winter.

AREA PROFILE

The landscape surrounding the Hunnewell Building includes many high-value accessions, including a collection of Arnold Arboretum introductions. Although not frequently visited, visitors with special interest in magnolias often explore this area. Providing accessions with high-quality care is the most important goal; magnolias east of parking lot near Arborway edge would benefit from increased care.

SPECIAL PRIORITIES

Maintain health of collections, particularly magnolias.

ARBORICULTURE

- Zone 1.2 has a very diverse array of plant material ranging from the collection of magnolias east of the garage parking lot, to the grove of conifers behind the Hunnewell Building and continuing west towards Linden Path. These collections contain a mix of trees that varies from very young to very old.
- Over the past three years the collection of magnolias in this zone has received repeated care and appear to be in good shape and should only require bi-yearly visits to remove unwanted sucker growth, storm damaged branches and any dead or diseased wood.
- The large stand of conifers located behind the Hunnewell Building comprises mostly healthy mature trees. Generally, the type of care these trees will require is clean-up missions of repairing storm breaks and removing the dead lower branches that have died due to lack of sunlight.
- Further to the west, Zone 1.2 becomes a collection of deciduous trees of varying age. The younger trees in this zone will require yearly visits to administer structural pruning/training cuts in order to avoid poor structural or hazardous conditions later in the trees' life. The small stand of *Liriodendron* is of advanced age and in decline. Because the tops of these trees are continuously dying back, they now require reduction cuts in their crowns down to strong healthy lateral branches, as well as a plant health care program to help alleviate their condition.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems, and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

SPRING

- ✦ Aerate all open areas (or in Fall).
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around trees; apply double-ground mulch at a depth of 2”.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Prepare patio garden with proper pruning and mulch in beds.
- ✦ Monitor *Rubus* in patio area—treat as needed.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around trees; apply double-ground mulch at a depth of 2”.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all open areas (or in Spring).
- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Monitor and spray shrubs for rodent damage.
- ✦ Clear debris and overgrowth from Goldsmith Brook to maintain stream flow and storm water drainage.
- ✦ Cut back all herbaceous material in patio garden.
- ✦ Prune and train vines in patio area.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Kudzu	<i>Pueraria lobata</i>	Glyphosate, Triclopyr	Apr–Oct
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Stinging Nettle	<i>Urtica dioica</i>	Glufosinate-ammonium, Flame torch	Spring, Summer
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/ Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer
Diplodia Tip Blight	<i>Sphaeropsis sapina</i>	Mancozeb	Spring, Summer

CURATION

Collections Development: As part of the review of Zone 1.1, evaluate the thematic collection to identify appropriate planting scheme(s) for this central location. This also includes potential area behind the Visitor Center on the slope to site understory tree and shrub material, particularly those requiring some degree of winter protection, as well as bulbs to be used for children’s education programs. With respect to the latter, identify appropriate bulb taxa for children’s education program that would span a wide blooming period; likewise identify planting areas from full sun to deep shade to further stretch blooming period.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune to rejuvenate shrubs (*Forsythia*).
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Continue work to establish grass on old Bridal path.
- ✦ Potential need to stabilize banks of Goldsmith brook.
- ✦ Patio garden: evaluate plantings and identify a planting theme for the area.
- ✦ Plant bulbs on hillside.

CAPITAL PROJECTS

- ✦ Stabilize the banks of Goldsmith Brook. The bank is severely eroded at the corner of the parking lot.

NOTE: A temporary drainage pipe has been installed to mitigate the parking lot run-off, as to stave off the majority of erosion caused by this surge of water. This is only a temporary solution and a more permanent one needs to be implemented.

NOTES

1.3 Azalea Border along Meadow Road

High Priority

Moderate Intensity



Rhododendron viscosum rhodanthum, Acc. 638-62A. Michael Dosmann.



Azalea Border. Wes Kalloch.

AREA PROFILE

Azalea Border merits the highest level of care and presentation as it is the most tangible legacy of Beatrix Farrand's work as consulting landscape architect for the Arnold Arboretum, and potentially one of our most spectacular spring displays with its range of Azalea taxa. Exceptional specimens of *Cercidiphyllum*, *Enkianthus*, *Cotinus* and other species further enrich areas in and around the beds.

SPECIAL PRIORITIES

Unlike more naturalistic areas of the Arboretum landscape, Azalea Border requires clean lines to bed edges (Meadow Road side) and regular mulching and weeding. Garlic mustard, *Allium* sp. and ostrich fern are both special challenges in this area. Because of the high water table of the abutting meadow, root rot has historically afflicted susceptible plantings.

ARBORICULTURE

Azalea Border has been assigned a level of high intensity and in the past has received just that type of care. Due to their high visibility and status, the trees that line the east side of Meadow Road, from the front of the Hunnewell Building to the *Acer* collection, have constantly been groomed. Dead and dying branches continue to be removed as soon as they appear. Most species of trees in this zone appear to be in good health. Exceptions are the senescent *Cercidiphyllum japonicum* which seem to suffer from root damage and the *Amelanchier* species that continuously require sanitation pruning to remove outbreaks of Fire Blight. New tree plantings in this zone will require annual visits for training purposes.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Edge and mulch shrub beds to maintain clean sharp edge to beds facing road (use double ground mulch), meadow side of beds can be more natural.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Rehab and repair the “dry stream bed” drainage feature as needed. Replace or add river stone and crushed stone to freshen appearance.

SPRING

- ✦ Aerate all open areas, as needed.
- ✦ Control germination of maple seeds through timed pre emergent applications.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around trees; apply double-ground mulch at a depth of 2” to all trees.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Mow turf on a weekly or as needed basis.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around trees; apply double-ground mulch at a depth of 2” to all trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- ✦ Restrict Ostrich and Sensitive Fern populations to several clumps. Control spread of ferns by hand pulling and applications of organic or low toxicity herbicides.
- ✦ Encroaching meadow plants (mainly *Typha*, *Lythrum*, and *Sambucus*) should be removed as soon as they appear in beds. If low soil moisture conditions allow, mowing of area bordering the Meadow should be performed. Preferably using the Ventrac platform mower.
- ✦ Mow turf on a weekly or as needed basis.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all open areas (or in Spring).
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Encroaching meadow plants (mainly *Typha*, *Lythrum*, and *Sambucus*) should be removed as soon as they appear in beds. If low soil moisture conditions allow, mowing of area bordering the Meadow should be performed. Preferably using the Ventrac platform mower.
- ✦ Mow turf on a weekly or as needed basis.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary. Except for *Cercidiphyllum*.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Wild Garlic	<i>Allium vineale</i>	Glufosinate-ammonium	Early Summer through late Fall
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate labelled for wetland use, Hand pull	Spring

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

Continue to evaluate success of some recently planted shrub material; remove and replace with alternatives as needed.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune to rejuvenate shrubs.
- ✦ Prune trees and shrubs for dead, diseased, broken, and weak attachments.

Every 3 years, or as needed

- ✦ None.
- ✦ Prune to rejuvenate *Salix* in beds to maintain manageable size.

Additional Projects

- ✦ Ensure successful establishment of new shrub plantings. Follow-up to ensure replacement of unsuccessful plantings.

CAPITAL PROJECTS

- ✦ None.

NOTES

- ✦ Monitor and remove spontaneous Maple seedlings (*Acer rubrum* and *Acer saccharinum*).

1.4 The Meadow

Low Priority

Low Intensity



The Meadow. Eric Gehring.



The Meadow. Arnold Arboretum Archives.

AREA PROFILE

The Meadow is a key natural area providing contrast to the collections-based structure of the majority of the landscape. Placed to meet cultural requirements, collections of *Salix* and *Alnus* grow along the meadow's edge. Natives such as *Typha latifolia*, cattail and *Helianthus tuberosus*, Jerusalem artichoke have colonized the meadow; determining desired composition and providing appropriate vegetation management is an important goal.

SPECIAL PRIORITIES

Control of woody volunteers is obtained through annual mowing, typically when soils freeze. During consecutive warm winters, *Rubus* sp. and other invasives may gain a strong foothold. *Salix* and *Alnus* will benefit from increased care.

ARBORICULTURE

While the area of Zone 1.4 encompasses a large tract of land, the number of trees that populate this zone is relatively few. The majority of trees in this zone are mature *Salix* and *Alnus* species. Due to the fact that these trees are fast growing and soft-wooded, they are very prone to storm damage. Frequent inspection for storm breaks and clean-up will be required. Due to the high water table, access to this zone is typically limited to the outside perimeters during the growing season. In the winter, once the ground has frozen and the water turned to ice, the rest of the meadow should be accessible.

Annual Care Plan

ALL SEASONS

- ✦ Remove weeds and vines from *Alnus* and *Salix*.
- ✦ Eliminate volunteer woody plants.
- ✦ Prune dead wood from accessioned shrubs and trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Remove trash and debris from meadow along drainage ditches.
- ✦ Ensure culvert is kept free from debris, soil, roots and weeds to maintain integrity of the culvert.

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ Remove water plants (including *Nasturium officinale*–Watercress) from drainage ditches to allow water flow.

WINTER

- ✦ Mow as conditions allow, leaving portions of the meadow unmowed for bird nesting and rotating these areas from year to year.
- ✦ Remove debris and vegetation from water ways to maintain stream flow and storm water drainage.
- ✦ Relocate woody debris to roadside for chipper.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate labelled for wetland use, Hand pull	Spring
Stinging Nettle	<i>Urtica dioica</i>	Flame torch	Spring, Summer
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate labelled for wetland use	Spring, Summer, Fall
Purple Loosestrife	<i>Lythrum salicaria</i>	Hand pull, Glyphosate labelled for wetland use, Monitor for Loosestrife Eating Beetle (<i>Galerucella</i> spp.)	Late Summer
Watercress	<i>Nasturium officinale</i>	Glyphosate labelled for wetland use, Hand pull	All seasons
Oriental Bitter- sweet	<i>Celastrus orbiculatus</i>	Lance with Glyphosate, Hand pull	Spring, Summer, Fall
Multiple species	<i>Polygonaceae</i>	Hand pull, String trim	Summer, Fall
Multiflora Rose	<i>Rosa multiflora</i>	Lance with Glyphosate, Hand pull	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Imported Willow Leaf Beetle	<i>Plagioderia versicolora</i>	Spinosad	Spring, Summer, GDD:192–2200
Woolly Alder Aphid	<i>Paraprociophilus tessellatus</i>	Monitor	Summer

CURATION

Collections Development:

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune trees for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ Mow edge of meadow to maintain border and to keep cattails and cup plant from encroaching into Azalea Border.

Additional Projects

- ✦ *Salix* specimens need attention from arborists.
- ✦ Collections development goals needed for *Salix* and *Alnus*.
- ✦ Ensure that all artificial drainage ditches are kept clear of debris and sediment, to ensure proper flow of water.
- ✦ Soil and water remediation to improve and create opportunity to build on *Alnus* and *Salix* collections.
- ✦ Remove invasive *Lythrum salicaria* and other non-native vegetation.

CAPITAL PROJECTS

- ✦ Reduce trash and debris—Installation of a catch gate at entrance to Goldsmith Brook.
- ✦ Diversify meadow vegetation for increased bird habitat, nesting, feeding and observation.
- ✦ Study the idea of building a boardwalk with observation deck through the meadow.

NOTES

- ✦ Be conscious of native *Celastrus scandens* (American bittersweet) population.

1.5 Willow Path and the Arborway Wall Edge

High Priority
Moderate Intensity



Willow Path. Jennifer Leigh.



Staphylea holocarpa var *rosea*, Acc. 59-81A. Michael Dosmann.

AREA PROFILE

Willow Path is heavily traveled by commuters to Forest Hills station and by dog walkers and joggers. The path offers excellent views into the Meadow, that features northern terminus planting of *Metasequoia glyptostroboides* and *Petasites japonicus*.

SPECIAL PRIORITIES

Celastrus orbiculatus, *Urtica dioica*, *Rubus* sp. *Ranunculus ficaria* and *Cynanchum louiseae* have been chronic issues on both sides of the path. Eradication, particularly on the meadow-side, will require management program.

ARBORICULTURE

This long narrow tract of land along Willow Path has a diverse population of tree species, ranging from the large *Metasequoia*, *Taxodium*, *Acer* and *Magnolia* species, to the smaller *Amelanchier*, *Alnus* and *Salix* species. Because this zone is regarded as having a high-priority status, frequent visits are recommended to inspect the health and shape of the trees. Dead and diseased branches should be removed as needed and newer plantings of trees still in their juvenile years should receive annual treatments of structural/pruning. Again, special attention should be given to the *Amelanchier* collection as outbreaks of Fire Blight require more frequent visits for sanitation pruning.

Annual Care Plan

ALL SEASONS

- ✦ Eliminate unwanted path side vegetation as appropriate, using mower, string-trimmer or torch.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ None.

SUMMER

- ✦ None.
- ✦ Scout host trees for ALB.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove leaves from path.
- ✦ Mow/mulch leaves into turf alongside path.

WINTER

- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand-pull	Spring
Stinging Nettle	<i>Urtica dioica</i>	Glufosinate-ammonium, Flame torch	Spring, Summer
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Wild Garlic	<i>Allium vineale</i>	Glufosinate-ammonium	Early Summer through late Fall
Purple Loosestife	<i>Lythrum salicaria</i>	Hand pull, Glyphosate, Monitor for Loostrife-eating Beetle (<i>Galerucella</i> spp.)	Late Summer

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Woolly Alder Aphid	<i>Paraprociophilus tessellatus</i>	Monitor	Summer

CURATION

Collections Development: As part of on-going review of the *Acer* Collection, evaluate current holdings as well as areas for future planting (in this case, areas adjacent to the Arborway Wall).

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- Prune shrubs to rejuvenate.
- Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- None.
- Add rough chips to plantings along the path.

Additional Projects

- None.

CAPITAL PROJECTS

- Willow Path is highly uneven in some stretches, floods at Goldsmith Brook during heavy rain, and is subject to severe erosion in some areas. Capital improvements are needed to stabilize the path.
- In addition, the wall below the Arborway sidewalk, property of the City of Boston, is deteriorating in several locations. It needs to be rebuilt.
- The banks along Goldsmith Brook are eroding and need stabilizing.

NOTES

1.6 The *Acer* and *Salix* Collections

Moderate Priority

Low Intensity



Acer rubrum. Robert Mayer.



Acer griseum bark. Arnold Arboretum Archives.

AREA PROFILE

A report released in Fall 2010 by Botanic Gardens Conservation International ranked the Arnold Arboretum's *Acer* Collection as the most significant in the world for conservation purposes. Home to the majority of the Arnold's NAPCC *Acer* Collection, this area fits the classic Arboretum mold of well-spaced trees among low-management grasses and forbes. A few notable specimens occupy the shrub layer—*Staphylea holocarpa*, *Ilex collina*, and *Amelanchier* spp. A significant portion of the *Salix* Collection occupies the Northeast corner where this area meets the meadow.

SPECIAL PRIORITIES

- ✦ High quality care for *Acer* specimens is the number one priority.
- ✦ *Ilex collina* bed: A Center for Plant Conservation planting will require frequent weeding and pruning to maintain shrubs as individual specimens.
- ✦ *Verticillium* Wilt: Maintain vigor of the *Acer* collection through pruning, watering and mulching to prevent further progression of disease, particularly amongst the *Acer palmatum* grove.

ARBORICULTURE

High-quality care for the *Acer* specimens is the number one priority in Zone 1.6. The collection of maples is comprised of many mature trees that necessitate occasional visits to repair storm breaks and remove deadwood. However, the newer plantings and younger trees will require annual visits for structural/training pruning. The plantings of *Acer palmatum* demand frequent inspection and removal of branches infected with *Verticillium* Wilt. Certainly the *Acer* collection would benefit from certain cultural practices to stave off the threat of biotic and abiotic disorders such as *Verticillium* Wilt, attacks from winter moth, low soil pH, and compaction. Due to the 1.12.11 snow storm the Maple Collection sustained heavy damage. The Arborist team is scheduled to spend 2–3 weeks in May 2011 removing storm damaged limbs.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Aerate all grass areas (or in Fall).
- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings around bases of all young and specimen trees with double-ground mulch at a depth of 2".

SUMMER

- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all grass areas (or in Spring).
- ✦ Apply soil amendments, if needed.
- ✦ Mulch/Mow leaves.

WINTER

- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand pull	Spring
Stinging Nettle	<i>Urtica dioica</i>	Glufosinate-ammonium, Flame torch	Spring, Summer

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
<i>Verticillium</i> Wilt	<i>Verticillium dahliae</i>	Maintain vitality of <i>Acer</i> Collection through good cultural practices	All Seasons

CURATION

Collections Development:

As part of on-going review of the *Acer* Collection evaluate current holdings, as well as areas for future planting. Project removals that may occur in the next 1–5, 5–10, or 10+ year ranges. Focus in particular on the interface between 1.6 & the Rose Garden.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- Prune shrubs to rejuvenate.
- Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- Reduce traffic on the cart path through the *Acer* Collection. It carries deep tire ruts. Use only as a last resort and never when wet.
- Apply top-dressing of compost where soil is bare.

CAPITAL PROJECTS

- None.

NOTES

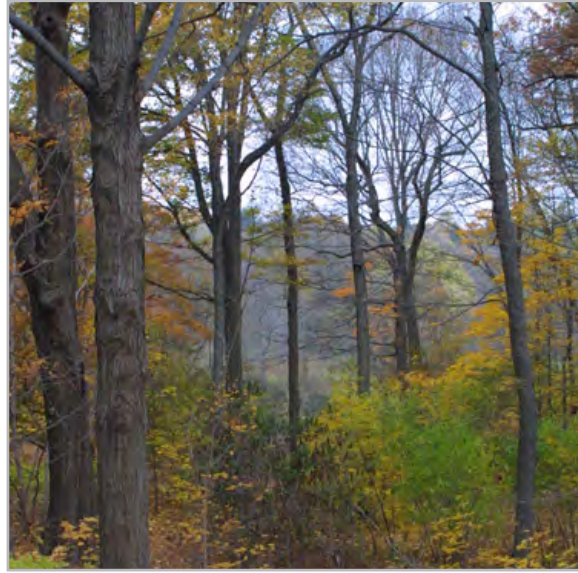
1.7 North Woods with Accessions

Moderate Priority

Low Intensity



North Woods. Michael Dosmann.



North Woods. Arnold Arboretum Archives.

AREA PROFILE

This area contains a few of the oldest spontaneous hardwoods on the property, some of which are entering decline and require care. The understory contains many valuable accessions, including *Acer*, *Cornus*, *Staphylea*, *Hydrangea* and *Hamamelis*. This area contains a few remaining specimens of *Rhododendron kaempferi* that Sargent collected in Japan.

SPECIAL PRIORITIES

Provide care for native hardwoods and specimens in understory beds. Eradicate garlic mustard, a major problem in this area.

ARBORICULTURE

This zone is densely populated with both canopy trees and understory trees and shrubs. The large *Quercus*, *Carya* and *Betula* are senescent and declining in their vigor. These conditions will require yearly visits to remove the continuous accumulation of deadwood. Due to the heavy planting of smaller trees and shrubs beneath the canopy of the older trees, much care must be used while pruning the larger trees to avoid damage below. One way to avoid harming the smaller plants is to utilize the bucket truck in this area. This method of pruning allows the arborists more freedom in lowering large, dead limbs without causing harm to the plants below. Due to the likelihood of compaction to the soil from the weight of the bucket truck, this means of pruning should take place during the winter months when the ground is frozen and reduce the likelihood to compaction.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Aerate all grass areas (or in Fall).
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around young and specimen trees; apply double-ground mulch at a depth of 2”.

SUMMER

- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all grass areas (or in Spring).
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from turf.
- ✦ Mow/Mulch leaves into shrub beds.

WINTER

- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Lily Leaf beetle	<i>Lilioceris lili</i>	Remove adults and larvae by hand; Neem	Spring, Summer

CURATION

Collections Development:

Continue to develop the collection as per BRC plan.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Reduce traffic on the cart path through the *Acer* collection. It carries deep tire ruts. Use only as a last resort and never when wet.

CAPITAL PROJECTS

- ✦ None

NOTES

1.8 Bradley Rosaceous Collection

High Priority
High Intensity



Bradley Rosaceous Collection. Jon Hetman.



Prunus flowers; Bradley Rosaceous Collection. Jon Hetman.

AREA PROFILE

The Bradley Rosaceous Collection (BRC) comprises a high priority as both a botanical collection and horticultural exhibit. The BRC is among the nation's finest collections of Rosaceous shrubs, attracting frequent visitation with its outstanding displays and broad lawns.

SPECIAL PRIORITIES

- ✦ Ongoing efforts to eradicate perennial weeds and separate taxa comprise a high priority.
- ✦ Weed-free beds, separation between taxa and high-quality turf are important goals for its maintenance.

ARBORICULTURE

Many of the trees and shrubs incorporated inside the zone of the Bradley Rosaceous Collection fall within the realm of care designated to the horticultural technologist in care of the Rose Garden. There are, however, several trees along the Arborway slope and others found in the planting beds that necessitates the care of the arborist crew. As in the past, these trees will receive an annual visit for any necessary structural pruning or any immediate care, as required. Fire Blight; a destructive bacterial disease, is present on several of the trees in the Rose Garden. Care must be taken to disinfect all pruning tools while removing any infected branches.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all display beds and mulched areas around trees.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Eliminate excessive shrub growth to maintain separation between taxa and desired dimensions of beds.

SPRING

- ✦ Aerate all grass areas (or in Fall).
- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Test irrigation system.
- ✦ Fertilize turf.
- ✦ Prune dead wood.
- ✦ Remove leaf litter from shrub beds.
- ✦ Prune and fertilize hybrid Roses.
- ✦ MAY: Completely weed all beds, secure assistance as necessary.

SUMMER

- ✦ Apply double ground mulch to shrub beds so as to provide uniform coverage at depth of 2".
- ✦ Create mulch rings around trees; apply double-ground mulch at a depth of 2".
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all grass areas (or in Spring).
- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Remove leaf litter from shrub beds and turf.
- ✦ Winterize irrigation system.

WINTER

- ✦ Prune trees and shrubs.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Broadleaf weeds (turf)		Triclopyr, Dicamba	Spring, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Aphids		Monitor for beneficial insects; Horticultural Oil, Potassium salts, Insecticidal soap	Summer
Black Knot	<i>Apiosporina morbosa</i>	Prune knots & an additional 4" behind swelling	When dry
Brown Rot	<i>Monilinia fruticola</i>	Prune and destroy infected plant parts; Potassium salts of phosphoric acid	Spring, Summer
Black Spot of Rose	<i>Diplcarpon rosea</i> and <i>Marssonina rosea</i>	Mancozeb	During wet season when tolerance threshold is reached

CURATION

Collections Development:

Continue to develop the collection as per the BRC plan.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ Revision of plantings, interpretation and circulation system.
- ✦ In collaboration with the Manager of Visitor Education, establish interpretive plantings and signage.

NOTES

1.9 The Three Ponds: Dawson, Faxon, Rehder

High Priority

High Priority



Dawson Pond. Arnold Arboretum Archives.



Faxon Pond. Arnold Arboretum Archives.

AREA PROFILE

The ponds provide aesthetic interest, dramatic siting for accessions, and drain the surrounding landscape. As the Arboretum's primary water feature, they require high priority focus to realize their potential. It is also one of the few areas where Sargent's original intention of lining roads with shrub beds of native plant material is still evident, with plantings of *Rosa carolina*, *Cornus racemosa* and *Hamamelis vernalis*.

SPECIAL PRIORITIES

- ✦ Center for Plant Conservation Plants: A mass planting of *Amelanchier nantucketensis* was relocated to Dawson Pond in 2009; this should be maintained as 32 individual specimens.
- ✦ Special attention should be given to collections-quality plant material planted around Dawson Pond in 2010.
- ✦ Closely monitor and prevent the establishment of two invasive weeds: *Trapa natans* (water chestnut) in Rehder Pond and *Phalaris arundinaceae* (reed canary grass) around Faxon Pond.

ARBORICULTURE

The perimeters surrounding the three ponds (i.e., the banks), have their share of large trees and shrubs whose care is the responsibility of the arborists. Due to the level of care assigned to this zone, these trees should receive weekly visual inspections and immediate corrective arboricultural services.

Annual Care Plan

ALL SEASONS

- ✦ Weed all pond edges of unwanted vegetation. (See Noxious Weeds section.)
- ✦ Clean debris and vegetation from all in-flow and out-flow water pipes to maintain stream flow and storm water drainage.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Monitor aquatic weeds in ponds and take appropriate action. (See Additional Projects section.)
- ✦ Prune and fertilize *Rosa* 'Bucbi' (Carefree Beauty™ Rose).

SUMMER

- ✦ Eradicate all *Lythrum salicaria* from pond edges.
- ✦ Eradicate *Cuscuta* sp. from all three ponds.
- ✦ Deadhead and fertilize *Rosa* 'Bucbi' (Carefree Beauty™ Rose) for extended and repeat bloom.

FALL

- ✦ None.

WINTER

- ✦ Cut back herbaceous plant material around ponds.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Dodder	<i>Cuscuta</i> sp.	Hand pull, bag and dispose, Flame Torch	At first sight
Water Chestnut	<i>Trapa natans</i>	Hand Pull	At first sight
Aquatic Weeds		Fluridone	Spring, Summer
Purple Loosestife	<i>Lythrum salicaria</i>	Hand pull, Glyphosate labelled for wetland use, Monitor for Loosestrife Eating Beetle (<i>Galerucella</i> spp.)	Late Summer
Reed Canary Grass	<i>Phalaris arundinacea</i>	Mow, Hand pull, Flame Torch, Glyphosate labelled for wetland use	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

Continue to review the holdings of these three areas and vet as needed to make way for new acquisitions of higher collections quality, that at the same time provide erosion control.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.
- ✦ Maintain individual accessioned plants as distinct plants; do not let them grow together.

Every 3 years, or as needed

- ✦ None.
- ✦ Maintain drainage pipes connecting the three ponds and Faxon Pond into the meadow to avoid flooding of the ponds.

Additional Projects

- ✦ Appropriately vegetate pond edge and shoreline landscape.
- ✦ Future management of aquatic vegetation will be determined through ponds restoration project, with particular focus on Dawson Pond.

CAPITAL PROJECTS

- ✦ Dredge ponds on a five-year rotation or as needed.
- ✦ Restore Rheder and Faxon Ponds using methods similar to the most recent renovation of Dawson Pond.

NOTES

1.10 Mass State Lab Slope & Forest Hills Gate Area Low Priority

High Intensity



Malus 'Barbara Ann', Acc. 94-96A. Jennifer Leigh.



Mass State Lab Slope. Jennifer Leigh.

AREA PROFILE

This slope buffers the neighboring State Lab property and contains a diversity of vegetation, including some quality accessions, cultivars and large numbers of volunteer wood plants.

SPECIAL PRIORITIES

Control of *Rubus* sp. and other invasives, containment of suckering shrubs, and maintaining separation between accessions are priorities for this area. It would also be desirable to open concealed areas at the top of slope near Forest Hills gate that are occasionally used for drinking and drugs.

ARBORICULTURE

The large number of Rosaceous trees will be provided with a planned pruning rotation, every 2–3 years. Due to their habit of pushing out many suckers or water sprouts after pruning, it is advisable to prune these trees late in the growing season or early winter. There are also many conifers at the top of the slope along the property line between the Arboretum and the State Lab. These mature trees, with their large sails, are subject to wind throw and storm damage. Periodic inspections and removal of storm breaks will be necessary to keep these trees safe and healthy. (These trees also suffered severe storm damage from the 1.12.11 snow storm and will require some time this June to clean and repair.)

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around young and specimen trees and apply double-ground mulch at depth of 2”.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Porcelain-berry	<i>Ampelopsis brevipedunculata</i>	Cut & spray resprouts w/ Triclopyr, Hand pull, Lance with Glyphosate	Spring, Summer, Fall
Buckthorn	<i>Frangula</i> spp.	Pull, Lance with Glyphosate if large	When temps are above 40° F
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F
Wild Grape	<i>Vitis</i> spp.	Triclopyr, Hand pull, Lance with Glyphosate	Spring, Summer, Fall
Cork Tree	<i>Phellodendron</i> spp.	Hand pull, Lance with Glyphosate	When temps are above 40° F
Nightshade	<i>Solanum dulcamara</i>	Glufosinate-ammonium, Hand pull	Spring, Summer
Castor Aralia	<i>Kalopanax pictus</i>	Hand pull, Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts; Potassium salts of phosphoric acid	When dry

CURATION

Collections Development: If and when needed, incorporate curatorial review of Rosaceous collection.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- Prune shrubs to rejuvenate.
- Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- Clear out large areas of rampant *Rubus* sp., unaccessioned *Forsythia* and other plant material that has taken over large areas of the slope. In areas where it is possible to mow, convert to turf, possibly including a meadow mix of fescues to reduce work load.

CAPITAL PROJECTS

- None.

NOTES

1.11 The Legumes, including Shrubs

Moderate Priority

Moderate Priority



Styphnolobium japonicum, Acc. 216-35A. Michael Dosmann.



Legumes. Arnold Arboretum Archives.

AREA PROFILE

This area is an important crossroad for the visitor experience. It contains the legume collection, is a gateway to the *Syringa* collection, and has a high concentration of centenarian plants, including important specimens of *Cladrastis*, *Styphnolobium* and *Gymnocladus*. It is also one of the few areas where Sargent's original intention of lining the roads with shrub beds of native plants is still evident, with a planting of *Xanthorhiza simplicissima*.

SPECIAL PRIORITIES

- **Wolcott Bed:** Bed originally established with gift money in memory of Mary E. Wolcott, an Arboretum volunteer, it contains a collection of *Rhododendron prunifolium*, a CPC plant and other flowering shrubs providing an extended season of interest. This bed should be free of weeds and leaves at most times.
- **Puddingstone steps area:** A frequently used path and shortcut eliminating the hairpin curve at the junction of Meadow Road and Bussey Hill Road, it has plantings nearby that should be kept free of weeds.
- **Xanthorhiza Bed:** Rehabilitation of this area began in the summer of 2008. Although the majority of the weed plants that caused maintenance problems have been eliminated, there is ongoing work to control lingering issues. *Cynanchum nigrum*, several species of *Rubus*, and various grasses are still problematic. Heavy suckering of the *Gymnocladus* requires constant pruning throughout growing season.

ARBORICULTURE

In the past, the trees found in Zone 1.11 were pruned on an as-needed basis. However, due to their status as moderate priority, the trees here warrant care of a more continuous manner. Even to the trained eye, locating deadwood in the *Gleditsia* collection during the dormant months is a difficult task. Because this zone is a gateway to the *Syringa* collection it is recommended that the trees in this zone be pruned for sanitation each spring. After an initial work through, annual visits to this zone should become less time consuming. Special attention should be given to several of the *Cladrastis* in this zone. Some of these trees are centenarian plants and are currently in dire need of mechanical support (i.e., cabling and screw-rods).

Annual Care Plan

ALL SEASONS

- Monitor newly planted accessions, investigate problems and take appropriate action.
- Remove or relocate woody debris to roadside for chipper.
- Chip brush.
- Remove weeds from all shrub beds and mulched areas around trees.
- Report needs for additional labels to Plant Records Dept. by filling out a Plant Care Request Form.

SPRING

- Aerate all grass areas (or in Fall).
- Apply soil amendments, if needed.
- Remove leaves from Wolcott bed and all other shrub beds.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- Rapid spread of *Ranunculus ficaria* population under the *Cladrastis* trees needs special attention in regards to control. Herbicide application during flowering is optimal for effectiveness.

SUMMER

- Apply or inject herbicide on *Rubus* sp. that is beginning to establish itself behind the Wolcott bed.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- Remove *Gymnocladus* root suckers from *Xanthorhiza simplicissima* planting.
- Remove any *Epimedium* blocking the memorial plaque.
- *Clerodendrum* and *Vitex* beds that line the puddingstone steps area are ideally suited for the use of low toxicity post emergent herbicides such as clove oil or fatty acids.
- Bussey Hill Road shrub beds to be weed free and mulched. *Ribes* beds in particular need repeated weeding to keep *Cynanchum* under control.
- *Clerodendrum* and *Viburnum* plantings should be pruned back from sidewalk to accommodate pedestrian passage.

FALL

- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Aerate all grass areas (or in Spring).
- Apply soil amendments, if needed. Remove leaves from Wolcott bed and all other shrub beds.

WINTER

- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Structure prune young trees, as needed. Secure assistance of arborist, if necessary.
- Prune trees and shrubs away from sidewalk.
- Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Horse Nettle	<i>Solanum carolinense</i>	Glyphosate, Triclopyr	Spring, Summer
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

Review shrub beds as part of on-going review of miscellaneous shrub beds in the arboretum, with the aim to remove those of poor collections quality and consolidate when possible to minimize maintenance. Successional planning is needed for several aging accessions in this area.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Complete rejuvenation and redesign of shrub beds along Bussey Hill Road, across from the *Syringa* collection.
 - Study bed layout.
 - Vet plants.
 - We seek to minimize the net increase in shrub bed area.

CAPITAL PROJECTS

- ✦ None.

NOTES

1.12 *Zelkova* and Area Below the Esker

Moderate Priority

Low Intensity



Zelkova sp. Peter Del Tredici.



Zelkova serrata bark. Robert Mayer.

AREA PROFILE

This area contains an exceptional grove of mature *Zelkova* grown from seed from first-generation trees at Hall Estate in Rhode Island and will receive a moderate level of horticultural maintenance with proximity to the Leventritt Garden and the *Syringa* Collection.

SPECIAL PRIORITIES

- ✦ **Off-road trails:** Used by mountain bikers and hikers, the trails should be mulched for erosion purposes and barriers created to prevent bikes from passing through.

ARBORICULTURE

In the summer of 2007 this zone was treated to a makeover. The *Zelkova* and other accessioned plants were pruned and mulched. These cultural practices were made in an effort to increase the vigor of the older trees, and improve their health. If successful then shorter annual visits to remove dead and diseased branches and structurally prune the younger trees will keep this zone uncluttered and well-kept.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and in mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Aerate all grass areas (or in Fall).
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around young and specimen trees and apply double-ground mulch at a depth of 2”.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around young and specimen trees and apply double-ground mulch at a depth of 2”.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all grass areas (or in Spring).
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- Evaluate areas of erosion and address them.
- Prune shrubs to rejuvenate.
- Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- None.

CAPITAL PROJECTS

- None.

NOTES

1.13 Leventritt Shrub and Vine Garden

High Priority

High Intensity



Clematis montana, Leventritt Garden. Jen Kettell.



Leventritt Garden. Tony Goncalves.

AREA PROFILE

This four-acre garden was opened to the public in 2002 and features a diverse array of over 600 sun-loving ornamental shrubs and trees planted in over 60 display beds, and 100 woody vines displayed on trellises and stone walls. This collection creates opportunities for teaching botany, ecology, conservation, horticulture and landscape design. The Leventritt Garden is among the most important landscapes at the Arnold Arboretum. This area will be maintained at the highest standard to represent the horticultural excellence of the Arboretum.

SPECIAL PRIORITIES

- ✦ **Vinedom:** Keep each accessioned vine contained on its trellis.
- ✦ **Shrub beds:** Beds should be kept free of weeds at all times and those shrubs identified as specimens should be pruned as such.
- ✦ **Center for Plant Conservation shrubs:** Plants will require frequent root pruning to maintain them as individual specimens.
- ✦ **Stone Dust Paths:** Paths should be kept weed-free at all times.

ARBORICULTURE

Currently, there are over three dozen trees in the Leventritt Garden that warrant the qualifications of the arborist crew. The majority of these trees are young, adolescent trees that will benefit from annual visits for structural purposes. This type of pruning practice will reduce the trees' potential to form structural defects and should help to minimize the amount of labor required to prune them as they mature.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all display beds and mulched areas around trees.
- ✦ Keep stone dust path clean from grass cuttings and other debris.
- ✦ Monitor path for wear and tear and erosion and rake if necessary.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Maintain clean edge along the stone dust path and edges of bed.
- ✦ Apply herbicide to stone dust paths and dry river bed to control weeds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Monitor turf; investigate problems and take appropriate actions.
- ✦ Check pavilion for trash; remove all debris and dispose of daily.
- ✦ Follow Leventritt Maintenance Guide for all plants within the garden.
- ✦ Ensure all hardscape features are string trimmed, including permanent and temporary signs and stonewalls.
- ✦ Keep riverbed clear of debris, leaves, sticks, and weeds to prevent soil buildup.
- ✦ Prune shrubs and trees (of not specimens) to keep grass pathways clear for pedestrian traffic.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.
- ✦ Evaluate shrub performance and placement in the garden.

SPRING

- ✦ Aerate grass areas (or in Fall), as needed.
- ✦ Apply soil amendments, if needed.
- ✦ Test irrigation system.
- ✦ Fertilize turf, if necessary.
- ✦ Remove leaf litter from garden.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2", as needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all trees, as needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Apply pre-emergent to formal beds and stone dust pathways.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2", as needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all trees, as needed.
- ✦ Prune vines to maintain a comfortable walkway through the path entering the pavilion and along the "Great Wall" so there is a 3' wide and 6' high clearance through the center.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- ✦ Apply pre-emergent to formal beds and stone dust pathways.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all grass areas (or in Spring) as needed.
- ✦ Apply soil amendments, if needed.
- ✦ Fertilize turf.
- ✦ Remove leaf litter from garden.
- ✦ Prune vines to maintain a comfortable walkway through the path entering the pavilion and along the "Great Wall" so there is a 3' wide and 6' high clearance through the center.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Winterize irrigation system.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Add stone dust to path where needed.
- ✦ Coppice selected shrubs (*Salix*, *Cornus*).
- ✦ Scout for rabbit damage, treat where necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Broadleaf weeds (turf)		Triclopyr, Dicamba	Spring, Fall
Yellow Nutsedge	<i>Cyperus esculentus</i>	Halosulfuron	Summer
Ground Ivy	<i>Glechoma hederacea</i>	Triclopyr, Glyphosate, Hand pull	After it flowers or mid-Sept to mid-Oct.
Wild Garlic	<i>Allium vineale</i>	Glufosinate-ammonium	Early Summer through late Fall
Spiderwort	<i>Tradescantia</i> spp.	Hand pull	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Southern Red Mite	<i>Oligonychus ilicis</i>	Horticultural Oil, Potassium salts, Insecticidal soap	246–363, 618–802 GDD
Lacebugs	<i>Stephanitis</i> spp.	Horticultural Oil, Potassium salts, Insecticidal soap	448–2300 GDD; Spring to Early Fall
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall

CURATION

Collections Development: Continue to evaluate current holdings for their suitability in this high-priority area, with removal to be considered for those that do not meet the standard (e.g., poor aesthetic performance of those included purely as ornamentals, lack of documentation of those included for their botanical value, etc.). Create desiderata for acquisitions that prioritizes documentation and source (for both wild and cultivated material). Eliminate some individuals in mass plantings to improve maintenance and performance of neighboring shrubs. Identify locations for future plantings along the perimeter as well as potential bed enlargement/consolidation within the garden proper.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate as per Levintritt maintenance schedule.
- ✦ Oversee cleaning and sealing and replacement of blue stone steps. (Last done in 2010.)
- ✦ Monitor stone walls for loose pieces.

Every 4 years, or as needed

- ✦ Refinish woodwork at the pavilion.
- ✦ Paint wooden fence along Centre Street.

Additional Projects

- ✦ Address erosion issue at the bank between the Dana Greenhouses and *Zelkova* Path.
- ✦ Assess Centre Street slope and plantings, possibly use a low-grow fescue.
- ✦ In collaboration with the Manager of Visitor Education, the Horticulture Department will continue to select and grow taxa of high interpretive value.
- ✦ Address entrance to garden vis Bussey Road, reposition edging and lay cobble stones at entrance.
- ✦ Address erosion issue at North point of garden (path from Centre Street down into Levintritt garden).
- ✦ Rejuvenate turf to manage major weed issues and bare and compacted soils.
- ✦ Renovate turf strip adjacent to Bussey Hill Road between sidewalk.
- ✦ Monitor Levintritt garden edge neighboring condominium property for shading of collections materials.

CAPITAL PROJECTS

- ✦ Complete study of all bluestone steps:
 - Study drainage and leaching at main steps.
 - Redesign handrails at all of the steps.
- ✦ Study enhancement of wood perimeter fence/sound barrier along Centre Street for safety and aesthetics.
- ✦ Signage and interpretation.
- ✦ Stone dust path—Address drainage issues and possibly alternative medium.

NOTES

1.14 Linden Path

Moderate Priority
Moderate Intensity



Linden Path, Richard Schulhof.



Linden Path, Jill K. Conley

AREA PROFILE

A highly visible and frequented path linking Meadow Road to the Leventritt Garden by a winding route beneath the *Tilia* and through under story shrubs predominantly housing the *Lonicera* (Honeysuckle) Collection along the Arboretum's property line. Linden Path and its adjacent plantings will be maintained at the highest standard to represent the horticultural excellence of the Arboretum.

SPECIAL PRIORITIES

- ✦ **Stone dust path:** This path requires frequent monitoring and maintenance to be kept clear of grass cuttings and other organic debris and to address erosion.
- ✦ **Shrub beds:** The beds should be free of weeds.
- ✦ **Property Edge:** Bolster plantings to hide rusted and damaged chain link fence at property line.

ARBORICULTURE

Between Linden Path and the chain link fence that marks the Arboretum's property line, there is a small assortment of tree species. The *Cornus*, *Nyssa*, *Carya* and *Quercus* that make up this group are mostly mature trees that should require an annual visit to provide any necessary maintenance, and all younger trees in this zone should be structurally pruned at this time as well.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Keep stone dust path clean from grass cuttings and other debris.
- ✦ Monitor path for wear and tear, upheaving and erosion; rake if necessary.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Maintain clean edge along the path.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Ensure all hardscape features are string trimmed regularly to maintain a high standard.
- ✦ Prune plants along Linden path as needed for pedestrian traffic.

SPRING

- ✦ Aerate grass areas (or in Fall) as needed.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2", as needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees., as needed.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2", as needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees, as needed.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds, and mulch back into beds.
- ✦ Fill in ruts and seed.

WINTER

- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Monitor for rodent damage; spray where necessary.
- ✦ Add stone dust to path where needed.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Poison Ivy	<i>Toxicodendron radicans</i>	Triclopyr, Lance with Glyphosate (clean any surface of lance that comes in contact with plant)	Spring, Summer
Honeysuckle spp.	<i>Lonicera</i> spp.	Hand pull, Weed wrench, Lance with Glyphosate	Spring, Summer, Fall
Common Burdock	<i>Arctium minus</i>	Triclopyr, Inject with Glyphosate, Mow	Spring, Summer, Fall
Pokeweed	<i>Phytolacca americana</i>	Hand dig, Weed wrench	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall

CURATION

Collections Development: Plants from Peters Hill still need to be relocated to this area. Plantings need to be added in order to hide the rusty condominium fence. Continue to develop new Theaceae collection in this area.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Relocate *Lonicera* from Peters Hill to their proper place in sequence along Linden Path as identified in P.H. Curatorial Shrub review.
- ✦ Linden path/ Old Bridal Path / Meadow Road triangle—continue to eliminate weeds and build soil for future *Stewartia* plantings.
- ✦ Renovate turf (where needed) to maintain high standards—both within the zone and within the strip between the sidewalk along Meadow Road.
- ✦ Benches - renovate area and set benches within a cobblestone base.
- ✦ This area may be a candidate for bulb planting in the future.

CAPITAL PROJECTS

- ✦ Evaluate property edge:
 - Evaluate and review plants.
 - Study screen plantings.
 - Develop a plan for mitigating the derelict chain link fence.

NOTES

1.15 *Leitneria* Bowl to Bamboo

Moderate Priority

High Intensity



Leitneria Bowl. Richard Schulhof.



Rhododendron vaseyi. Richard Schulhof.

AREA PROFILE

Leitneria provides an interesting example of vestigial hardiness, with *Hamamelis* cvs. offering early season interest in close proximity. Outstanding plantings of *Aesculus parviflora* var. *serotina*, *Rhododendron vaseyi*, and *Acer tegmentosum* are other collections highlights. Incursions of *Rubus* sp. obstruct access to accessions on some esker slopes. The tree and shrub plantings along Meadow Road are highly visible year round and should reflect a moderate level of horticultural maintenance at the Arboretum.

SPECIAL PRIORITIES

- ***Rhododendron vaseyi* bed:** Requires frequent weeding to control establishment of *Alliaria petiolata*, *Fallopia japonica* and *Koelreuteria*.
- ***Hamamelis* collection:** Requires special attention to control the spread of *Rubus* sp.

ARBORICULTURE

With the exception of the *Koelreuteria* collection, Zone 1.15 is a mix of tree species made up of the fringe areas of other collections and the North Woods area. *Acer*, *Aesculus*, *Betula*, *Cornus*, *Magnolia*, *Nyssa*, *Ostrya*, *Oxydendron* and *Quercus* are found throughout this zone. Many of these trees will be provided with structural pruning in the near future. There are many large trees, accessioned and non-accessioned alike, growing along the western border of this zone. These trees mark the edge of the North Woods and grow over an occasionally used foot path. This row of trees will be inspected periodically and any potentially hazardous conditions removed.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Aerate all grass areas (or in Fall).
- ✦ Apply soil amendments, if needed.
- ✦ Eradicate any stray bamboo and prevent it from establishing itself on the esker.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Remove debris from swale and drainage pipe opening.
- ✦ Trench *Leitneria* swamp with mini excavator.
- ✦ Remove leaf litter and brush.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Remove debris from swale and drainage pipe opening.
- ✦

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Clear waterway of debris and overgrowth to maintain stream flow and storm water drainage.
- ✦ Eradicate any stray bamboo and prevent it from establishing itself on the esker.
- ✦ Prune *Rhododendron vaseyi* to maintain sidewalk access along Meadow Road.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Lesser celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand pull	Spring
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall

CURATION

Collections Development:

As part of institutional review of bamboo holdings, determine appropriate holdings and siting of bamboo taxa in this area. As a primary location for *Hamamelis* cv. display (across road as well) assess value and development. A complete curatorial review needs to be done on the *Leitneria* swamp area.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ In order to contain bamboo collections, maintain designated clump parameters with mower as needed. This will keep each of the species from growing into each other and/or spreading into unwanted areas.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ None.

NOTES

1.16 *Aesculus*, *Tilia*, *Phellodendron* and *Cornus*

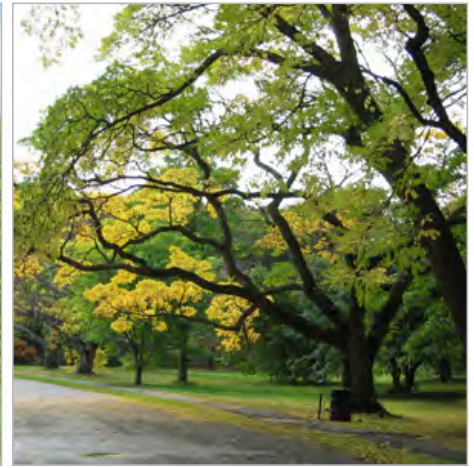
Moderate Priority
Moderate Intensity



Tilia. Richard Schulhof.



Aesculus. Sylvia Winter.



Phellodendron, adjacent to Meadow Road.
Arnold Arboretum Archives.

AREA PROFILE

Offering classically arranged generic collections; this area is an important interpretive destination and one of Meadow Road's most important scenic assets. The area's close proximity to the Hunnewell Building and the main entrance to the Arboretum brings heavy visitor traffic, as does the newly created Linden Path.

SPECIAL PRIORITIES

- **Open lawn areas:** Frequently used by the visitor for relaxation or for casual recreation, the open lawn areas should be mowed frequently to maintain a height at no more than 3.5" (See Mowing Operations, Appendix A).

ARBORICULTURE

Zone 1.16 accounts for over 175 trees. While the idea of using a two or three year pruning rotation to care for these trees seems like a good one, it is just not feasible because shortly after a branch dies in a *Tilia* or *Phellodendron*, the bark begins to shed in long strips or plates from the woody part of the branch. Two or three years of accumulating dead branches in these trees would create a rather large blemish. Due to their high visibility, the condition of these trees is kept at a high standard, which often requires multiple visits per year.

Annual Care Plan

ALL SEASONS

- Monitor newly planted accessions, investigate problems and take appropriate action.
- Remove or relocate woody debris to roadside for chipper.
- Chip brush.
- Remove weeds from all shrub beds and mulched areas around trees.
- Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- Apply soil amendments, if needed.
- Remove leaf litter from shrub beds.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- Remove leaf litter from shrub beds.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Apply soil amendments, if needed.

WINTER

- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- Structure prune young trees, as needed. Secure assistance of arborist, if necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Honeysuckle spp.	<i>Lonicera</i> spp.	Hand pull, Weed wrench, Lance with Glyphosate	Spring, Summer, Fall
Multiflora Rose	<i>Rosa multiflora</i>	Lance with Glyphosate, Hand pull	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development: Successional planning for age diversity and replacement.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None

Every 3 years, or as needed

- Prune shrubs to rejuvenate.
- Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- None.

CAPITAL PROJECTS

NOTES

1.17 North Woods

Low Priority
Moderate Intensity



North Woods, Sheila Connor.



North Woods, Arnold Arboretum Archives.

AREA PROFILE

North Woods is one of three native woodland areas set aside for preservation in Sargent and Olmsted's plan for the Arboretum. It contains *Acer saccharum*, *Quercus rubra* and *Betula lenta*—some of the oldest and largest native hardwoods on the property. *Rubus* sp. and volunteer *Kalopanax* and *Frangula* are a problem in several areas.

SPECIAL PRIORITIES

Eliminate exotics. Monitor seedling recruitment among native species.

ARBORICULTURE

Two major maintenance requirements of the North Woods are keeping the foot paths safe and removing invasive species. Once a year, and following any major wind, snow, or ice storm, an inspection of the trees is made and any potentially hazardous conditions remedied. A survey of invasive tree species should be conducted with a plan to eradicate this area of such trees. Currently there are many *Phellodendron*, *Kalopanax*, and *Acer platanoides* found throughout this zone. The issue of erosion also needs to be addressed here as much of the organic layer of soil is being washed down the hillsides.

Annual Care Plan

ALL SEASONS

- + Remove volunteer exotics.

SPRING

- + None.

SUMMER

- + None.

FALL

- + None.

WINTER

- + Thin large clusters of native woods plants to promote proper forest management.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Buckthorn	<i>Frangula</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F
Cork Tree	<i>Phellodendron</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer
Bronze Birch Borer	<i>Agrilus anxius</i>	Imidacloprid, Do not prune in summer	440–2000 GDD

CURATION

Collections Development: None.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- + None.

Every 3 years, or as needed

- + None.

Additional Projects

- + Erosion on the esker path needs monitoring and some reconstruction may be required. Leave large woody debris as wildlife habitat.
- + Larger initial effort will be required to contain *Rubus* sp. and exotics.
- + Monitor and aid seedling regeneration of *Acer saccharum*, *Quercus rubra* and *Betula lenta* in canopy gaps.
- + Continue monitoring seedling recruitment of desired native hardwoods. Supplement with accession plantings as unfilled canopy gaps appear.

CAPITAL PROJECTS

- + None.

NOTES

1.18 Dana Greenhouse, Nurseries and Bonsai

High Priority
High Intensity



Bonsai House, Sylvia Winter.



Bonsai House, Jim Harrison.

AREA PROFILE

This four-acre site is the main propagation and nursery growing area for the Living Collections of the Arnold Arboretum (AA). Within this area is held the Larz Anderson Bonsai Collection, one of the main destinations at the AA. There are also a number of display beds around the Dana Greenhouse (DGH) as well as a lawn area adjacent to the Bonsai House. The Bonsai House can be reached through a connector path from the Leventritt Garden, from the Centre Street gate entrance to the DGH as well as from the grounds entrance gate to the DGH. The care and presentation of this area should maintain a high standard reflecting its importance to the overall image of the AA. This area includes the 1090 parcel which is under Harvard's ownership and is not part of the City lease agreement.

SPECIAL PRIORITIES

Keep the paths, roads, and fence line free of litter blown in from Centre Street on a daily basis. Weed control of the beds, cracks in the road and gates are important. Keep the turf cared for by routine mowing, watering and fertilizing as necessary. Provide a safe environment for guests staying above the DGH. **1090 Centre Street:** This parcel will require frequent mowing and attention to keep the vines and shrubs in check.

ARBORICULTURE

A large part of the landscaping surrounding the Dana Greenhouse consists of various conifer and deciduous cultivar species. These trees are the perfect example of putting the right plant in the right place. Because they have all of the proper requirements for growing, they demand little maintenance beyond periodic inspections for, and the removal of, occasional storm breaks. On average the dogwood and maple trees by the southeast corner of the greenhouse building need to be pruned back from the roadway about twice a year.

Annual Care Plan

ALL SEASONS

- ✦ Keep area free of plant debris. Remove or relocate woody debris for chipping.
- ✦ Remove weeds from display beds and mulch. Also keep pavement cracks, edges and around gates weed free.
- ✦ Maintain clean edge to turf along paths and road surfaces to the Bonsai House.
- ✦ Provide supplemental irrigation, as needed, to all plantings.
- ✦ Apply herbicide around gates, pavement areas, edges as needed.
- ✦ Eliminate any reachable dead wood from trees and shrubs.
- ✦ Keep fence areas free of woody and herbaceous weed vines.

SPRING

- ✦ Cut back herbaceous material as needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Apply mulch to shrub beds to provide a uniform coverage at a depth of 2".
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

SUMMER

- ✦ Apply mulch to shrub beds to provide a uniform coverage at a depth of 2".
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Cut back herbaceous material as needed.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Keep front entrances and gates free of ice and snow.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall

CURATION

Collections Development: None.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ Redesign of the Bonsai house to improve security and visitor interaction with the plants.

NOTES

1.19 Main Gate (Hunnewell Building) & Forest Hills Gate

High Priority

Moderate Intensity



Main Gate. Jill K. Conley



Forest Hills Gate. Arnold Arboretum Archives.

AREA PROFILE

Since the gates welcome all visitors to the grounds, they are to be kept in pristine condition as this presentation sets the tone for what will be experienced within the Arboretum. The Hunnewell and Forest Hills Gates are the primary pathways of entry into the Arboretum for both visitors and commuters; a high priority of care should regularly be given to maintain these gates at the highest standard.

SPECIAL PRIORITIES

- ✦ These gates should be kept free of all litter, debris and leaves.
- ✦ All weeds and unwanted vegetation should be controlled.
- ✦ Accessioned plant material should be mulched and maintained at the highest standard.

ARBORICULTURE

Due to the high traffic experienced at the Main Gate, any *Magnolias* which overhang the Arborway sidewalk at the entrance should be pruned to maintain clear access for pedestrians and bicyclists.

Annual Care Plan

ALL SEASONS

- ✦ Keep gates free of trash, debris and weeds at all times.
- ✦ Keep gate area free of unauthorized advertisements and solicitations.

SPRING

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

SUMMER

- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

FALL

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

WINTER

- ✦ Keep pedestrian walkways and entire crosswalk clear of ice and snow.
- ✦ Ensure entire entrance is kept clear of snow and ice for all delivery and vehicular traffic (including emergency vehicles).

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

None.

Field Checks:

LONG-TERM PROJECTS/TASKS

- None.

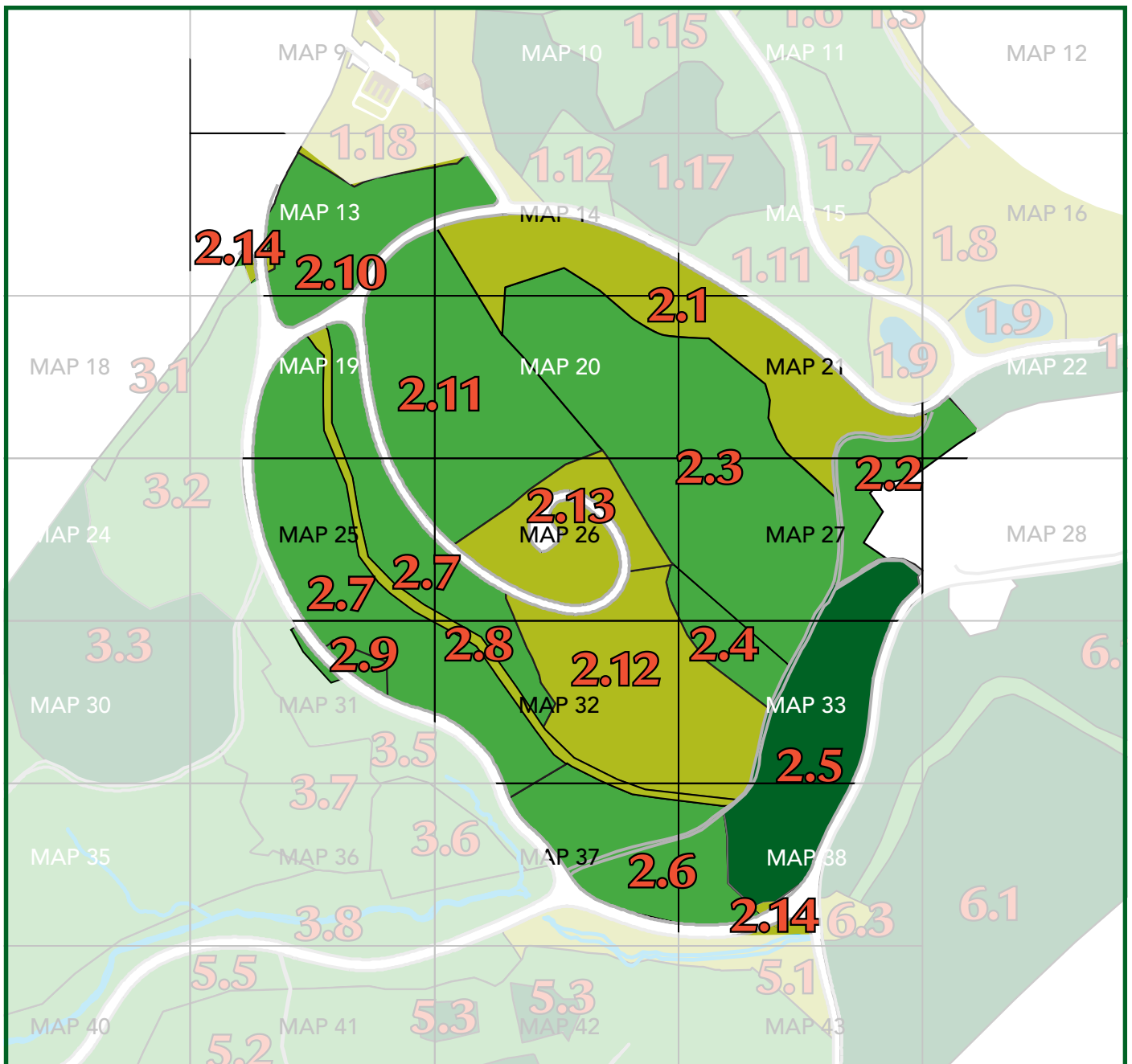
CAPITAL PROJECTS

- Address drainage issue at Main Gate.

NOTES

- The Gates should be painted regularly to maintain their integrity and high standard.

REGION 2 MAP



Region 2—Bussey Hill

	<u>Zone</u>	<u>Priority</u>	<u>Intensity</u>
2.1	<i>Syringa</i> Collection	High	High
2.2	<i>Forsythia</i> Bank and Accessioned Shrubs	Moderate	Moderate
2.3	Legume Beds & <i>Catalpa, Ulmus, Morus, Fraxinus</i> & <i>Celtis</i>	Moderate	High
2.4	Historic Bussey Mansion Area	Moderate	Low
2.5	South Street Bank, Upper Slope & Beech Path	Low	High
2.6	<i>Fagus</i> Collection	Moderate	Moderate
2.7	<i>Quercus</i> Collection and Understory	Moderate	Moderate
2.8	Oak Path Corridor	High	Moderate
2.9	The Rockery	Moderate	High
2.10	The <i>Viburnum</i> Collection	Moderate	Moderate
2.11	<i>Betula, Euonymus</i> and <i>Prunus</i> Collections	Moderate	Low
2.12	Explorers Garden	High	High
2.13	Bussey Hill Summit	High	High
2.14	Linden Path	High	Moderate

2.1 *Syringa* Collection

High Priority
High Intensity



Syringa vulgaris 'Edmond Boissier'. Robert Mayer.



Syringa reticulata. Robert Mayer.

AREA PROFILE

This NAPCC collection represents one of the largest and most diverse *Syringa* collections in North America. It is also one of the Arboretum's most visible spring landscape and merits our highest standards of care and presentation.

SPECIAL PRIORITIES

- ✦ This area is plagued with vines; they should be removed as soon as they appear.
- ✦ **Phyto-plasma:** Monitor for symptoms of disease, maintain vigor of collection to reduce spread.
- ✦ Eradication of ground ivy in turf on high-traffic areas is an absolute must.

ARBORICULTURE

Each spring, an average of two weeks is required to assist the Horticultural Technologist move through the *Syringa* collection in order to present them at their best for visual display on Lilac Sunday. Due to a high risk of spreading vascular diseases from plant to plant, great care must be taken in order to sterilize the pruning tools before each plant is pruned.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all beds and mulched areas around trees.
- ✦ String trim around sign bases, retaining wall, irrigation boxes.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Prune dead wood. Disinfect all pruning tools with Green Shield between specimens.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Aerate all grass areas, as needed.
- ✦ Apply soil amendments, as needed.
- ✦ Test irrigation system.
- ✦ Remove leaf litter from all beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to all trees.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Dead head fruiting lilacs, finish by mid-July. Use ethyl alcohol to sanitize pruning shears in between plantings (Late May).

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to all trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from all beds and around base of trees.
- ✦ Aerate all grass areas, as needed.
- ✦ Apply soil amendments, as needed.
- ✦ Remove leaf litter from all beds.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Winterize irrigation system.
- ✦ Dead head remainder of lilacs.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at depth of 2” to all trees.

WINTER

- ✦ Assemble and install snow fences and signs in all sled-prone areas (November).
- ✦ Remove all spontaneous woody weeds from all beds and around base of trees.
- ✦ Perform rejuvenation pruning.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Bur Cucumber	<i>Sicyos angulatus</i>	Hand pull before flowering	Spring, Summer
Nightshade	<i>Solanum dulcamara</i>	Glufosinate-ammonium, Hand pull	Spring, Summer
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Yellow Nutsedge	<i>Cyperus esculentus</i>	Halosulfuron, Glufosinate-ammonium	Summer
Ground Ivy	<i>Glechoma hederacea</i>	Triclopyr, Glyphosate, Borax and slice seed, Hand pull	After it flowers or mid-Sept to mid-Oct.
Oriental Bitter-sweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Lilac Borer	<i>Podosesia syringae</i>	Prune out infested stems	148–299 GDD
Phytoplasma		Good cultural practices	Summer

CURATION

Collections Development:

Continue to review the collection with an eye towards:

- 1) performance of individual plants in the face of biotic/abiotic pressures
- 2) identification of unique accessions and/or taxa with particular merit
- 3) addition of new material of high collections value

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Investigate a low-grow grass to reduce mowing.

CAPITAL PROJECTS

- ✦ Expand the existing irrigation to include the area along the slope-side of the sidewalk.

NOTES

2.2 *Forsythia* Bank and Accessioned Shrubs

Moderate Priority

Moderate Intensity



Forsythia mandshurica, Acc. 93-68B. Michael Dosmann.

AREA PROFILE

The recent past has proven that this area can be difficult to maintain as one large mass. Historically, *Forsythia* is expected to be grown here. A balance must be struck between proper management and aesthetics of this collection. Conversion of non-collections material to turf, with greater focus on accessions care will greatly improve this area. Also in this area are high-priority CPC plants (*Spiraea virginiana*).

SPECIAL PRIORITIES

- ✦ This area is prone to erosion. Constant monitoring required.
- ✦ *Rubus* sp. is known to thrive here. Treat all *Rubus* sp. with a chemical herbicide.

ARBORICULTURE

Though packed with copious amounts of various species of shrubs, Zone 2.2 has relatively few trees. Be that as it may, several of the trees found in Zone 2.2 are centurion and warrant special attention. Currently most of these trees are in good condition and with periodic inspections and maintenance their health should remain so. All newer plantings of young trees will also receive annual visits with the intention to prescribe any necessary training/pruning cuts. There is a grove of non-accessioned beech trees at the western end of this zone that will also require frequent visits to maintain their level of wellness.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Aerate all grass areas, as needed.
- ✦ Apply soil amendments, as needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, as needed.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Monitor and spray shrubs for rodent damage.
- ✦ Add stone dust to path where needed.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Bur Cucumber	<i>Sicyos angulatus</i>	Hand pull before flowering	Spring, Summer
Cork Tree	<i>Phellodendron</i> spp.	Hand pull, Lance with Glyphosate	When temps are above 40° F
Common Burdock	<i>Arctium minus</i>	Triclopyr, Inject with Glyphosate, Mow	Spring, Summer, Fall
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development: Continue to develop planting area to house high-value *Forsythia* as well as Hydrangeaceae, namely *Deutzia* and *Philadelphus* near Sargent Oak and above F. 'Meadowlark' mass. Also, reinstate mixed evergreen screen along the State Lab Perimeter.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.
- ✦ Maintain CPC plants (*Spiraea virginiana*).

Additional Projects

- ✦ Bank restoration, *Rubus* eradication, turf establishment. (Began in 2007.)
- ✦ Plant a screen along the property edge at the State Lab fence.
- ✦ Keep adding to the screen along the property edge at the State Lab Fence.
- ✦ Turf establishment under *Tilia* on the right of State Lab.
- ✦ Keep up on weed removal on bank.

CAPITAL PROJECTS

- ✦ None.

NOTES

2.3 Legume Beds & *Catalpa*, *Ulmus*, *Morus*, *Fraxinus* & *Celtis* Moderate Priority

High Intensity



Catalpa bignonioides 'Aurea', Acc. 174-40. Michael Dosmann.

AREA PROFILE

With the renovation of *Forsythia* bank, this area will become much more visible and, it is anticipated, more heavily visited. Renovated only a few years ago, these legume beds need to retain the look of care that they have been recently enjoying.

The *Fraxinus*, *Ulmus*, *Catalpa*, and *Morus* are located in this area. They too, have been receiving recent care.

SPECIAL PRIORITIES

None.

ARBORICULTURE

The two dominant collections in this zone are the *Fraxinus* and *Ulmus* collections. Both of these collections are represented by a wide range of age classes. The overall health of the *Fraxinus* and *Ulmus* collections are fair to good, with the exception of some of the older trees that are showing signs of stress and decline. Due to their brittle nature, the *Catalpa* and *Paulownia* collections should be inspected after any strong wind, snow or ice storm for potential damage. When the LMP was put into effect and the arboricultural aspects written, the plan was to put the collections in this zone on a three year pruning rotation. Since the initiation of the LMP, the arborist crew has swept through these collections twice. However; due to the size, number, and health of the trees in this large zone it seems at this time a three year rotation is not feasible. The arborist crew will continue to visit these collections yearly until we feel we can allow for longer time between visits.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Aerate all grass areas (or in Fall).
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge beds and apply double-ground mulch so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- ✦ Edge beds and apply double-ground mulch so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Aerate all grass areas (or in Spring).
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Monitor and spray Liquid Fence to prevent rabbit damage.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Oriental Bitter-sweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Poison Ivy	<i>Toxicodendron radicans</i>	Triclopyr, Lance with Glyphosate (clean any surface of lance that comes in contact with plant)	Spring, Summer
Nightshade	<i>Solanum dulcamara</i>	Glufosinate-ammonium, Hand pull	Spring, Summer
Pokeweed	<i>Phytolacca americana</i>	Hand dig, Weed wrench	Spring, Summer, Fall
Wild Grape	<i>Vitis</i> spp.	Triclopyr, Hand pull, Lance with Glyphosate	Spring, Summer, Fall
Docks	<i>Rumex</i> spp.	Triclopyr, Glufosinate-ammonium, Glyphosate	Spring, Summer, Fall
Castor Aralia	<i>Kalopanax pictus</i>	Hand pull, Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Emerald Ash Borer	<i>Agrilus planipennis</i>	imidacloprid	Spring

CURATION

Collections Development:

Evaluate and vet legume shrub plantings.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- Prune shrubs to rejuvenate.
- Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- Spread compost under *Catalpas*.
- Air Spade and spread compost under *Fagus*.
- Be on lookout for EAB in the *Fraxinus*. Establish an EAB Management Plan.

2.4 Historic Bussey Mansion Area

Moderate Priority

Low Intensity



Fagus sylvatica. John DelRosso.

AREA PROFILE

A nice open area along Beech Path. It needs to be maintained as such. Located in this area are the remains of a former outbuilding once belonging to the Bussey Mansion that was demolished in 1940, a mill stone covering an old well and two round granite markers located at the entrance to the former drive to the Bussey Mansion. Some 4.7 acres in this area are owned by Harvard.

SPECIAL PRIORITIES

American beech grove: Remove *Rubus* sp. and other invasive weeds.

ARBORICULTURE

In Zone 2.4 there is a small compilation of venerable trees. Currently, these trees are in fair to good condition. In an effort to preserve the health of these trees mulch rings have been added to some of them. Pruning for sanitation will also be a concerted effort we will undertake in order to lessen the trees vulnerability to decline and beech bark disease and will be conducted with biannual inspections and removal of dead and diseased branches. Also found in Zone 2.4 is a small grove of *Fagus grandifolia*. Due to its location and growth habit, this band of trees is protected from many of the abiotic disorders such as compaction, drought, and competition from turf grasses that are often the causes of stress and decline to the accessioned trees. Periodic inspections, especially after heavy wind, snow, and ice storms, should be performed to remedy the trees of any storm breaks.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove invasive weeds.
- ✦ String trim around foundation and protruding granite posts.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Limit encroachment of *Forsythia*, *Lonicera*, *Henlwingia*, and *Diervilla*.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Stinging Nettle	<i>Urtica dioica</i>	Glufosinate-ammonium, Flame torch	Spring, Summer

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

None.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- + None.

Every 3 years, or as needed

- + Rejuvenate prune shrubs.
- + Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- + Protocols for management of Bussey carriage house foundation are needed as part of the CRMP.

CAPITAL PROJECTS

- + None.

NOTES

2.5 South St. Bank, Upper Slope & Beech Path

Low Priority
High Intensity



South St. Bank. Jennifer Leigh.



South St. Bank. Jennifer Leigh.

AREA PROFILE

- ✦ **South Street bank/Upper slope:** Stabilize, yet keep free of weed trees and invasives.
- ✦ **Beech Path:** Create a pleasant experience for visitors while retaining an important maintenance road.

SPECIAL PRIORITIES

- ✦ Removal of large weed trees and invasives on slope.
- ✦ Maintain view into the Arboretum from South Street.

ARBORICULTURE

This large swath of land strongly resembles naturalized woodland. Much of this zone is filled with mass plantings of *Picea*, *Pinus*, and *Tsuga*, with numerous mass under-story plantings of *Kalmia latifolia* and *Rhododendron kaempferi*. Over time, large amounts of deadwood, storm breaks, invasive trees, vines, and dead plants have accumulated. Reclaiming this zone requires a significant push from a team of Horticultural Technologists and Arborists combined, or in small increments, over what may turn out to be a long period of time, with multiple visits from the zone manager. The majority of *Tsuga* planted in Zone 2.5 were previously non-accessioned. Now accessioned, these trees will continue to be treated with soil injections of Imidacloprid, to control Hemlock Woolly Adelgid.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove invasive weeds.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, as needed.
Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Drag and rake Beech Path.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

FALL

- ✦ Remove all spontaneous woody weeds from shrubs and around base of trees.
- ✦ Apply soil amendments, as needed.

WINTER

- ✦ Remove all spontaneous woody weeds from shrubs and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Buckthorn	<i>Frangula</i> sp.	Pull, Lance with Glyphosate if large	When temps are above 40° F
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Castor Aralia	<i>Kalopanax pictus</i>	Hand pull, Lance with Glyphosate	When temps are above 40° F
Cork Tree	<i>Phellodendron</i> spp.	Hand pull, Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer
Diplodia Tip Blight	<i>Sphaeropsis sapinea</i>	Prune & destroy infected plant parts, Mancozeb	When dry, Early Spring, Summer

CURATION

Collections Development: None.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- Prune shrubs to rejuvenate.
- Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- Replant under story with *Cornus florida*.

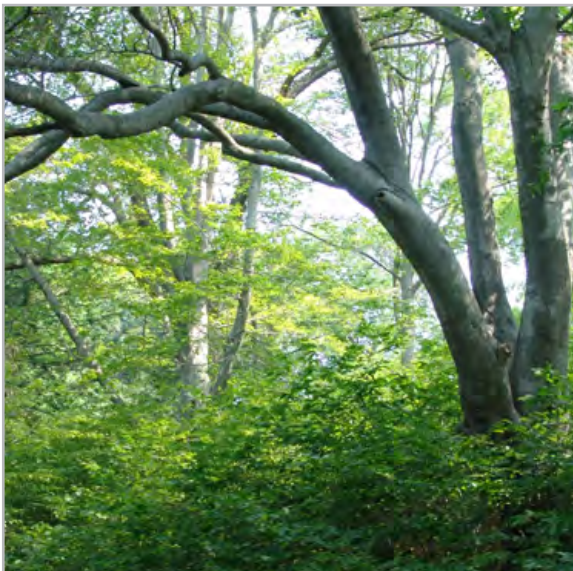
CAPITAL PROJECTS

- Engineer and rebuild Beech Path.

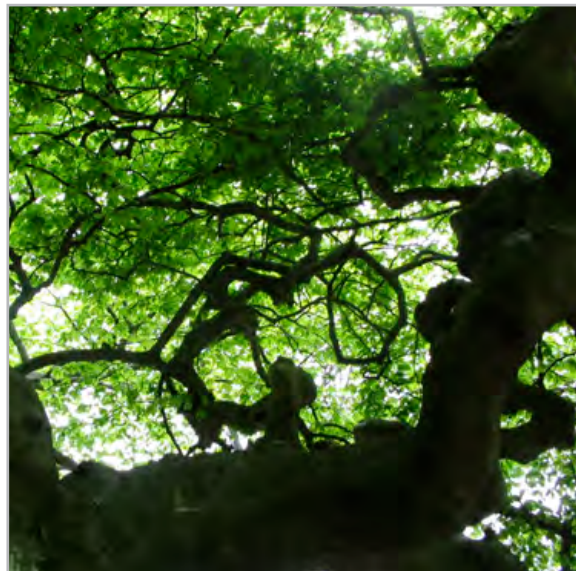
NOTES

2.6 *Fagus* Collection

Moderate Priority
Moderate Intensity



American Beech. Richard Schulhof.



Fagus sylvatica 'Tortuosa', Acc. 2420A. Michael Dosmann.

AREA PROFILE

NAPCC *Fagus* collection is among the nation's finest. Maintain our historic *Fagus* collection to the highest standards possible, including pre-empting drought stress through supplemental irrigation.

SPECIAL PRIORITIES

- ✦ Efforts should continue to combat soil moisture loss and compaction with mulching. Frequent monitoring for bleeding cankers must continue. Removal of large weed trees and invasives on slope.
- ✦ **Weeds growing in the mulch in the beech collection:** They detract and compete with the trees and need to be eliminated. Burdock is the most offensive and should be injected with an herbicide.

ARBORICULTURE

The *Fagus* collections are currently undergoing a program to restore their health and vitality. After years of poor growing conditions these trees have succumbed to stress and attacks of wood-decaying fungal cankers. The following steps have been, and hopefully will continue to be taken in order to revive the *Fagus* collection.

- ✦ Prune for sanitation. Removal of all dead and diseased wood, cutting back to strong healthy growth. It is best to remove the infected woody branches during the dormant period of the fungal pathogen, i.e., fall and winter.
- ✦ Aeration of the soil with the Air Knife to lessen the soil compaction.
- ✦ Apply the recommended amounts of lime to the soil to increase soil pH.
- ✦ Apply mulch under the drip edge of the trees to increase the amount of organic matter, lessen compaction, and decrease competition from weeds.
- ✦ Monitor the soil for moisture levels and irrigate when necessary.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Remove invasive weeds.

SPRING

- ✦ Aerate with air-knife when moisture is adequate (or in Fall).
- ✦ Apply soil amendments, as needed.
- ✦ Create mulch rings around young and specimen trees and apply double-ground mulch at a depth of 2”.

SUMMER

- ✦ Create mulch rings around young and specimen trees and apply double-ground mulch at a depth of 2”.
- ✦ Monitor soils for moisture with tensiometer. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds.
- ✦ Aerate with air-knife when moisture is adequate (or in Spring).
- ✦ Apply soil amendments, as needed.

WINTER

- ✦ Remove all spontaneous woody weeds.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Common Burdock	<i>Arctium minus</i>	Inject with Glyphosate; Mow	Spring, Summer
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand pull	Spring

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

As part of on-going review of *Fagus*, identify inter- and intra-specific gaps in the collection and identify sources and schedule acquisitions. Project potential removals that may occur in the next 1–5, 5–10, or 10+ year ranges.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune trees for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Address erosion issues.
- ✦ Develop successional plan for aging *Fagus sylvatica* cvs. as well as other *Fagus* species.

CAPITAL PROJECTS

- ✦ Install an irrigation system.

NOTES

2.7 *Quercus* Collection and Understory

Moderate Priority
Moderate Intensity



Quercus collection. Michael Dosmann.



Quercus collection, 1937. Arnold Arboretum Archives.

AREA PROFILE

Maintain the historic *Quercus* collection to the highest standards possible.

SPECIAL PRIORITIES

Continue to combat compaction and monitor soil pH and moisture to reduce stress on the collection and to build resistance to the two-lined chestnut borer. Keep trees clean of all dead wood.

ARBORICULTURE

- Much of the emphasis for maintenance in this zone is placed on the *Quercus* collection. Many of these trees are older, mature specimens. Due to their species type and location, these trees have been subjected to numerous types of biotic and abiotic disorders. With multiple types of stress factors battling these trees, their health and vigor has declined and made these trees vulnerable to attacks by wood-boring insects. Special care must be taken to remove as much of the dead and dying branches as soon as they appear to help slow the advance of these pests. Because of their advanced age, poor health, large size, and sheer numbers, the type of maintenance required to keep these trees healthy is a tremendous undertaking. Using the bucket truck to accomplish this feat becomes necessary in order to complete the work in a timely fashion. Due to the likelihood of creating compaction and intensifying the situation, this type of work is best left for the winter months when the ground is frozen.
- Another collection in this zone that demands frequent maintenance is the *Juglans*. Due to their soft brittle wood, frequent inspections of these trees is necessary after any menacing storm.
- Zone 2.7 is also home to smaller collections of the genera *Liquidambar* and *Corylus*. These two genera of trees are generally in fair to good condition and seldom require maintenance beyond storm repair and light structural pruning. However, when subjected to stress, these trees tend to be predisposed to fungal cankers, each specific to its own species. These fungal cankers attack the base of the plants, causing considerable amounts of die-back or death to the plant. When removing infected parts of the plant, it is best to do so when the fungus is dormant and to sterilize any pruning tools between plants. Keeping these trees healthy and vigorous is the best way to combat these hard to control diseases.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Identify individual oaks that would benefit from soil aeration.
- ✦ Monitor Bussey Hill Road Bank for invasive plants and other noxious weeds. Remove mechanically or by herbicide when necessary. Note: watch for reemergence of *Fallopia* in vicinity of *Rubus odoratus* stand.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Remove debris from cobblestone gutters.
- ✦ Edge and apply rough chip mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply rough chip mulch at a depth of 2” to young and specimen trees.
- ✦ Promote masses of desirable wildflowers (*Trillium* and *Actaea* in particular) through weeding and avoidance while mowing.

SUMMER

- ✦ Edge and apply rough chip mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply rough chip mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- ✦ Promote masses of desirable wildflowers (*Trillium* and *Actaea* in particular) through weeding and avoidance while mowing.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Remove debris from cobblestone gutters.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in cobble-stone gutter		Pre and Post-emergent herbicides	Monthly, as needed during growing season
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Two-lined Chestnut Borer	<i>Agrilus bilineatus</i>	Good cultural practices, Imidacloprid	Year round
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Oak Anthracnose	<i>Apiognomonia</i>	Mancozeb	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development: Review *Rhododendron calendulaceum* as needed to define Oak Path edges. Develop successional plans for aging *Quercus* specimens. Project potential removals that may occur in the next 1–5, 5–10, or 10+ year ranges and establish desiderata, identify sources, and schedule for acquisitions that would begin in earnest starting in 2013+.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Re-establish meadow.

CAPITAL PROJECTS

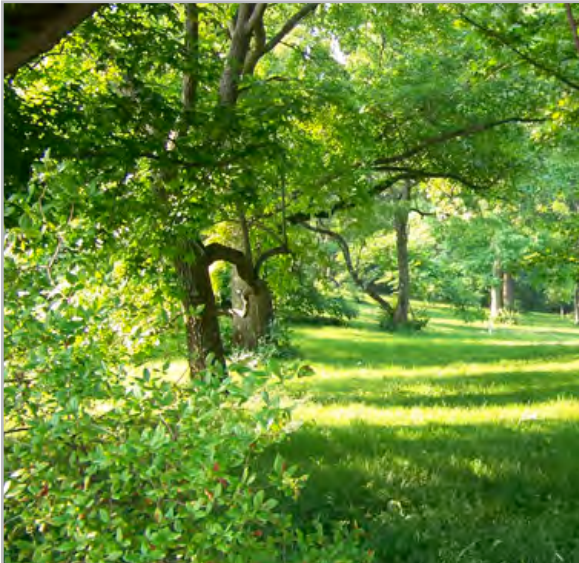
- ✦ Install irrigation.

NOTES

2.8 Oak Path Corridor

High Priority

Moderate Intensity



Oak Path, 2007. Julie Coop



Oak Path, 1903. T.E. Marr

AREA PROFILE

This historic path was a focus of the 1980s restoration effort. It has tremendous potential but tends to lose legibility in some areas during the summer. To re-establish this area as a destination point for visitors by strengthening legibility of entrance and increasing the level of care and enriching plantings is an important goal.

SPECIAL PRIORITIES

- ✦ Establish different mowing regimes for the path and surrounding areas. Investigate possibility of growing different grasses to distinguish the path. (See Mowing Operations, Appendix A.)

ARBORICULTURE

Running north to south Oak Path bisects Zone 2.7 and continues south until ending at Beech Path in the northwest quadrant of map 38. The top priorities for the arborists are to keep the path safe from any hazardous conditions overhead, remove invasive tree species and keep the path wide enough for arboretum equipment to pass through. These goals are met with periodic inspections and visits to the path. Despite that fact that Zone 2.8 is a high-priority zone in terms of arboricultural maintenance it requires a low degree of labor.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Remove weeds from all beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records Dept. by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Apply rough chip and edge with herbicide, preferably a low toxicity herbicide.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all specimen and young trees.

SUMMER

- ✦ Apply rough chip and edge with herbicide, preferably a low toxicity herbicide.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all specimen and young trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Wild Buckwheat	<i>Polygonum convolvulus</i>	Glufosinate-ammonium, Hand pull	Spring, Summer
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Two-lined Chestnut Borer	<i>Agrilus bilineatus</i>	Good cultural practices, Imidacloprid	Year round
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Oak Anthracnose	<i>Apiognomonina</i>	Mancozeb	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development: Evaluate success of the reinstatement of this corridor's northwest end. Review the ad hoc plantings of shrubs near and below the *Juglans*. As part of curatorial review of *Carya*, identify planting locations for future acquisitions.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Establish new plantings to signal entrance to Oak Path. (Started in 2007.)
- ✦ Plant bulbs.

CAPITAL PROJECTS

- ✦ None.

NOTES

2.9 The Rockery

Moderate Priority

High Intensity



The Rockery. Jennifer Leigh.

AREA PROFILE

Broad mix of shrubs and sub-shrubs in a “rockery” setting. Definition of collections and horticulture goals is required to inform revisions and renovations.

SPECIAL PRIORITIES

- ✦ **Shrub beds:** Should be kept weed free at all times. Pre-emergent and post-emergent herbicides will help accomplish this task.
- ✦ Eliminate any trace of *Cornus* and *Aristolochia* reappearing on top of Oak Side Rockery.

ARBORICULTURE

Small in area, the Rockery does not necessitate much of the arborists time in order to maintain this zone at a high standard. Valley Road dissects this zone east and west. The only trees found in the westernside of Zone 2.9 are a medium size clump of *Castanea dentata* 24–80*A. Almost every stem of this accessioned plant is infected with a stem or basal canker of Chestnut Blight. Rather than risk the spread of this disease, it is best to prune this species for dead wood only. On the eastern side of Valley Road there are approximately a dozen trees large enough in size to require the ability of the arborist team. Half of these trees are large over-story oaks that should be pruned, when necessary, to remove deadwood and storm breaks. The remaining trees are medium to smaller oaks and under-story trees such as *Cornus* and *Acer palmatum*. These trees should be visited once a year to provide any necessary structural or training pruning cuts.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all beds and mulched areas around trees.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Report needs for additional label to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
Remove leaf litter from beds.
- ✦ Remove debris from cobblestone gutter.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from beds.
- ✦ Remove debris from cobblestone gutter.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in cobblestone gutter		Pre and Post-emergent herbicides	Monthly, as needed during growing season
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

This area requires a complete historical, thematic, functional, and collection review (including present plantings, their mapped locations, and documentation). Following 2011 renovation to remove spontaneous and low collections-value accessions, future work should define new collection goals.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ As part of the CRMP, develop thematic definition and management goals for the Rockery.

CAPITAL PROJECTS

- ✦ None.

NOTES

2.10 The *Viburnum* Collection

Moderate Priority

Moderate Intensity



Viburnum plicatum f. *tomentosum*. Arnold Arboretum Archives.



Viburnum rhytidophyllum. Arnold Arboretum Archives.

AREA PROFILE

This area is highly visible due to its proximity to the Centre Street entrance to the Arboretum and will be maintained at the highest standard to represent the horticultural excellence of the Arboretum.

SPECIAL PRIORITIES

- ✦ **Shrub beds:** Should be kept free of weeds and have a clean edge at all times.
- ✦ ***Viburnum* collection:** Will require close and frequent monitoring for the *Viburnum* leaf beetle.

ARBORICULTURE

Though small in area, Zone 2.10 is large in diversity. In this zone there are many older trees from various genera. Considering their age and stature these trees merit individual attention. Because this zone is regarded as having a high priority status, monthly visits are recommended to inspect the health and condition of the trees. Dead and diseased branches should be removed as needed. In order to minimize the amount of labor usually required to cultivate these older trees, cultural practices such as watering, mulching, and aerating the soil may help to increase their health and vigor, thereby lessening the amount of accumulated deadwood. Newer planting of trees still in their juvenile years should receive annual treatments of structural/training pruning.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Maintain clean edge along all shrub beds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Ensure that all hardscape features are string trimmed regularly.
- ✦ Keep chainlink fence free of weeds.
- ✦ Keep gravel driveway clean and clear for vehicular access.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds. Mulch as many leaves into turf as possible.
- ✦ Fill in all ruts and seed.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Yellow Nutsedge	<i>Cyperus esculentus</i>	Halosulfuron, Glufosinate-ammonium	Summer
Black Swallow-wort	<i>Cynanchum louiseae</i>	Halosulfuron, Glufosinate-ammonium	Summer
Wild Garlic	<i>Cynanchum louiseae</i>	Halosulfuron, Glufosinate-ammonium	Early Summer through late Fall
Spiderwort	<i>Cynanchum louiseae</i>	Halosulfuron, Glufosinate-ammonium	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Sycamore Anthracnose	<i>Apiognomonina veneta</i>	Mancozeb	Spring, Summer
Aphids		Monitor for beneficial insects; Horticultural Oil, Potassium salts, Insectidal soap	Summer
Viburnum Leaf Beetle	<i>Pyrrhalta viburni</i>	Monitor, Prune and destroy infested twigs after egg-laying in fall	Spring, Summer, Fall

CURATION

Collections Development:

Evaluate shrub plantings in *Viburnum* collection, particularly tree peonies. Pending future use of 1090, explore the development of the landscape adjacent the structure for siting historic and period shrub collections.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.
- ✦ Prune vines on chain link fence.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Consolidate *Viburnum* collection for ease of care and treatment in anticipation of the *Viburnum* Leaf Beetle.
- ✦ Set bench within a cobblestone base.
- ✦ Renovate turf where necessary to maintain high standards of the grounds—both within the zone and the strip along Bussey Road.

CAPITAL PROJECTS

- ✦ None

NOTES

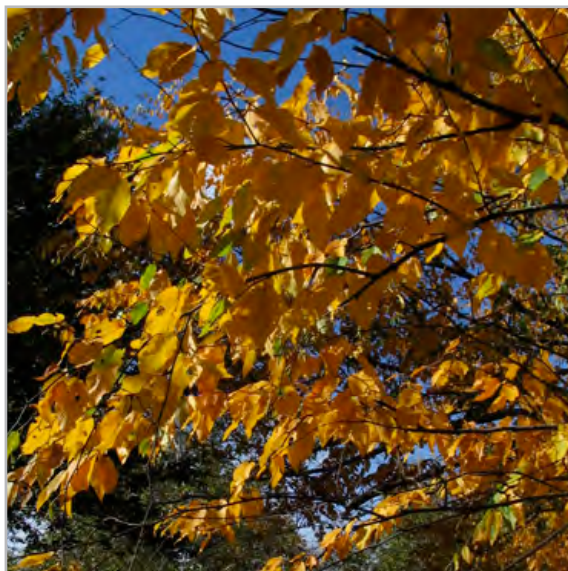
2.11 *Betula*, *Euonymus* and *Prunus* Collections

Moderate Priority

Low Intensity



Birch Collection. Richard Schulhof.



Betula lenta, Acc. 17679A. Michael Dosmann.

AREA PROFILE

This collection of *Betula*, *Prunus* and *Euonymus* is located at the intersection of two major roads, Bussey Hill Road and Valley Road and is in a visible location. It should receive a moderate level of horticultural maintenance.

SPECIAL PRIORITIES

- ***Prunus*:** Re-establish the planting amongst the birches as Wilson did in 1927. Monitor for black knot.
- ***Betula* collection:** Monitor and treat for Bronze birch borer and Birch leaf miner.

ARBORICULTURE

A zone of moderate size and density with the majority of its plants being in good condition zone 2.11 presents itself as a zone that can conceivably continue to be managed on a three year pruning rotation with “in-between” visits to clean up after any damaging wind, snow, or ice storms and short annuals visits to the younger trees for structural and training pruning.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Clean cobblestone gutter.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- ✦ String trim under all plant material twice during the summer to prevent vines from growing plant material.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Clean cobblestone gutter.
- ✦ String trim under all plant material to prevent vines from growing plant material.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Prune trees and shrubs away from sidewalk.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in cobblestone gutter		Pre and Post-emergent herbicides	Monthly, as needed during growing season
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Bronze Birch Borer	<i>Agrilus anxius</i>	Imidacloprid, Do not prune in summer	440–2000 GDD
Euonymus Scale	<i>Unaspis euonymi</i>	Horticultural oil, Imidacloprid, Dinotefuran	533–820 GDD
Black Knot	<i>Apiosporina morbosa</i>	Prune knots & an additional 4" behind swelling	Late Winter to early Spring
Sycamore Anthracnose	<i>Apiognomonina veneta</i>	Mancozeb	Spring, Summer
Elm Bark Beetle	<i>Scolytus multistriatus</i> , <i>Hylurgopinus rufipes</i>	Imidacloprid	GDD: 7–120
Dutch Elm Disease	<i>Ophiostoma ulmi</i>	Sanitation by removal of dead or diseased branches	At any time

CURATION

Collections Development:

Because of substantial thinning of this area over the years, determine future priorities, use and acquisitions. Continue to acquire new *Betula* holdings. Review and vet *Euonymus* collections.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

+ None.

Every 3 years, or as needed

+ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

+ None.

CAPITAL PROJECTS

+ None.

NOTES

2.12 Explorers Garden

High Priority

High Intensity



Pyrus pyrifolia, Acc. 7272C. Michael Dosmann.



Cedrus libani ssp. *stenocoma*. Richard Schulhof.

AREA PROFILE

All three areas, Chinese Path, Azalea Path and the Center for Plant Conservation (CPC) bed, contain important [CPC and NAPCC (North American Plant Collections Consortium)] and historic (Asian and Southeastern United States) collections for the Arboretum and are among the most important landscapes at the Arnold Arboretum. Specimens of scientific and historic significance are too numerous to mention. All three areas will be maintained at the highest standard to represent the horticultural excellence of the Arboretum.

SPECIAL PRIORITIES

- ✦ **Chinese Path beds:** To reflect high standards. The turf should be green and all shrub beds should be free of weeds, edged and pruned so as not to obstruct foot paths.
- ✦ **Azalea Path:** Turf should be green and the shrub beds as seen from Azalea Path should have a clean edge and be free of weeds. Treat *Rubus* sp. with herbicide before it takes over.
- ✦ **CPC bed:** Bed requires frequent weeding and plantings of *Diervilla* must be maintained as individual specimens. The *Rhododendron vaseyi* must be maintained as individual specimens.
- ✦ **Stewartia collection:** A NAPCC collection.
- ✦ **Metasequoia grove:** Mulch foot path and add steps leading to and from Oak Path and prune lower limbs on trees to allow pedestrian access.
- ✦ Address squirrel damage.

ARBORICULTURE

The inner circle of the Explorers Garden previously known as Chinese Path is now overcrowded with mature specimen plants of high importance and recognition. Wherever possible, pruning to rejuvenate a plant will be performed in order to boost the vigor of a plant and provide more growing space. The boundaries of this zone incorporate a grove of conifers with *Pinus strobus* and *Cedrus libani* to the east, a collection of *Quercus* now commonly known as the Oriental oaks to the south, a mature mass planting *Tsuga canadensis* and a row of several large North American oaks along Azalea Path to the west. Many of these larger, mature trees are subject to wind throw and soil compaction. These conditions quickly create die-back and storm breaks that require frequent visits to repair. It is recommended that this zone receive annual visits to maintain the health of the larger trees and to provide training and structural support to the younger trees and newer plantings. Aeration of the soil to the row of oak trees along Azalea path would help to improve their health.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all display beds and mulched areas around trees.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Maintain a clean edge on all shrub beds in the Chinese Path area and on the edge of the shrub beds as seen from Azalea Path.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Limit encroachment of *Forsythia*, *Lonicera*, *Helwingia*, and *Diervilla*.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Clean cobblestone gutter.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2".
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all trees.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2".
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Clean cobblestone gutter.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Monitor and spray shrubs for rodent damage.
- ✦ Prune woody plants away from walking paths and sidewalk.
- ✦ Monitor and spray Liquid Fence to prevent rabbit damage.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Wild Garlic	<i>Allium vineale</i>	Glufosinate-ammonium	Early Summer through late Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Common Burdock	<i>Arctium minus</i>	Triclopyr, Inject with Glyphosate, Mow	Spring, Summer, Fall
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand pull	Spring
Ground Ivy	<i>Glechoma hederacea</i>	Triclopyr, Glyyphosate, Borax and slice seed, Hand pull	After it flowers or mid-Sept to mid-Oct.
Stinging Nettle	<i>Urtica dioica</i>	Glufosinate-ammonium, Flame torch	Spring, Summer
Pokeweed	<i>Phytolacca americana</i>	Hand dig, Weed wrench	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer
Brown Rot	<i>Monilinia fruticola</i>	Prune and destroy infected plant parts; Potassium salts of phosphoric acid	Spring, Summer

CURATION

Collections Development:

Crowding of plants along the southwest 'loop' of Chinese Path presents a need for a review of these holdings, exploration of some thinning, and the development of new beds on the northeast 'loop' near and below the *Cedrus libani* ssp. *stenocoma*.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Evaluate areas of erosion and address them.
- ✦ Prune shrubs to rejuvenate and to maintain open pathways.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Study shrub beds and tree plantings.
- ✦ In collaboration with the Manager of Visitor Education, support periodic interpretive programs.
- ✦ Air Spade and spread compost under selected plant material.

CAPITAL PROJECTS

- ✦ Bring water from street up to hill.
- ✦ Install a drip irrigation system.

NOTES

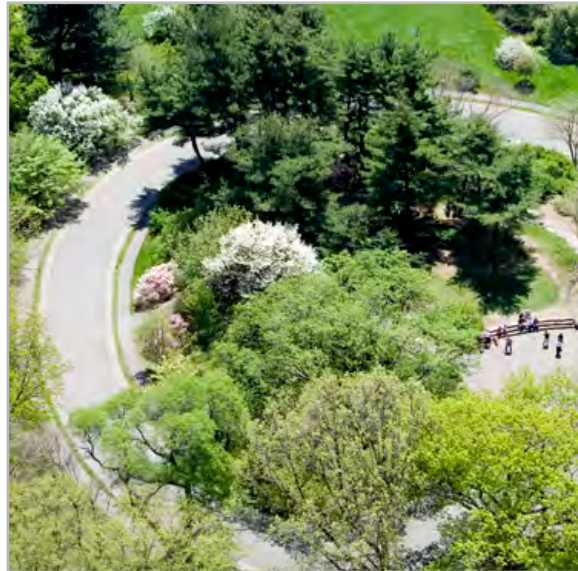
2.13 Bussey Hill Summit

High Priority

High Intensity



Bussey Hill Summit. Sheryl White.



Bussey Hill Summit, aerial view. Jay Connor.

AREA PROFILE

The summit, at 198 feet and originally designed by Olmsted as part of the City of Boston reservation, is the second highest point in the Arboretum and offers terrific views of the Arboretum, city and metro Boston, and the Blue Hills. This area is among the most important landscapes at the Arnold Arboretum. Redesigned in 1972 as part of the Arboretum's centennial celebration, the summit's plantings and circulation system are presently in need of updating. Bussey Hill Summit will be maintained at the highest standard to represent the horticultural excellence of the Arboretum.

SPECIAL PRIORITIES

- *Rhus* plantings: Historic.
- *Cornus* collection.

ARBORICULTURE

In order to maintain this zone at a level of high priority, annual visits are recommended. The outer limits of this reasonably round zone encompass some rather large, mature trees. Due to their declining health, these trees have a tendency to accumulate deadwood at an accelerated rate. Because these trees are in close proximity to Bussey Hill Road and the cul-de-sac that forms the lookout, any potentially hazardous conditions should be removed as soon as they are recognized. The same practice should apply to the grove of *Pinus strobus* and *Pinus parviflora* located at the top of the lookout. This zone also contains many smaller trees and large shrubs (i.e., the collection of *Cornus* species) that seem to necessitate the benefits of an annual pruning cycle.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Keep all paths and steps clean from grass cuttings and other debris.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Clean debris from cobblestone gutters.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to all trees.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to all trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Prune shrubs away from foot paths and sidewalks.
- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Clean debris from cobblestone gutters.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Prune shrubs away from foot paths and sidewalks.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Monitor and spray Liquid Fence to prevent rabbit damage.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand pull	Spring
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F
Wild Garlic	<i>Allium vineale</i>	Glufosinate-ammonium	Early Summer through late Fall
Porcelain-berry	<i>Ampelopsis brevipedunculata</i>	Cut & spray resprouts w/ Triclopyr, Hand pull, Lance with Glyphosate	Spring, Summer, Fall
Poison Ivy	<i>Toxicodendron radicans</i>	Triclopyr, Lance with Glyphosate (clean any surface of lance that comes in contact with plant)	Spring, Summer
Fiveleaf Akebia	<i>Akebia quinata</i>	Hand pull, Lance with Glyposate, Triclopyr	Spring, Summer, Fall
Greenbriar	<i>Smilax</i> spp.	Triclopyr	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development: Continue to site occasional *Acer* in *P. strobus* understory. As part of a larger, institutional review of this area in the future (including possible capital project work), identify accessions of unique and high value for re-propagation/relocation in preparation for any future work in this site. Review possible thematic and functional plans for the collection.

Field Checks: Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.
- ✦ Prune accessioned vines to prevent them from growing into the canopy of the trees.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Air Spade and spread compost under top level *Pinus*.
- ✦ Monitor condition of benches and fence rail. Repair and replace, as needed.

CAPITAL PROJECTS

- ✦ Complete restoration of summit.
 - Study circulation, plantings and hardscape.
- ✦ Install an irrigation system.
- ✦ Bussey Hill Summit is a high-priority asset that, along with the ponds and the BRC, is scheduled for capital funding in the next 2–5 years.

NOTES

2.14 Centre Street and South Street Gates

High Priority

Moderate Intensity



Centre Street Gate, Jay Connor.



South Street Gate, Jill K. Conley.

AREA PROFILE

Since the gates welcome all visitors to the grounds, they are to be kept in pristine condition as this presentation sets the tone for what will be experienced within the Arboretum. The Centre and South Street Gates are high traffic areas for entry into the Arboretum for both visitors and commuters; a high priority of care should regularly be given to maintain these gates at the highest standard.

SPECIAL PRIORITIES

- ✦ These gates should be kept free of all litter, debris and leaves.
- ✦ All weeds and unwanted vegetation should be controlled.
- ✦ Accessioned plant material should be mulched and maintained at the highest standard.

ARBORICULTURE

None.

Annual Care Plan

ALL SEASONS

- ✦ Keep gates free of trash, debris and weeds at all times.
- ✦ Keep gate area free of unauthorized advertisements and solicitations.

SPRING

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

SUMMER

- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

FALL

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

WINTER

- ✦ Keep pedestrian walkways clear of ice and snow.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

None.

Field Checks:

None.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- None.

Additional Projects

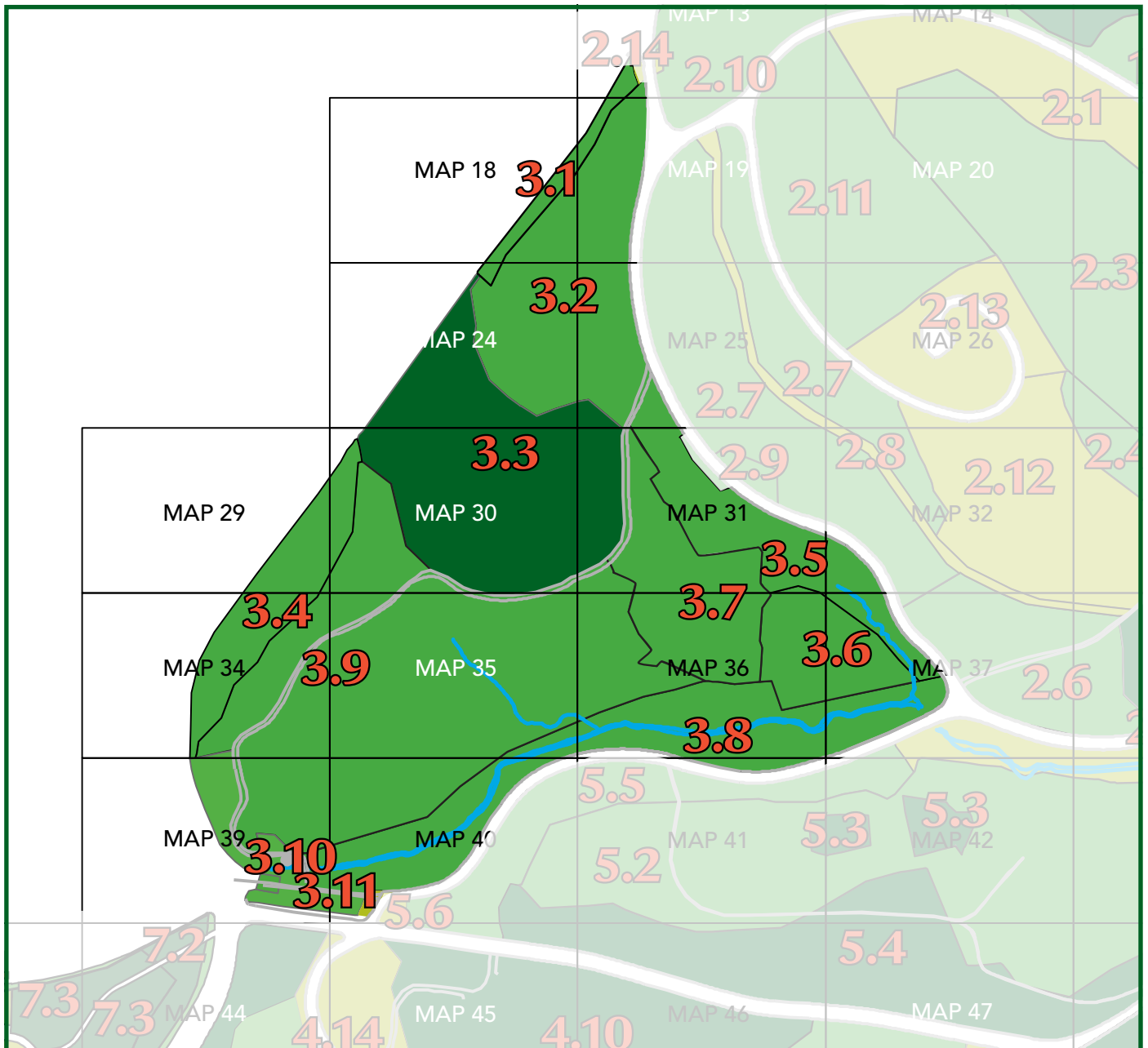
- Due to the use of the Centre Street Gate area for events such as the Plant Giveaway, cracks in the roads should be filled in to eliminate weeds and maintain the high standard of the surrounding areas.
- The Gates should be painted regularly to maintain their integrity and high standard.

CAPITAL PROJECTS

- None

NOTES

REGION 3 MAP



Region 3—Conifer Area

	<u>Zone</u>	<u>Priority</u>	<u>Intensity</u>
3.1	Centre Street Beds	Moderate	High
3.2	<i>Carya</i> and Centre Street Collections	Moderate	Moderate
3.3	Central Woods	Low	Moderate
3.4	City Shack Parcel	Moderate	High
3.5	<i>Carpinus</i> and <i>Castanea</i> Collections	Moderate	High
3.6	Juniper Knoll	Moderate	Moderate
3.7	Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thuja</i>	Moderate	Moderate
3.8	Bussey and Spring Brook Corridor to Road	Moderate	High
3.9	Conifer Collection	Moderate	Low
3.10	Hebrew Slope and Walter Street Gate Area	Moderate	High
3.11	Walter Street and Bussey Street Gates	High	Moderate

3.1 Centre Street Beds

Moderate Priority

High Intensity



Centre Street Beds, Jill K. Conley.



Centre Street Beds, Jill K. Conley.

AREA PROFILE

This area is somewhat visible due to its proximity to the Centre Street gate entrance to the Arboretum and will be maintained at a moderate standard to represent the horticultural excellence of the Arboretum. The Centre Street beds, running along the south-facing slope on Centre Street, were created and first planted in 1910 with Asiatic plant material to test for hardiness. They continue to serve this same important purpose today.

SPECIAL PRIORITIES

- ✦ Monitor and treat cluster of *Ptelea trifoliata* that are under significant stress due to leafhoppers, aphids, and scale.

ARBORICULTURE

With its moderate priority, small size, and relatively few larger trees, this zone demands less time for maintenance than most. What does routinely merit attention is the number of *Halesia* found here. These trees seem more susceptible to storm damage than others and should receive regular inspections after any strong storms. It is conceivable that a three-year pruning rotation should be sufficient to maintain this area. This zone was last maintained in July of 2010.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Maintain clean edge along the shrub bed.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from all shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from all shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.
- ✦ Remove any suckering rootstock on grafted *Hamamelis*.
- ✦ Monitor trees and shrubs along sidewalk border; prune for clearance.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Lesser celandine	<i>Ranunculus ficaria</i>	Glyphosate, Hand pull	Spring
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Carolina Silverbell	<i>Halesia tetraptera</i>	Hand pull or scuttle hoe seedlings	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

Because of loss of a number of overstory trees (as well as the anticipated loss of more in the near future), identify locations and candidate acquisitions. This is of high priority, as it impacts the survival and performance of a number of shade-requiring and/or marginally hardy taxa. This also relates to the review of the *Carya* collection conducted in 2010.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Curatorial review recommended.
- ✦ Consider revitalizing use of beds for accessions of borderline hardiness.

CAPITAL PROJECTS

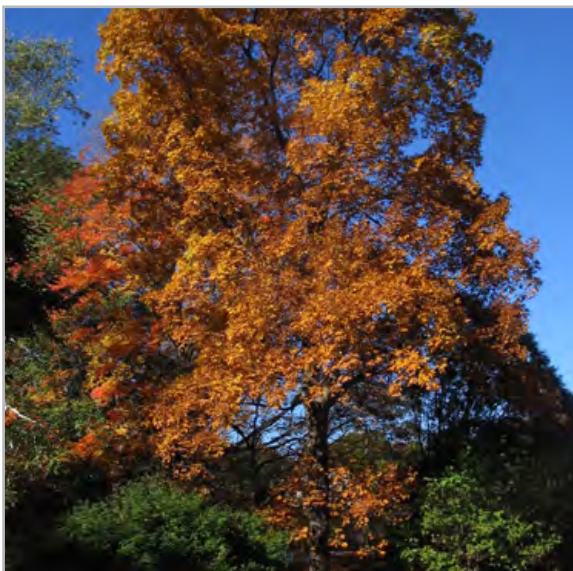
- ✦ None.

NOTES

3.2 *Carya* and Centre Street Collections

Moderate Priority

Moderate Intensity



Carya laciniosa, Acc. 22866B. Michael Dosmann.



Ilex. John DelRosso

AREA PROFILE

This area is small in square footage but large in the number of collections located here according to the Bentham and Hooker sequence. Sited here, partly or wholly, are Buxaceae, Styracaceae, Hamamelidaceae, Myricaceae, and Juglandaceae. Landmark specimens include Sargent-era *Parrotia persica*, *Styrax japonicus*, and *Hamamelis mollis* and the NAPCC of *Stewartia* and *Carya*. In addition, this area is valued for its microclimate and is used to test plant hardiness and has become the home to a collection of larger leaf magnolias. This area will receive a moderate level of attention.

SPECIAL PRIORITIES

- ✦ ***Stewartia* and *Carya* collections:** A North American Plant Collections Consortium collection.
- ✦ **Spontaneous woody plants and vines:** Tend to be rampant in this area and will require attention.

ARBORICULTURE

This zone has a large number of accessioned trees present, the largest body of which consists of the genus *Carya*. Due to their tendency towards storm damage, periodic visits will be necessary. Ideally this zone would benefit from being placed on a pruning rotation, however, bear in mind that the magnitude of this job will require a considerable amount of time to complete a thorough sweep of the entire zone. With its new boundary now extending further west along Centre Street and south along Zone 3.3, comes an additional priority to Zone 3.2. In October of 2007 an extensive effort was made to push back the natural woods that had grown into the collections of the genera *Pterocarya*, *Hamamelis* and *Ilex*. Return visits will now be necessary to maintain these collections and control the threat of invasive species returning.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulch areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Clean cobblestone gutter.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- ✦ Continue to monitor cobblestone gutter for weeds.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Clean cobblestone gutter.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in paths and cobblestone gutter		Pre and Post-emergent herbicides, Flame Torch	Monthly, as needed during growing season
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

Because of loss of a number of overstory trees (as well as the anticipated loss of more in the near future), identify locations and candidate acquisitions. This is of high priority, as it impacts the survival and performance of a number of shade-requiring and/or marginally hardy taxa. This also relates to the general review of the *Carya* collection conducted in 2010.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ None.

NOTES

3.3 Central Woods

Low Priority
Moderate Intensity



Central Woods. Richard Schulhof.

AREA PROFILE

The Central Woods is one of the few and the largest remaining natural areas found within the Arboretum. A large population of seedling white pine supplanting hardwoods will further change the character of this area in coming years. It features a couple of large rock outcroppings.

SPECIAL PRIORITIES

- ✦ **Collections on woodland edge:** Will require more frequent attention in terms of pruning every three years or as needed and removing woody weeds from base of specimens annually.

ARBORICULTURE

- ✦ The principal concerns in dealing with maintaining this zone are:
 1. Maintain the health and condition of accessioned trees within this zone.
 2. Monitor for hazardous trees over paths or accessioned collections.
 3. Continually push back the encroaching woods along its borders.
- ✦ Due to the small number of accessioned plants in this zone, item one should require a short annual visit to accomplish any necessary pruning requirements. Item number two needs only to be performed on an as-needed basis. Item number three will be the responsibilities of the horticulturalists that have ownership to the adjoining zones. Central woods received a thorough cleaning for the removal of hazardous deadwood in October of 2010.

Annual Care Plan

ALL SEASONS

- ✦ Monitor for hazardous trees.
- ✦ Remove volunteer exotics (*Aralia*, *Frangula*).

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ None.

WINTER

- ✦ Remove all spontaneous woody weeds from base of trees.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Oriental Bitter-sweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Korean Mountainash	<i>Sorbus alnifolia</i>	Pull, Lance with Glyphosate	When temps are above 40° F
Buckthorn	<i>Frangula</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune along cart path to maintain vehicle access.
- ✦ Prune collections at edge of woodlands.

Additional Projects

- ✦ There are areas of erosion that need to be addressed on a number of trails within this area. Water bars should be installed at key points to mitigate this problem.

CAPITAL PROJECTS

- ✦ None.

NOTES

3.4 City Shack Parcel

Moderate Priority

High Intensity



Betula davurica, Acc. 1015-80A. Michael Dosmann.

AREA PROFILE

This triangular piece of land bordered by Centre Street, Conifer Path and the Central Woods came to Harvard in 1931 when Centre Street was straightened. It was named after the “shack” remaining on the property that was used by the public works department for materials and storage. In the 1960s the “shack” was removed, the soil was amended and the parcel was planted with conifers and spring flowering trees to be viewed from Centre Street. The several rambling bamboo plantings combine with other accessions to give this area a somewhat random, *ad hoc* character. City Shack’s visual prominence to Centre and Walter Street motorists makes redesign and review of plantings an important priority. This area will receive a moderate level of horticultural care.

SPECIAL PRIORITIES

- ✦ **Centre Street edge:** Highly visible from the street, this edge will require constant monitoring for trash and debris and overgrown vegetation.

ARBORICULTURE

Many of the plants in this zone were planted in order to provide a welcome view into the Arboretum from Bussey and Centre Streets. These plants may require an annual visit in order to be maintained at the moderate level it demands. Special attention needs to be given to the Magnolia and the flowering trees of the rosaceous family. The large *Quercus rubra* found in this zone and mentioned in the 2nd edition of the LMP has been cabled and braced 2008 and will be inspected periodically.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Keep mulch ring containing Arnold Arboretum sign free of weeds and debris.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2".
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Remove dead bamboo canes.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2".
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Remove dead bamboo canes.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Monitor trees and shrubs along sidewalk border; prune for clearance.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Pokeweed	<i>Phytolacca americana</i>	Glyphosate, Weed wrench	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Bronze Birch Borer	<i>Agrilus anxius</i>	Imidacloprid	440–2000 GDD
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall

CURATION

Collections Development:

Because of its prominence as a window into the collections, review this area's thematic potential. In particular, attention should be paid to the bamboo collections and the miscellaneous shrub and tree collections.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Improve soil.
- ✦ Review plant material growing to close to Conifer Path for vehicle traffic.

CAPITAL PROJECTS

- ✦ Incorporate Reed/Hilderbrand recommendations:
 - Install stone wall along the perimeter edge.
 - Review plant collections.

NOTES

3.5 *Carpinus* and *Castanea* Collections

Moderate Priority

High Intensity



Carpinus betulus, Acc. 22053B. Michael Dosmann.

AREA PROFILE

These collections are wedged between Valley Road and Spring Brook. The *Carpinus* area required a pH correction (i.e., liming) in the mid-1990s that produced a significant improvement in plant health. Continued monitoring of soil chemistry is an important task for the *Carpinus* collection. This area also contains an historic spring believed to date to the Bussey era.

SPECIAL PRIORITIES

- ✦ **Soil:** Continue to monitor soil for low pH.
- ✦ **Historic spring site:** Monitor to keep vegetation and debris from this area.

ARBORICULTURE

- ✦ Over a decade ago, efforts were made to improve the soil conditions in the *Carpinus* collection. The improvements in the soil helped to improve the health of the plants as well. Improved health conditions combined with the fact that *Carpinus* are a slow-growing, medium-sized tree spell out fewer visits required to maintain their condition. However, due to their dense growing habit they are prone to holding large loads of snow and ice making them susceptible to storm damage. It is possible that this collection of trees could be maintained with a four-year pruning rotation and regular repairs to any/all storm damage. As noted above, due to the heavy snow that fell on 1.12.11 the arborist team will return to this zone in March of 2011 to repair many storm damaged trees.
- ✦ Due to the presence of the persistent stem canker *Cryphonectria parasitica* (Chestnut Blight). The *Castanea* collection may require annual returns for pruning for the removal of infected stems.

Annual Care Plan

ALL SEASONS

- Monitor newly planted accessions, investigate problems and take appropriate actions.
- Remove or relocate woody debris to roadside for chipper.
- Chip brush.
- Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- *Castanea pumila* grove must be kept free of weeds and debris. *Prunus* suckers are an ongoing problem and are best controlled with applications of triclopyr.

SPRING

- Apply soil amendments, if needed.
- Clean cobblestone gutter.
- Clear vegetation and leaf litter from historic spring site.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- *Ranunculus ficaria* is a major problem in this zone. Because of the close proximity of Spring Brook, apply an herbicide rated for wet areas.

SUMMER

- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- Maintain bank of Spring Brook to exclude any noxious weeds Especially poison ivy, purple loosestrife and *Rubus*. Promote stands of Joe-Pye Weed and various grasses.

FALL

- Remove all spontaneous woody weeds from around base of trees.
- Apply soil amendments, if needed.
- Clean cobblestone gutter.
- Clear vegetation and leaf litter from historic spring site.
- Remove stems infected with fungal cankers on the *Castanea*.

WINTER

- Remove all spontaneous woody weeds from around base of trees.
- Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in paths and cobblestone gutter		Pre and Post-emergent herbicides	Monthly, as needed during growing season
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate labelled for wetland use, Hand pull, String trim	Early Summer through late Fall
Lesser Celandine	<i>Ranunculus ficaria</i>	Glyphosate lableed for wetland use, Hand pull	Spring

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

Review holdings in next 2–5 years for possible NAPCC proposal.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ None.

NOTES

3.6 Juniper Knoll

Moderate Priority

Moderate Intensity



Juniper Knoll. Jennifer Leigh.



Juniper Knoll. Jennifer Leigh.

AREA PROFILE

This collection is in a prominent location and is sited on a knoll just above Bussey and Spring Brooks at the intersection of Valley and Hemlock Hill Roads. It serves as a backdrop to the *Carpinus* collection and the stand of *Fagus grandifolia*, and contains an outstanding *Zenobia* mass planting. Growth of Black Swallowwort needs continuous monitoring, but its population has decreased significantly.

SPECIAL PRIORITIES

- *Cynanchum louiseae*: Rampant in this area, will require month sweeps to begin to control it to continue to decrease its population.
- *Rosa multiflora*: Will require initial investment to eradicate.
- *Fagus grandifolia* stand: In a prominent location in front of the juniper collection and in back of Bussey Brook. It provides a brilliant fall color display.

ARBORICULTURE

From an arboricultural view most of the accessioned plants that constitute this zone are small to large shrubs. On occasion the horticultural technologist assigned to this zone should secure the assistance of an arborist when needed to prune the larger shrubs and trees. On account of their smaller stature and slow growth habit, visits to the Juniper collection can be spread out over longer periods of time. Pruning rotations may only be necessary every four to five years. Plants demanding more attention in this zone are the mass planting of *Fagus grandifolia* and the small collection of native North American trees, including: *Amelanchier arborea*, *Betula lenta*, *Oxydendrum arboreum*, *Pinus strobus*, *Quercus rubra*, and *Tsuga canadensis*. The long open swale that serves as the watercourse for Bussey Brook creates a funnel for wind as well. Many of the trees that are found at the end of this basin are subject to wind and storm damage. The grove of *Fagus grandifolia* are especially prone to breaking apart due to their large, heavy branches that are infected with a perennial canker. Regular inspections and necessary repairs are prescribed for this area. As foreseen, the winter storm of 1.12.11 took its toll on the collection of trees noted above. The arborist crew will spend a considerable length of time in March repairing and removing storm damage.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- ✦ Remove weeds from *Zenobia*.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Install signs deterring the harvesting of winter greens and berries.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Bur Cucumber	<i>Sicyos angulatus</i>	Hand pull before flowering	Spring, Summer
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Greater Celandine	<i>Chelidonium majous</i>	Hand pull	Early Summer through late Fall
Poison Ivy	<i>Toxicodendron radicans</i>	Triclopyr, Lance with Glyphosate (clean any surface of lance that comes in contact with plant)	Spring, Summer
Stinging Nettle	<i>Urtica dioica</i>	Glufosinate-ammonium, Flame torch	Spring, Summer
Nightshade	<i>Solanum dulcamara</i>	Glufosinate-ammonium, Hand pull	Spring, Summer

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

Continue to review accessions of poor health and low collections value for vetting.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ None.

NOTES

3.7 Old Dwarf Conifers, *Chamaecyparis*, *Thuja*

Moderate Priority

Moderate Intensity



Dwarf Conifers. Arnold Arboretum Archives.

*Thuja occidentalis* 'Milleri', Acc. 1309-60B and *Picea abies* 'Mucronata', Acc.1411-78A. Jennifer Leigh.

AREA PROFILE

Chamaecyparis and *Thuja* collections contain significant C. S. Sargent accessions and a pleasing informal path and glade enjoyed by many visitors. The Arboretum's original dwarf conifer collection, established in 1911, includes an outstanding Sargent's weeping hemlock as well as other important specimens.

SPECIAL PRIORITIES

None.

ARBORICULTURE

Holding four families and over a dozen genera this zone has an extensive collection of coniferous plant material. Fortunately, many of them are either dwarf varieties or slow-growing, medium sized trees. In December of 2007 the arborist team started a sweep through some of the largest *Chamaecyparis*, removing years of accumulated deadwood. There are many more plants in this zone that require this same type of maintenance. The overall health of these plants is good but their conditions need improvement. Once this effort is completed it is reasonable to believe that a four-year pruning rotation should be adequate to meet the requirements of this zone. Since November of 2010 further progress has been made in this zone, and, if the health of the plants continue to prosper the goal of getting this zone on a four-year rotation seems very practical.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Provide winter protection/brace against storm damage smaller conical and globose dwarf conifers.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Install signs deterring the harvesting of winter greens and berries.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.
- ✦

Additional Projects

- ✦ Review *Sorbus* and other deciduous trees planted in this location.

CAPITAL PROJECTS

- ✦ None.

NOTES

3.8 Bussey and Spring Brook Corridor to Road

Moderate Priority

High Intensity



Bussey Brook. John Del Rosso.



Bussey Brook Corridor, circa 1900's. William Dawson.

AREA PROFILE

The Bussey Brook vista, seen from Valley Road or Beech Path, is among the Arboretum's most important scenic and historic features. Well documented by images over time, changes to mowing frequency have sought to restore populations of native wildflowers. Current goals are to maintain a meadow effect and to prevent further erosion along the brook as well as any knotweed recurrence.

SPECIAL PRIORITIES

- ✦ **Brooks and stream bank:** Require analysis to mitigate high-velocity events.
- ✦ **Shrub beds:** Require frequent weeding to control *Rubus* sp.

ARBORICULTURE

With the main emphasis of this zone being on maintaining a scenic vista there are obviously few trees found here impeding the view. Those trees that are present are found along Valley and Hemlock Hill Roads. Because these trees grow in an area of high visibility they are constantly receiving care. Recommendations for this zone are to continue monthly inspections and administer care on an as-needed basis.

Annual Care Plan

ALL SEASONS

- Monitor newly planted accessions, investigate problems and take appropriate action.
- Remove or relocate woody debris to roadside for chipper.
- Chip brush.
- Remove weeds from all edges of brooks, shrub beds and mulched areas around trees.
- Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- Apply soil amendments, if needed.
- Remove leaf litter from shrub beds.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- Complete a thorough sweep of brooks for trash after snow melt.

SUMMER

- Remove leaf litter from shrub beds.
- Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Apply soil amendments, if needed.
- Complete a thorough sweep of brooks for trash prior to snowfall.
- Using string trimmer or brush cutter cut back woody and herbaceous material along the brook. Leave a section of plant material each winter to provide wildlife habitat to overwintering beneficial insects. Rotate section annually.
- Clear brook of overgrowth to maintain stream flow and storm water drainage.

WINTER

- Remove all spontaneous woody weeds from shrub beds and around base of trees.
- Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Dodder	<i>Cuscuta</i> sp.	Hand pull, bag, dispose	At first sight
Weeds in paths and cobblestone gutter		Pre and Post-emergent herbicides , Flame Torch	Monthly, as needed during growing season
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate labelled for wetland use	Spring, Summer, Fall when in bloom
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate labelled for wetland use, Hand pull, String trim	Early Summer through late Fall
Purple Loosestife	<i>Lythrum salicaria</i>	Hand pull, Glyphosate	Late Summer
Porcelain-berry	<i>Ampelopsis brevipedunculata</i>	Cut & spray resprouts w/ Triclopyr, Hand pull, Lance with Glyphosate	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

As needs dictate, review collections and the impact of Hemlock Hill management upon them. Review of those plantings in danger of falling into brook due to erosion. Evaluate importance of such plants and repropagate as needed.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Address erosion and drainage issues at the wooden bridge nearest the Walter Street Gate.
- ✦ Address bank erosion along Bussey Brook.

CAPITAL PROJECTS

- ✦ Restore the culvert and crossing on Bussey Brook nearest the *Taxus* collection with a historically appropriate design (See CRMP).

NOTES

3.9 Conifer Collection

Moderate Priority

Low Intensity



Conifer Collection. Sheila Connor.



Conifer Collection. Tom Ward.

AREA PROFILE

The Arboretum's conifer collection is among the finest in the world, offering magnificent specimens and sweeping vistas into the landscape from Hemlock Hill Road and to Peters Hill from knolls within. Conifer Path offers exceptional access to collections and views. Age of collections suggests curatorial review and long-range successional planning.

SPECIAL PRIORITIES

- ✦ **Conifer Tour:** Plants featured on this tour should be weed free and pruned more frequently.

ARBORICULTURE

Extended visits to this zone occurred in the summer of 2007 and again in May 2009. This completed a sweep of the conifer collections. Ideally this collection could now be put on a three to four year rotation, however, the storm of 1.12.11 and continued outbreaks of needle blight will have us back there again this year.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulch areas around trees.
- ✦ Report needs for additional labels to Plant Records Dept. by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Install signs deterring the harvesting of winter greens and berries.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Oriental Bitter-sweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Rhabdocline Needle Cast	<i>Rhabdocline sp.</i>	Mancozeb	Early spring
Diplodia Tip Blight	<i>Sphaeropsis sapinea</i>	Prune & destroy infected plant parts, Mancozeb	When dry, Early Spring, Summer
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Larch Casebearer	<i>Coleophora laricella</i>	<i>Bacillus thuringiensis var. kurstaki</i> , Spinosad	73–350 GDD
Bronze Birch Borer	<i>Agrilus anxius</i>	Imidacloprid	440–2000 GDD
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer
Swiss Needle Cast	<i>Phaeocryptus gaumanni</i>	Mancozeb	Spring, Summer

CURATION

Collections Development:

Age of collection suggests curatorial review and long-range successional planning.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Complete road work on South Side of Path.

CAPITAL PROJECTS

NOTES

3.10 Hebrew Slope and Walter Street Gate Area Moderate Priority

High Intensity



Pseudolarix amabilis, Acc. 16779A. Michael Dosmann.



Walter Street Gate Area. Arnold Arboretum Archives.

AREA PROFILE

This is an important image-making area for the Arnold Arboretum, highly visible from both within and outside the landscape. Enhancement of the perimeter condition and daily litter pick-up will greatly improve its appearance. It will be maintained at the highest standard to represent the horticultural excellence at the Arboretum.

SPECIAL PRIORITIES

- ✦ **Walter Street Gate:** This area will require daily sweeps to keep it completely free of litter, graffiti, weeds, leaves in the fall, and snow and ice in the winter.
- ✦ **Property Edge:** As seen from Bussey and Walter Streets, this perimeter edge should be litter and weed free at all times.
- ✦ **Water birches:** Monitor small stand of *Betula occidentalis* var. *occidentalis* for herbaceous and woody weeds.

ARBORICULTURE

- ✦ In the Hebrew Slope section of Zone 3.10 there are several representatives of the genera *Betula*, *Larix*, and *Picea*. Many of the conifers found here are slow growing and currently require little care. The birch trees, however, do seem to struggle with the poor soil and require routine visits. What does seem to warrant the most attention here are the planting beds that are full with mature shrubs.
- ✦ Another section of Zone 3.10 is the long narrow bed that runs perpendicular to Bussey Street. This bed consists mostly of mature *Taxus* and *Ginkgo* trees. Because these plants have reached maturity, they too are slow growing and require a low level of attention. Some repair pruning will be necessary to clean up after the winter storm of 1.12.11. If conditions remain constant then this zone should not require any more attention until our next planned visit in February 2013.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Monitor newly planted accessions, investigate problems and appropriate actions.
- ✦ Chip brush.
- ✦ Maintain clean edge on all shrub beds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to all young and specimen trees.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to all young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Install signs deterring the harvesting of winter greens and berries.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Larch Casebearer	<i>Coleophora laricella</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	73–350 GDD
Bronze Birch Borer	<i>Agrilus anxius</i>	Imidacloprid	440–2000 GDD
Rhabdocline Needle Cast	<i>Rhabdocline</i> sp.	Mancozeb	Early spring
Diplodia Tip Blight	<i>Sphaeropsis sapinea</i>	Prune & destroy infected plant parts, Mancozeb	When dry, Early Spring, Summer
Swiss Needle Cast	<i>Phaeocryptus gaumanni</i>	Mancozeb	Spring, Summer

CURATION

Collections Development:

Because of this area's close proximity to Weld Hill, review the thematic and functional collections near the gate, wall and brook. Develop a list of acquisitions.

Note: Status of the brook and any rehabilitation will have to play a part in the staging and plant selection.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Evaluate areas of erosion and address them, especially on Conifer Path itself.

CAPITAL PROJECTS

- ✦ Improvements to the property edges to be determined. (NOTE: Wall is falling apart in certain areas.)

NOTES

3.11 Walter Street and Bussey Street Gates

High Priority

Moderate Intensity



Bussey Street Gate, Jill K. Conley.



Walter Street Gate, Jill K. Conley.

AREA PROFILE

Since the gates welcome all visitors to the grounds, they are to be kept in pristine condition as this presentation sets the tone for what will be experienced within the Arboretum. The Walter and Bussey Street Gates are high traffic areas for entry into the Arboretum for both visitors and commuters; a high priority of care should regularly be given to maintain these gates at the highest standard.

SPECIAL PRIORITIES

- ✦ These gates should be kept free of all litter, debris and leaves.
- ✦ All weeds and unwanted vegetation should be controlled.
- ✦ Accessioned plant material should be mulched and maintained at the highest standard.

ARBORICULTURE

- ✦ None.

Annual Care Plan

ALL SEASONS

- ✦ Keep gates free of trash, debris and weeds at all times.
- ✦ Keep gate area free of unauthorized advertisements and solicitations.

SPRING

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

SUMMER

- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

FALL

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

WINTER

- ✦ Keep pedestrian walkways clear of ice and snow.
- ✦ Ensure entire entrance way at Bussey Street Gate is kept clear of snow and ice for all vehicular traffic (including emergency vehicles).

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

None.

Field Checks:

None.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- None.

Additional Projects

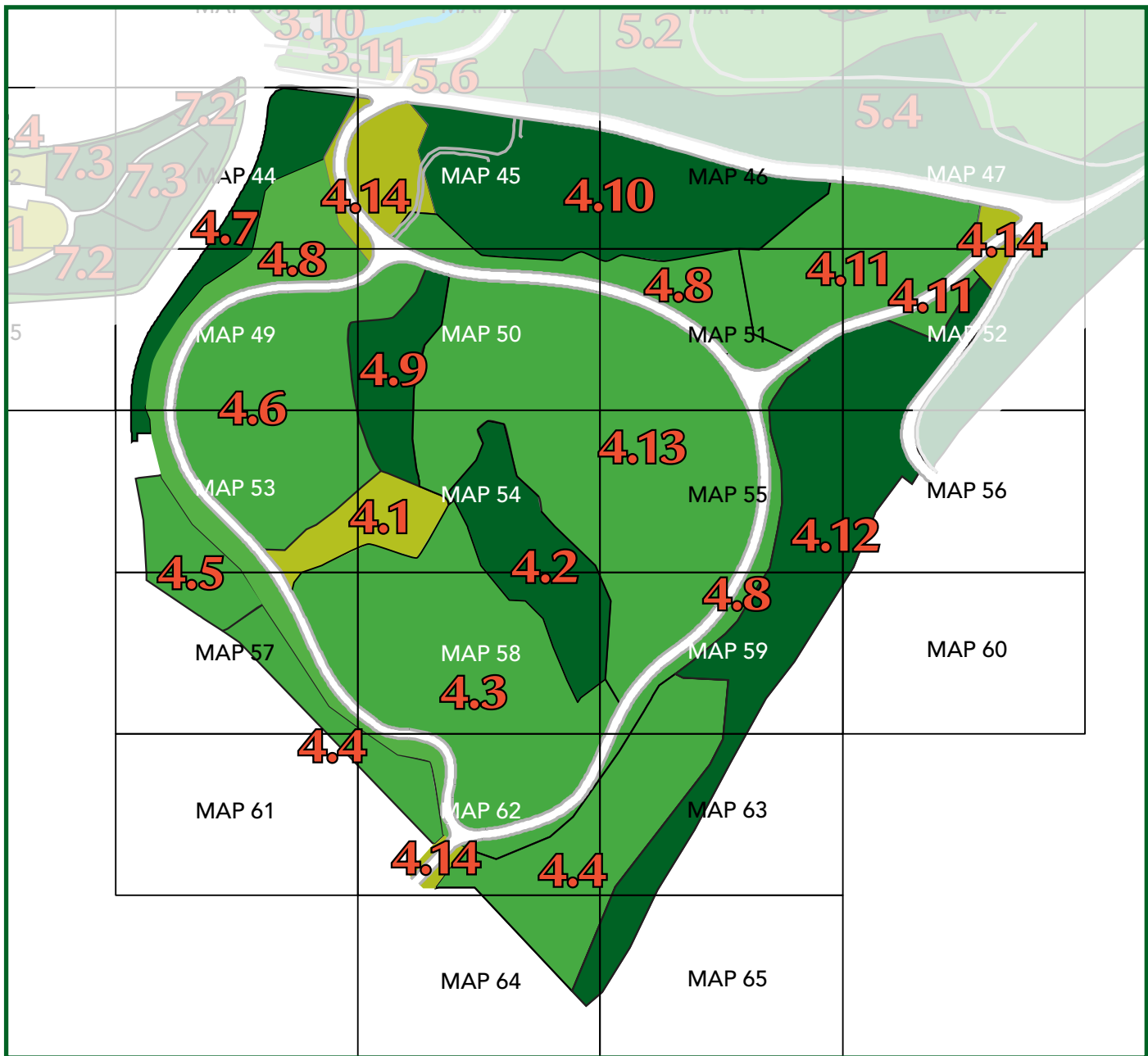
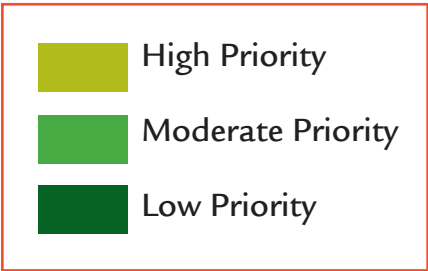
- The Gates should be painted regularly to maintain their integrity and high standard.

CAPITAL PROJECTS

- None.

NOTES

REGION 4 MAP



Region 4—Peters Hill

	<u>Zone</u>	<u>Priority</u>	<u>Intensity</u>
4.1	Peters Hill Summit	High	High
4.2	Peters Hill Natural Woods	Low	Moderate
4.3	Collections Woodland, <i>Larix</i> Grove	Moderate	Moderate
4.4	Oaks (<i>Quercus</i>)	Moderate	Moderate
4.5	Walter Street Burying Ground	Moderate	Low
4.6	Miscellaneous Collections on Slope	Moderate	Moderate
4.7	<i>Pinus</i> along Walter Street	Low	Moderate
4.8	Shrub Beds along Peters Hill Road	Moderate	Moderate
4.9	North-facing Hill	Low	Low
4.10	The Quarry	Low	Moderate
4.11	<i>Populus</i> , <i>Pyrus</i> and Oak Allée	Moderate	Moderate
4.12	South Street and Commuter Rail Edge	Low	High
4.13	Rosaceous Orchard	Moderate	High
4.14	Gate Areas of Peters Hill	High	Moderate

4.1 Peters Hill Summit

High Priority
High Intensity



Peters Hill, aerial view. Jay Connor.



View from Peters Hill. Jill K. Conley

AREA PROFILE

As a major destination point for visitors, this area must be maintained at a high standard. Overlooking downtown Boston, the summit allows for relaxing views and a nice place to sit. Summit was redesigned in 1998 and planted with *Rhus*, *Comptonia*, and other natives adapted to site conditions. On June 15, 1999 the Peters Hill Plantings were dedicated in honor of Jack Connors and a brass plaque was installed at the base of one of the granite piers at the entrance. Litter is a frequent problem in summer.

SPECIAL PRIORITIES

Zero litter and graffiti. Turf should be in good condition. The shrub beds must remain litter free, weeded and edged. Vegetation should not be allowed to take over the hardscape.

ARBORICULTURE

The main emphasis for this zone is based on the attention it draws as a scenic destination point. Many of the plants found in this zone are located within bed plantings, most of the trees are not. The trees here seem to be at a disadvantage due to the poor soil type. Their health and vigor may improve if the soil medium were less compacted and held a higher percentage of organic matter. Currently the trees found in this zone require only an annual visit to remove any dead or diseased branches and pruning for structural training.

Annual Care Plan

ALL SEASONS

- ✦ String trim as needed around hardscape.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Weed all beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.
- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.

SUMMER

- ✦ Remove leaf litter from shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Top dress and seed lawn areas where needed.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- + None.

Every 3 years, or as needed

- + Prune shrubs to rejuvenate.
- + Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- + Soil compaction continues to be a major obstacle in establishing turf. Assess functionality of current design.

CAPITAL PROJECTS

- + Complete renovation of the composting facility, including paving the site and amending the drainage issues.

NOTES

4.2 Peters Hill Natural Woods

Low Priority
Moderate Intensity



Peters Hill Natural Woods. Jennifer Leigh.



Peters Hill Natural Woods. Robert Mayer.

AREA PROFILE

This area was preserved as natural woodland by C.S. Sargent. Over time, a number of exotics have infiltrated the site. Freeing the area of invasive plants is an important priority.

SPECIAL PRIORITIES

This zone represented the site of the Hunnewell internship project for the years 2008, 2009, and 2010. During that time the invasive plant problems of this area were identified and an initial eradication push was initiated. This area needs to be aggressively monitored in order to maintain the results that were achieved through this effort.

ARBORICULTURE

For three years this zone was the site of the Arboretum Intern project. The main focus was to eradicate the non-native invasive plant species. One method of removing the larger non-native trees without creating too much disruption to the site was to girdle the trees and let them die “on the stump.” Not wanting to generate hazardous conditions the arborist team returned to this zone to remove the now dead trees and all other potentially hazardous conditions. With a continued planned approach to controlling the invasive species this zone should require only occasional visits to preserve it as a “native” natural wooded area.

Annual Care Plan

ALL SEASONS

- ✦ Remove woody volunteer exotics. Pull or inject with herbicide.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ None.

WINTER

- ✦ None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Oriental Bitter-sweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Corktree	<i>Phellodendron</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Bronze Birch Borer	<i>Agrilus anxius</i>	Imidacloprid	440–2000 GDD

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ None.

NOTES

4.3 Collections Woodland, *Larix* Grove

Moderate Priority

Moderate Intensity



Pseudolarix amabilis. Peter Del Tredici.



Pseudolarix amabilis. Arnold Arboretum Archives.

AREA PROFILE

This area has some large mature trees that need care. The larch collection is a C.S. Sargent planting, with Japanese larch (*Larix kaempferi*) as well as other *Larix* spp. thought to reflect his interest in silviculture and reforestation. This area provides an important vista greeting visitors coming through Mendum Street Gate.

SPECIAL PRIORITIES

Scouting for dead wood, disease and damage is a priority for this area.

ARBORICULTURE

This large zone encompasses many different genera of trees ranging from young to old. The two genera that are most heavily planted, *Larix* and *Quercus*, hold trees that are close to, or over, 100 years old. Many of these ageing trees are facing a decline in their health. Due to the advanced age and large number of trees, return trips to this zone are required to remove accumulating deadwood. We plan a thorough sweep through this zone and will implement a plan for aftercare. Improving the health of these trees might help to decrease the time required between return visits. The multitude of younger trees in this zone will also command attention, requiring yearly inspections and grooming. This zone, like others located on Peters Hill, may rank as moderate priority, but demand a high level of intensity.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove invasive weeds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Larch Casebearer	<i>Coleophora laricella</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	73–350 GDD

CURATION

Collections Development:

Review and ID those plants likely to be removed 1–5, 5–10, 10–15 years and undergo plans for succession.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ Investigate the possibility of bringing irrigation from Mendum Street to this area. It would be highly beneficial to this area during a drought.

NOTES

4.4 Oaks (*Quercus*)

Moderate Priority

Moderate Intensity



Oak Collection. Jen Leigh.

*Quercus alba*. Jen Leigh.

AREA PROFILE

The first area that greets visitors who come through Mendum Street Gate, this zone contains some large mature trees that need increased care. It includes first generation, wild-collected *Quercus* accessions that may have been part of Sargent and Wilson's interest in establishing forestry plantations in preparation for a planned but never realized timber tree breeding program.

SPECIAL PRIORITIES

Pruning care with increased attention to dead wood and disease should be a priority in this area.

ARBORICULTURE

- ✦ This large collection of older declining trees requires regular removal of dead and dying branches. One of the primary reasons for the decline of the trees in this zone is the compacted soil. In order to avoid perpetuating this problem, pruning these trees will be scheduled for the winter months when the ground is frozen and less likely to compact under the weight of the bucket truck. Waiting for the ground to freeze however, creates a small window of opportunity to work the trees, and advance planning is required to complete the entire zone.
- ✦ Achieving the goals for this zone will require a thorough sweep of all trees and a care plan to improve health and slow decline. It should be noted that there is also a small collection of beech trees within this zone that need to be closely monitored for the presence of fungal cankers. All dead or dying branches should be removed from these trees as quickly as they are found to reduce the threat of this disease spreading.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove invasive weeds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Wild Crabapple	<i>Malus</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Two-lined Chestnut Borer	<i>Agrilus bilineatus</i>	Reduce stress, Good cultural practices, Imidacloprid	Year round
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Larch Casebearer	<i>Coleophora laricella</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	73–350 GDD

CURATION

Collections Development:

Review and ID those plants likely to be removed 1–5, 5–10, 10–15 years and undergo plans for succession.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Replant specimen trees at the Mendum Street Gate area where beeches once were.

CAPITAL PROJECTS

- ✦ Investigate the possibility of bringing irrigation from Mendum Street to this area. It would be highly beneficial to this area during a drought.

NOTES

4.5 Walter Street Burying Ground

Moderate Priority

Low Intensity



Sorbus alnifolia, Acc. 3626B. Michael Dosmann.



Walter Street Burying Ground. Sheila Connor.

AREA PROFILE

This historic burying ground, established in 1712, is owned by the City but it is the responsibility of the Arboretum to maintain the turf and trees, per an agreement signed on May 22, 1946 between the City of Boston Parks Department and the President and Fellows of Harvard College. The burying ground contains the graves of early settlers and a single large tomb for Revolutionary soldiers.

SPECIAL PRIORITIES

- ✦ Keep weed trees, vines and other unwanted vegetation from growing on or near the headstones.
- ✦ Maintain American flags in good condition at headstones of veterans.
- ✦ Keep the Walter Street steps clear of debris (weeds, leaves, snow).

ARBORICULTURE

- ✦ Enclosed within the border of the burying ground are the mass plantings of the genera *Metasequoia* and *Liriodendron*. The *Metasequoia* were planted in the early 1990s and are in good condition. The *Liriodendron* were planted back in 1924 and are doing poorly. Most of the trees that constitute this mass are exhibiting signs of die back in their central leaders. Because of their excurrent growth habit this condition affects a large portion of the trees' crowns. In order to remedy the trees' conditions, large reduction cuts, down to substantially sized healthy leaders, will have to be made.
- ✦ This zone is also home to a very large and old *Sorbus alnifolia* 3626*B. This tree is in need of some care as well, and would benefit from the following type of treatments:
 - ✦ Prune for sanitation; remove all dead and diseased branches.
 - ✦ Cable two of its main leaders to add support to a large weakened branch union.
 - ✦ Aerate and add composted mulch beneath the drip line to help amend the soil and boost the tree's vigor.

Annual Care Plan

ALL SEASONS

- Monitor newly planted accessions, investigate problems and take appropriate action.
- Remove or relocate woody debris to roadside for chipper.
- Chip brush.
- Remove invasive weeds.
- Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- Apply soil amendments, if needed.
- Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- Remove all spontaneous woody weeds at property edge along the stone wall.

FALL

- Remove all spontaneous woody weeds from around base of trees and at property edge along the stone wall and headstones.
- Apply soil amendments, if needed.
- Remove leaf litter accumulating at headstones.
- Mulch/mow leaves.

WINTER

- Remove all spontaneous woody weeds from around base of trees and at property edge along the stone wall.
- Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/ Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ This area may be a candidate for bulb planting in the future.

CAPITAL PROJECTS

- ✦ Restore the original stone boundary wall removed in 1923 that once stood between the cemetery and the Arboretum (CRMP recommendation).

NOTES

4.6 Miscellaneous Collections on Slope

Moderate Priority

Moderate Intensity



Prunus cerasifera. Sheryl White.



Gleditsia triacanthos 'Majestic'. Michael Dosmann.



Prunus cyclamina. Sheryl White.

AREA PROFILE

A wide-ranging miscellany of genera, this area should be defined as to what it is. Existing plants should be vetted and some statement of themes or purpose brought to bear on the area's reorganization. Plants that are important, including wild-collected *Lindera* and *Clethra*, need extra care.

SPECIAL PRIORITIES

Plantings here need to be vetted.

ARBORICULTURE

As its name implies, this zone is home to a wide array of plant material. Four genera of trees in this zone, including *Prunus*, represent the Rose family. This family, and primarily this collection of *Prunus*, tends to require a considerable amount of labor in order to keep them healthy. There is also a fair representation of mature oak trees that also demand frequent attention. It is recommended that this zone receive a maintenance schedule of every two years.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove invasive weeds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborists as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborists as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Black Knot	<i>Apiosporina morbosa</i>	Prune knots & an additional 4" behind swelling	Late Winter to early Spring
Brown Rot	<i>Monilinia fruticola</i>	Prune and destroy infected plant parts; Potassium salts of phosphoric acid	Spring, Summer
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry

CURATION

Collections Development:

Follow-up on shrub review (2009) and work to re-propagate and relocate shrubs of value.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Curatorial review of all shrubs and trees.

CAPITAL PROJECTS

- ✦ None.

NOTES

4.7 *Pinus* along Walter Street

Low Priority
Moderate Intensity



Pinus strobus. Jennifer Leigh.



Pinus thunbergiana. Sheryl White.

AREA PROFILE

White pine (*Pinus strobus*) plantation established by C.S. Sargent to screen roads and provide some visual connection to contiguous Arboretum through continuation of evergreen belt. This area is also an extension of the conifer collection with *Pinus*, *Picea*, *Larix* and others. Maintain a grove of pines on the edge of Peters Hill that currently cascades over a well-used visitor path. Visitors should feel safe as they walk or jog the path.

SPECIAL PRIORITIES

Keep area free from fallen dead wood and invasive plants.

ARBORICULTURE

A large portion of this zone consists mainly of conifers. Roughly half of them are made up of a mass planting of *Pinus strobus* planted in 1950. These trees were last pruned in March of 2009. Due to their habit of accumulating a significant amount of deadwood in their crowns over time, these trees will be scheduled to be pruned again in March of 2012. Within this collection of conifers there are close to three dozen trees that are of the centurial class. These trees, too, would benefit from being pruned for sanitation. It is reasonable to assume that once these trees have been maintained they could be kept on a three- or four-year pruning rotation.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove invasive weeds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, as needed.
- ✦ Prune bamboo away from destination sign.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Mow back weeds (or in Fall).

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees and at property edge along the stone wall.
- ✦ Apply soil amendments, as needed.
- ✦ Mow back weeds (or in Summer).

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees and at property edge along the stone wall.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborists as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Poison Ivy	<i>Toxicodendron radicans</i>	Triclopyr, Lance with Glyphosate (clean any surface of lance that comes in contact with plant)	Spring, Summer
Wild Blackberry	<i>Rubus</i> spp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Dodder	<i>Cuscuta</i> sp.	Hand pull, bag and dispose, Flame Torch	At first sight

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Larch Casebearer	<i>Coleophora laricella</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	73–350 GDD

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Evaluate bamboo at property edge.

CAPITAL PROJECTS

- ✦ None.

NOTES

4.8 Shrub Beds along Peters Hill Road

Moderate Priority

Moderate Intensity



Lindera obtusiloba. Peter Del Tredici.



Hamamelis 'Diane'. Peter Del Tredici.

AREA PROFILE

Keeping these shrub beds well weeded, edged and mulched will set a new tone for the Peters Hill side of the Arboretum, sending a particularly positive message to the Hill's many frequent visitors. For the many walkers who confine their travels to the road circling the Hill, the beds are an important focus. These shrub beds include important wild-collected accessions, including CPC, as well as plants of garden or unknown origin—curatorial review is needed.

SPECIAL PRIORITIES

- ***Diervilla sessilifolia* plantings:** These CPC plants are located in shrub beds in map quadrants 57SE and 62NW, will require pruning to be maintained as individual specimens.

ARBORICULTURE

Although the name of this zone gives attention to plants of smaller stature, there are a considerable number of large ornamental shrubs and trees that require the qualifications of the arborist team to maintain. Many of the trees belong to the Rosaceous family. Because of their growth habits and high level of visibility, these plants will warrant frequent attention. Rejuvenation and structural pruning will presumably be necessary every two years.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove weeds from all shrub beds and mulched areas around trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from all shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2” to young trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaf litter from all shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry
Two-lined Chestnut Borer	<i>Agrilus bilineatus</i>	Reduce stress, Good cultural practices, Imidacloprid	Year round

CURATION

Collections Development:

As part of the 2009 review of miscellaneous shrub beds, follow-up on re-propagation/relocation, and elimination of unnecessary beds.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

CAPITAL PROJECTS

- ✦ None.

NOTES

4.9 North-facing Hill

Low Priority

Low Intensity



North-facing Hill. *Jennifer Leigh.*

AREA PROFILE

Mainly a grassy area, this has most recently been designated as nesting habitat for migratory birds.

SPECIAL PRIORITIES

We must keep out woody weeds while still maintaining sufficient habitat during the mating season.

ARBORICULTURE

Due to the area profile of this zone and its special priorities, any trees found in this zone ought to be incorporated with the zones they are found nearest to and resemble most (i.e., Zones 4.6 and 4.13).

Annual Care Plan

ALL SEASONS

- ✦ None.

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ None.

WINTER

- ✦ None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ This area would be a good candidate for wild flower growth.

CAPITAL PROJECTS

- ✦ None.

NOTES

4.10 The Quarry

Low Priority
Moderate Intensity



The Quarry, Jill K. Conley.



AREA PROFILE

The Quarry will remain our recycling center. Natural woods acts as a screen from the public eye. This area should remain free of invasive plant species.

SPECIAL PRIORITIES

Keep invasive plant species from contaminating our compost and mulch with weed seed.

ARBORICULTURE

There are several foot paths that run through the wooded area surrounding the recycling area. An occasional inspection will detect and remove any potential hazardous conditions over these paths. Time and attention should also be given to controlling the invasive species found in this zone. This could be done in conjunction with the visual inspections, or as a separate task altogether. Special consideration should also be given to the Bussey Street border of this zone, especially by the gated entrance to the recycling area. Due to its close proximity to Bussey Street, the function this area has as a collection area for wood (both host and non-host species of the ALB) and the fact that many host species trees grow in this zone; special consideration should be given to regular inspections of these trees for evidence of the ALB.

Annual Care Plan

ALL SEASONS

- ✦ Using loader, consolidate wood chip pile.
- ✦ Using loader, load dumpster with nearby debris.
- ✦ Turn compost pile.
- ✦ Grind wood chips into double ground mulch.
- ✦ Screen compost pile every other year or as needed.

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ None.

WINTER

- ✦ None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in compost pile		Apply herbicide to compost pile and surrounding area.	Monthly, as needed during growing season
Bur Cucumber	<i>Sicyos angulatus</i>	Glyphosate, Hand pull before flowering	Spring, Summer
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/ Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Diplodia	<i>Sphaeropsis</i>	Prune & destroy infected plant parts, Mancozeb	When dry, Early Spring
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Replace gate at entrance off of Bussey Street.
- ✦ Improve planting along Bussey Street to better screen the recycling center.
- ✦ Evaluate bamboo planted along Bussey Street.

CAPITAL PROJECTS

- ✦ Complete renovation of the composting facility, including paving the site and amending the drainage issues.

NOTES

4.11 *Populus, Pyrus* and Oak Allée

Moderate Priority

Moderate Intensity



Populus deltoides. Peter Del Tredici.

AREA PROFILE

This relatively under-utilized entrance contains the Arboretum's most formal and best defined allée comprising of large, mature trees in need of care (mostly red oaks of unknown origin). This is the first area greeting visitors coming through Poplar Gate.

SPECIAL PRIORITIES

- ✦ Removal of deadwood, disease and damage is a priority in this area.
- ✦ Special attention needs to be paid to the ailing *Pyrus* collection.

ARBORICULTURE

Due to what seems to be poor growing conditions, the health of the collections in this zone seem to suffer. The removal of die-back is a constant concern and struggle. An effort should be made to improve the health of the trees with special attention given to the soil structure and moisture. At the present time, these trees demand yearly visits to remove the heavy accumulation of deadwood. By improving the health of the trees it is expected the amount of maintenance currently required would lessen and it is reasonable to assume that these trees could then be maintained with a two to three-year pruning cycle.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove invasive weeds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Prevent natural woods from encroaching on collection. Remove spontaneous weed trees along natural woodland bi-annually.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborists as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborists as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Poison Ivy	<i>Toxicodendron radicans</i>	Triclopyr, Lance with Glyphosate (clean any surface of lance that comes in contact with plant)	Spring, Summer

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Two-lined Chestnut Borer	<i>Agrilus bilineatus</i>	Reduce stress, Good cultural practices, Imidacloprid	Year round
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

Recent and future removals of large oak specimens have created a number of canopy gaps. Determine candidate acquisitions and timeline for replacements.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Review and revitalize the *Pyrus* collection.
- ✦ Underplant *Quercus* allée with *Quercus* of known wild origin to address age diversity issues.

CAPITAL PROJECTS

- ✦ Investigate the possibility of bringing in irrigation from South Street. It would be beneficial to this area during a drought.

NOTES

4.12 South Street and Commuter Rail Edge

Low Priority

High Intensity



South Street and Commuter Rail edge. Peter Del Tredici.



AREA PROFILE

Maintain trees for erosion control. Eradicate invasive woody plants. Poor soil quality predominates.

SPECIAL PRIORITIES

- None.

ARBORICULTURE

Many of the trees found in this zone are conifers, which were planted in the late 70s and early 80s with the intention of providing a screen from the commuter rail. These trees are growing in a soil medium best described as fill. The soil has a low percentage of organic matter, and because of its coarse texture, a reduced ability to hold moisture. These characteristics create growing conditions that cause slow and stunted growth. Because of their slow growth, the time between pruning visits may be extended. It is suggested that these trees be put on a three-year pruning rotation with occasional visits after storms to remove any damage.

Annual Care Plan

ALL SEASONS

- ✦ Chip brush.
- ✦ Remove invasive weeds.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Oriental Bitter-sweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Two-lined Chestnut Borer	<i>Agrilus bilineatus</i>	Reduce stress, Good cultural practices, Imidacloprid	Year round
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ None.

CAPITAL PROJECTS

- ✦ None.

NOTES

4.13 Rosaceous Orchard

Moderate Priority

High Intensity



Malus 'Donald Wyman', Acc. 23254A. John DelRosso.



Crab Apple *Malus spectabilis* × *micromalus baccata*. Arnold Arboretum Archives.

AREA PROFILE

Bring back “Crab Apple Saturday” in two years. A considerable amount of work has been done to this collection over the past 3 years. The trees have all been pruned in a way that allows for mowing to occur under each one. This mowing has enabled us to keep ahead of the vines that have been choking out this collection. Now that this threat has been tamed, it’s time to increase the health and vigor of these plants to a level of quality that warrants its own annual festival. Curatorial review (2010–2012) to vet collections and clarify aim of cultivar collections, particularly crab apple needs follow up to repropagate/acquire new accessions.

SPECIAL PRIORITIES

Eradication of *Celastrus orbiculatus* is a high priority.

ARBORICULTURE

Because of their growth habits and responses to pruning, ornamental trees of the Rose family tend to require a high degree of maintenance. Combine this with a desire to put these trees on display during their peak bloom and a maintenance level of high intensity is created. In the winter of 2007–08 every tree in this zone was pruned, and another sweep was made in March of 2010. Structural pruning cuts were made, dead and diseased branches were removed, and lower limbs raised in order to allow mowing beneath the trees to deter invasive vines from entering them. The objective is to improve the health and vigor of these trees and place them on a two-year pruning rotation. However, with this zone being the focus of the Apprentice Miles Sax, this year maintenance will continue to be a priority and pruning will commence again in March.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Remove invasive weeds—especially look for persistent vines growing up or near the base of trees.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Black Knot	<i>Apiosporina morbosa</i>	Prune knots & an additional 4" behind swelling	Late Winter to early Spring
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry
Brown Rot	<i>Monilinia fruticola</i>	Prune and destroy infected plant parts; Potassium salts of phosphoric acid	Spring, Summer

CURATION

Collections Development:

Develop *Malus* following 2010/2011 review.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.
- ✦ Prune to lift branches to ease mowing and to discourage aggressive vines from growing into the canopy.

Additional Projects

- ✦ In two years, hold the re-birth of Crab Apple Saturday.
- ✦ Curatorial review needed for *Malus*.

CAPITAL PROJECTS

- ✦ Extend fire hydrant line into Peters Hill. This area would benefit greatly from irrigation during droughts.

NOTES

4.14 Gate Areas of Peters Hill

High Priority

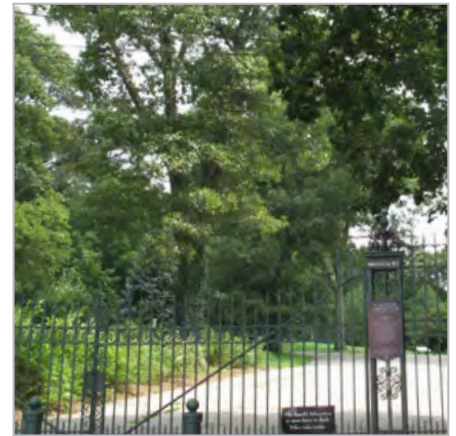
Moderate Intensity



Poplar Gate, Jill K. Conley.



Bussey Street Gate, Jill K. Conley.



Mendum Street Gate, Jill K. Conley.

AREA PROFILE

From the mature allée at Poplar Gate, to the welcoming neighborhood entrance at Mendum Street, the gates of Peters Hill offer a diversity of arrival and entry experiences, and are a high priority for care and presentation.

SPECIAL PRIORITIES

- ✦ Remove all litter, graffiti, unauthorized advertisements and solicitations.
- ✦ Clear all unwanted vegetation mechanically or chemical.
- ✦ CPC holdings of *Spiraea virginiana* must be regularly maintained as single individuals.

ARBORICULTURE

With a level of moderate intensity focused on such small areas, special consideration can be given to individual plants at each gate entrance.

- ✦ Peters Hill Gate at Bussey Street seems to receive perpetual care. As a result the plant material found nearby is in good condition. Special attention needs to be given to *Taxus* 'Thayerae'. In order to keep this intersection safe this plant needs to be continuously cut back. Just opposite the *Taxus* 'Thayerae' is a row of *Campsis radicans*. If making a good impression is in order here then consideration should be given to removing these vines or providing them a structure on which to grow. Located behind the *Campsis* is a grove of *Pinus resinosa*. These trees provide a nice setting as they grow on a small knoll overlooking the entrance to Peters Hill. Unfortunately, they are infected with a fungal needle blight. In October of 2006 these trees were pruned for sanitation, removing infected branches and needles. The area was raked clean of all debris and mulched, and the trees have been put on a spray program. Unfortunately, symptoms of the disease are still evident and efforts to save these trees will need to be stepped up as the health of these trees continue to decline.
- ✦ The most impressive plants that greet visitors at Poplar Gate might be the *Fagus grandifolia* along the right-hand side upon entering. This tree will continue to be groomed as it matures to reduce any accumulation of structural defects. There is a triad of medium-sized *Tsuga canadensis* nearby that should continue to be protected from the Hemlock Woolly Adelgid. Just beyond the hemlocks there is a small grove of non-accessioned *Betula* sp.; these trees were in poor condition. In an attempt to rejuvenate these trees and improve their health, coppice pruning cuts were made. The wooded medium along South Street is encroaching upon the accessioned plants. Weed trees will be cut back and removed from this area.
- ✦ There are newer plantings around the Mendum Street Gate area of Oak, Elm, and *Aesculus* and these plants will require annual structural pruning as they mature. Currently this task can be performed by the Horticultural Technologist whom has possession of this zone. There are also three large *Quercus rubra* and one *Acer platanoides* that must be kept clean of any potential hazardous conditions.

Annual Care Plan

ALL SEASONS

- ✦ Cut back.

SPRING

- ✦ Remove all weeds, leaves.

SUMMER

- ✦ None.

FALL

- ✦ Remove all weeds, leaves.

WINTER

- ✦ Remove all ice and snow.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in pavement cracks		Pre and Post-emergent herbicides	Monthly, as needed during growing season

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Fireblight	<i>Erwinia amylovora</i>	Prune & destroy infected plant parts, Potassium salts of phosphoric acid	When dry

CURATION

Collections Development:

Continue to develop landscape beds at each gate.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

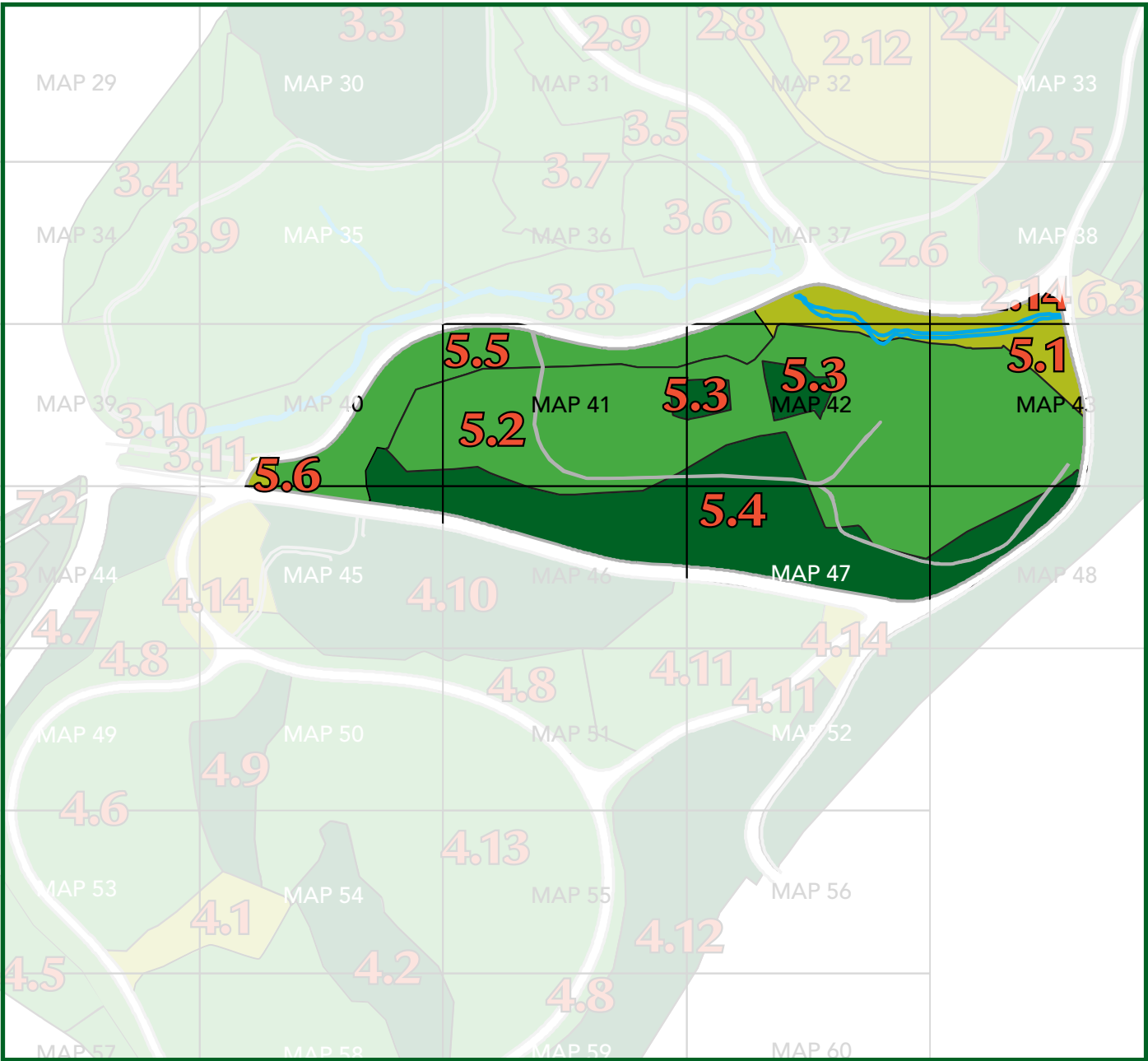
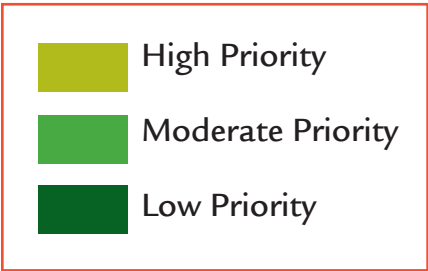
- ✦ Re-point all stone pillars at gates every three years or as needed.
- ✦ Evaluate bamboo plantings at Poplar and Peters Hill Gates.
- ✦ Improve plantings for each gate with unique combinations of shrub and trees.

CAPITAL PROJECTS

- ✦ None.

NOTES

REGION 5 MAP



Region 5—Hemlock Hill

	<u>Zone</u>	<u>Priority</u>	<u>Intensity</u>
5.1	<i>Rhododendron</i> /Davison Path Corridor	High	Moderate
5.2	Hemlock Dominant Slope	Moderate	Moderate
5.3	Cut Plots	Low	High
5.4	Hardwood, Mixed Hemlock/Deciduous	Low	Low
5.5	Accessions, including Understory Road Edge	Moderate	Moderate
5.6	Bussey St. Gate	High	Moderate

5.1 *Rhododendron*/Davison Path Corridor

High Priority

Moderate Intensity



Rhododendron Path. 1990. Linda J. Davison.



Bussey Brook. Richard Schulhof.

AREA PROFILE

The Davison Path through ‘Rhody Dell’ was designed by Julie Moir Messervy and Gary Koller in 1991 to provide contemplative enjoyment of Bussey Brook and display a collection of *Rhododendron* and plantings of *Anemone canadensis*, *Epimedium* sp. and other perennials selected for this shaded woodland environment.

SPECIAL PRIORITIES

In collaboration with IPM specialists and the arborists, provide appropriate protection for selected hemlock. Inspect for tree hazards and alert arborists as appropriate. Also because of this area’s heavy use in summer, daily pick-up of litter is an important priority.

ARBORICULTURE

Although the priority level of this zone is considered high, the maintenance requirements, from an arboricultural standpoint, are low. Most importantly the *Tsuga canadensis* need protection from the hemlock woolly adelgid. These trees also need to be kept clean of hazardous conditions. There are several young oaks, ornamental maples, and a small array of mature deciduous trees scattered throughout this zone that will elicit yearly visits for structural pruning. In the fall of 2006 several of the *Rhododendrons* were found to be infected with the fungal bud and twig blight *Briosisia azaleae*. This fungal blight will kill flower buds. A major step was taken towards removing all infected parts of the plants. Pruning for sanitation, and to allow for better circulation of light and air was also done. Currently the plants have improved significantly. They should continue to be closely monitored.

Annual Care Plan

ALL SEASONS

- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Remove weeds from all shrub beds.
- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Chip brush.
- ✦ Prune all dead wood. To prevent spread of fungus on *Rhododendron* do this in dry weather.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Remove leaves from all shrub beds.
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.

SUMMER

- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.

FALL

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Apply soil amendments, if needed.
- ✦ Remove leaves from all shrub beds.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborist as necessary.
- ✦ Clear brook of overgrowth and debris to maintain stream flow and storm water drainage.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/ Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Kalmia Leaf Spot	<i>Pseudocercospora kalmiae</i> and <i>Phylosticta colorata</i>	Mancozeb, Collect and destroy fallen leaves in fall	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

As needs dictate, review collections and the impact of Hemlock Hill management upon them.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune shrubs to rejuvenate.
- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ This area needs to be integrated into a longer term care program for selected hemlock on the hill, with stem- and soil-injected Imidacloprid applied as appropriate.
- ✦ Collection of *Rhododendron* cultivars needs curatorial review and definition of purpose. Original mix for herbaceous layer has been partly lost to aggressive nature of anemone; future species composition and care protocols need to be determined.
- ✦ In the path area, lost hemlock have been replaced with garden-origin oaks—work to replace with *Tsuga chinensis* over time.
- ✦ Prune hemlocks to improve air circulation in *Kalmia* Collection.

CAPITAL PROJECTS

- ✦ Install irrigation.
- ✦ Stabilize Bussey Brook banks.

NOTES

5.2 Hemlock Dominant Slope

Moderate Priority

Moderate Intensity



Hemlock Hill. Richard Schulhof.



Hemlock Hill. Richard Schulhof.

AREA PROFILE

The hemlock-dominated woodland is among the Arboretum's most historically significant areas, with public use dating to the early 1840s. Protecting trees from adelgid, as is logistically, environmentally and financially feasible, is the key goal.

SPECIAL PRIORITIES

Hemlock protection efforts are not always successful, and some trees will be deemed beyond recovery or otherwise poor candidates for treatment. Also, the area is frequently used in spring and fall for an elementary school field study. Consequently, inspecting for and eliminating tree hazards will be a critically important task.

ARBORICULTURE

As noted in the main course of the LMP, the special priority for Zone 5.2 is keeping it safe from the hazardous conditions that dead and dying hemlocks create. It is recommended that inspections and rectifications be performed at least once a year.

Annual Care Plan

ALL SEASONS

- ✦ Inspect for hazardous trees, engage arborists as appropriate.
- ✦ Remove woody debris, protruding dead limbs, poison ivy and other hazards in the vicinity of school program field study.
- ✦ Eliminate exotic vegetation, some history of Japanese knotweed in this area (large amounts of regeneration in areas of hemlock decline).
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.
- ✦ Regularly inspect areas used by the children's program for hazardous trees, dangerous deadwood and snags. Remove immediately and contact the Manager of Children's Education.

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ None.

WINTER

- ✦ None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Devil's Walking Stick	<i>Aralia spinosa</i>	Lance with Glyphosate	When temps are above 40° F
Buckthorn	<i>Frangula</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

Discuss future planting plans for both the dominant slope as well as the cut plots. Explore opportunities for the siting of new *Tsuga* acquisitions in this area to accommodate NAPCC needs.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Long-term care program for hemlock population, including continuing applications of horticultural oil and Imidacloprid for “Preservation Zone.”
- ✦ In canopy gaps, replant with *Tsuga* and/or other taxa.

CAPITAL PROJECTS

- ✦ None.

NOTES

5.3 Cut Plots

Low Priority

High Intensity



Hemlock Hill, cut plots. Jennifer Leigh.



AREA PROFILE

These areas were clear-cut in winter 2004 as part of the Harvard Forest research project looking at ecological impacts of hemlock removal. The three-year study has monitored successional vegetation, thereby precluding any vegetation management during this period. A substantial investment of resources is needed to eliminate established *Frangula* and other exotics when the Harvard Forest study concludes.

SPECIAL PRIORITIES

Control of invasives and promotion of native woodland are important priorities.

ARBORICULTURE

The special priorities in Zone 5.3 specify that the spread of invasive species be controlled. This responsibility falls on the shoulders of the Horticultural Apprentice. If needed, this person may secure the assistance of the arborist for removal of large plant material.

Annual Care Plan

ALL SEASONS

- ✦ Remove woody exotics.
- ✦ Use chemical herbicides to manage vegetation.

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ None.

WINTER

- ✦ None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

Discuss future planting plans for both these plots and the dominant slope. Explore opportunities for the siting of new *Tsuga* acquisitions in this area to accommodate NAPCC needs.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ As has been observed on similar sites, dense stands of black birch are expected to eventually shade out most herbaceous species, including exotics.

CAPITAL PROJECTS

- ✦ None.

NOTES

5.4 Hardwood, Mixed Hemlock/Deciduous

Low Priority

Low Intensity



Hemlock Hill. Richard Schulhof.

AREA PROFILE

Mostly oak, maple and hickory, this area includes scattered hemlock. Because this is sub-prime habitat for hemlock (western-southern exposure) any chemical protection efforts will be very selectively applied and given lower priority than the program planned for optimal habitat areas on the northern and eastern slopes. The path along Hemlock Hill's southern slope is frequently used in spring and fall for a school program field study. Poison ivy here has been a problem.

SPECIAL PRIORITIES

- ✦ Control of invasives and promotion of native woodland. Keep path hazard free.
- ✦ *Buckleya distichophylla*: Our oldest accessioned plant, collected by Asa Gray.

ARBORICULTURE

Due to the decline of the hemlocks on Hemlock Hill two major repercussions have presented themselves: the increase of potentially hazardous conditions presented by the dead or dying hemlock trees, and the surge of invasive species. As noted in the special priorities of Zones 5.2 and 5.3 these issues are addressed through regular monitoring and removals. Considering their close proximity and matching concerns, these zones may all be treated as one with similar treatments and timing.

Annual Care Plan

ALL SEASONS

- ✦ Walk school program path and eliminate any poison ivy, woody debris or other nearby hazard.
- ✦ Weed woody exotics.

SPRING

- ✦ None.

SUMMER

- ✦ None.

FALL

- ✦ None.

WINTER

- ✦ None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Buckthorn	<i>Frangula</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Several hundred liners—oak, maple, beech, hickory—were planted on the southern slope in spring 2006. Revegetation efforts in areas of hemlock decline may require additional plantings.

CAPITAL PROJECTS

- ✦ None.

NOTES

5.5 Accessions, including Understory Road Edge

Moderate Priority

Moderate Intensity



Kalmia latifolia 'Elf'. Arnold Arboretum Archives.



Pseudotsuga menziesii var. *glauca*. Arnold Arboretum Archives.

AREA PROFILE

An extension of the conifer collection, this area contains valuable *Tsuga*, *Pseudotsuga* and a border of *Kalmia* established by C.S. Sargent.

SPECIAL PRIORITIES

ARBORICULTURE

Stretching from Rhododendron Dell to the Bussey Street Gate this zone encompasses a large collection of *Kalmia latifolia* and *Pseudotsuga menziesii*. Recently these plants have seen a decline in their health. Efforts have been made to reduce the spread of fungal leaf spots by removing dead and diseased branches as well as applications of fungicidal sprays. These treatments should continue for as long as the symptoms remain or improvements are seen in the plants overall health. Other accessioned plants found in this zone will receive periodic inspections and necessary repairs made to them.

Annual Care Plan

ALL SEASONS

- ✦ Monitor newly planted accessions, investigate problems and take appropriate action.
- ✦ Remove or relocate woody debris to roadside for chipper.
- ✦ Chip brush.
- ✦ Report needs for additional labels to Plant Records office by filling out a Plant Care Request Form.

SPRING

- ✦ Apply soil amendments, if needed.
- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all young and specimen trees.

SUMMER

- ✦ Create mulch rings and apply double-ground mulch at a depth of 2" to all young and specimen trees.
- ✦ Monitor soils for moisture. Pre-empt drought stress with irrigation, if necessary.
- ✦ Clear vegetation within an 18" circumference around bases of trees.

FALL

- ✦ Remove all spontaneous woody exotics from around base of trees and in shrubs.
- ✦ Apply soil amendments, if needed.

WINTER

- ✦ Remove all spontaneous woody exotics from around base of trees and in shrubs.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance of arborists as necessary.
- ✦ Structure prune young trees, as needed. Secure assistance of arborist as necessary.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Oriental Bitter-sweet	<i>Celastrus orbiculatus</i>	Foliar spray or cut & spray w/ Triclopyr, Lance with Glyphosate	Spring, Summer, Fall
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Wild Blackberry	<i>Rubus</i> sp.	Stem inject w/Glyphosate, Triclopyr	Spring, Summer, Fall
Garlic Mustard	<i>Alliaria petiolata</i>	Glyphosate, Hand pull, String trim	Early Summer through late Fall
Buckthorn	<i>Frangula</i> sp.	Pull, Lance with Glyphosate	When temps are above 40° F

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Kalmia Leaf Spot	<i>Cercospora</i>	Mancozeb	Spring
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Imidacloprid, Dinotefuran, Horticultural Oil	Spring, Fall
Elongate Hemlock Scale/Fiorina Scale	<i>Fiorinia externa</i>	Dinotefuran	Summer
Rhabdocline Needle Cast	<i>Rhabdocline</i> sp.	Mancozeb	Early spring
Swiss Needle Cast	<i>Phaeocryptus gaumanni</i>	Mancozeb	Spring, Summer

CURATION

Collections Development:

As needs dictate, review collections and the impact of Hemlock Hill management upon them.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ None.

Every 3 years, or as needed

- ✦ Prune trees and shrubs for dead, diseased, broken and weak attachments.

Additional Projects

- ✦ Spray *Tsuga* with dormant oil once or twice a year and soil inject the *Tsuga* that can not be reached with spray with Imidacloprid every two-three years.

CAPITAL PROJECTS

- ✦ None.

NOTES

5.6 Bussey Street Gate

High Priority

Moderate Intensity



Bussey Street Gate. Jill K. Conley

AREA PROFILE

Since the gates welcome all visitors to the grounds, they are to be kept in pristine condition as this presentation sets the tone for what will be experienced within the Arboretum. The Bussey Street Gates are high traffic areas for entry into the Arboretum for both visitors and commuters; a high priority of care should regularly be given to maintain these gates at the highest standard.

SPECIAL PRIORITIES

- ✦ These gates should be kept free of all litter, debris and leaves.
- ✦ All weeds and unwanted vegetation should be controlled.
- ✦ Accessioned plant material should be mulched and maintained at the highest standard.

ARBORICULTURE

- ✦ None.

Annual Care Plan

ALL SEASONS

- ✦ Keep gates free of trash, debris and weeds at all times.
- ✦ Keep gate area free of unauthorized advertisements and solicitations.

SPRING

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

SUMMER

- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

FALL

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

WINTER

- ✦ Keep pedestrian walkways clear of ice and snow.
- ✦ Ensure entire entrance way at Bussey Street Gate is kept clear of snow and ice for all vehicular traffic (including emergency vehicles).

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

None.

Field Checks:

None.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- None.

Additional Projects

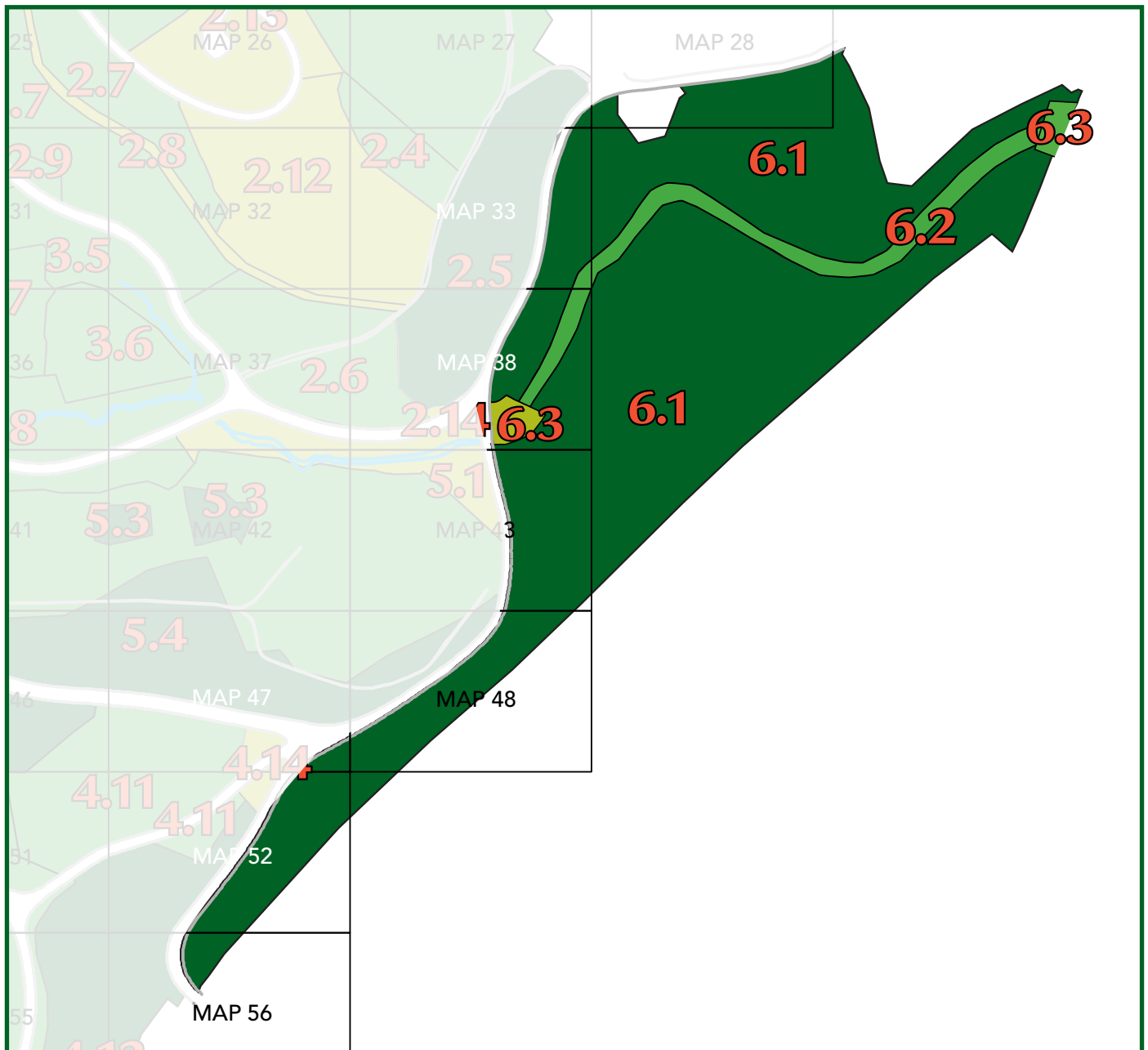
- The Gates should be painted regularly to maintain their integrity and high standard.

CAPITAL PROJECTS

None.

NOTES

REGION 6 MAP



Region 6—South Street Tract

	<u>Zone</u>	<u>Priority</u>	<u>Intensity</u>
6.1	Bussey Brook Meadow, including the Mesa	Low	Low
6.2	Blackwell Footpath Corridor	Moderate	Low
6.3	South Street (@ Blackwell Path) & Washington St.	High	Moderate

6.1 Bussey Brook Meadow, including the Mesa

Low Priority

Low Intensity



The Mesa. Arnold Arboretum Archives.



Bussey Brook Meadow. Jennifer Leigh.

AREA PROFILE

The overall intent for Bussey Brook Meadow is that of an “urban wild,” preserving wetland habitat and providing educational opportunities for the public. The site has a long history of fill deposition, soil disturbance and invasive colonization.

SPECIAL PRIORITIES

The Bussey Brook Meadow area has been set aside by the Arnold Arboretum as a site for long-term monitoring of the ecological structure and function of an unmanaged urban landscape (see “Bussey Brook Meadow-A Plan for the future, P. Del Tredici [revised 22 February 2012]). As a result, all work performed in this area must adhere to the maintenance agreement crafted in partnership with the Arboretum Park Conservancy and the Boston Conservation Commission (revised April, 2012).

ARBORICULTURE

Zones 6.1 and 6.2 are to be preserved as an “Urban Wild”. With no special priorities assigned, these zones will require very little attention. Maintenance will be focused on keeping the footpaths clear of fallen debris. This type of maintenance will be administered on an as-needed basis.

Annual Care Plan

ALL SEASONS

- Monitor for hazardous trees.
- See Mowing Operations (Appendix A).

SPRING

- None.

SUMMER

- None.

FALL

- None.

WINTER

- None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- None.

Additional Projects

- None.

CAPITAL PROJECTS

NOTES

6.2 Blackwell Footpath Corridor

Moderate Priority

Low Intensity



Blackwell Footpath. Jennifer Leigh.



Blackwell Footpath. Phyllis Anderson.

AREA PROFILE

This path, linking the Forest Hills MBTA Station to the South Street Gate entrance to the Arboretum was established through a collaboration involving the Arnold Arboretum, Arboretum Conservancy and Boston Parks and Recreation Department. Litter collecting near the Washington Street entrance is a chronic problem.

SPECIAL PRIORITIES

- ✦ **Blackwell Path:** An important access from Forest Hills Station, this path should project a positive image at all times.
- ✦ **South Street Gate and Washington Street Gate:** These areas will require daily sweeps to keep it completely free of litter, graffiti, weeds, leaves in the fall, and snow and ice in the winter.
- ✦ **John Blackwell stone marker:** Will require string trimming to keep the sign visible.
- ✦ The Bussey Brook Meadow area has been set aside by the Arnold Arboretum as a site for long-term monitoring of the ecological structure and function of an unmanaged urban landscape (see “Bussey Brook Meadow-A Plan for the future, P. Del Tredici [revised 22 February 2012]). As a result, all work performed in this area must adhere to the maintenance agreement crafted in partnership with the Arboretum Park Conservancy and the Boston Conservation Commission (revised April, 2012).

ARBORICULTURE

Zones 6.1 and 6.2 are to be preserved as an “Urban Wild”. With no special priorities assigned, these zones will require very little attention. Maintenance will be focused on keeping the footpaths clear of fallen debris. This type of maintenance will be administered on an as-needed basis.

Annual Care Plan

ALL SEASONS

- Monitor for hazardous trees.
- See Mowing Operations (Appendix A).

SPRING

- None.

SUMMER

- None.

FALL

- None.

WINTER

- None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Weeds in footpath		Pre and Post-emergent herbicides	Monthly, as needed during growing season

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

None.

Field Checks:

Systematic field checks are conducted in specific map locations on a four year cycle. See Appendix D for a full schedule.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- + None.

Every 3 years, or as needed

- + None.

Additional Projects

- + None.

CAPITAL PROJECTS

- + None.

NOTES

6.3 South Street & Washington Street (@ Blackwell Path)

High Priority

Moderate Intensity



South Street (@ Blackwell Path). Jill K. Conley.



Washington Street (@Blackwell Path). Jill K. Conley.

AREA PROFILE

The South Street (@ Blackwell Path) and Washington Street Gates serve as a commuter path from Forest Hills MBTA Station; a regular level of care should be given to maintain these gates.

SPECIAL PRIORITIES

- ✦ These gates should be kept free of all litter, debris and leaves.
- ✦ All weeds and unwanted vegetation should be controlled.
- ✦ Accessioned plant material should be mulched and maintained at the highest standard.
- ✦ The Bussey Brook Meadow area has been set aside by the Arnold Arboretum as a site for long-term monitoring of the ecological structure and function of an unmanaged urban landscape (see “Bussey Brook Meadow-A Plan for the future, P. Del Tredici [revised 22 February 2012]). As a result, all work performed in this area must adhere to the maintenance agreement crafted in partnership with the Arboretum Park Conservancy and the Boston Conservation Commission (revised April, 2012).

ARBORICULTURE

- ✦ None.

Annual Care Plan

ALL SEASONS

- ✦ Keep gates free of trash, debris and weeds at all times.
- ✦ Keep gate area free of unauthorized advertisements and solicitations.

SPRING

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

SUMMER

- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

FALL

- ✦ Remove all leaves and debris.
- ✦ Prune trees and shrubs to keep pedestrian entrances clear and accessible.
- ✦ Mulch where necessary.
- ✦ Apply pre-emergent where necessary.

WINTER

- ✦ None.

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

- + None.

Field Checks:

- + None.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- None.

Every 3 years, or as needed

- None.

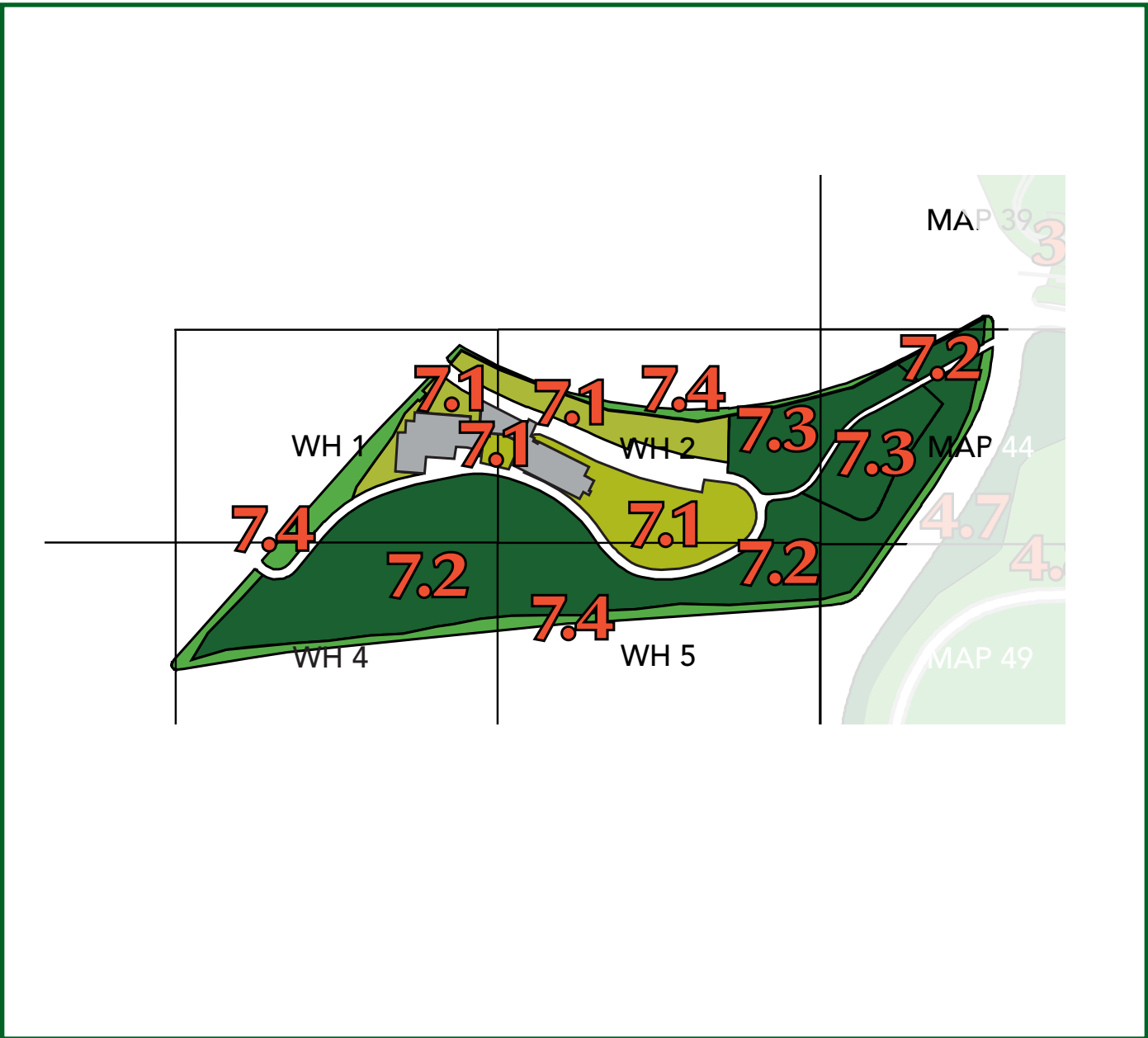
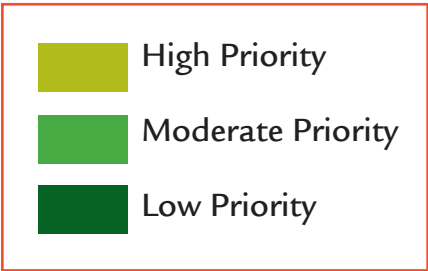
Additional Projects

- The gates should be painted regularly to maintain their integrity and high standard.

CAPITAL PROJECTS

- None.

NOTES



Region 7 - Weld Hill

	<u>Zone</u>	<u>Priority</u>	<u>Intensity</u>
7.1	Landscape surrounding Weld Hill Research Center	High	High
7.2	Grassy Meadows	Low	Moderate
7.3	Oak Stand	Low	Low
7.4	Weld Hill Perimeters; Walter St., Weld St., & Centre St.	Moderate	Moderate

7.1 Landscape surrounding Weld Hill Building

High Priority
High Intensity



Weld Hill Landscape, Jill K. Conley.



Weld Hill, Jill K. Conley.

AREA PROFILE

The Weld Hill facility represents the establishment of a full-fledged research effort based at the Arboretum's Roslindale campus. Initially, the landscape immediately surrounding the building was installed to reflect the meadow look of the adjacent hillside. This texture proved to be problematic in terms of practicality and the aesthetic was less than appropriate for the administrative headquarters of North America's oldest public arboretum. Over the next several years we will establish a landscape that exemplifies the mission of the Arboretum while recognizing the need that such a landscape be aligned with the sustainable nature of the site.

SPECIAL PRIORITIES

Establishing a managed landscape around the building over the next three years will be the top priority for this region. Steps include:

- ✦ Establish walking path and planting areas with turf on the north side of the property.
- ✦ Shift landscape from meadow to planting beds and turf around the building.
- ✦ Keep all walkways clear of tall grasses.
- ✦ Gradually replace nursery stock as needed.

ARBORICULTURE

Due to its close proximity to the building this zone has been given a high priority level. Efforts will be made to improve the quality of the plant material growing along the northern property line abutting the Jewish Rehabilitation Center and south of the parking area. Undesirable trees will be removed and others will be pruned.

Annual Care Plan

ALL SEASONS

- ✦ Daily circle check of zone required especially front entrance and patio areas. Monitor for trash and debris.
- ✦ Remove weeds from all display beds and mulched areas around trees. Also keep pavement cracks and edges weed-free.
- ✦ Tend to and winterize containerized plants
- ✦ Maintain clean edge to turf along entry paths to Weld Hill Building.
- ✦ Monitor newly planted accessions, investigate problems, and take appropriate action.
- ✦ Chip brush.
- ✦ Prune all dead wood within reach.
- ✦ Keep fence areas free of weed vines.
- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Report needs for additional labels to Plant Records Dept. by filling out a Plant Care Request Form.
- ✦ Refer to Mowing Operations (Appendix A).

SPRING

- ✦ Remove leaf litter from shrub beds.
- ✦ Mow entire zone including any remaining meadow areas (first mow).
- ✦ Edge and apply double-ground mulch to shrub beds so as to provide uniform coverage at depth of 2”.
- ✦ Create mulch rings around trees. Apply double-ground mulch at a depth of 2” to designated trees.
- ✦ Repair winter damage from snow plows.

SUMMER

- ✦ Mow entire zone including any remaining meadow areas (second mow).

FALL

- ✦ Remove leaf litter from shrub beds and lawn.
- ✦ Cut back herbaceous material.
- ✦ Install pathway markers for snow removal.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Refer to Snow Removal Operations (Appendix F).

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/ Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom
Black Swallow-wort	<i>Cynanchum louiseae</i>	Glyphosate, Triclopyr, Glufosinate-ammonium, Flame torch	Spring, Summer, Fall
Lady's thumb	<i>Persicaria vulgaris</i>	Mow prior to flowering	
Dodder	<i>Cuscuta sp.</i>	Hand pull, bag and dispose, Flame Torch	At first sight

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring
Rodents			

CURATION

Field Checks:

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Prune to rejuvenate shrubs.
- ✦ Prune trees and shrubs for dead, diseased, broken, and weak attachments.
- ✦ Structure prune young trees; secure assistance of arborist as necessary.
- ✦ Clear drain tubes.

Every 3 years, or as needed

- ✦ None.

Additional Projects

- ✦ Look for alternative pervious material that is more stable than the pea stone on the edges of the parking lot.

CAPITAL PROJECTS

- ✦ None.

NOTES

7.2 Grassy Meadow

Low Priority
Moderate Intensity



Grassy Knoll. Jill K. Conley.



Grassy Knoll. Jill K. Conley.

AREA PROFILE

This particular area has been designated a non-development area within the Arnold Arboretum's Institutional Master Plan. The larger hill sits atop the well field for the building's geothermal HVAC system. The smaller hill, on the Walter street side, is a regraded stockpile of material from construction that was kept onsite. Both of these areas have been sculpted to have a "rolling hillside" look. Each hillside has been vegetated with a cosmopolitan meadow mix specially blended to cope with disturbed soils.

SPECIAL PRIORITIES

- ✦ Continue to establish the meadow planting on both hills.
- ✦ Nurture white pine plantings.
- ✦ Monitor drainage swales for woody weed and debris.
- ✦ Monitor condition of weather station.
- ✦ Maintain a well-established cart path from the designated break in the Walter St wall into the meadow.

ARBORICULTURE

With the intent to keep the maintenance of these two areas low, they have been seeded with a wildflower "meadow" mix. Currently there are only a handful of mature trees found in this zone. After an initial visit to restore the condition of these trees return visits could be scheduled on an "as needed basis."

Annual Care Plan

ALL SEASONS

- ✦ Remove weeds from all mulched areas around trees. Also keep pavement cracks and edges weed-free.
- ✦ Monitor newly planted accessions, investigate problems, and take appropriate action.
- ✦ Chip brush.
- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Report needs for additional labels to Plant Records Dept. by filling out a Plant Care Request Form.
- ✦ Refer to Mowing Operations (Appendix A).
- ✦ Regularly monitor condition of weather station.
- ✦ Keep cart path at Walter Street wall opening mowed regularly.

SPRING

- ✦ Remove leaf litter as needed.
- ✦ Create mulch rings around trees. Apply double-ground mulch at a depth of 2" to designated trees.
- ✦ Repair winter damage from snow plows.
- ✦ Mow entire meadow after Chicory (*Chichorium intybus*) blooms have passed. The mower deck should be set as high as possible for this spring mow.

SUMMER

- ✦ Mow borders of meadow one deck's width.

FALL

- ✦ Mow entire meadow.
- ✦ Remove leaf litter as needed.
- ✦ Install pathway markers for snow removal.

WINTER

- ✦ Remove all spontaneous woody weeds from shrub beds and around base of trees.
- ✦ Remove basal sprouts from trees, as appropriate; secure assistance from arborist, if necessary.
- ✦ Refer to Snow Removal Operations (Appendix F).
- ✦ ***Be aware of weather station during snow removal***

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/ Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

Field Checks:

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

+ None.

Every 3 years, or as needed

+ None.

Additional Projects

CAPITAL PROJECTS

+ None.

NOTES

7.3 Oak Stand

Low Priority

Low Intensity



Oak Stand, Jill K. Conley.



Oak Stand, Jill K. Conley.

AREA PROFILE

Relatively undisturbed, this mixed oak stand represents one of the few areas on the property that was not impacted by construction. It offers visitors of the Weld Hill parcel a break from the hot summer sun with its abundant shade. Therefore, keeping the canopy free of dead wood is important.

SPECIAL PRIORITIES

Preserve the natural feel of this area.

ARBORICULTURE

This zone is largely composed of mature oak trees. The overall health of these trees is good, however, over time a considerable amount of deadwood has accumulated in their crowns. The plan for this zone is to do an initial sweep thru the stand pruning for sanitation. This will entail removing deadwood, storm breaks, major crossing and rubbing limbs, and diseased branches. Due to the condition of the trees, the site they are growing in, and their age, this combination makes for healthy slow-growing trees. Therefore, it is reasonable to assume that this zone could be put on a three year pruning rotation.

Annual Care Plan

ALL SEASON

- Remove all spontaneous woody weeds from around base of trees.
- Report needs for additional labels to Plant Records Dept. by filling out a Plant Care Request Form.
- Refer to Mowing Operations (Appendix A).

SPRING

- Repair winter damage from snow plows.
- Mow grassy areas.

SUMMER

- Monitor and eliminate poison ivy.

FALL

- Mow entire area
- Install pathway markers for snow removal.

WINTER

- Remove all spontaneous woody weeds around base of trees.
- Refer to Snow Removal Operations (Appendix F).

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Buckthorn	<i>Frangula</i>	Pull, Lance with Glyphosate	When temps are above 40° F
Japanese Knotweed	<i>Fallopia japonica</i>	Stem inject w/Glyphosate, Foliar spray w/ Glyphosate	Spring, Summer, Fall when in bloom

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>
Winter Moth	<i>Operophtera brumata</i>	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> , Spinosad	Spring

CURATION

Collections Development:

Field Checks:

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

Every 3 years, or as needed

None.

Additional Projects

None.

CAPITAL PROJECTS

None.

NOTES

7.4 Weld Hill Perimeters; Walter St., Weld St., Centre St. Moderate Priority

Moderate Intensity



Walter Street. Jill K. Conley.



AREA PROFILE

The Weld Hill parcel is flanked by two very busy roads, a residential neighborhood, and the Hebrew Senior Life complex. Establishing and maintaining the Arboretum's reputation through the appearance of its outer perimeter is an important first impression. The Weld Hill parcel perimeters in particular have been largely neglected over the past several decades and will take time to rehabilitate.

SPECIAL PRIORITIES

- ✦ Maintain a clean, presentable perimeter all while preserving the natural look of the parcel.

ARBORICULTURE

Surrounding the Weld Hill Research Center on three sides, this long narrow track of land consists of a variety of tree species, with many age classes, and varying health and structural conditions. Because many of these trees are growing over sidewalks or roadways, the main emphasis here is to ensure the safety of pedestrian and vehicular traffic. Consideration must also be given to the structural integrity of the stone wall. Any trees that are growing so close that they may be capable of disturbing the wall will be considered for removal.

Annual Care Plan

ALL SEASONS

- ✦ Monitor weekly for trash and debris.
- ✦ Remove all spontaneous woody weeds from around base of trees.
- ✦ Report needs for additional labels to Plant Records Dept. by filling out a Plant Care Request Form.
- ✦ Refer to Mowing Operations (Appendix A).

SPRING

- ✦ Monitor condition of stone walls.
- ✦ Repair winter damage from snow plows.
- ✦ Keep sidewalks clear of vegetation.

SUMMER

- ✦ Monitor and eliminate poison ivy.
- ✦ Keep sidewalks clear of vegetation.

FALL

- ✦ Install pathway markers for snow removal.
- ✦ Monitor condition of stone walls.
- ✦ Keep sidewalks clear of vegetation.

WINTER

- ✦ Remove all spontaneous woody weeds around base of trees.
- ✦ Refer to Snow Removal Operations (Appendix F).

NOXIOUS WEEDS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

PESTS AND DISEASE

<u>Common Name</u>	<u>Scientific Name</u>	<u>Treatment</u>	<u>Schedule</u>

CURATION

Collections Development:

Field Checks:

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- ✦ Monitor for stone wall repointing.
- ✦ Brush cut steep bank along Weld Street.

Every 3 years, or as needed

- ✦ Repoint stone walls as needed.

Additional Projects

- ✦ Install a park-style swing gate at the Walter Street end of the service road.

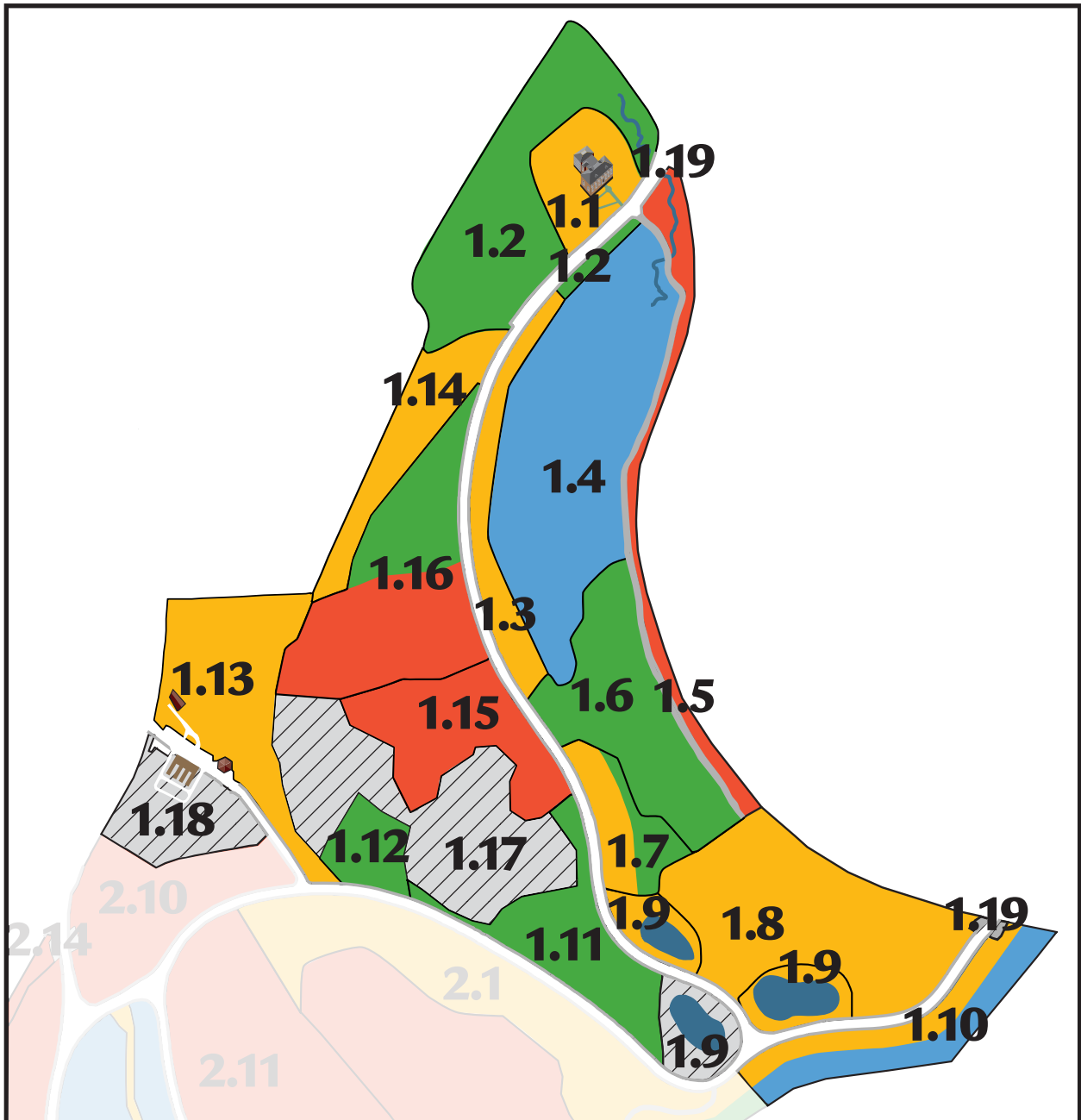
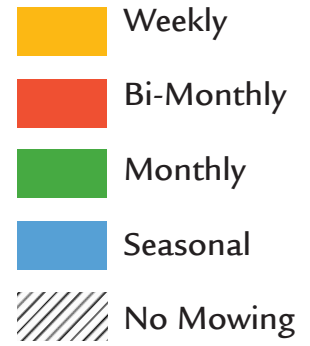
CAPITAL PROJECTS

- ✦ Eventually repair second half of Walter Street wall.

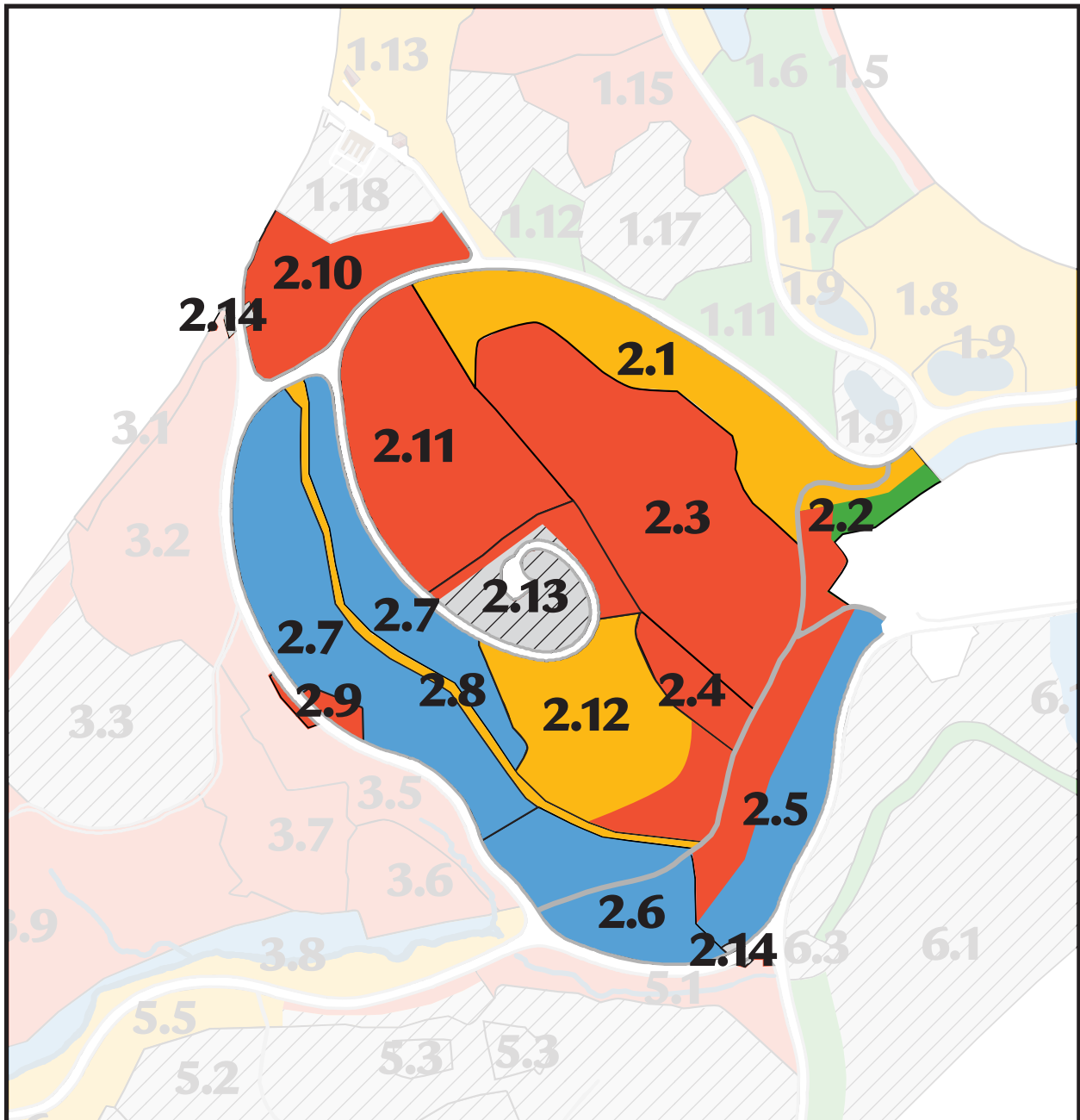
NOTES

Appendix A Mowing Operations

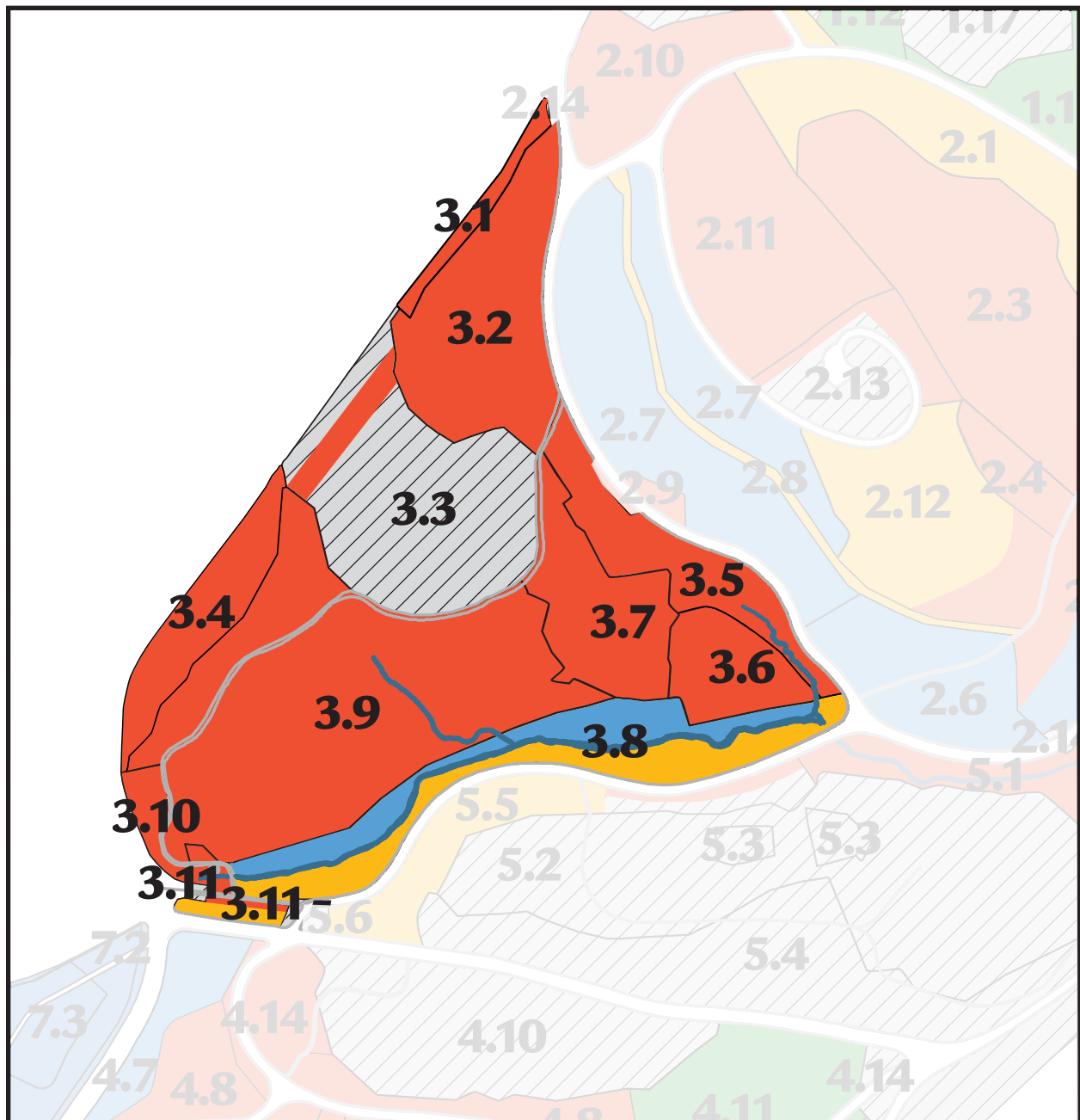
Region 1—Most Highly Visited Area



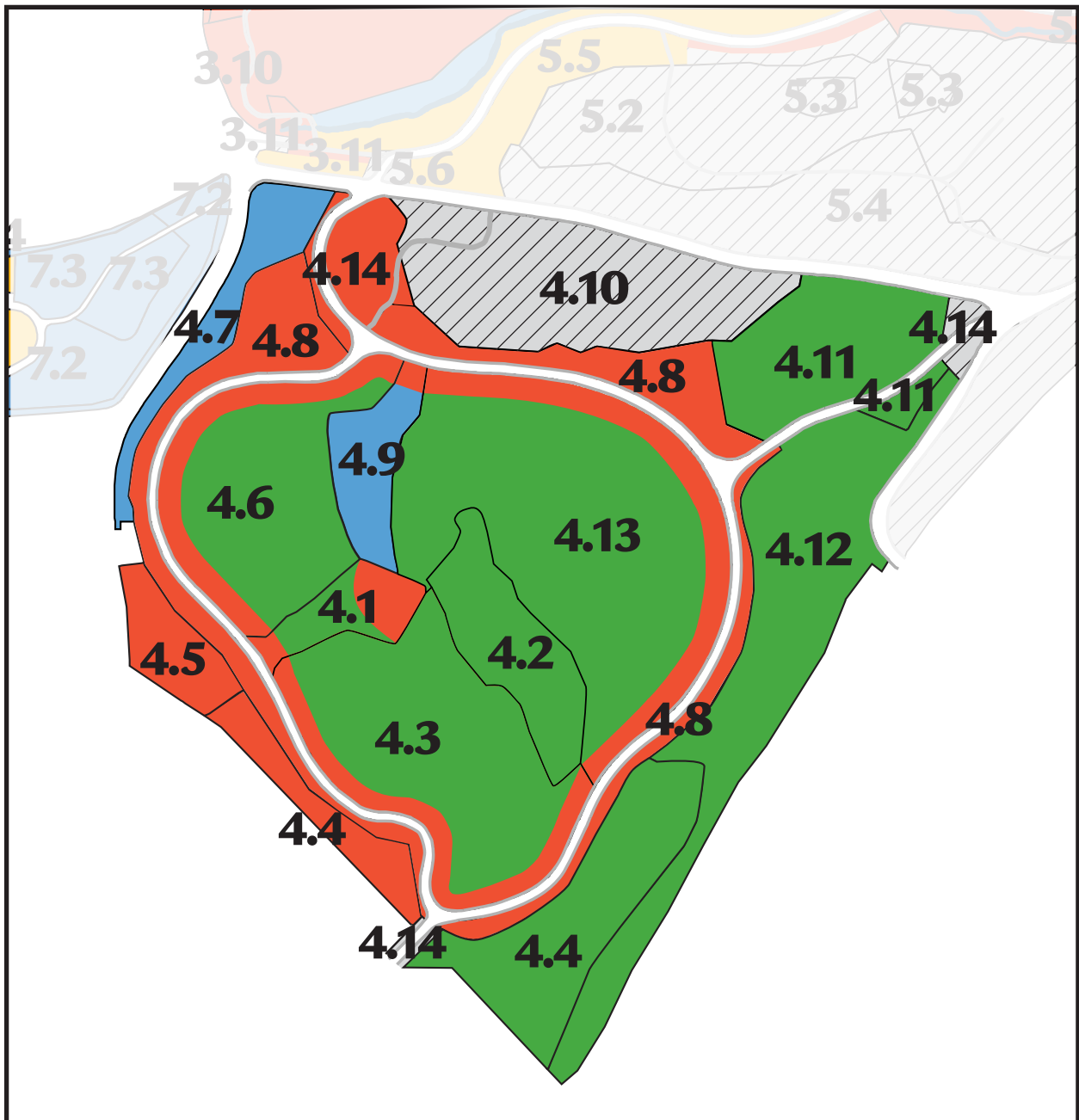
Region 2—Bussey Hill



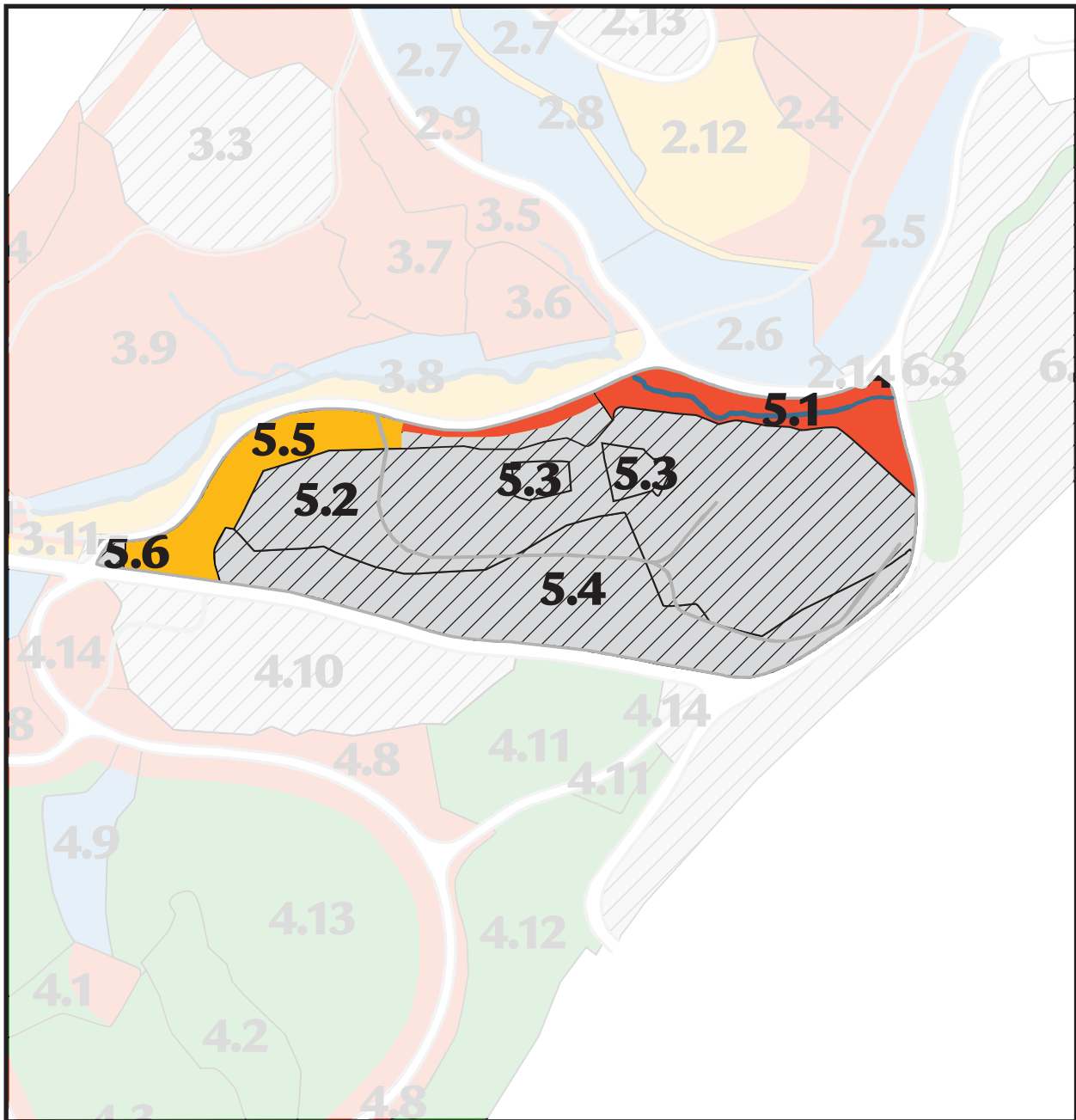
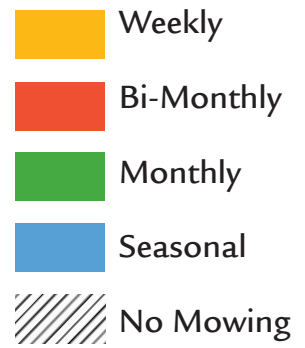
Region 3—Conifer Area



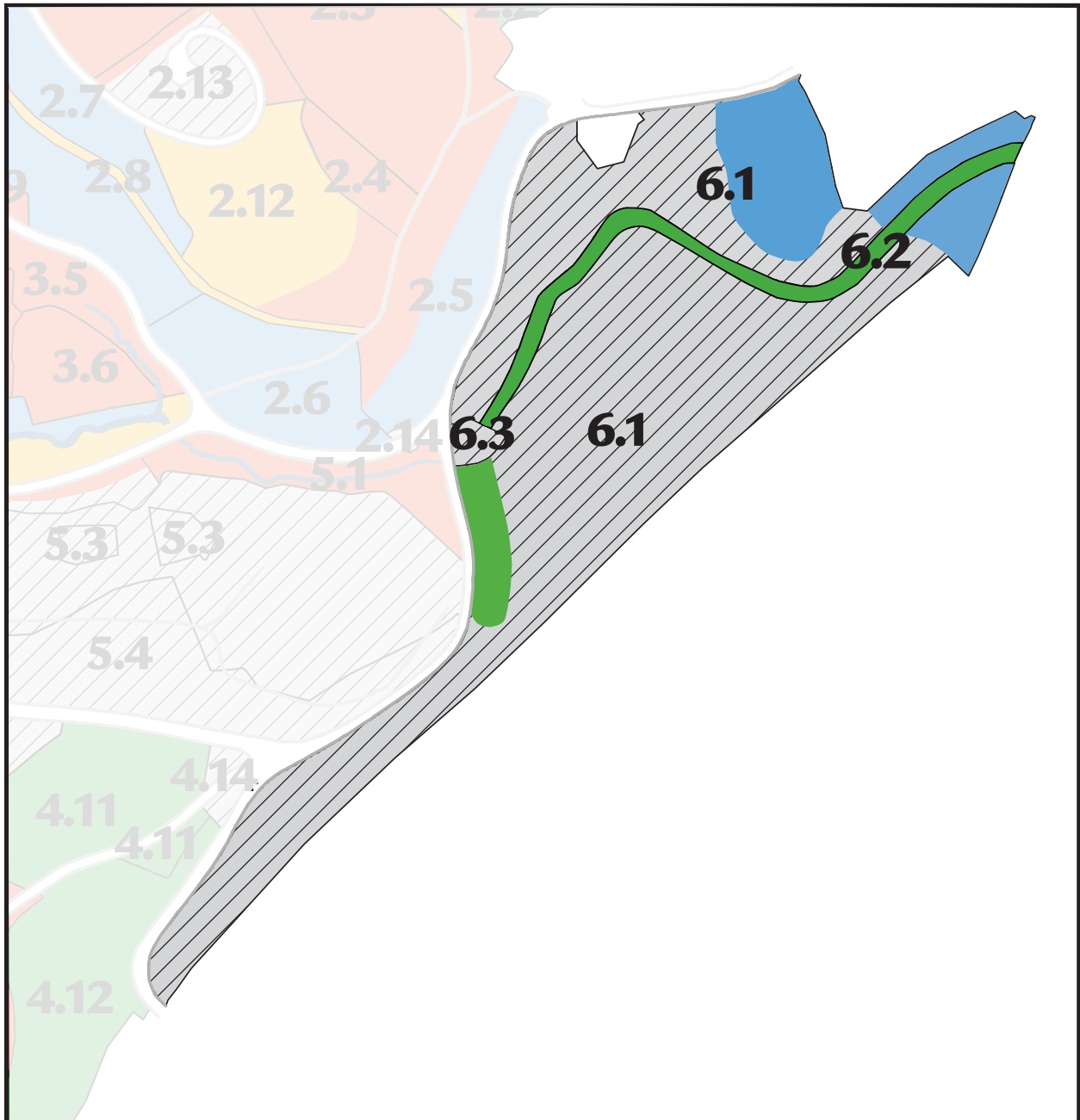
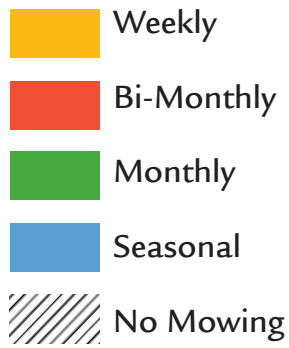
Region 4—Peters Hill



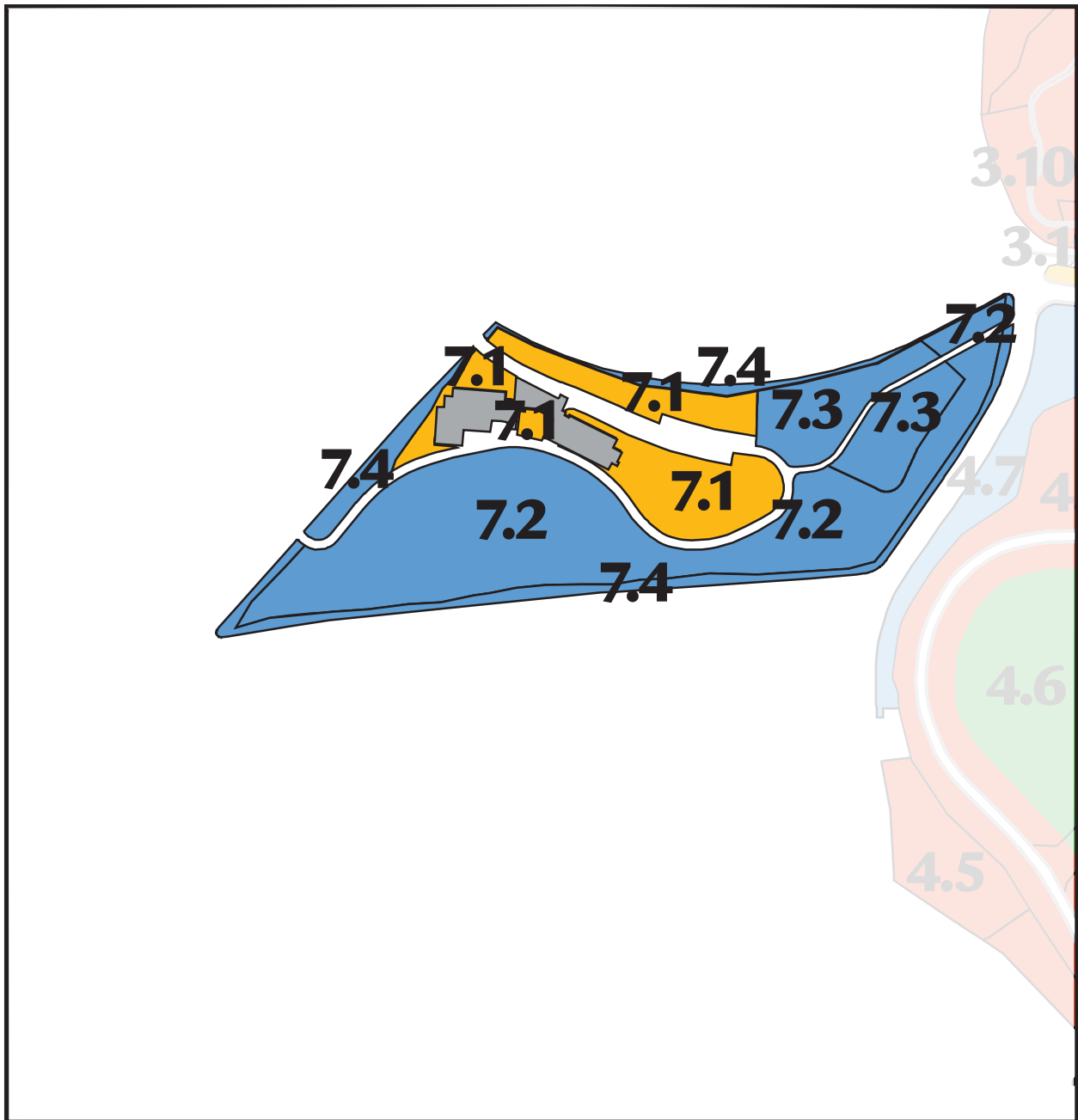
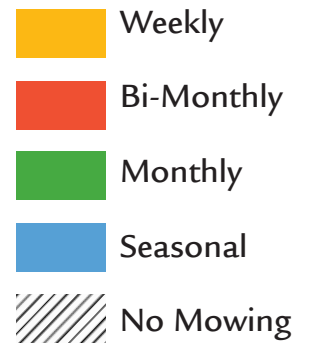
Region 5—Hemlock Hill



Region 6—South Street Tract



Region 7—Weld Hill



AREA PROFILE

Snow removal at the Arnold Arboretum is kept to a minimum in order to cause the least amount of disturbance to the landscape while still facilitation basic visitor access and enjoyment of the collection. Areas designated for snow removal are prioritized according to need for staff access to facilities and the collection, ease of commuting for staff and visitors, as well as compliance with city pedestrian laws. Providing access to trash receptacles is an important step towards encouraging visitors to use them and not litter.

Safety is top priority during snow removal. Visitors and pedestrians always have the right-of-way and should be yielded to. When equipment is being used for snow removal at least one safety light should be functional at all times (head lights, strobes, flashers, etc).

SNOW PLOW TRUCKS

Under normal circumstances, our paved roads and parking lots are cleared with the snow plow trucks. When clearing fenced in lots:

- ✦ Do not push snow up against the fence. This will damage the fence. Back-blade away from the fence or have a snow thrower clear the snow near the fence.
- ✦ Plowing the paved roads of the Arboretum should consist of one full blade length down the middle of the road and then one-half blade lengths on either side of the road. These guide lines are meant to help prevent the plowing of sod. There may be circumstances and specific areas that will warrant further widening of the roads as needed.
- ✦ Do not push or pile snow up against any of the gates. Direct all snow to the side of the gate away from the pedestrian access.
- ✦ Be mindful of the two cobble stone pads within the parking area in front of the Hunnewell Building. Do not cross over them with the plow.
- ✦ Be mindful of all signs and map tables along the roads. Always plow away from them.
- ✦ Note** All paved areas on Weld Hill are composed of pervious material and require that a plastic blade be used when plowing snow. Do not use a steel blade on this surface.

JOHN DEERE SNOW THROWERS

- ✦ Before you leave the garage make sure you have extra sheer pins and tools, full tank of fuel, functioning windshield wiper, and at least one functioning light
- ✦ Never clear a clogged shoot with your hand.
- ✦ When using to clear a stone dust path or cobble stone area, remember to raise the deck slightly.
- ✦ When clearing snow near the weather station at the DGH or on Weld Hill, be sure to direct the shoot AWAY from the station.

AREAS OF PRIORITY

SNOW PLOW TRUCKS

1. Staff parking lot adjacent to the maintenance facility.
2. The driveway leading to the maintenance facility and parking area in front of the Hunnewell Building, as well as the gates greenhouse drive, parking lot,
3. Weld Hill parking lot and loop road **use plastic blade only**.
4. Greenhouse drive, parking area, and gates.
5. Internal paved roads throughout the Arboretum.

JOHN DEERE SNOW THROWERS:

1. Front entrance to the Hunnewell Building.
2. Sidewalk running along the Arborway and Centre Street; starting at the convent and ending at the pedestrian ramp leading to Forest Hills T Station.
3. Bussey and Walter Street sidewalks.
4. The roads and allies around the DGH complex.
5. Blackwell foot path (South Street).
6. Trash cans, fire hydrants, dumpsters, and donation canisters.

*where/when applicable, it may be more efficient to use the large rotary brush attachment rather than the snow thrower attachment.

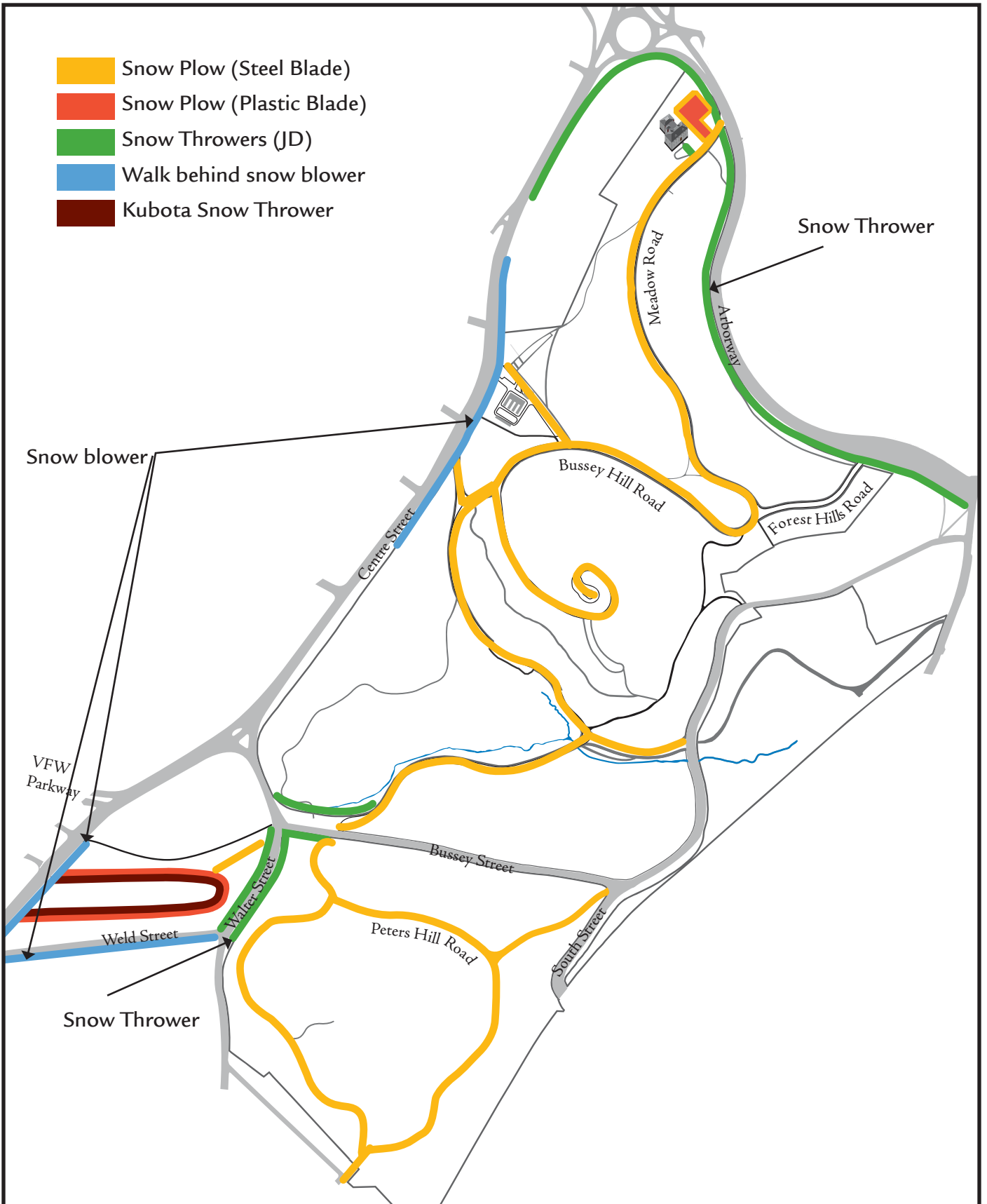
HAND SHOVEL:

1. All stairs of the Hunnewell Building.
2. Emergency fire exit door out by the elevator shaft.
3. Front gate area.
4. All pedestrian access points including gate entrances, steps by South Street swale, and cemetery steps.
5. Fire exit door by Hunnewell building elevator shaft.
6. Second floor deck on the north side of the Weld Hill building. (Keep snow away from the base of the doors.)
7. All emergency exits at Weld Hill building.

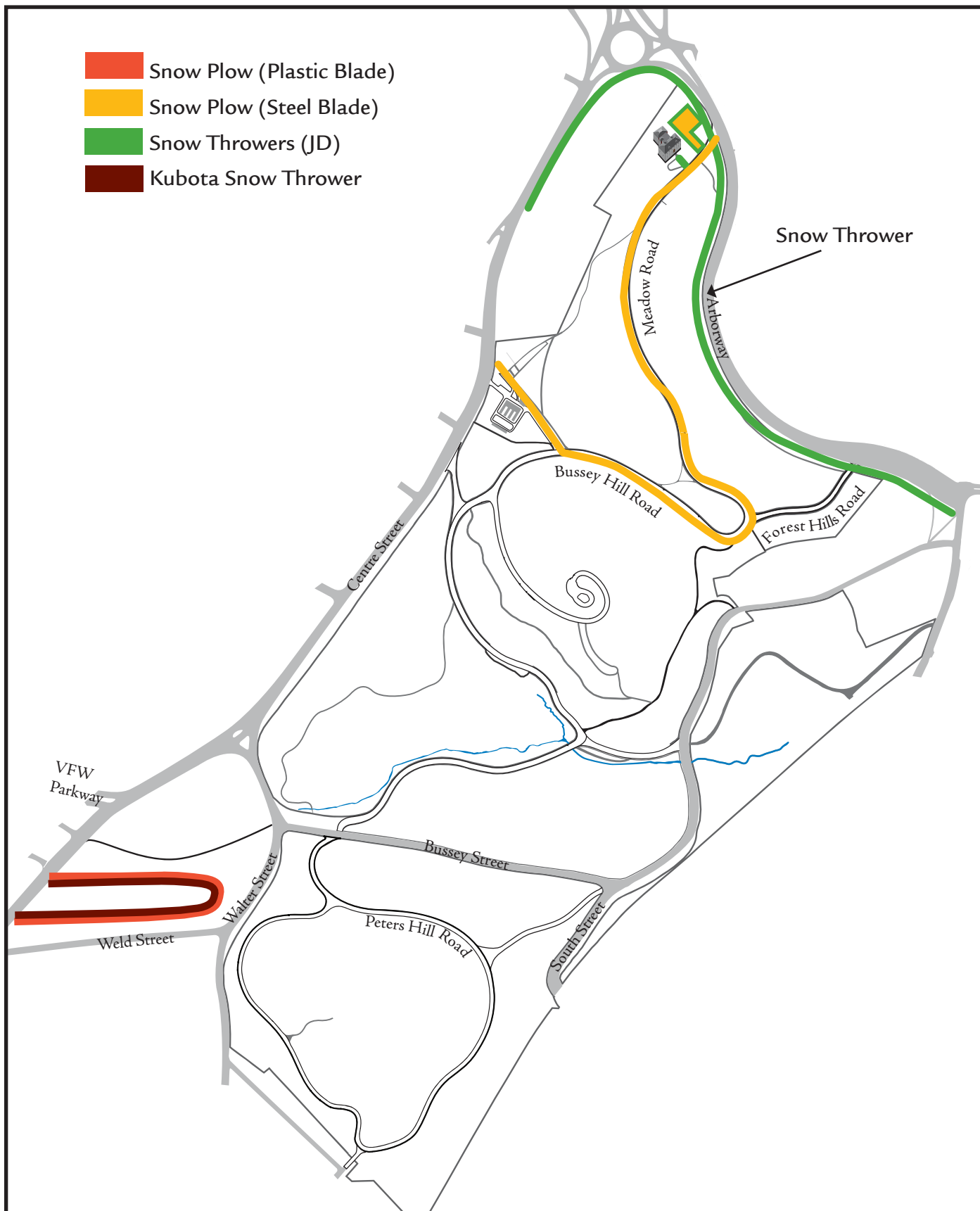
SAND/ICE-MELT:

- ✦ Always use sand and ice-melt sparingly in order to protect the environment
- ✦ Use ice-melt in back parking lot and “blue ice-melt” on front steps. Never use ice-melt out in the collection.
- ✦ When sanding roads for pedestrians, use sparingly and sand only a small walking path, not the entire road.
- ✦ Never us sand on any of the hard pervious surfaces of Weld Hill.

Snow Removal Routes



Early Shift Snow Removal Guidelines



Appendix C Infrastructure and Hardscape

AREA PROFILE

This region encompasses all of the hardscape within the Arboretum, including the paved road and walkways, the cobblestone gutters, the benches, interpretive signs, the eleven ornamental wrought iron gates at the entrances, the trash receptacles, water fountains and light fixtures.

SPECIAL PRIORITIES

None.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- + None.

Every 3 years, or as needed

- + None.

Additional Projects

- + Re-point stone pillars at entrance gates every five years, or as needed.

CAPITAL PROJECTS

- + Replace all park benches with one style.
- + Investigate new trash receptacles.
- + Assess paving at water fountains, benches, signs, bike racks, etc.
- + Remove asphalt along Forest Hills Road, Valley Road and Peters Hill Road to reveal cobblestone gutter.

NOTES

General Maintenance Plan

ALL SEASONS

- ✦ Monitor all 12 gates and the immediate surrounding entrance area and remove all litter, graffiti, in the spring and fall, and snow and ice in the winter.
- ✦ Walk the Arboretum's perimeter and remove trash.
- ✦ Monitor and remove all graffiti from the grounds. Report any extensive graffiti to supervisor.
- ✦ Remove all unauthorized advertisements and solicitations.
- ✦ Empty trash receptacles.
- ✦ May–October: String trim at the base of signs, trash receptacles, benches and lamp posts.
- ✦ May–October: Apply herbicides to gate areas, paved roads and walkways and cobblestone gutters as needed. String trimmer may also be used where practicable.
- ✦ Cut back vines at gates from sidewalks and signs.
- ✦ Clean debris away from all catch basins.
- ✦ Touch up signs with paint as needed.

SPRING

- ✦ Monitor fountains to make sure that they are turned on and off for the season.
- ✦ Clean cobblestone gutters.
- ✦ Remove all leaf litter from gates.
- ✦ Paint park benches.
- ✦ Replace finials on path markers, as needed.
- ✦ String trim weeds around bases of signs.

SUMMER

- ✦ Paint park benches.
- ✦ Evaluate the quality of paint on all ornamental gates.
- ✦ Paint bollards.
- ✦ Paint handrail at puddingstone steps in legume collection.
- ✦ Replace finials on path markers, as needed.
- ✦ String trim weeds around bases of signs.

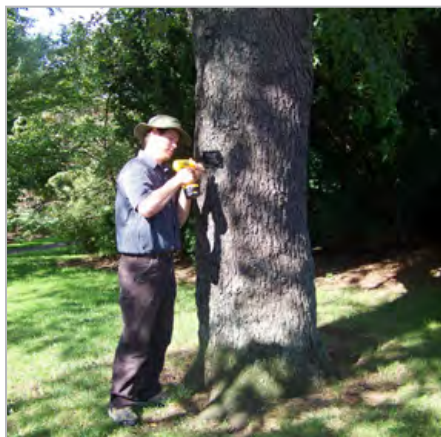
FALL

- ✦ Monitor fountains to make sure that they are turned on and off for the season.
- ✦ Clean cobblestone gutters.
- ✦ Remove all leaf litter from gates.
- ✦ Place a stake to mark all catch basins requiring snow removal.
- ✦ Assess snow removal markers on the five hydrants and replace if needed.
- ✦ Replace finials on path markers, as needed.
- ✦ String trim weeds around bases of signs.

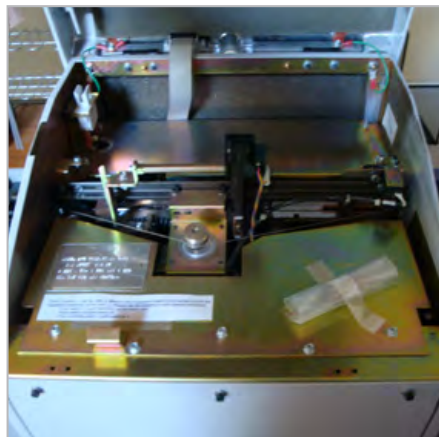
WINTER

- ✦ Assess trash cans and replace worn ones with new ones.
- ✦ Paint all trash cans.
- ✦ Assess park benches and make repairs if needed.

Appendix D Curation and Plant Records Office



Trunk label installation. Julie Coop.



Curation and Plant Records label Embosser. Kyle Port.



Voucher Collection. Reni Driskall

DOCUMENTATION

RECORDS AND MAPPING

Collections management at the Arnold Arboretum ensures the highest level of documentation. Records for each accession in the collection are maintained in a PC-based database application, BG-BASE, which was initiated in 1985 at the request of the Arnold Arboretum and the Threatened Plants Unit (TPU) of the World Conservation Monitoring Centre (WCMC) in Cambridge, UK. Currently developed and supported by the Royal Botanic Garden Edinburgh (UK) and BG-BASE, Inc., in Topsham, Maine (US), the system is now used around the world in over 185 sites in 30 countries.

For each accession, the database stores information on the source; specific provenance data; date of acquisition; accepted botanical name and previously used synonyms; size of the plant upon receipt as well as at intervals throughout its existence in the collection; number of plants; map location on the grounds; and the presence of any vouchers in the cultivated herbarium or photographic images. Additional data may include performance observations; unique ornamental characteristics; growth and survival rates; hardiness potential; specific propagation techniques required; a botanical description; taxonomic verification; and notes on storm damage, susceptibility to insects or diseases, or experimental data. Observations on plant collections (field checks) are ongoing and formal assessment activities are documented in the Arboretum's *Plant Inventory Operations Manual*. See *Inventory Field Checks* section for a schedule of field check activities across the Arboretum.

The Arboretum utilizes a suite of ESRI Desktop and Mobile GIS software applications to manage, analyze, query, capture, manipulate, and display geographic information. Field mapping of landscape features (e.g., plants, benches) is accomplished using a Trimble Nomad handheld computer attached to a Trimble ProXRT GPS receiver with GLONASS (Global Navigation Satellite System) which provides real-time decimeter accuracy. A grid system overlaid onto the base map divides the property into 70 individual maps, each 400 feet by 600 feet, and each map is further divided into 4 quadrants labeled as NW, NE, SW, SE.

Map books are produced annually in an 11x17" format during the winter months. These are distributed to various staff members before the growing season for use in the collection. Visiting professionals are also provided with maps and information from BG-BASE that pertains to their area(s) of interest.

VOUCHER COLLECTION

Vouchering of the collection is ongoing, and accessions of known wild provenance are a primary focus. The goal is to add at least 700 voucher specimens to the Cultivated Herbarium of the Arnold Arboretum annually and to document each accession in flower, fruit, and vegetative states. During the growing season, two days a week are devoted to the collection of herbarium vouchers by curatorial staff.

PLANT CARE REQUEST FORM

Plant Care Request forms are to be filled out and submitted to the Curator for all plants in decline prior to any action (e.g., removal) being taken. The Curator will review and field-check the plant(s) and determine a course of action and then return the form or forward it to appropriate personnel. In the Curator's absence, the Manager of Horticulture can review green cards and determine courses of action. Likewise, all verification requests are forwarded to the Curator. Requests to label or remap should be forwarded to the Manager of Plant Records. Upon completion of activity, forms should be submitted to the Curatorial Assistant entry and/or archiving.

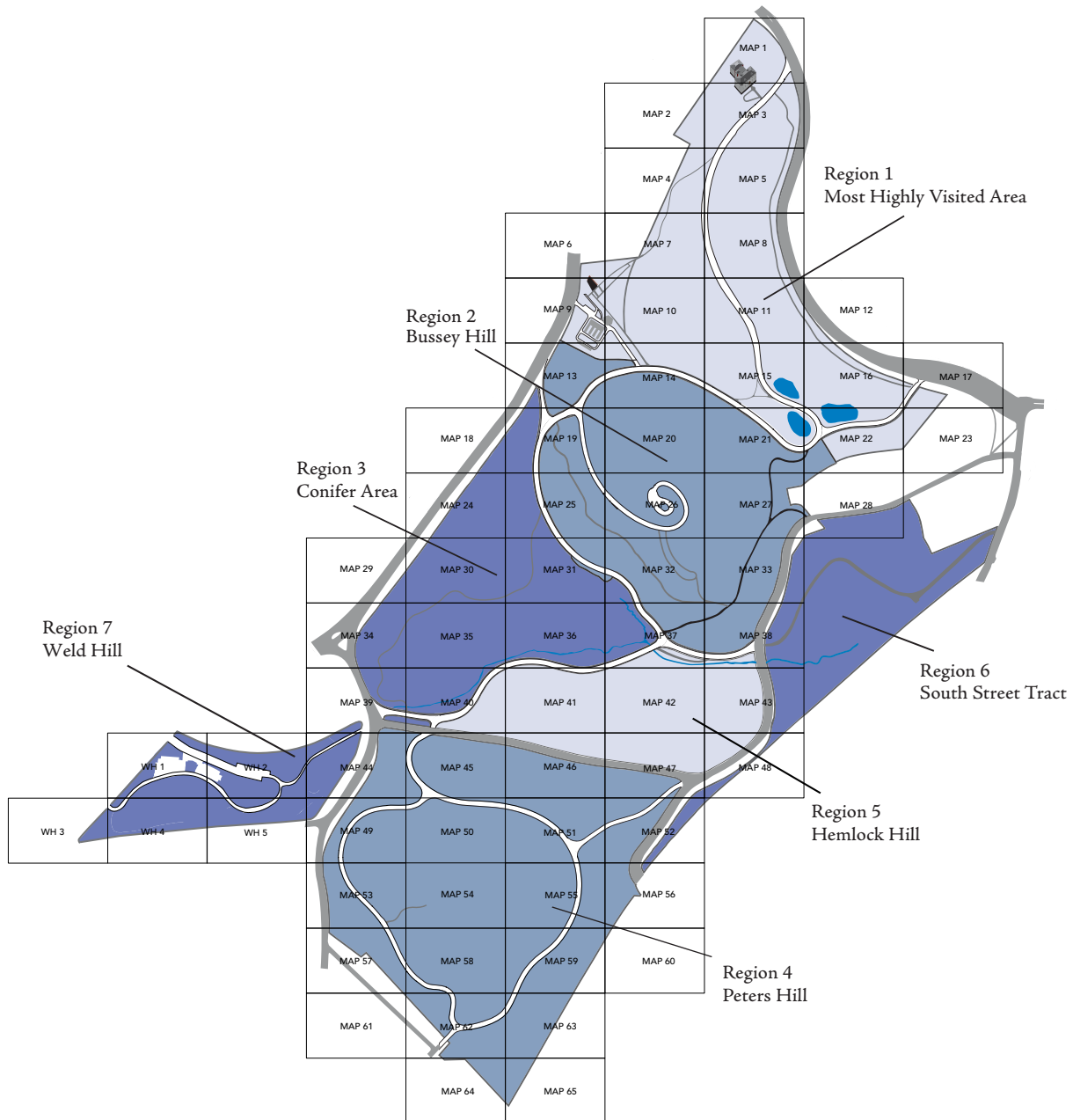
<u>Arnold Arboretum Plant Care Request Form</u>	
Requested by: _____ Date: _____ Botanical name: _____ Accession #: _____ Map location: _____ Problem and maintenance proposed: _____ _____ Standing dead: Yes No Action(s) proposed: Remap Label Verify Remove Reprop. Relocate from _____ to _____ Maintenance completed by: _____ Date: _____ Stump Treatment (circle one): Pulled Ground To be ground Treated w/ herbicide (describe): _____	Curatorial Review: Field check by: _____ Date: _____ Herbarium checked by: _____ Date: _____ Action(s) to be taken: Remap Label Collect voucher Remove Reprop. Relocate from _____ to _____ Signature for removal: _____ Mapping/labeling by: _____ Date: _____ Voucher collected by: _____ Date: _____ Propagation completed by: _____ Date: _____ BG-BASE entry completed by: _____ Date: _____

Front

Back

INVENTORY FIELD CHECKS

Systematic field checks are conducted in specific map locations on a five-year cycle. Below is a projected timeline:



¹ Field check activities include but are not limited to: objective health evaluation, measurement (e.g., DBH), label need assessment/adjustment, and map feature (hardscape and softscape) verification/capture. See the Arboretum's *Plant Inventory Operations Manual* for more information.

LABELING



A typical records label hung by the preferred wire twisting method (the 'curatorial twist').

Labels are produced (embossed) on an as-needed basis. Report label need to the Manager of Plant Records by filling out a Plant Care Request Form or enter a label request in BG-BASE.

As a general rule, plants in the collection are labeled with two brown anodized aluminum records labels. Gold records labels replace brown labels on specimens highlighted in self-guided tours. In some cases, one records label is attached to a screw mounted opposite sightlines derived from primary paths, roadways, viewsheds.

Trunk labels are mounted on trees with DBH greater than 15 cm using 3" stainless steel screws. Plants with ornamental bark are typically not labeled in this manner to avoid scarring. Grove plantings and accessions with multiple qualifiers are labeled at the discretion of the Curation department.

TREES

Records labels are placed opposite one another on trees with low hanging branches. Accessibility is critical and every effort is made to hang the labels in conspicuous locations on stems that bear secondary branching. Trees (> 15 cm DBH) without low-hanging branches are labeled by inserting a 3" stainless steel screw (square head) at an appropriate height (approximately 12") above soil line.

A records label is attached to a loop stake and placed next to trees < 15 cm DBH.

In rare cases, records labels may hang from trunk label mounts (screws [preferred] or nails), however every precaution should be taken to avoid owl-eyeing (discoloration of bark due to label spinning due to loosely wrapped wire). Aluminum loop stakes can also be used to present records labels on young trees that do not have secondary branches.

SHRUBS

Two records labels are hung on each shrub. One records label is attached to the base of the plant or affixed to a loop stake while the other is hung in a conspicuous location, roughly at waist height. In the Bradley Rosaceous Collection, one label is always hung at or near cardinal point north (N).

How to read a plant label

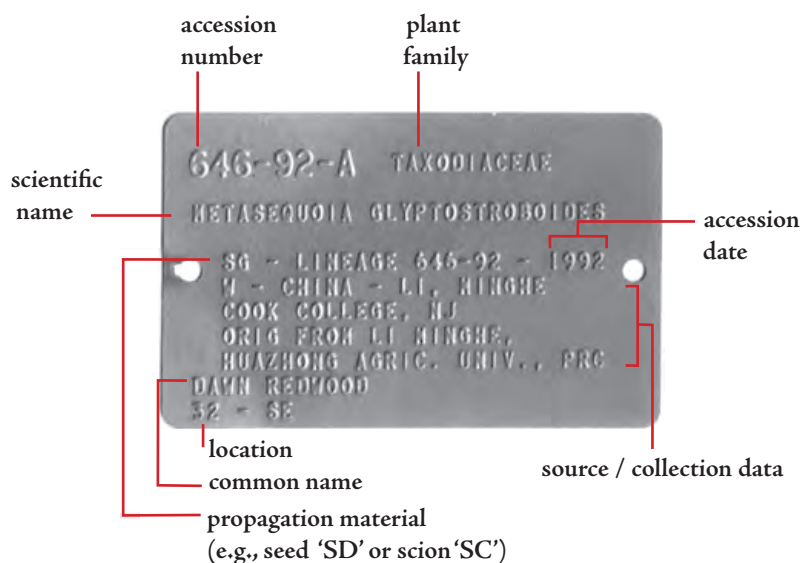


Figure 1.

VINES

Vines growing on trellis structures in the Leventritt Garden are labeled in a specific manner. Narrow pillars are labeled with two anodized aluminum labels at horizontal bar 5 and 25. Wide panels are labeled with two anodized aluminum labels hung on horizontal bar 1 and 12. In both cases, labels hang on the same side of the trellis, however, vine growth may dictate placement. Vines without supplemental support are labeled by twisting wire around a main stem. Ideally, an aluminum loop stake holding one anodized aluminum label should be placed at the base of the plant.

HERBACEOUS PLANTS

One anodized aluminum records label is twisted onto an aluminum loop stake and inserted near the base of herbaceous plants.

Stakes are sunk deeply (> 10") into the soil to reduce frost heaving and ensure relative permanence.

SPECIAL CONSIDERATIONS

Center for Plant Conservation collections are labeled following the standards noted above. However, red plastic labels with the accession number and letter qualifier written in pencil or pen are also maintained.

Dedication labels are maintained on plants and vary in material type. Historic dedication labels are maintained until such time their condition requires replacement. All "memorialized" plants are labeled with two records labels embossed with accession information (see Figure 1. *How to read a plant label* above) and an additional label containing dedication text.

Historic labels (e.g., zinc, aluminum, wood) are left in the landscape at the discretion of curatorial staff.

Yellow temporary labels are hung for various research reasons and are also used in the inventory field check process.

LABELING CONT.

Assessing Label Needs

Formal label need assessments are conducted during inventory activities and in advance of research use, special events (galas, fundraisers, etc.), and annual happenings which include: Lilac Sunday (Region 1 [along roadways, paths]; Region 2.1, 2.2, 2.3 [all *Syringa* accessions]) and Plant Sale).

Plants highlighted on self-guided tours or by other forms of interpretation (e.g., signage, cell phone, podcast(s), etc.) should receive either a trunk label, records label, or both. Visitor Education staff contact the Manager of Plant Records when labels are needed for interpretation projects.

Label Source Guide and Standards

Record labels are embossed in-house using a Datacard 295 machine (www.datacard.com) purchased from Higgins (www.higgins3.com). Records labels are purchased from:

Higgins

777 Broadway, South Portland, ME 04106

Phone: (800) 486.1312

www.higgins3.com

Arnold Arboretum standard

- Damon Tags-Brown Aluminum Anodize, #TAG31A50BR6215, 3¼ x 2"
- \$375.00 per box (1000 labels/box); \$0.37 each label or \$0.74/plant

Records labels are fitted with rubber grommets in high wind areas to reduce wire wear and label fatigue. Grommets are supplied by:

Western Rubber & Supply, Inc.

7888 Marathon Drive, Suite F, Livermore, CA 94550

Phone: (925) 960.8700

Email: sales@westernrubber.com

www.westernrubber.com

Arnold Arboretum standard

- 0 .080" ID GROMMETT 60 SBR, \$0.15 ea.

Records labels are attached to plants using wire supplied by:

Forest Hills Electric Supply Inc.

3607 Washington Street, Boston, MA 02130

Phone: (617) 983.9920

Primary contact: Edward (Ed) Katz, Proprietor, edcalling@aol.com

Arnold Arboretum standard

- 22 gauge (0.64 mm or .025" thickness) copper wire with plastic coating



A typical trunk label.



A typical stake label.

Aluminum loop stakes are purchased from:

Paragon Spring Company

4435-45 W. Rice Street, Chicago Illinois 60651

Phone: (773) 489.6300

Fax: (733) 489.6356

Primary contact: Amy Whittle, President, awhittle@paragonspring.com

www.paragonspring.com

Arnold Arboretum standard

- 0.187 or 3/16" diameter aluminum stake; 16" in length with looped and flattened end, \$1.80 ea.
- OD (outside diameter) of loop 1.410"
- ID (inside diameter) of hole at the end of the loop, 0.065", which accommodates 22 gauge (0.64 mm or .025" thickness) copper wire with plastic coating

Trunk & stake label production is outsourced to:

Nameplate & Panel Technology

387 Gundersen Drive, Carol Stream, IL 60188

Phone: (630) 690.9360 or (800) 833.8397

Fax: (630) 690.9365

Primary contact: Renee Melbourn, reneem@nptec.com

www.myplantlabel.com/products.asp

Arnold Arboretum standard

- Trunk Labels
 - 6 x 4", two hole centered, \$8.45 ea.; mounted with Grip Rite 3" stain-less steel screws, sq. head
- Stake Labels
 - Explorers Garden: 3x 6", label hidden mount, \$9.55 ea. + \$3.75 ea. for 24" metal stake
 - Leventritt Garden and Bradley Rosaceous Collection: 2 x 4", label hidden mount, \$7.25 ea. + \$3.75 ea. for 24" metal stake

Trunk & stake label text are edited before vendor production by the Label Text Editing Committee:

Michael Dosmann, Curator of Living Collections

Kathryn Richardson, Curatorial Assistant

Nancy Rose, *Arnoldia* Editor

Kyle Port, Plant Records Manager

Julie Warsowe, Manager of Visitor Education

Appendix E-1 Noxious Weeds

(Listed alphabetically by scientific name)

Alliaria petiolata

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Garlic Mustard	<i>Alliaria petiolata</i>	Brassicaceae (Mustard)	Biennial

BRIEF DESCRIPTION

Garlic mustard is a cold-season biennial, introduced from Europe as a cooking herb, and is now a threat to the forest understory, competing and beating out the regeneration of our native wildflowers and trees. It produces anywhere from 350 to 7,900 seeds on a single plant. A combination of aggressive measures is needed to control this pest and to reduce its seed bank. It has been suggested that five years is the length of time it will take to do so.

RECOMMENDATIONS FOR CONTROL

Manual

- Garlic mustard can be hand pulled in smaller areas, where feasible. In larger areas the flowering stalks produced on the second year's growth can be removed with a string trimmer, or lawn mower, in early spring, prior to flowering to prevent seed production. However, it has been shown that the same plants can produce another flowering stalk, so it is important to monitor the plants to insure that they are not allowed to flower again.

Chemical

- Because garlic mustard is a cold-season plant with a long growing season, foliar applications of a mixture of 2%-3% glyphosate can be applied to its rosettes early in the spring, after the leaves have fully developed, or later in the fall.

REFERENCES

<http://www.ipm.msu.edu/garlicmustard.htm>

<http://tncweeds.ucdavis.edu/esadocs/allipeti.html>

Allium vineale

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Wild garlic	<i>Allium vineale</i>	Liliaceae (Lily)	Perennial

BRIEF DESCRIPTION

This perennial weed emerges in early spring, allowing for easier control with a broad spectrum post-emergent herbicide, while other plants may not have emerged yet. It is particularly aggressive because it not only spreads by its underground bulbs but by aerial bulblets and by seed.

RECOMMENDATIONS FOR CONTROL

Manual

- Repeated mowing will tire the root system and, if done prior to flowering, it will reduce the spread by seed and aerial bulblets. Hand pulling can be done in smaller areas, but because it is nearly impossible to retrieve all underground reproductive structures it will have to be done again and again.

Chemical

- Ideal control is to apply a foliar application of glufosinate-ammonium while the plant is actively growing in the early spring; when it is between two and twelve inches tall and when there is no rain in the forecast for the next six hours.

REFERENCES

http://www.weedalert.com/weed_pages/wa_wild_garlic.htm

Cuscuta sp.

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Dodder	<i>Cuscuta</i> sp.	Convolvulaceae (Morning glory)	Annual

BRIEF DESCRIPTION

This is a parasitic annual weed easily identified by its orange-colored stem found climbing on, and attached to, its host plant. It has no leaves and flowers in April or May. It spreads by seed, so control for this weed must be done prior to seed set.

RECOMMENDATIONS FOR CONTROL

Manual

- Dodder can either be hand pulled, bagged and disposed of or, if it is growing on un-accessioned plant material, destroyed with the flame torch. According to Randy Prostak, UMass Extension Weed Specialist, when using a flame torch you don't need to incinerate the weeds, you just need to "lick them with good heat."

Chemical

- None recommended.

REFERENCES

<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7496.html>

Uva, Richard H., Neal, Joseph C., and DiTomaso, Joseph M. Weeds of the Northeast. Cornell University Press.

Noxious Weeds

Cynanchum louiseae

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Black Swallow-wort	<i>Cynanchum louiseae</i>	Asclepiadaceae (Milkweed)	Perennial

BRIEF DESCRIPTION

Introduced to the United States as a garden plant from the Ukraine, black swallow-wort is a tenacious twining vine, known to some as the “strangling vine” because it grows in and on its host plant. This makes it difficult to control with a foliar herbicide application or to properly attempt to weed it out.

This highly invasive weed is double-trouble because it not only spreads by seed but by rhizomes. Each plant produces an abundance of seed that is dispersed by wind, as is typical of the common milkweed plant. The seed can be poly-embryonic, meaning that one seed is capable of producing several seedlings. It flowers from June to September.

RECOMMENDATIONS FOR CONTROL

Manual

- Some degree of control can be achieved by hand weeding or cutting back the foliage. Although it is nearly impossible to pull out all rhizomes when weeding and any left behind will re-sprout, it is important to repeat this process over and over again. The hope is to exhaust the plant and if nothing else, it will prevent the plant from going to seed and spreading any further.
- If the opportunity exists, the flame torch can be used to control to control this weed. According to Randy Prostack, UMass Extension Weed Specialist, when using a flame torch you don't need to incinerate the weeds, you just need to “lick them with good heat.”

Chemical

- Apply a foliar application of triclopyr, glyphosate or glufosinate-ammonium.

REFERENCES

<http://tncweeds.ucdavis.edu/esadocs/vincnigr.html>

Lobdell, Matthew. Management Options for *Cynanchum* sp. Draft One. 2008.

Kaufman, S.R., W. Kaufman. Invasive Plants, Guide to Identification and the Impacts and Common North American Species. Stackpole Books.

Cyperus esculentus

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Yellow Nutsedge	<i>Cyperus esculentus</i>	Cyperaceae (Sedge)	Perennial

BRIEF DESCRIPTION

This sedge has an underground root system in the form of rhizomes and tubers. The tubers are what overwinters and what reproduces and form up to 1,900 plants in one growing season. Monitoring and control for nutsedge should begin in late-May to early-June. According to Randy Prostack, UMass Extension Weed Specialist, Yellow Nutsedge can be controlled with careful monitoring and chemical control in two years.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- The most effective means for controlling yellow nutsedge is a foliar application of halosulfuron while this sedge is actively growing, but not before it has developed three leaves or when it is at its flower-growth stage. This pesticide is most effective when applied at least four hours before a rainfall or irrigation is used.

REFERENCES

http://www.weedalert.com/weed_pages/wa_nutsedge.htm

Fallopia japonica

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Japanese Knotweed	<i>Fallopia japonica</i>	Polygonaceae (Smartweed or Buckwheat)	Perennial

BRIEF DESCRIPTION

None.

RECOMMENDATIONS FOR CONTROL

Manual

- Randy Prostack, UMass Extension Weed Specialist claims that repeated mowing within the same growing season will starve the plant's root system and will eventually lead to its demise.

Chemical

- Stem injection** - Using the JK injection tool, inject 5 ccs of 100% glyphosate concentrate into each plant stem below the third node. The stem may be too small or fleshy early in the growing season and too woody later on so monitoring and timing is important. Note of caution: In large areas of infestation and injection, be careful to not exceed the maximum allowable pesticide use for the square footage.
- Foliar application** - Plants should be sprayed with glyphosate when in bloom. To reduce the risk of drift and because this plant can grow up to 6 feet in height when in bloom, plants should be cut back in late-May to early-June so that they do not reach their maximum height and can be sprayed when shorter in height. The stems may not flower, as a result of being cut back, so it is important to observe other *Fallopia* flowering in the community and spray when they are in bloom.

Noxious Weeds

REFERENCES

<http://www.jkinjectiontools.com/index.php>
<http://tncweeds.ucdavis.edu/esadocs/polycusp.html>

Glechoma hederacea

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Ground Ivy	<i>Glechoma hederacea</i>	Lamiaceae (Mint)	Perennial

BRIEF DESCRIPTION

Formerly a medicinal and ornamental plant found in the home landscape, dating back to the early 1800s, ground ivy has now become a nuisance in lawns and planting beds. It spreads by seeds and along its spreading stem it roots at each node. According to Randy Prostack, UMass Extension Weed Specialist, this is not a difficult weed to control when properly managed.

RECOMMENDATIONS FOR CONTROL

Manual

- Ground ivy can be hand pulled, if the patch is small enough.

Chemical

- The most effective control for this weed is a foliar application of triclopyr or dicamba just after it flowers. Although not as effective, a foliar application can also be made from the second week in September to the second week in October.
- Sodium tetraborate, a naturally occurring mineral, can be an alternative method to using registered pesticides to control ground ivy, however, like them, it is important to read the label and follow the directions because it too has the potential to become toxic if not used properly.
- Following is a recipe for using Boron to control ground ivy in the spring for two years: Dissolve ten ounces of Boron into four ounces of warm water, and then dilute it in 2.5 gallons of water. Spray evenly over exactly 1,000 square feet of lawn.

REFERENCES

Kaufman, S.R., W. Kaufman. Invasive Plants, Guide to Identification and the Impacts and Common North American Species. Stackpole Books.
<http://www.ipm.iastate.edu/ipm/hortnews/1997/8-22-1997/borax.html>

Lythrum salicaria

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Purple loosestrife	<i>Lythrum salicaria</i>	Lythraceae (Loosestrife)	Perennial

BRIEF DESCRIPTION

Early detection and elimination is essential to controlling this wetland weed. While it may be too late for some of the following control measures for the meadow, it may not be for smaller colonies sighted along the ponds and Bussey Brook.

RECOMMENDATIONS FOR CONTROL

Manual

- Repeated hand pulling may be feasible when plant colonies are small but it is not the case in larger stands. Because hand pulling typically does not remove all underground reproductive structures that will re-sprout, it must be repeated over and over again, which will lead to the plant's decline by exhausting and starving the root system.
- Removing flowers will reduce the plants' spread particularly since one plant can produce over two million seeds.

Chemical

- Glyphosate, is a registered pesticide to be used near water and should be used in the following applications.
- **Stem injection** - Cut each stem to a height of six inches and inject a 20–30% solution into the stem.
- **Foliar application** - Just after peak bloom spray plants with a 1–2% rate of Glyphosate.

REFERENCES

<http://tncweeds.ucdavis.edu/esadocs/lythsali.html>

Uva, Richard H., Neal, Joseph C., and DiTomaso, Joseph M. *Weeds of the Northeast*. Cornell University

Ranunculus ficaria

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Buttercup	<i>Ranunculus ficaria</i>	Ranunculaceae (Buttercup)	Perennial

BRIEF DESCRIPTION

This is an aggressive perennial groundcover that forms a thick carpet that can quickly overtake an area. Its basal rosette foliage emerges in late winter and is followed by an early spring bloom of yellow flowers. It is prolific in moist and shady areas, thriving in one corner of the Hunnewell Building landscape. It spreads by tubers. In the summer, the foliage dies back to the ground.

Noxious Weeds

RECOMMENDATIONS FOR CONTROL

Manual

- Because *Ranunculus* spreads by tubers, it is very important to remove every last bit of underground growth, which is nearly impossible to do, besides being very time consuming, so this method of control is not recommended for large infestations. Even in small infestations, repeated hand weeding is required again and again in order to remove all tubers.

Chemical

- Apply a 39–41% glyphosate at a 1.5% rate and mixed with a non-ionic surfactant to the foliage in late winter or very early spring when the temperatures are above 50°F and there is no threat of rain for 12 hours.

REFERENCES

<http://www.nps.gov/plants/alien/fact/rafi1.htm>

Urtica dioica

COMMON NAME	SCIENTIFIC NAME	HOST	LIFE CYCLE
Stinging nettle	<i>Urtica dioica</i>	Urticaceae (Nettle)	Perennial

BRIEF DESCRIPTION

This weed is much avoided because of the stinging hairs found on its leaf surfaces, that when broken, inject a stinging toxin into whatever it has come into contact with it, whether it's an arm, hand or leg.

RECOMMENDATIONS FOR CONTROL

Manual

- Burn this plant with a flame torch. According to Randy Prostak, UMass Extension Weed Specialist, when using a flame torch you don't need to incinerate the weeds, you just need to "lick them with good heat."

Chemical

- Apply a foliar application of glufosinate-ammonium.

REFERENCES

Uva, Richard H., Neal, Joseph C., and DiTomaso, Joseph M. *Weeds of the Northeast*. Cornell University Press.

Weeds

COMMON NAME	LIFE CYCLE
Weeds in the cobblestone gutters, paths, pavement cracks	Annual and Perennial

BRIEF DESCRIPTION

None.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- If weeds have emerged, make and apply a cocktail of pre- and post-emergent herbicides, making sure to read the label for pesticide compatibility. This should keep the weeds away and allow for a longer period of control.
- Also recommended, in certain circumstances, is clove oil, a contact herbicide that provides a quick kill that is most effective on shallow-rooted annual weeds.

REFERENCES

None.

Appendix E-2 Insects

(Listed alphabetically by common name.)

Asian Longhorned Beetle

COMMON NAME	SCIENTIFIC NAME	HOST
Asian Longhorned Beetle	<i>Anoplophora glabripennis</i>	<i>Acer</i> , <i>Aesculus</i> , <i>Albizia</i> , <i>Betula</i> , <i>Celtis</i> , <i>Fraxinus</i> , <i>Platanus</i> , <i>Populus</i> , <i>Salix</i> , <i>Sorbus</i> , <i>Ulmus</i> , and <i>Cercidiphyllum</i> spp.

BRIEF DESCRIPTION

The Asian Longhorned Beetle was first identified in the United States in Brooklyn, New York in 1996, and since then infestations have been found in parts of New Jersey and Massachusetts. Other Infestations have been successfully eradicated in Illinois and Hudson County, New Jersey.

Over the July 4th weekend of 2010 a small infestation of the Asian longhorned Beetle was identified in six red maple trees on the grounds of Faulkner Hospital in Jamaica Plain, MA, which is across Centre Street from the Arnold Arboretum. Immediately following this detection, a USDA regulated, 1.5 mile quarantine area, was established that includes the Arnold Arboretum, Franklin Park, Brookline golf courses, and Jamaica Pond. As of March of 2012 this is still an isolated incidence with no other findings of the beetle.

The adult beetle is approximately 1 1/4" in length. It is a shiny black color with white spots on its back. The antennae are longer than their bodies and each antennal segment alternates between white and black. Adult beetles emerge from trees in June and may be active into fall. Female beetles chew individual "notches" in the bark of trees in which they lay one egg per site. Larvae soon hatch in about 11 days and will start to feed under the bark. Later, in the fall, they tunnel into the heartwood where they over winter. Pupation begins in spring and the adults emerge in June leaving perfectly round exit holes, about the size of a dime.

RECOMMENDATIONS FOR CONTROL

The USDA plan is complete eradication of this pest by the use of manual and chemical control.

Manual:

Once a tree is identified as being infested by the Asian Longhorned beetle, it is removed and chipped into 1 inch or smaller pieces

Chemical:

Soil injection of imidacloprid has been found to only have a 75% kill rate, and only in the early stages of its life cycle before it tunnels into the heartwood, but is being used by the USDA as a preventive measure.

REFERENCES

"Asian Longhorned Beetle - Landscape Nursery and Urban Forestry - UMass Extension."

Landscape Nursery and Urban Forestry - UMass Extension. UMass Extension, n.d. Web. 11 Mar. 2011. <http://umassgreeninfo.org/fact_sheets/wood_attackers/asian_longhorned_beetle.html>.

"Asian Longhorned Beetles ." *ARS : Home*. United States Department of Agriculture, 1 June 2000. Web. 11 Mar. 2011. <<http://www.ars.usda.gov/is/AR/archive/jun00/asian0600.htm>>.

Bronze Birch Borer

COMMON NAME	SCIENTIFIC NAME	HOST
Bronze Birch Borer	<i>Agrilus anxius</i>	Prefers white and European birches

BRIEF DESCRIPTION

The bronze birch borer is a native North American beetle, less than one-half inch in size whose larvae feed just under the bark on white barked birches. The trees eventually succumb to the girdling feeding pattern. Upper branches are attacked first. Signs of the beetle are D-shaped exit holes on the tree and a rust colored staining.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- ✦ Borers will attack and invade plants that are under stress, so supplying adequate moisture, reducing compaction and controlling birch leafminer will help keep the tree healthy so that it can overcome any borers.

Chemical

- ✦ Soil inject with imidacloprid every two to three years. See label for rate.

REFERENCES

Cranshaw, Whitney. 2004. *Garden Insects of North America*. Princeton University Press.

Eastern Tent Caterpillar

COMMON NAME	SCIENTIFIC NAME	HOST
Eastern Tent Caterpillar	<i>Malacosoma disstria</i>	Prefers plants in Rosaceae

BRIEF DESCRIPTION

This caterpillar builds its tent in the crotches of tree branches and is not to be confused with the fall webworm that builds its tent on the tips of branches or the Forest tent caterpillar that does not even build an obvious tent. It is one of the earliest caterpillars to emerge in the spring at approximately 50 growing degree days (GDD). It emerges before the forest tent caterpillar and is easily identified by the white stripe on its back. The male has one stripe and the female has two. It feeds at night on its host's foliage and can cause severe defoliation. One generation is produced per year.

Insects

RECOMMENDATIONS FOR CONTROL

Manual

- In the winter, look for black egg sacs encircling the smaller branches on the tree. They can be pruned out while dormant and definitely before egg hatch.

Chemical

- For control, foliage can either be sprayed with *Bacillus thuringiensis* var. *kurstaki* or a spinosad. The *Bt* is only effective on the earliest instar stages of this pest, when it is less than a half-inch long. It is ingested by the larvae and feeding ceases within an hour, however, death can take between two and five days. A spinosad should be used at the later stages of instar growth. Once ingested by the larvae, they die. Unlike the *Bt* it has a much longer residual.

REFERENCES

Cranshaw, Whitney. 2004. Garden Insects of North America. Princeton University Press.

Elm Bark Beetle

COMMON NAME	SCIENTIFIC NAME	HOST
Elm Bark Beetle	<i>Scolytus multistriatus</i> and <i>Hylurgopinus rufipes</i>	<i>Ulmus</i> spp.

BRIEF DESCRIPTION

Scolytus multistriatus is an introduced beetle from Asia, while *Hylurgopinus rufipes* is a native bark beetle. Both species are about 1/8 inch long with a black head and thorax with reddish colored wing covers. These two pests are vectors of Dutch Elm Disease which is why their populations are closely monitored here at the Arboretum. Both species emerge in spring and feed in twig crotches thus transmitting the disease. Pheromone traps can be hung in late March to monitor for their emergence.

RECOMMENDATIONS FOR CONTROL

Manual

- Proper sanitation is the basis for elm bark beetle management. Prompt removal and disposal of dead and dying elms, as well as, immediate pruning of dead branches is essential to reducing bark beetle breeding sites.

Chemical

- The Arboretum does not use chemical treatment for elm bark beetles due to efficacy and potential environmental hazards.

REFERENCES

Davidson, John A., and Michael J. Raupp. Managing Insects and Mites on Woody Plants: An IPM Approach. Londonderry: Tree care Industry, (2009).

“Elm Bark Beetle - Landscape Nursery and Urban Forestry - UMass Extension.”
Landscape Nursery and Urban Forestry - UMass Extension. UMass Extension, n.d. Web. 14 Feb. 2011.
<http://umassgreeninfo.org/fact_sheets/bark_beetles/elm_bark_beetle.html>

Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

Elongate Hemlock Scale/Fiorinia Scale

COMMON NAME	SCIENTIFIC NAME	HOST
Elongate Hemlock Scale/ Fiorinia Scale	<i>Fiorinia externa</i>	Prefers <i>Tsuga canadensis</i> and <i>Tsuga caroliniana</i>

BRIEF DESCRIPTION

The Elongate Hemlock Scale/ Fiorinia scale is an introduced armored scale from Asia. This 3/16 inch long pest feeds on the undersides of hemlock needles making the needles become yellow and chlorotic. The crawler stage can be present at any time of the growing season, which makes it difficult to attack the crawler stage. Monitor the undersides of hemlock needles for tan to brown female covers or white male covers to know if treatment is needed.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended

Chemical

- Soil drench and trunk spray of Dinotefuran coupled with pentrabark has shown promising outcomes.

REFERENCES

Davidson, John A., and Michael J. Raupp. Managing Insects and Mites on Woody Plants: An IPM Approach. Londonderry: Tree care Industry, (2009).

Insects

Fall Cankerworm

COMMON NAME	SCIENTIFIC NAME	HOST
Fall Cankerworm	<i>Alsophila pometaria</i>	Likes <i>Tilia</i> , <i>Fagus</i> , <i>Acer</i> , <i>Quercus</i> , <i>Ulmus</i> and other hardwoods.

BRIEF DESCRIPTION

Named the fall cankerworm because it is in the late fall that the adults emerge. This is when the female, who remains wingless, climbs into the canopy of the tree to lay eggs on the tree's smaller branches. The eggs hatch at approximately 115 growing degree days (GDD) and the larvae begin feeding on the foliage. The larvae continue to grow and remain in the canopy of the tree until they fully mature. Then they spin down from the tree, which is what we often see, bright green caterpillars hanging onto silk threads from a tree. One generation is produced per year.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- For control, foliage can either be sprayed with *Bacillus thuringiensis* var. *kurstaki* or a spinosad. The *Bt* is only effective on the earliest instar stages of this pest, when it is less than a half-inch long. It is ingested by the larvae and feeding ceases within an hour, however death can take between two and five days. A spinosad should be used at the later stages of instar growth. Once ingested by the larvae, they die. Unlike the *Bt* it has a much longer residual.

REFERENCES

Cranshaw, Whitney. 2004. Garden Insects of North America. Princeton University Press.

Forest Tent Caterpillar

COMMON NAME	SCIENTIFIC NAME	HOST
Forest Tent Caterpillar	<i>Malacosoma disstria</i>	Prefers <i>Quercus</i> but feeds on broad host <i>Acer</i> , <i>Betula</i> and others.

BRIEF DESCRIPTION

Despite its name, this caterpillar does not build an obvious 'tent' like the Eastern tent caterpillar and the fall webworm. It is one of the earliest caterpillars to emerge in the spring at approximately 192 growing degree days (GDD). It can be identified by the white-colored, shaped 'keyhole' patterns on its back. It feeds on its host's foliage leaving behind what appears to be a bunch of shot-holes in the leaves. One generation is produced per year.

RECOMMENDATIONS FOR CONTROL

Manual

- The egg masses are similar to those of the Eastern tent caterpillar in that they are black and found encircling the smaller branches on the tree. They can be pruned out while dormant and particularly before eggs hatch.

Chemical

- For control, foliage can either be sprayed with *Bacillus thuringiensis* var. *kurstaki* or a spinosad. The *Bt* is only effective on the earliest instar stages of this pest, when it is less than a half-inch long. It is ingested by the larvae and feeding ceases within an hour, however death can take between two and five days. A spinosad should be used at the later stages of instar growth. Once ingested by the larvae, they die. Unlike the *Bt* it has a much longer residual.

REFERENCES

None.

Hemlock Woolly Adelgid

COMMON NAME	SCIENTIFIC NAME	HOST
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	Prefers Eastern and Carolina hemlocks.

BRIEF DESCRIPTION

Hemlock woolly adelgid was first seen in the Arboretum in 1997. It is an introduced pest from Asia and is believed to have been in the United States since 1924. It feeds at the base of the hemlock and can cause hemlock death in three to five years.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- Soil inject with imidacloprid being careful not to exceed the maximum dosage of 8.6 ounces of active ingredient per acre per year.
- Because it can take some time for the pesticide to translocate to the upper portions of the tree, a soil drench of dinotefuran can be made for a quicker kill. **Note of caution:** Restricted use pesticide in Massachusetts and warrants this level because of its threat to groundwater contamination. It is both highly mobile and resistant to biodegradation.

REFERENCES

<http://www.na.fs.fed.us/fhp/hwa/>

Insects

Imported Willow Leaf Beetle

COMMON NAME	SCIENTIFIC NAME	HOST
Imported Willow Leaf Beetle	<i>Plagioder a versicolora</i>	<i>Salix</i> spp.

BRIEF DESCRIPTION

These introduced beetles are about 3/16 inch long, oval and are a metallic blue to green color. As an adult they chew holes in leaves from the upper surface. The larvae are about ¼ inch long and appear black with rows of tubercles. As larvae they skeletonize the bottom surface of the leaves. There can be two to three generations per year, and with high populations, control may be required. GDD 192-2200

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended

Chemical

- The use of spinosad sprayed on foliage in early to late spring has provided great control.

REFERENCES

Davidson, John A., and Michael J. Raupp. Managing Insects and Mites on Woody Plants: An IPM Approach. Londonderry: Tree care Industry, (2009).

Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

Lace Bug (*Stephanitis*)

COMMON NAME	SCIENTIFIC NAME	HOST
Lace Bug	<i>Stephanitis</i> spp.	See complete list below.

BRIEF DESCRIPTION

This lace bug tends to favor shrubs (i.e., *Rhododendron*, *Pieris* and *Kalmia*). This insect pest, approximately 1/5 of an inch in size can be found feeding as early as late-May on the underside of the leaves, as evidenced by deposits of black frass, a very characteristic trait of this insect. The leaves, as viewed from the top, appear chlorotic. Up to four generations of this pest are produced each year. It is important to control this pest in its first generation.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- A foliar spray of horticultural oil or potassium salts can be sprayed on the foliage, making sure to get good coverage on the underside of the leaf where the lace bug is.
- A soil injection of imidacloprid is also recommended.

REFERENCES

UMass Extension Landscape, Nursery and Urban Forestry Program. [Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England 2003-2004.](#)

Larch Casebearer

COMMON NAME	SCIENTIFIC NAME	HOST
Larch Casebearer	<i>Coleophora laricella</i>	European and American larch.

BRIEF DESCRIPTION

The larvae emerge in late-May to early-June at approximately 75 growing degree days (GDD) and begin feeding on its host's foliage. While this pest may not kill the tree, its feeding pattern turns the needles brown, which detracts from the beauty of the tree.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- Spray foliage with *Bacillus thuringiensis* var. *kurstaki*.

REFERENCES

UMass Extension Landscape, Nursery and Urban Forestry Program. [Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England 2003-2004.](#)

Insects

Spring Cankerworm

COMMON NAME	SCIENTIFIC NAME	HOST
Spring Cankerworm	<i>Paleacrita vernata</i>	Likes <i>Tilia</i> , <i>Fagus</i> , <i>Acer</i> , <i>Quercus</i> , <i>Ulmus</i> and other hardwoods.

BRIEF DESCRIPTION

The spring cankerworm is often mistaken for the fall cankerworm but differs in its appearance. It does not have the third pair of prolegs and the caterpillar has a yellow stripe on each side of its body. Like the fall cankerworm, the female is wingless and climbs into the canopy of the tree to lay eggs on the tree's smaller branches. She does this in late winter. The eggs hatch at approximately 115–400 growing degree days (GDD) and the larvae begin feeding on the foliage. The larvae continue to grow and stay in the canopy of the tree until they fully mature. Then they spin down from the tree, which is what we often see, bright green caterpillars hanging onto silk threads from a tree. One generation is produced per year.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- For control, foliage can either be sprayed with *Bacillus thuringiensis* var. *kurstaki* or a spinosad. The *Bt* is only effective on the earliest instar stages of this pest, when it is less than a half inch long. It is ingested by the larvae and feeding ceases within an hour, however death can take between two and five days. A spinosad should be used at the later stages of instar growth. Once ingested by the larvae, they die. Unlike the *Bt* it has a much longer residual.

REFERENCES

Cranshaw, Whitney. 2004. Garden Insects of North America. Princeton University Press.

Twolined Chestnut Borer

COMMON NAME	SCIENTIFIC NAME	HOST
Twolined Chestnut Borer	<i>Agrilus bilineatus</i>	<i>Quercus</i>

BRIEF DESCRIPTION

The twolined chestnut borer, a native to Wisconsin but found throughout the Eastern United States, gets its name from its former host, the American chestnut. This pest now favors the genus *Quercus* and feeds on oaks that are stressed from a multiple of causes, including defoliators such as the winter moth, soil compaction and drought. The twolined chestnut borer can be distinguished from other borers attacking oaks by its D-shaped exit hole.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- Borers can be difficult to control once established so it is important to maintain the vigor of the tree so that the borer does not become established in the first place. Borers will attack and invade plants that are under stress, so supplying adequate moisture, reducing compaction and mulching will help keep the tree healthy so that it can overcome any borers.
- Prune wilted branches in late summer and remove deadwood

Chemical

- Soil inject with imidacloprid every two to three years. See label for rate.

REFERENCES

<http://www.na.fs.fed.us/Spfo/pubs/fidls/chestnutborer/chestnutborer.htm>

Winter Moth

COMMON NAME	SCIENTIFIC NAME	HOST
Winter Moth	<i>Operophtera brumata</i>	Wide selection.

BRIEF DESCRIPTION

The winter moth is an introduced pest from Europe whose larvae tunnel into the buds on a wide host of woody plants and feed on them. The larvae prefer flower buds but will also feed on foliar buds, moving from bud to bud and ballooning from tree to tree. Defoliation can be extensive and trees will succumb to repeated years of defoliation. The adult moths emerge from the soil in early winter. The female moth, which is wingless, climbs the tree to deposit her eggs. They hatch in early spring (late-March to early-June) at approximately 20–50 GDD. The male moth is often what we see flying near a light source in late-November through January.

RECOMMENDATIONS FOR CONTROL

Manual

- None recommended.

Chemical

- For control, foliage can either be sprayed with *Bacillus thuringiensis* var. *kurstaki* or a spinosad. The *Bt* is only effective on the earliest instar stages of this pest, when it is less than a half inch long. It is ingested by the larvae and feeding ceases within an hour, however death can take between two and five days. A spinosad should be used at the later stages of instar growth. Once ingested by the larvae, they die. Unlike the *Bt* it has a much longer residual.

REFERENCES

http://www.umassgreeninfo.org/fact_sheets/defoliators/winter_moth.pdf

Appendix E-3 Diseases

(Listed alphabetically by common name)

Black Knot

COMMON NAME	SCIENTIFIC NAME	HOST
Black Knot	<i>Apiosporina morbosa</i>	Cherry, chokecherry, and plum are the most common hosts, but twenty different <i>Prunus</i> species have been found to be susceptible.

BRIEF DESCRIPTION

The fungus (*Apiosporina morbosa*) produces hormones that cause development of larger and more xylem and phloem cells that produce galls that swell and envelop the infected branch. These galls are black, oozing looking, knobby, lumpy growth forms. These galls encircle the infected branch and cause distortion, stunted, suppressed growth, and dieback. If left unmanaged black knot can lead to the death of the entire tree.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

Pruning out the galls/knots at least three to four inches below the swelling is the best method for control. Try to remove as soon as any swelling is visible and before the knot has started to grow through the bark. Make sure to dispose of all infected branch debris away from susceptible trees, as the fungus can still produce spores after pruned out.

Chemical

Fungicides can be applied, from bud break through the end of branch growth, or throughout the entire growing season, to help protect new growth from possible infection. Timing is a key issue with chemical applications and in most cases chemical applications have little efficacy.

REFERENCES

Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

<http://extension.umass.edu/landscape/fact-sheets/black-knot-prunus>

Briosia Bud Blast & Twig Blight

COMMON NAME	SCIENTIFIC NAME	HOST
Briosia Bud Blast & Twig Blight	<i>Briosia azaleae</i>	<i>Rhododendron</i>

BRIEF DESCRIPTION

This fungal disease first attacks the flower buds and causes them to turn brown and not open. In the spring, tiny black fruiting structures can be seen covering the bud. If kept unchecked this disease will travel to the lateral foliage buds and then into the twigs.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- The dead flower buds and twigs should be pruned out of the plant and destroyed. This task should be completed only when the weather is dry, so as to not spread the disease.

Chemical

- If necessary, apply a fungicide in early summer when the flower buds are forming.

REFERENCES

UMass Extension Landscape, Nursery and Urban Forestry Program. [Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England 2003-2004.](#)

Diplodia Blight

COMMON NAME	SCIENTIFIC NAME	HOST
Diplodia Blight	<i>Sphaeropsis</i>	<i>Pinus nigra</i> , <i>P. mugo</i> , <i>P. sylvestris</i> , <i>P. strobus</i> , <i>P. resinosa</i> , <i>P. cembra</i>

BRIEF DESCRIPTION

This is a fungus that causes dieback on new shoots, affects cones and is characterized by the black spots on new needles. It mostly attacks pines that are stressed from poor growing conditions.

RECOMMENDATIONS FOR CONTROL

Manual

- Maintain vigor of the trees. Pruning infected branches will not reduce the spread of inoculum, but it will improve the appearance of the tree. Removing infected cones will reduce the spread of inoculum.

Chemical

- Apply a foliar application of mancozeb just as buds begin to swell. Repeated applications may be necessary if damp wet weather continues and until the new growth fully expands.

REFERENCES

UMass Extension Landscape, Nursery and Urban Forestry Program. [Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England 2003-2004.](#)

Dutch Elm Disease

COMMON NAME	SCIENTIFIC NAME	HOST
Dutch Elm Disease	<i>Ophiostoma ulmi</i>	<i>Ulmus</i> spp.

Diseases

BRIEF DESCRIPTION

The first visual symptoms are what is referred to as “flagging”, which is when a branch of a tree develops symptoms of wilting and/or yellowing of the leaves. Prior to this occurring, symptoms are internal and include the death of xylem cells, the loss of water conducting ability, and the browning of the infected sapwood.

RECOMMENDATIONS FOR CONTROL

Manual

- Remove any “flagging” branches immediately. Remove enough of the branch to be certain of removing the infection.

Chemical

Use of insecticides can be used to kill the elm bark beetles, but overall, chemical treatments have variable results on the fungus and the insect.

REFERENCES

“Dutch Elm Disease - Landscape Nursery and Urban Forestry - UMass Extension.”

Landscape Nursery and Urban Forestry - UMass Extension. UMass Extension, n.d. Web. 14 Feb.2011.

http://umassgreeninfo.org/fact_sheets/diseases/dutch_elm_disease.pdf

Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

Fire Blight

COMMON NAME	SCIENTIFIC NAME	HOST
Fire Blight	<i>Erwinia amylovora</i>	<i>Amelanchier</i> , <i>Aronia</i> , <i>Aruncus</i> , <i>Chaenomeles</i> , <i>Cotoneaster</i> , <i>Crataegomespilus</i> , <i>Crataegus</i> , <i>Cydonia</i> , <i>Exochorda</i> , <i>Holodiscus</i> , <i>Kerria</i> , <i>Malus</i> , <i>Mespilus</i> , <i>Photinia</i> , <i>Physocarpus</i> , <i>Potentilla</i> , <i>Prinsepia</i> , <i>Prunus</i> , <i>Pyracantha</i> , <i>Pyrus</i> , <i>Rhodentypos</i> , <i>Rosa</i> , <i>Rubus</i> , <i>Sorbaria</i> , <i>Sorbus</i> , <i>Spiraea</i> , <i>Stranvaesia</i> spp.

BRIEF DESCRIPTION

The bacteria (*Erwinia amylovora*) can create widespread damage on Rosaceous plants in years when environmental conditions (average daily temperature 60F or greater, rain or heavy dew while flowers are present) are conducive for infection. Under these conditions primary infection of *E. amylovora* occurs in blossoms and then moves down the plant creating secondary infections in twigs and branches. Flowers can become brown and wilted. Twigs can shrivel and blacken which can leave crooks on the end of the branches. Secondary infection can advance forming discolored cankers that ooze bacteria and become sources of inoculum for future infection. Fire blight infections can destroy limbs and even entire shrubs or trees.

RECOMMENDATIONS FOR CONTROL

Manual

- During dormant season Rosaceous plants should be scouted for canker sites and removed. Prune out and destroy infected parts of the plant.
- During the growing season monitor Rosaceous plants starting 1 week after petal fall. Immediately remove blighted material utilizing the “ugly stub” technique (Cut into 2 year old wood, 8–12” bellow visible damage leaving a 4” stub. Leave and come back in dormant season to remove stub). Never combine this sanitation pruning technique with corrective or structural pruning. Sanitize tools after all jobs have been complete, or as necessary.

Chemical

- **Copper:** Spray applications are applied as a preventative measures in orchards with a history of fire blight. Copper is applied between silver tip to ¼” green tip stage of bud break. All plants in a block or area need to be treated. Long term copper application can have adverse effects on soil health.
- **Antibiotic:** Streptomycin antibiotics sprays can be used during flowering. This application should be guided by computer based modeling software that allows for pinpointing exact environmental conditions that are conducive for fire blight infection. Applications should only be used in areas where annual dormant season pruning of cankers has been conducted since Streptomycin can form resistance to treatment.

REFERENCES:

- Steiner, W. Paul. 2000 January, “Managing Fire Blight in Apples”, Paper given at Illinois Horticultural Society Meeting. Web. 14 Sep. 2010 <http://www.caf.wvu.edu/kearneysville/articles/FB-MANAGE00.html>
- Steiner, W. Paul. 2000 January, “The Biology and Epidemiology of Fire Blight” Paper given at Illinois Horticultural Society Meeting. Web. 8 Oct. 2010 <http://www.caf.wvu.edu/kearneysville/articles/FB-BIOLOGY00.html>
- P.W. Steiner, T. van der Zwet, and A. R. Biggs “Fire Blight—*Erwinia amylovora*” *Kearneysville—Plant Disease Fact Sheet*. University of West Virginia: Davis College of Agriculture, Natural Resources and Design. Web. 24 Feb. 2011
- Sinclair, A. Wayne, Lyon H. Howard, Johnson T. Warrant, “Disease of Trees and Shrubs” Cornell, NY. Cornell University Press 1987
- “Fire Blight Management Guidelines--UC IPM.” *UC Statewide Integrated Pest Management Program*. University of California: Agriculture and Natural resources, 1 Oct. 2003. Web. 14 Feb. 2011. <<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7414.html>>.
- Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

Diseases

Oak Anthracnose

COMMON NAME	SCIENTIFIC NAME	HOST
Oak Anthracnose	<i>Apiognomonia</i>	<i>Quercus</i> spp.

BRIEF DESCRIPTION

None.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- Prune to improve air circulation and to remove infected branches. Remove diseased leaf litter from the area.

Chemical

Apply a foliar application of mancozeb just as buds are beginning to open. Repeated applications may be necessary if damp wet weather continues.

REFERENCES

UMass Extension Landscape, Nursery and Urban Forestry Program. [Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England 2003-2004.](#)

Phytoplasma

COMMON NAME	SCIENTIFIC NAME	HOST
Phytoplasma	<i>Phytoplasma</i>	<i>Syringa</i> spp.

BRIEF DESCRIPTION

Phytoplasma is a specialized bacteria that is vectored by insects, mainly leafhoppers, which can cause numerous symptoms to the infected plant and even cause death. Symptoms that occur can be but are not limited to: yellowing or reddening of the leaves, shortening of the internodes with stunted growth, smaller leaves, excessive proliferation of shoots resulting in a witches' brooms, necrosis of the phloem tissues, dieback of the branches of woody plants, and the general decline and death of the plant.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- Maintain good cultural practices to keep plants in good health and vigor.

Chemical

- No known treatments.

REFERENCES

“What Are Phytoplasmas?.” Phytoplasma Web Site. The University of Tokyo Graduate School of Agricultural and Life Sciences Department of Agricultural and Environmental Biology Laboratory of Plant Pathology (PLANPATH), 1 June 2004. Web. 14 Feb. 2011. papilio.ab.a.u-tokyo.ac.jp/planpath/phyto-genome/index.html.

Rhabdocline Needle Cast

COMMON NAME	SCIENTIFIC NAME	HOST
Rhabdocline Needle Cast	<i>Rhabdocline</i>	<i>Pseudotsuga menziesii</i>

BRIEF DESCRIPTION

This fungal disease attacks the needles, turning them brown, and works its way from the bottom of the tree upwards. The needles will remain green at the point of attachment but will drop.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- Improve air circulation around trees. Keep weeds away from the base of the tree. When conditions are dry, prune out infected branches.

Chemical

- Apply a foliar application of mancozeb just as the buds swell and as the needles emerge and expand to full size. Repeated applications may be necessary if damp wet weather continues. No known treatments

REFERENCES

UMass Extension Landscape, Nursery and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England 2003-2004.

Swiss Needlecast

COMMON NAME	SCIENTIFIC NAME	HOST
Swiss Needlecast	<i>Phaeocryptus gaeumanni</i>	<i>Pseudotsuga menziesii</i>

BRIEF DESCRIPTION

Swiss Needlecast is caused by the fungus *Phaeocryptus gaeumanni*, which only attacks Douglas-fir. The fungus produces spherical, black, fruiting bodies which can be found on the undersides of the infected needle. The fungus infects the newly expanding needles, but usually does not kill needles until they are 2 to 3 years old. At that time, infected needles start to turn yellow and can be cast from the tree. Infection occurs mainly near the base of the tree and may leave the lower foliage looking thin and unattractive.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

Maintain good air circulation by pruning and controlling weeds which will allow for more sunlight. This helps cut down on a wet and humid environment which reduces inoculation of the fungus.

Chemical

The application of mancozeb is recommended when the shoot elongation is .5–2 inches long. Reapplications every 2–3 weeks are needed if rainy conditions persist. Two successive seasons of treatment have shown to have promising results of suppressing the fungus.

REFERENCES

“Swiss needlecast.” Cornell University—Department of Plant Pathology. N.p., n.d. Web. 14 Feb. 2011. <http://www.plantpath.cornell.edu/trees/SwissNcst.html>.

Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

Sycamore Anthracnose

COMMON NAME	SCIENTIFIC NAME	HOST
Sycamore Anthracnose	<i>Apiognomonia veneta</i>	<i>Platanus</i> spp.

BRIEF DESCRIPTION

The most common symptom is slow leafing-out after mild winters and/or cool, wet springs. Dead areas or blotches on leaves are also common. Infected areas are often along the veins and midrib of the leaf, and dead areas may merge until the whole leaf dies. Sycamore anthracnose also affects twigs, buds, and branches.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- ✦ Sanitation is the first defense, by cleaning up and disposing of all leaves. Maintain a pruning schedule to promote good air circulation and an open canopy to reduce inoculation of disease.

Chemical

- The use of mancozeb has been used in the past with variable results. If used, apply right at bud break in early spring and every 2–3 weeks during wet periods. This application might not be practical with such large specimen trees and sanitation and pruning might be a better defense.

REFERENCES

“Sycamore Anthracnose - Landscape Nursery and Urban Forestry - UMass Extension.” *Landscape Nursery and Urban Forestry - UMass Extension*. UMass Extension, n.d. Web. 14 Feb.2011.

http://www.umassgreeninfo.org/fact_sheets/diseases/sycamore_anthracnose.pdf

Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

Verticillium Wilt

COMMON NAME	SCIENTIFIC NAME	HOST
Verticillium Wilt	<i>Verticillium dahlia</i>	The most common plants infected are ash (<i>Fraxinus</i>), catalpa, Kentucky coffee tree (<i>Gymnocladus dioicus</i>), elm (<i>Ulmus</i>), magnolia, maple (<i>Acer</i>), Russian olive (<i>Elaeagnus angustifolia</i>), redbud (<i>Cercis</i>), smoketree (<i>Cotinus</i>), tuliptree (<i>Liriodendron</i>), and viburnum

BRIEF DESCRIPTION

Verticillium is a soil borne fungus that infects plant roots when damaged, or can directly infect the fibrous feeder roots. The fungus is transmitted into the vascular tissue of the tree causing wilting symptoms. Leaf wilt, branch dieback, stunted growth, drying, premature loss, and discoloration of leaves are symptoms that can appear at any time during the growing season. There may be visible green to black streaks in the vascular cambium, when the bark is stripped off of the infected branches.

RECOMMENDATIONS FOR CONTROL

Manual/Cultural

- Maintaining the tree’s vitality and vigor with the use of good horticultural practices is the best control method. Reducing any root damage or water shortage, as well as any stress on susceptible trees will help ward off the *Verticillium* fungus. Maintain tree health.

Chemical

- There are no known chemical controls.

REFERENCES

Umass Extension Landscape, Nursery, and Urban Forestry Program. Professional Management Guide for Insects, Diseases, and Weeds of Trees and Shrubs in New England. 2008.

<http://extension.umass.edu/landscape/fact-sheets/verticillium-wilt>

Appendix F Secondary Paths, Annual Care Plan

PATHS INCLUDE

- ✦ Willow Path
- ✦ Beech Path
- ✦ Conifer Path
- ✦ Hemlock Hill Rd.
- ✦ Dump
- ✦ 1090 Path

ALL SEASONS

- ✦ Prior to heavy rain storms, clear water-bars and drains of all obstructions with use of blowers, picks, and/or air gun.
- ✦ Ensure water-bars can shed water to open areas.

SPRING

- ✦ Inspect all secondary paths for wash outs, and areas of wear due to winter weather.
- ✦ Clear all water-bars and drains of debris.
- ✦ Repair areas of wear by adding material as needed and compacting accordingly.

SUMMER

- ✦ Monitor roads for wear and run-off issues.
- ✦ Prior to summer storms clear all water-bars of debris and make sure water will shed to open areas.
- ✦ Prior to large storms place a row of hay bales in front of channel drains, and in specified washout areas.

FALL

- ✦ Routinely clear water-bars and channel drains of leaf litter prior to storms to avoid wash outs.
- ✦ **Willow Path:** Place hay bales leading up to the bridge to aid in preventing erosion during major storms.
- ✦ **Beech Path:** Place hay bales in front of (2) channel drains to aid in directing water.
- ✦ **Conifer Path:** Place hay bales along the edge of the sharp bend on the Walter St. side of Conifer Path.
- ✦ **Hemlock Hill Rd:** Clear all leaf litter from drainage channel adjacent to path. Make sure to clear before snowfall to avoid build-up in the spring.

WINTER

- ✦ **Beech Path:** Place hay bales in front of (2) channel drains to aid in directing water.
- ✦ **Willow Path:** Place hay bales leading up to the bridge to aid in preventing erosion during major storms.
- ✦ **Conifer Path:** Place hay bales along the edge of the sharp bend on the Walter St. side of Conifer Path.

SPECIFIC NEEDS

Zone 1.12 Zelkova and Area Below the Esker

- The blocked drain must be cleared and repaired to amend drainage issues in that area. Ruts caused by rushing water can be repaired after the drain is fixed.

LONG-TERM PROJECTS/TASKS

Every 2 years, or as needed

- Re-grade all secondary paths.
- Eroded areas should be evaluated to determine if additional water mitigation tools are to be installed.
- Apply, spread, and compact $\frac{3}{4}$ " crusher, where needed.

CAPITAL PROJECTS

Willow Path

- Look into re-engineering the streams flow. The 90° bend in the stream is causing major erosion issues leading up to the bridge.
- An alternate option may be to build up the stream banks to prevent erosion.

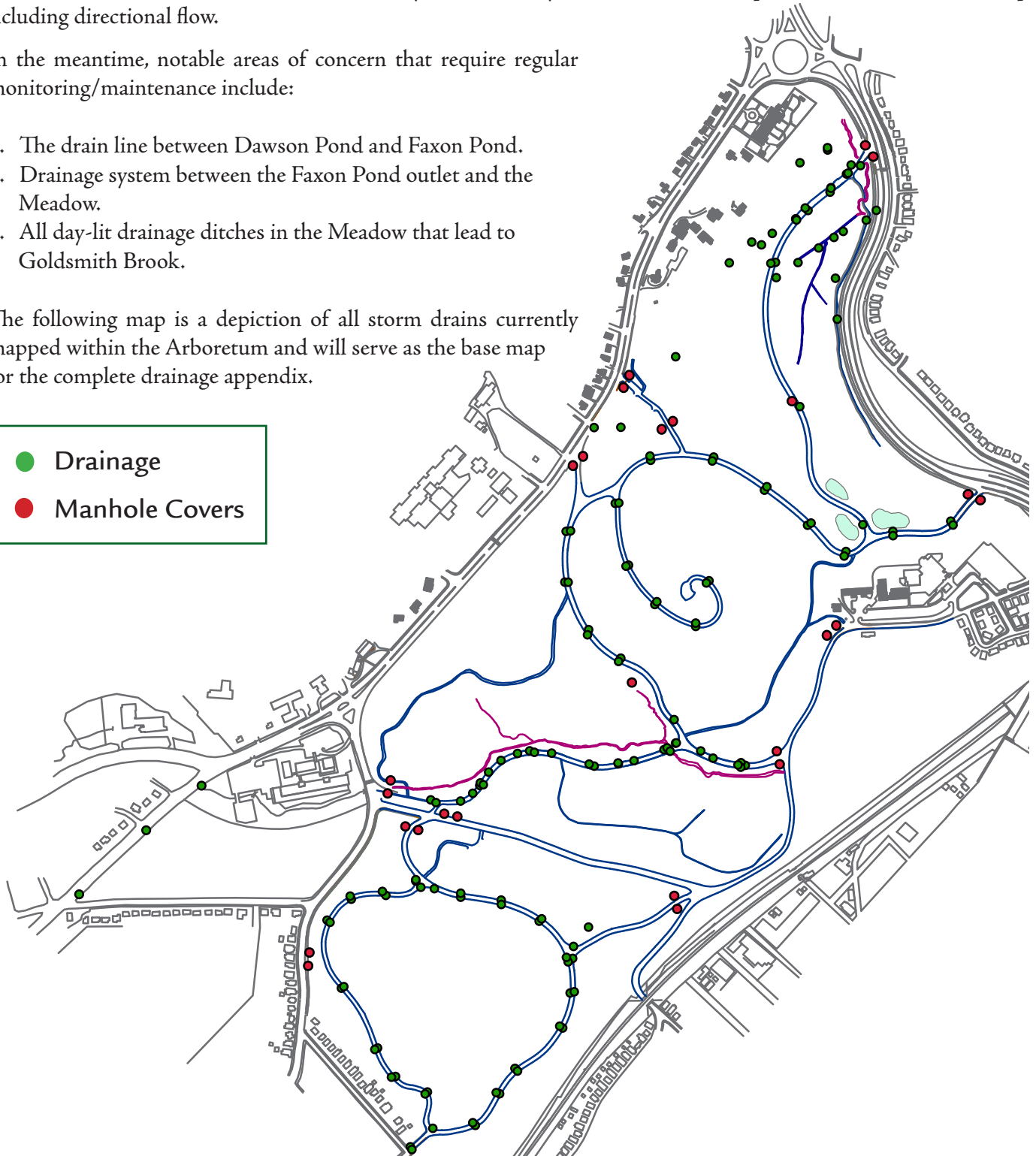
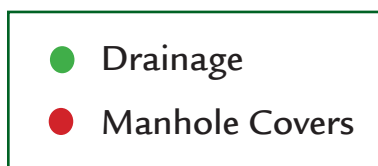
Appendix G Drainage

Drainage structures in the Arnold Arboretum range from systems which incorporate century-old storm drains and tiles to brand new systems that rely on state-of-the-art pervious surfaces and infiltration chambers. As we begin to lose significant contributors to the institutional knowledge of our older drainage systems, and as we begin to incorporate more complicated, modern ones into the landscape, it is imperative that the associated maintenance requirements for these systems be outlined in detail. This section of the LMP is currently under construction. Once completed it will detail what kind of systems currently exist within each of the management regions followed by a list of maintenance tasks associated with those systems. Each system will have its components illustrated on the map including directional flow.

In the meantime, notable areas of concern that require regular monitoring/maintenance include:

1. The drain line between Dawson Pond and Faxon Pond.
2. Drainage system between the Faxon Pond outlet and the Meadow.
3. All day-lit drainage ditches in the Meadow that lead to Goldsmith Brook.

The following map is a depiction of all storm drains currently mapped within the Arboretum and will serve as the base map for the complete drainage appendix.



Appendix H Arborists Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

March 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		Zone 3.5 <i>Carpinus</i> & <i>Castanea</i> Collection, Storm Drainage & Pruning				
6	7	8	9	10	11	12
	Zone 3.5 <i>Carpinus</i> & <i>Castanea</i> Collection, Storm Drainage & Pruning					
13	14	15	16	17	18	19
	Zone 1.15 <i>Leitnaria</i> Bowl					
20	21	22	23	24	25	26
	Weld Hill Priorities					
27	28	29	30	31		
	Weld Hill Priorities					

April 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
					Weld Hill Priorities	
3	4	5	6	7	8	9
	Zone 3.8 Bussey & Spring Brook Corridor					
10	11	12	13	14	15	16
	Zone 3.8 Bussey & Spring Brook Corridor			Zone 5.1 Rhododendron/Davidson		
17	18	19	20	21	22	23
	Zone 5.1 Rhododendron/Davidson Path & understory road edge accessions.					
24	25	26	27	28	29	30
	Tree Work in preparation for Lilac Sunday. Work along the road and Linden Path.					

High Priority
 Moderate Priority
 Low Priority
 Other

May 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 Zone 1.6 The Acer Collection	4	4	5	6	7
8	9 Zone 1.5 Willow Path	10	11	12	13	14
15	16 Zone 1.7 North Woods with Accessions	17	18	19	20	21
22	23 Zone 1.7 North Woods with Accessions	24	25	26	27	28
29	30 Memorial Day	31 Storm Damage				

June 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 Storm Damage Pruning: Arboretum Wide	2	3	4
5	6 Storm Damage Pruning: Arboretum Wide	7	8	9	10	11
12	13 Storm Damage Pruning: Arboretum Wide	14	15	16	17	18
19	20 Storm Damage Pruning: Arboretum Wide	21	22	23	24	25
26	27 Storm Damage Pruning: Arboretum Wide	28	29	30		

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

July 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Storm Damage	2
3	4 July 4th	5 Zone 2.3 <i>Ulmus, Morus, Fraxinus & Catalpa</i> (Elms need the most work)	6	7	8	9
10	11 Zone 2.3 <i>Ulmus, Morus, Fraxinus & Catalpa</i> (Elms need the most work)	12	13	14	15	16
17	18 Zone 2.3 <i>Ulmus, Morus, Fraxinus & Catalpa</i> (Elms need the most work)	19	20	21	22	23
24 31	25 Zone 1.8 Bradley Rosaceous Collection	26	27	28	29	30

August 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Weld Hill Oaks: Weld Hill	2	3	4	5	6
7	8 Weld Hill Oaks: Weld Hill	9	10	11	12	13
14	15 Zone 2.5 South St. Bank, Upper Slope, Beech Path	16	17	18	19	20
21	22 Zone 2.5 South St. Bank, Upper Slope, Beech Path	23	24	25	26	27
28	29 Peters Hill Larix Grove/Walter St. Burying Ground	30	31			

High Priority
 Moderate Priority
 Low Priority
 Other

September 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Peters Hill Larix Grove/Walter St.	2	3
4	5 Zone 4.3,4.5 Peters Hill Larix Grove/Walter St. Burying Ground	6	7	8	9	10
11	12 Zone 4.3,4.5 Peters Hill Larix Grove/Walter St. Burying Ground	13	14	15	16	17
18	19 Zone 3.9 Conifer Collection	20	21	22	23	24
25	26 Zone 3.9 Conifer Collection	27	28	29	30	

October 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3 Zone 3.9 Conifer Collection	4	5	6	7	8
9	10 Columbus Day	11 Zone 4.14 Peters Hill Gate Area	12	13	14	15
16	17 Zone 2.7 Bussey Hill Quercus Collection	18	19	20	21	22
23	24 Zone 2.7 Bussey Hill Quercus Collection	25	26	27	28	29
30	31 Bussey Hill Quercus					

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

November 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
		1	2	3	4	5	
		Zone 2.7 Bussey Hill <i>Quercus</i> Collection					
6	7	8	9	10	11	12	
	Zone 2.12 Explorer's Garden						
13	14	15	16	17	18	19	
	Zone 4.4 Peters Hill Oaks						
20	21	22	23	24	25	26	
	Zone 4.4 Peters Hill Oaks			Thanksgiving	Thanksgiving Break		
27	28	29	30				
	Zone 4.4 Peters Hill Oaks						

December 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
				Zone 4.4 Peters Hill Oaks		
4	5	6	7	8	9	10
	Zone 1.4 The Meadow					
11	12	13	14	15	16	17
	Zone 1.4 The Meadow					
18	19	20	21	22	23	24
	Zone 1.4 The Meadow					
25 Christmas	26 Winter Intersession	27	28	29	30	31

High Priority
 Moderate Priority
 Low Priority
 Other

January 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 New Year's Day	2 Zone 2.9 The Rockery	3	4	5	6	7
8	9 Zone 1.8 Bradley Rosaceous Collection	10	11	12	13	14
15	16 MLK Day	17 Zone 3.7 Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thuja</i>	18	19	20	21
22	23 Zone 3.7 Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thujas</i>	24	25	26	27	28
29	30 Zone 3.7 Old Dwarf Conifers	31				

February 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 Zone 3.7 Old Dwarf Conifers	2	3	4
5	6 Zone 1.2 Landscape Surrounding Visitor Center	7	8	9	10	11
12	13 Zone 1.2 Landscape Surrounding Visitor Center	14	15	16	17	18
19	20 President's Day	21 Zone 1.4 Linden Path	22	23	24	25
26	27 Zone 2.13 Bussey Hill Summit	28	29			

Appendix H Arborists Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

March 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
				Zone 2.13 Bussey Hill Summit		
4	5	6	7	8	9	10
	Zone 2.13 Bussey Hill Summit					
11	12	13	14	15	16	17
	Removals/Miscellaneous					
18	19	20	21	22	23	24
	Removals/Miscellaneous					
25	26	27	28	29	30	31
	Zone 4.7 Pinus along Walter St.					

April 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
	Zone 4.7 Pinus along Walter St.					
8	9	10	11	12	13	14
	Zone 4.7 Pinus along Walter St.					
15	16	17	18	19	20	21
	Zone 1.11 Legumes					
22	23	24	25	26	27	28
	Zone 1.11 Legumes					
29	30					
	Zone 1.11 Legumes					



May 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		Zone 1.11 Legumes				
6	7	8	9	10	11	12
	Prep for Lilac Sunday					
13 LILAC SUNDAY	14	15	16	17	18	19
	Zone 2.3 Morus, Catalpa, Fraxinus, Ulmus (Emphasis on Morus and Catalpa)					
20	21	22	23	24	25	26
	Zone 2.3 Morus, Catalpa, Fraxinus, Ulmus (Emphasis on Morus and Catalpa)					
27	28 Memorial Day	29	30	31		
		Zone 2.3 Morus, Catalpa, Fraxinus, Ulmus				

June 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
					Zone 2.3 Morus,	
3	4	5	6	7	8	9
	Zone 4.11 Populus, Pyrus and Oak Allee					
10	11	12	13	14	15	16
	Zone 4.11 Populus, Pyrus and Oak Allee					
17	18	19	20	21	22	23
	Zone 4.11 Populus, Pyrus and Oak Allee					
24	25	26	27	28	29	30
	Zone 4.10 Peters Hill, The Quarry					

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

July 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
	Zone 4.10 Peters Hill, Quarry		July 4th Holiday	Zone 4.10 Peters Hill, Quarry		
8	9	10	11	12	13	14
	Zone 1.8 Bradley Rosaceous Collection					
15	16	17	18	19	20	21
	Zone 1.8 Bradley Rosaceous Collection					
22	23	24	25	26	27	28
	Zone 1.16 Aesculus, Tilia, Phellodendron and Cornus					
29	30	31				
	Zone 1.16 Aesculus, Tilia, Phellodendron,					

August 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
			Zone 1.16 Aesculus, Tilia, Phellodendron and Cornus			
5	6	7	8	9	10	11
	Zone 1.16 Aesculus, Tilia, Phellodendron and Cornus					
12	13	14	15	16	17	18
	Zone 1.16 Aesculus, Tilia, Phellodendron and Cornus					
19	20	21	22	23	24	25
	Zone 1.10 State Lab Slope and Forest Hills Gate Area					
26	27	28	29	30	31	
	Zone 1.10 State Lab Slope and Forest Hills Gate Area					

High Priority
 Moderate Priority
 Low Priority
 Other

September 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3 Labor Day	4 Zone 1.10 State Lab Slope and Forest Hills Gate Area	5	6	7	8
9	10 Zone 1.10 State Lab Slope and Forest Hills Gate Area	11	12	13	14	15
16	17 Zone 1.17 North Woods	18	19	20	21	22
23 30	24 Zone 1.17 North Woods	25	26	27	28	29

October 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Zone 2.4 Historic Bussey Mansion Area	2	3	4	5	6
7	8 Columbus Day	9 Zone 2.4 Historic Bussey Mansion Area	10	11	12	13
14	15 Zone 2.4 Historic Bussey Mansion Area	16	17	18	19	20
21	22 Zone 2.7 <i>Quercus</i> Collection and Understory	23	24	25	26	27
28	29 Zone 2.12 Explorer's Garden	30	31			

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

November 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
				Zone 2.12 Explorer's Garden		
4	5	6	7	8	9	10
	Zone 2.12 Explorer's Garden					
11	12	13	14	15	16	17
	Zone 1.1 Hunnewell Building					
18	19	20	21	22 Thanksgiving	23 Thanksgiving Break	24
	Zone 1.1 Hunnewell Building					
25	26	27	28	29	30	
	Zone 4.4 Peters Hill Oaks					

December 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
	Zone 4.4 Peters Hill Oak					
9	10	11	12	13	14	15
	Zone 1.13, 1.18 Levintritt Garden/Dana Greenhouse					
16	17	18	19	20	21	22
	Removals/Miscellaneous					
23	24 Winter Intersession	25 Christmas	26	27	28	29
30	31 Winter Intersession					

High Priority
 Moderate Priority
 Low Priority
 Other

January 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 New Year's Day	2 Misc. Removals: Arboretum Wide	3	4	5
6	7 Zone 2.13 Bussey Hill Summit	8	9	10	11	12
13	14 Zone 2.13 Bussey Hill Summit	15	16	17	18	19
20	21 MLK Day	22 Zone 1.4 The Meadow	23	24	25	26
27	28 Zone 5.2, 5.4 Hemlock Hill	29	30	31		

February 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Hemlock Hill	2
3	4 Zone 5.2, 5.4 Hemlock Hill	5	6	7	8	9
10	11 Zone 2.2 Forsythia Bank Accessions	12	13	14	15	16
17	18 President's Day	19 Zone 3.4 City Shack	20	21	22	23
24	25 Zone 3.4 City Shack	26	27	28		

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

March 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 City Shack	2
3	4 Zone 3.4 City Shack	5	6	7	8	9
10	11 Zone 1.14 Linden Path	12	13	14	15	16
17	18 Zone 3.6 Juniper Knoll	19	20	21	22	23
24 31	25 Zone 3.6 Juniper Knoll	26	27	28	29	30

April 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Zone 3.6 Juniper Knoll	2	3	4	5	6
7	8 Zone 3.10 Hebrew Slope	9	10	11	12	13
14	15 Zone 1.12 Zelkova	16	17	18	19	20
21	22 Zone 1.12 Zelkova	23	24	25	26	27
28	29 Lilac Sunday Prep; Misc.	30				

High Priority
 Moderate Priority
 Low Priority
 Other

May 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
			Lilac Sunday Prep; Misc.			
5	6	7	8	9	10	11
	Lilac Sunday Prep; Misc.					
12	13	14	15	16	17	18
	Zone 2.10 Centre Street Gate Area					
19	20	21	22	23	24	25
	Zone 2.10 Centre Street Gate Area					
26	27 Memorial Day	28	29	30	31	
		Zone 2.10 Centre Street Gate Area				

June 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
	Zone 2.5 South St. Bank, Upper Slope, Beech Path					
9	10	11	12	13	14	15
	Zone 2.5 South St. Bank, Upper Slope, Beech Path					
16	17	18	19	20	21	22
	Zone 4.6 Peters Hill					
23	24	25	26	27	28	29
30	Zone 4.6 Peters Hill					

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

July 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Zone 4.8 Shrub Beds on Peters Hill	2	3	4 July 4th Holiday	5 Shrub Beds	6
7	8 Zone 4.8 Shrub Beds on Peters Hill	9	10	11	12	13
14	15 Zone 4.13 Rosaceous Orchard	16	17	18	19	20
21	22 Zone 4.13 Rosaceous Orchard	23	24	25	26	27
28	29 Zone 3.3 Central Woods	30	31			

August 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Zone 3.3 Central Woods	2	3
4	5 Zone 3.3 Central Woods	6	7	8	9	10
11	12 Removals/Miscellaneous: Arboretum Wide	13	14	15	16	17
18	19 Removals/Miscellaneous: Arboretum Wide	20	21	22	23	24
25	26 Zone 1.15 <i>Leitneria</i> Bowl to Bamboo	27	28	29	30	31



September 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 Labor Day	3 Zone 1.15 <i>Leitnaria</i> Bowl to Bamboo	4	5	6	7
8	9 Zone 3.2 <i>Carya</i> Centre Street Collection	10	11	12	13	14
15	16 Zone 3.2 <i>Carya</i> Centre Street Collection	17	18	19	20	21
22	23 Zone 3.2 <i>Carya</i> Centre Street Collection	24	25	26	27	28
29	30 <i>Carya</i>					

October 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Zone 3.2 <i>Carya</i> Centre Street Collection	2	3	4	5
6	7 Zone 3.1 Centre Street Beds	8	9	10	11	12
13	14 Zone 3.1 Centre Street Beds	15	16	17	18	19
20	21 Zone 1.5 Willow Path & the Arborway Wall Edge	22	23	24	25	26
27	28 Zone 1.5 Willow Path & the Arborway Wall Edge	29	30	31		

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

November 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Willow Path	2
3	4 Zone 1.6 The Acer Collection	5	6	7	8	9
10	11 Zone 1.6 The Acer Collection	12	13	14	15	16
17	18 Weld Hill Priorities; Weld Hill Research Building Landscape	19	20	21	22	23
24	25 Weld Hill Priorities; Weld Hill Research Bldg.	26	27	28 Thanksgiving	29 Thanksgiving Break	30

December 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 Zone 1.1 Hunnewell Visitor Center Area	3	4	5	6	7
8	9 Zone 1.1 Hunnewell Visitor Center Area	10	11	12	13	14
15	16 Removals: Arboretum Wide	17	18	19	20	21
22	23 Removals	24 Winter Intersession	25 Christmas	26	27	28
29	30 Winter Intersession	31				

High Priority
 Moderate Priority
 Low Priority
 Other

January 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 New Year's Day	2 Break	3	4
5	6 Zone 3.5 <i>Carpinus</i> & <i>Castanea</i> Collection, Storm Drainage & Pruning	7	8	9	10	11
12	13 Zone 3.5 <i>Carpinus</i> & <i>Castanea</i> Collection, Storm Drainage & Pruning	14	15	16	17	18
19	20 MLK Day	21 Zone 3.8 Bussey and Spring Brook Corridor	22	23	24	25
26	27 Zone 3.8 Bussey and Spring Brook Corridor	28	29	30	31	

February 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3 Weld Hill Oaks; Weld Hill Natural Woods	4	5	6	7	8
9	10 Weld Hill Oaks; Weld Hill Natural Woods	11	12	13	14	15
16	17 President's Day	18 Weld Hill Oaks; Weld Hill Natural Woods	19	20	21	22
23	24 Zone 5.1 <i>Rhododendron</i> /Davison Path Corridor	25	26	27	28	

Appendix H Arborist Calendar

High Priority
 Moderate Priority
 Low Priority
 Other

March 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
	Zone 5.1 Rhododendron/Davison Path Corridor					
9	10	11	12	13	14	15
	Zone 1.10 State Lab Slope/Forest Hills Gate Area					
16	17	18	19	20	21	22
	Zone 2.13 Bussey Hill Summit					
23	24	25	26	27	28	29
	Zone 2.13 Bussey Hill Summit					
30	31					
	Removals					

April 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		Removals; Arboretum Wide				
6	7	8	9	10	11	12
	Removals; Arboretum Wide					
13	14	15	16	17	18	19
	Zone 4.14 Gate Areas of Peters Hill					
20	21	22	23	24	25	26
	Zone 4.14 Gate Areas of Peters Hill					
27	28	29	30			
	Lilac Sunday Prep; Meadow Road					



May 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
				Lilac Sunday Prep		
4	5	6	7	8	9	10
	Zone 1.12 <i>Zelkova</i> & Area Below the Esker					
11	12	13	14	15	16	17
	Zone 1.12 <i>Zelkova</i> & Area Below the Esker					
18	19	20	21	22	23	24
	Zone 2.11 <i>Betula</i> , <i>Euonymus</i> and <i>Prunus</i> Collection					
25	26 Memorial Day	27	28	29	30	31
		Zone 2.11 <i>Betula</i> , <i>Euonymus</i> and <i>Prunus</i> Collection				

June 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
	Zone 2.11 <i>Betula</i> , <i>Euonymus</i> and <i>Prunus</i> Collection					
8	9	10	11	12	13	14
	Zone 4.1 Peters Hill Summit					
15	16	17	18	19	20	21
	Zone 4.3 Collections Woodland, <i>Larix</i> Grove					
22	23	24	25	26	27	28
	Zone 4.3 Collections Woodland, <i>Larix</i> Grove					
29	30					
	Zone 4.3					

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

July 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		Zone 4.3 Collections Woodland, <i>Larix</i> Grove				
6	7	8	9	10	11	12
	Zone 4.3 Collections Woodland, <i>Larix</i> Grove					
13	14	15	16	17	18	19
	Zone 4.11 <i>Populus</i> , <i>Pyrus</i> and Oak Alee					
20	21	22	23	24	25	26
	Zone 4.11 <i>Populus</i> , <i>Pyrus</i> and Oak Alee					
27	28	29	30	31		
	Zone 4.11 <i>Populus</i> , <i>Pyrus</i> and Oak Alee					

August 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
					Zone 4.11	
3	4	5	6	7	8	9
	Removals Misc; Arboretum Wide					
10	11	12	13	14	15	16
	Removals Misc; Arboretum Wide					
17	18	19	20	21	22	23
	Zone 2.3 Legume Beds & <i>Catalpa</i> , <i>Ulmus</i> , <i>Morus</i> , <i>Fraxinus</i>					
24	25	26	27	28	29	30
	Zone 2.3 Legume Beds & <i>Catalpa</i> , <i>Ulmus</i> , <i>Morus</i> , <i>Fraxinus</i>					
31						

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

September 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Labor Day	2	3	4	5	6
		Zone 2.3 Legume Beds & <i>Catalpa, Ulmus, Morus, Fraxinus</i>				
7	8	9	10	11	12	13
	Zone 2.3 Legume Beds & <i>Catalpa, Ulmus, Morus, Fraxinus</i>					
14	15	16	17	18	19	20
	Zone 2.3 Legume Beds & <i>Catalpa, Ulmus, Morus, Fraxinus</i>					
21	22	23	24	25	26	27
	Zone 2.3 Legume Beds & <i>Catalpa, Ulmus, Morus, Fraxinus</i>					
28	29	30				
	Zone 3.9 Conifer Collection					

October 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
			Zone 3.9 Conifer Collection			
5	6	7	8	9	10	11
	Zone 3.9 Conifer Collection					
12	13	14	15	16	17	18
	Zone 3.9 Conifer Collection					
19	20	21	22	23	24	25
	Zone 3.9 Conifer Collection					
26	27	28	29	30	31	
	Zone 4.7 <i>Pinus</i> Along Walter St.					

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

November 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
	Zone 4.7 <i>Pinus</i> Along Walter St.					
9	10	11	12	13	14	15
	Zone 1.8,1.9 Bradley Rosaceous Collection, The Three Ponds					
16	17	18	19	20	21	22
	Zone 1.8,1.9 Bradley Rosaceous Collection, The Three Ponds					
23	24	25	26	27 Thanksgiving	28 Break	29
	Zone 1.8,1.9 Bradley Rosaceous Collection,					
30						

December 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
	Zone 4.6 Miscellaneous Collections on Slope					
7	8	9	10	11	12	13
	Zone 4.6 Miscellaneous Collections on Slope					
14	15	16	17	18	19	20
	Zone 1.13, 1.18 Levintritt Garden and Dana Greenhouse					
21	22	23	24	25 Christmas	26 Winter Intersession	27
	Levintritt Garden and Dana Greenhouse					
28	29 Winter Intersession	30	31			

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

January 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 New Year's Day	2 Break	3
4	5	6	7	8	9	10
	Removals/Miscellaneous; Arboretum Wide					
11	12	13	14	15	16	17
	Removals/Miscellaneous; Arboretum Wide					
18	19 MLK Day	20	21	22	23	24
		Zone 1.4 The Meadow				
25	26	27	28	29	30	31
	Zone 1.4 The Meadow					

February 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
	Zone 1.4 The Meadow					
8	9	10	11	12	13	14
	Zone 1.4 The Meadow					
15	16	17	18	19	20	21
	Zone 1.11 Hunnewell Visitor Center					
22	23	24	25	26	27	28
	Zone 1.2 Landscape Surrounding Visitor Center					

Appendix H Arborist Calendar

High Priority
 Moderate Priority
 Low Priority
 Other

March 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
	Zone 1.2 Landscape Surrounding Visitor Center					
8	9	10	11	12	13	14
	Zone 1.2 Landscape Surrounding Visitor Center					
15	16	17	18	19	20	21
	Zone 1.2 Landscape Surrounding Visitor Center					
22	23	24	25	26	27	28
	Zone 2.9 The Rockery					
29	30	31				
	Zone 2.9 The Rockery					

April 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
			Zone 2.9 The Rockery			
5	6	7	8	9	10	11
	Zone 2.10 Centre St. Gate area, <i>Viburnum</i> and 1090					
12	13	14	15	16	17	1
	Zone 2.10 Centre St. Gate area, <i>Viburnum</i> and 1090					
19	20	21	22	23	24	25
	Zone 2.10 Centre St. Gate area, <i>Viburnum</i> and 1090					
26	27	28	29	30		
	Zone 2.10 Centre St. Gate area, <i>Viburnum</i> and 1090					

High Priority
 Moderate Priority
 Low Priority
 Other

May 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Centre St. Gate	2
3	4 Lilac Sunday Prep	5	6	7	8	9
10	11 Zone 2.12 Explorer's Garden	12	13	14	15	16
17	18 Zone 2.12 Explorer's Garden	19	20	21	22	23
24 31	25 Memorial Day	26 Zone 4.8 Shrub Beds on Peters Hill Rd.	27	28	29	30

June 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2 Zone 4.8 Shrub Beds on Peters Hill Rd.	3	4	5	6
7	8 Zone 2.5 South St. Bank, Upper Slope, Beech Path	9	10	11	12	13
14	15 Zone 2.5 South St. Bank, Upper Slope, Beech Path	16	17	18	19	20
21	22 Zone 2.5 South St. Bank, Upper Slope, Beech Path	23	24	25	26	27
28	29 Historic Bussey Mansion Area	30				

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

July 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 Historic Bussey Mansion Area	2	3 July 4th Holiday	4
5	6 Zone 2.4 Historic Bussey Mansion Area	7	8	9	10	11
12	13 Zone 2.6 <i>Fagus</i> Collection	14	15	16	17	18
19	20 Zone 2.7 Bussey Hill Oaks and Understory	21	22	23	24	25
26	27 Zone 2.7 Bussey Hill Oaks and Understory	28	29	30	31	

August 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3 Zone 2.7 Bussey Hill Oaks and Understory	4	5	6	7	8
9	10 Zone 2.7 Bussey Hill Oaks and Understory	11	12	13	14	15
16	17 Zone 3.7 Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thuja</i>	18	19	20	21	22
23	24 Zone 3.7 Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thuja</i>	25	26	27	28	29
30	31 Zone 3.7					

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

September 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		Zone 3.7 Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thuja</i>				
6	7 Labor Day	8	9	10	11	12
		Zone 3.7 Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thuja</i>				
13	14	15	16	17	18	19
	Zone 1.16 <i>Aesculus</i> , <i>Tilia</i> , <i>Phellodendron</i> and <i>Cornus</i>					
20	21	22	23	24	25	26
	Zone 1.16 <i>Aesculus</i> , <i>Tilia</i> , <i>Phellodendron</i> and <i>Cornus</i>					
27	28	29	30			
	Zone 1.16 <i>Aesculus</i> , <i>Tilia</i> , <i>Phellodendron</i> and <i>Cornus</i>					

October 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
				<i>Aesculus</i> , <i>Tilia</i> , <i>Phellodendron</i>		
4	5	6	7	8	9	10
	Removals/ Miscellaneous					
11	12	13	14	15	16	17
	Removals/ Miscellaneous					
18	19	20	21	22	23	24
	Zone 1.14 Linden Path including Beds					
25	26	27	28	29	30	31
	Zone 1.14 Linden Path including Beds					

Appendix H Arborist Calendar

■ High Priority
 ■ Moderate Priority
 ■ Low Priority
 ■ Other

November 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
		Zone 1.10 Mass State Lab Slope Forest Hills Gate Area				
8	9	10	11	12	13	14
	Zone 1.10 Mass State Lab Slope Forest Hills Gate Area					
15	16	17	18	19	20	21
	Zone 1.10 Mass State Lab Slope Forest Hills Gate Area					
22	23	24	25	26	27	28
	Zone 1.10 Mass State Lab Slope Forest Hills Gate			Thanksgiving	Break	
29	30					
	North Woods					

December 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		Zone 1.7 North Woods with Accessions				
6	7	8	9	10	11	12
	Zone 1.7 North Woods with Accessions					
13	14	15	16	17	18	19
	Zone 1.7 North Woods with Accessions					
20	21	22	23	24	25	26
	Zone 1.7 North Woods with Accessions				Christmas	
27	28	29	30	31		
	Winter Intersession					

Appendix I Hort Team Assignments

STAFF **PRIORITY**

Region 1–Most Highly Visited Area

1.1	Hunnewell Visitor Center Area	MC	High
1.2	Landscape Surrounding the Visitor Center	MC	Moderate
1.3	Azalea Border along Meadow Road	KB	High
1.4	The Meadow	DH	Low
1.5	Willow Path & the Arborway Wall Edge	KG	High
1.6	The <i>Acer</i> Collection	KG	Moderate
1.7	North Woods with Accessions	KG	Moderate
1.8	Bradley Rosaceous Collection	KG	High
1.9	The Three Ponds: Dawson, Faxon, Rehder	KG	High
1.10	Mass State Lab Slope & Forest Hills Gate Area	KB	Low
1.11	Legumes, including Shrubs	WK	Moderate
1.12	<i>Zelkova</i> and Area Below the Esker	MC	Moderate
1.13	Leventritt Shrub and Vine Garden	BMc	High
1.14	Linden Path	BMc	Moderate
1.15	<i>Leitneria</i> Bowl to Bamboo	MC	Moderate
1.16	<i>Aesculus</i> , <i>Tilia</i> , <i>Phellodendron</i> and <i>Cornus</i>	JK	Moderate
1.17	North Woods	App	Low
1.18	Dana Greenhouse, Nurseries and Bonsai	DGH	High
1.19	Main Gate (Hunnewell Building & Forest Hills Gate)	NS	High

Region 2–Bussey Hill

2.1	<i>Syringa</i> Collection	KB	High
2.2	<i>Forsythia</i> Bank and Accessioned Shrubs	KB	Moderate
2.3	Legume Beds & <i>Catalpa</i> , <i>Ulmus</i> , <i>Morus</i> , <i>Fraxinus</i> , & <i>Celtis</i>	SG	Moderate
2.4	Historic Bussey Mansion Area	SG	Moderate

		STAFF	PRIORITY
2.5	South St. Bank, Upper Slope & Beech Path	WK	Low
2.6	<i>Fagus</i> Collection	WK	Moderate
2.7	<i>Quercus</i> Collection and Understory	WK	Moderate
2.8	Oak Path Corridor	WK	High
2.9	The Rockery	WK	Moderate
2.10	The <i>Viburnum</i> Collection	SP	Moderate
2.11	<i>Betula</i> , <i>Euonymus</i> and <i>Prunus</i> Collections	MC	Moderate
2.12	Explorers Garden	SG	High
2.13	Bussey Hill Summit	SG	High
2.14	Centre Street and South Street Gates	NS	High

Region 3–Conifer Area

3.1	Centre Street Beds	JK	Moderate
3.2	<i>Carya</i> and Centre Street Collections	JK	Moderate
3.3	Central Woods	App	Low
3.4	City Shack Parcel	JK	Moderate
3.5	<i>Carpinus</i> and <i>Castanea</i> Collections	WK	Moderate
3.6	Juniper Knoll	JK	Moderate
3.7	Old Dwarf Conifers, <i>Chamaecyparis</i> , <i>Thuja</i>	JK	Moderate
3.8	Bussey and Spring Brook Corridor to Road	JK	Moderate
3.9	Conifer Collection	SP	Moderate
3.10	Hebrew Slope and Walter Street Gate Area	JK	Moderate
3.11	Walter and Bussey Street Gates	NS	High

Region 4–Peters Hill

4.1	Peters Hill Summit	MC	High
4.2	Peters Hill Natural Woods	App	Low

Appendix I Horticulture Team Assignments

		STAFF	PRIORITY
4.3	Collections Woodland, <i>Larix</i> Grove	MW	Moderate
4.4	Oaks (<i>Quercus</i>)	MW	Moderate
4.5	Walter Street Burying Ground	KG	Moderate
4.6	Miscellaneous Collections on Slope	MW	Moderate
4.7	<i>Pinus</i> along Walter Street	WK	Low
4.8	Shrub Beds along Peters Hill Road	MW	Moderate
4.9	North-facing Hill	MW	Low
4.10	The Quarry	MC	Low
4.11	<i>Populus</i> , <i>Pyrus</i> and Oak Allée	MC	Moderate
4.12	South Street and Commuter Rail Edge	MW	Low
4.13	Rosaceous Orchard	MW	Moderate
4.14	Gate Areas of Peters Hill	MC	High

Region 5–Hemlock Hill

5.1	Rhododendron/Davison Path Corridor	SP	High
5.2	Hemlock Dominant Slope	App	Moderate
5.3	Cut Plots	App	Low
5.4	Hardwood, Mixed Hemlock/Deciduous	App	Low
5.5	Accessions, including Understory Road Edge	SP	Moderate
5.6	Bussey Street Gate	NS	High

Region 6–South Street Tract

6.1	Bussey Brook Meadow, including the Mesa	DH	Low
6.2	Blackwell Footpath Corridor	DH	Moderate
6.3	South Street & Washington St (@Blackwell Path)	NS	High

		<u>STAFF</u>	<u>PRIORITY</u>
Region 7–Weld Hill			
7.1	Landscape Surrounding Weld Hill Research Center	SP	High
7.2	Grassy Meadow	BMc	Low
7.3	Oak Stand	BMc	Low
7.4	Weld Hill Perimeters; Walter St., Weld St., & Centre St.	SP	Moderate

Appendices

A	Mowing Operations	DH, MW	as needed
B	Snow Removal Operations	All Staff	High
C	Infrastructure and Hardscape	NS	High
D	Curation and Plant Records Office	n/a	n/a
E-1	Noxious Weeds	n/a	n/a
E-2	Insects	n/a	n/a
E-3	Diseases	n/a	n/a
F	Secondary Paths	Foreman	
G	Drainage	Foreman	
H	Arborist Calendar	JD, BE, KS	n/a

Staff (2011)

App	Apprentice	KB	Kevin Block
BE	Bob Ervin	KG	Kit Ganshaw
BMc	Brendan McCarthy	KS	Kyle Stephens
DGH	Dana Greenhouse Staff	MC	Matt Connelly
DH	Dennis Harris	MW	Mark Walkama
JD	John DelRosso	NS	Nima Samimi
JK	Jen Kettell	SG	Scott Grimshaw
JP	Jim Papargiris	SP	Sue Pfeiffer
		WK	Wes Kalloch



