THE CARL S. ENGLISH JR. BOTANICAL GARDEN AT THE HIRAM M. CHITTENDEN LOCKS: SUPPLEMENTAL HISTORIC GROUNDS REPORT AND MANAGEMENT PLAN FOR INCLUSION IN LAKE WASHINGTON SHIP CANAL PROJECT MASTER PLANNING

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1. ABBREVIATIONS

AHPA-Archaeological and Historic Preservation Act 1974
ALJ-Arthur Lee Jacobson author
CFR-Code of Federal Regulations
COL-Colonel
CX-Seattle District Center for Expertise on Historic Structures
Carter-Brian S. Carter gardener
Eckersstrom-Gustaf J. Eckerstrom gardener
English-Carl S. English Jr. gardener's helper and SDH
ER-Engineer Regulation
ESA-Endangered Species Act 1973
Fleming-Michael E. Fleming assistant gardener and SDH
FOBL-Friends of the Ballard Locks
Follestad-Ralph C. Follestad project engineer
Gould-Carl F. Gould architect
Hernandez-Alan Hernandez gardener
Kruckeberg-Arthur R. Kruckeberg professor of botany at the University of Washington and friend of English
LTC-Lieutenant Colonel
LWSC-Lake Washington Ship Canal
LWSCMP-Lake Washington Ship Canal Master Plan
LWSCNHD-Lake Washington Ship Canal National Historic District
MP-Master Plan
Mulligan-Director Washington Park Arboretum and friend of English
OMP-Operational Management Plan
OPM-Operations Project Manager
PBCUA-Public Buildings Cooperative Use Act 1976
I have been a gardener at the Hiram M. Chittenden Locks and Carl S. English Jr. Botanical Garden for a decade. In September of 2017 I began pursuing a Master of Environmental Horticulture degree at the University of Washington’s School of Environmental and Forest Sciences. A portion of the degree requirement is set aside for a research project.

It was not my original intent to fulfill my graduate degree by focusing my project on my place of employment. With so many opportunities for study I was excited by the prospect of studying something new or doing field work in a new locale. Yet studying the garden prevailed.

Pragmatically, I already had done much research on the garden and I could complete the plant inventory of the garden after my work shift had ended. I believe it a necessity that a scholarly work on the garden be produced. The last complete plant inventory was compiled in 1982 and the last thorough report on the garden was prepared in 1989 (Freier 1989, Mendelson and Fleming 1982).

This gap of 30 years or more of study of the garden also lent a sense of urgency to this work. Therefore, I tried to combine a supplemental grounds report, management plan, and inventory in one work. In hindsight, each one of these could have been focused on more and they in and of themselves would have been suitable for research project. The dearth of updated research on the garden compelled me to try to combine as much as possible into this work, however. This work was also timely. After a decade of working in the garden I feel that now, and only just so, I was ready to attempt a work of this scope.
Writing this for the University of Washington gave me some independence in thought and method. My experience in the garden helped me to make practical sense of the information I was sifting through to construct decision trees, provide commentary, and make recommendations.

In consideration of any bias I may have, it is certain that I am not neutral in my enthusiasm and advocacy for the garden. Yet, it is my belief that the primary source material provides the steadying hand of verifiable objectivity to my conclusions here.

My hope is to foster the shared conviction that the garden is indeed a place “worthy of serious study” and to encourage further energy into its study, preservation, and enhancement.

3. EXECUTIVE SUMMARY

3.1 Executive summary


It accomplishes these by combining extant reports and plans of and related to the garden with newly rediscovered primary source material, evaluating and assessing infrastructure work at the Locks and its influence on the garden, and an operational understanding of garden management.

The report and plan places emphasis on the career of Carl S. English Jr. (English) and establishes 10 December 1974, the date the Locks grounds were named after English, as the precise date when the garden became a contributing landscape to the LWSCNHD.

Operational decision trees are introduced here. These decision trees are based on historical and operational considerations within the garden. They endeavor to aid in the practical and feasible objectives associated with managing and preserving the garden.

Bed and area descriptions are included to aid in current management considerations and provide a description of their disposition in 2019. A new updated plant inventory is also introduced to provide numbers of plant families, genera, and species of the garden as well as what bed they reside.

This report and plan is meant to aid in the formulation of a new LWSC Master Plans (LWSCMP) as it relates to the garden, and serve as reference and catalyst for further reports and studies of the garden.
4. STATEMENT OF PURPOSE

4.1 Statement of purpose

4.1.1 Mission

The mission of this report and plan is to carry out the duty to preserve and maintain the garden. It achieves this by providing a complementary historical supplement and introduces an operations and management plan intended for consideration and inclusion in the LWSCMP as well as a full updated plant inventory to aid this endeavor.

4.1.2 Background and Context

The LWSC including the Locks and garden is at once a singularly beautiful and historic civil works project and is a vital infrastructure project to the City of Seattle, the State of Washington, the U.S. Army Corps of Engineers (USACE) and to the United States of America (McDowell 2017).

What is unique about the garden’s setting is that it surrounds a bustling navigational operation yet is a notable and highly trafficked tourist attraction. Uniquely, it is also home to a private residence, the Cavanaugh House. This structure is listed as a contributing building as part of the LWSCNHD. The house was planned by junior engineer C.A.D. Young in 1912 and construction was completed in 1913. The house is named after COL J.B. Cavanaugh who oversaw construction of the Locks from 1911-1917. (USACE 1998). It has been continually occupied since constructed. In 1967 it became the residence of the Seattle District Engineer.
The Locks and garden are subject to a web of legal, regulatory, designatory framework. Relevant documents are the National Historic Preservation Act (NHPA) of 1966, USACE Engineering Regulation (ER) 1130-2-540 Chapter 6 (USACE 1998), the USACE designation of the LWSC grounds after English (USACE 1974), and the February 1994 Lake Washington Ship Canal Master Plan (Design Memorandum 9) (1994 LWSCMP) prescribed by ER 1130-2-400.

Reports and plans related specifically on how the garden fits into these frameworks offering recommendations and policies have been provided and reiterated since 1989 (Freier 1989, USACE 1994, USACE 1998). In the intervening thirty years no operational or managerial template has been constructed to put into practice how these recommendations and policies actually and practically can be achieved.

The current LWSCMP is at once the most up to date MP and is 25 years old. This MP was prepared to shepherd “use and development of the natural and manmade resources at the project, which is administered by the Seattle District, U.S. Army Corps of Engineers”. This document sets the objectives for the project. Secondly this
document provides the framework for secondary management objectives in the form of “operational management plans” (OMP) (USACE 1994).

In order to implement an operational and management plan for the garden the overarching LWSCMP needs to be updated and the OMP related to the garden changed. To achieve this objective this report and plan intends to influence an updated LWSCMP and future OMPs.

4.1.3 What this report and plan delivers

The report and plan is the most comprehensive history of the garden to date. It synthesizes previous plans, reports, and primary source documents on the garden by complementing previous works written about the garden. Specifically the 1989 “Historic Grounds Report The Carl S. English Jr. Botanical Garden: Hiram M. Chittenden Locks” (1989 Report) prepared by Renee Freier is fundamental to framing this report and plan.

This report and plan delivers the first historical update in thirty years to the 1989 Report. It also introduces new primary source information directly related to the history of operations at the LWSC and the life and career of English.
A complete plant inventory of the garden is also provided in Appendix A, the first in 37 years.

An operations and management plan that includes:

- Operational context of the garden within the mission of the LWSC project
- Layers of development through the five garden eras
- What the garden is using English’s own words, his actions, the commentary of his contemporary and peers, and the plants English introduced to science and to the garden.
- How to emulate English in managing the garden
- Unique position of garden in relation to LWSCNHD and USACE designation
- An overview of the represented families, genera, and species in the garden from 1982 to present
• Collections Policy that guides the propagation methods, purchasing sources, and exchange policy for plant introduction in the garden
• Plant Significance Hierarchy that functions as a mechanism for evaluating and then deciding what plants to retain and plants to remove in a historical, regulatory, management, and botanical framework
• Bed renovation case studies
• Planting Bed Evaluation Decision Tree that guides operations in a historical, regulatory, management, and botanical framework
• Updated bed and area descriptions including overview of historic integrity, plants and features of interest, recommendations for operations and management
• Future recommendations for garden
• Complete plant inventory


4.2.1 LWSC OPM, NRM and NRS and LWSC staff
4.2.2 Seattle District Environmental and Cultural Resources Branch and Seattle District Technical Center of Expertise for Preservation of Historic Structures and Buildings
4.2.3 Seattle District Operations Division
4.2.4 Writers and editors of LWSC Master Plans
4.2.5 Seattle District Public Affairs Office
4.2.6 Schools, researchers, professors and students
4.2.7 Public

5. THE GARDEN AND CAREER OF ENGLISH

5.1 Introduction to the garden

Maintaining a garden and gardening is at first glance a straightforward matter of groundskeeping.

The lawns and grass are cut and trimmed, leaves are raked, mulch is spread, planting beds are outlined and edged, the various plants are clipped, snipped, pruned and hedged. Sometimes plants must be removed and new ones added, trees felled, and trees replanted. Litter is picked, sidewalks and roadways swept, blown, and pressure washed. If these essential albeit menial tasks are accomplished then the garden is gardened and the grounds are kept.
And yet these important and humble tasks while being a necessity and the first step to the operations of any garden or park, are only a part of the varied, complex, and interdisciplinary nature of the gardener’s job.

After the groundskeeping has been finished another suite of operational and management considerations and responsibilities are then required at the garden.

These considerations and responsibilities are aesthetic, botanical, cultural, historical, horticultural, legal, and regulatory. Of primary importance is the intent and mission of this report and plan is to properly explain these considerations and responsibilities to foster a shared understanding of the job at hand and the aims to be accomplished.

5.2 The Hiram M. Chittenden Locks: A singular place by design

The LWSC is a lock and dam that links a series of manmade canals and freshwater lakes with the inland sea of Puget Sound. The LWSC is a major conduit for local commerce and infrastructure while also being heavily trafficked by pleasure craft. Adjacent to the lock and dam is a fish ladder which is the artery for salmonid migration to the Cedar and Sammamish rivers.

The LWSC is situated in the middle of a large urban city. The superstructure of the project was constructed in a Second Renaissance Revival Style of architecture which was granted legal protection in 1978 as part of the LWSCNHD (USACE 1978). Surrounding the civils works project to the north are seven landscaped and parked acres and a residence on a hill.

It is unknown, or at present no primary source evidence has been rediscovered, pertaining to what the reasoning behind the architectural singularity and landscaped acreage. A recurring theme of this report and plan is that while it is unknown why some things were done it is simply known that they were.

The seven acres north of the lock and dam, the subject of this report and plan, are described here by the late Dr. Arthur Kruckeberg (Kruckeberg) in the Arboretum Bulletin during the Summer of 1959 written 28 years into English’s tenure.

"In 1955, over 735,000 people thronged…to the officially named ‘Hiram M. Chittenden Locks’ in 1956. Conjure up a mental image of this popular and familiar landmark. Then, in your mind’s eye erase the vision of the broad sweeps of lawn, the stately trees and the colorful plantings in the many spacious drifts and you have lost the elusive but significant aesthetic quality that is the Locks. To be sure, the average visitor enters the grounds bent on viewing the activity of boats and people at the lockssides. Yet, once entering the north gate on senses the change from the clutter and crowding of city life to the serenity and expansive beauty of a park. To the knowing eye, the plantings are not at all typical of just any park of estate. The keen gardener, horticulturalist, or botanist is at once convinced that he has stepped into a botanical sanctuary—a true arboretum."
In 1974 the Seattle District of USACE designated the grounds at the Locks to be named “The Carl S. English Jr. Gardens” in recognition of the namesake’s lifetime of distinguished service and “unselfish desire to preserve the environment for the benefit of mankind” (USACE 1974).

Figure 3 Disposition form regarding designation of English garden 25 July 1974. Locks archives

5.3 Carl S. English Jr.: Botanist, horticulturist, dirt gardener, meritorious and outstanding civil servant

When the grounds at the Locks were named after English in 1974 there was some discussion as to whether a civil works project could be solely or partially named after a
living person (USACE 1974). This discussion documented in letters in the nomination package helps illustrate what a distinct honor this was for English.

English was by all accounts a distinct individual. In deed and word English was a groundskeeper, or even “dirt gardener” (Dress 1957, Kruckeberg 1959). He was a groundskeeper in addition to botanist, plant discoverer and hybridizer, apparently able to write in Latin, as well as a meritorious and outstanding civil servant (Dress 1957, English 1947, Freier 1989, Kruckeberg 1959, USACE 1974).

Kruckeberg again writes in the Arboretum Bulletin Summer 1959:

“In 1931, Carl S. English Jr. joined the staff of civilian personnel as horticulturalist. Mix a dash of taxonomist and horticulturist with liberal portions of the field botanist and ‘dirt gardener’ and you have Carl English, the versatile plantsman. But, that is not the whole man. With these ingredients some divine power has blended the qualities of humility, generosity, love of all nature, and unbounded energy and industry.”

The study of botany, horticulture, and plants in general can be esoteric. The achievement of describing for the science of botany four new plants species is a rather specialized one (Flora 2018, Freier 1989). To the uninterested, untrained or those unfamiliar with plants it can be difficult to relate these remarkable actions adequately. The same goes for the introduction of new plant hybrids, the collection of plant seed from around the world and the single-handed development of a botanic garden.

Perhaps the appreciation of English and the garden by those not particularly interest in botany, horticulture, or the like, would be better understood if the appreciation was centered not on plants but rather on the achievement of the individual. Alternately the garden could be seen as a career long attendance to duty, ethics, values, and achievements of a meritorious and outstanding civil servant. Therefore duty, ethics, and values guide the mission to deliver on the considerations and responsibilities in managing and preserving the garden.
The Locks and garden are governed by a number of laws, regulations, and designations. These factors add nuance and complexity to the day to day operational considerations and responsibilities.

The LWSC was evaluated and made eligible by the Washington State Historic Preservation Officer in 1978 four years after the designation of the grounds in English’s honor in 1974 (USACE 1978). The LWSC was then listed on the National Historic Register in December of that year with the garden being listed as a contributing landscape to this designation 20 years later (USACE 1998).

This designation legally and regulatorily binds the operations of the LWSC to the NHPA of 1966 as amended in Section 106, the National Environmental Policy Act (NEPA) of 1969, Archeological and Historic Preservation Act (AHPA) of 1974, Public Buildings Cooperative Use Act (PBCUA) of 1976, Army Command Policy Memorandum #12, 19 November 1993 and ER 1130-2-540 Code of Federal Regulations (CFR) Title 36 Parks,
Forests, and Public Lands Chapter III (CFR Title 36) that regulates USACE public lands. Other federal laws are followed where applicable including the Endangered Species Act (ESA).

5.5 The landscape architecture of the garden

The garden’s design or disposition, most closely resembles that of the English landscape style. In other portions of the garden it tends to reflect the operational and architectural attributes and character of the design of the Locks (Freier 1989).

Figure 5 1989 Report division of landscape areas within the garden. Freier 1989.

At present areas A and B, in the above figure are exactly the same as they were in 1989. Changes made to the superstructure of the project (see 7.6) have changed area C significantly. Whatever designation could be made of area C today the garden is composed of different landscape styles and these areas require different approaches in operations and management.
5.6 The absence of a management plan

There currently is no management plan for the garden. While certain practices are followed either by tradition or an assumption of what should be done. The absence of a management plan leads to an unknown mission objective.

The 1989 Report provides recommendations and subsequently feeds the directives contained in the 1994 LWSCMP. Even so, there is a gulf between knowing what is to be done in theory and how it would or even could be accomplish in practice. A constant underlying push pull between the recommendations and policies in the former and operationally how these recommendations and policies are to be achieved.

The absence of a management creates an environment where decision making can be hampered or could be viewed with suspicion. Any decisions that are made could be viewed as subjective, haphazard, or ahistorical as there is no formal document that guides these decisions, however logical or well meaning.

The garden requires a management plan. There is much complexity in being in accord operationally with the LWSCNHD as a contributing landscape. It is also difficult in practice to faithfully adhere to recommendations of the 1989 Report, while also allowing for the passage of time, changes in infrastructure, visitor use patterns and activities, and the constant growth of vegetation.

A plan is mission essential meet to the duty of preserving and managing the garden given the interdisciplinary nature of the garden's history, setting, and contents. By creating a shared understanding of the history, setting, and contents of the garden is can thus direct a shared plan for meeting the mission to preserve and manage the garden operationally.

6. METHODOLOGY

6.1 Reference material

The reference material contained herein represents a collection of all reports, articles, letters, plans, catalogs, photographs, and interviews found to date.

6.2 Previous reports on the garden

There are two reports by landscape architects. The first was completed in 1989 by landscape architect Renee Freier, “Historic Grounds Report: The Carl S. English Jr. Botanical Garden”. The second was prepared by National Park Service (NPS) landscape architects in 2013 in conjunction with the USACE Seattle District Center for Expertise on Historic Structures (CX), “Landscape Chronology: Carl S. English Jr. Botanical Garden, Hiram M. Chittenden Locks” (Freier 1989), (NPS USACE 2013).
6.2.1 1989 Historic Grounds Report


This 1989 Report was directed to be prepared at the behest of Horace Foxall Manager of the CX. 1989 was a serendipitous time to write the report. It was prepared fifteen years after English’s retirement and at the exact midpoint of Seattle District Horticulturalist (SDH) Michael E. Fleming’s (Fleming) 30 year tenure. The majority of the people interviewed for this report are now retired, deceased, or both. Freier was able to conduct interviews with peers of English notably Brian Mulligan (Mulligan) of the Washington Park Arboretum and Kruckeberg of the U.W. She also walked the garden with English’s coworker and successor, Walter Lyon (Lyon) and spoke with English’s sister (Freier 1989).

Many subjects covered by Freier including flow of pedestrian traffic, visitation impact on grounds, pattern of garden development, site evaluation, place of the garden in landscape architecture history, and recommendations for development and preservation have either stayed true to the present and have been heeded and followed since publication (Carter 2018, Fleming 2015).

6.2.2 2013 NPS USACE Landscape Chronology

In 2013, as mitigation for the installation of the security fence around the James B. Cavanaugh House a joint National Park Service (NPS) and Corps landscape chronology study was written, “Landscape Chronology: Carl S. English Jr. Botanical Garden”.

This chronology study reviewed changes to the Locks landscape over time but did not take into account period plans as delineated in Freier’s 1989 Historic Grounds Report. The report also did not establish a fixed period for when the garden would be considered historic, if at all. Neither the 11 December 1974 designation of the grounds in honor of English nor the primary source documents relating to it are mentioned or cited.

Entryway Phases I and II were also not included in the report, two events which changed the superstructure of the Locks significantly and the garden layout changed with it. This omission produced an incomplete contextual understanding of the garden. Comparison photos contained in the report have no established contextual framework to refer to (NPS USACE 2013).

This report was originally intended to be the first of three reports examining if the garden itself could be on the National Register of Historic Places. The report
recommended a cultural landscape report followed by a preservation maintenance plan (NPS USACE 2013). These subsequent reports have not been produced.

6.3 1976 Botanical garden brochure and tour

This brochure was originally published in 1969 in preparation of the XI Botanical Congress visiting Seattle and the Locks. It was re-published in 1974 and 1976. It is the only complete bed by bed listing of plants during the English Era.

Figure 6 The 1976 Carl S. English, Jr. Gardens Brochure. Locks archives
6.4 Kathy Mendelson’s 1982 Plant Inventory

Kathy Mendelson compiled the plant inventory and developed a card catalog system for the plants in each of the beds. Mendelson studied under Kruckeberg at the University of Washington. (Fleming 2015). This inventory documents many interesting qualities of plants found in the garden during the early Fleming Era. It is helpful in establishing changes between 1976 and 1982. Mendelson also reported helpful information on individual plants in the garden. The inventory is included in the appendices of the 1989 Report. Taxonomic nomenclature changes since 1982 were not examined here.

6.5 1998 Historic Property Management Plan for LWSC

This plan primarily describes the contributing historic building and landscapes that are part of the LWSCNHD. This plan recognizes the garden as a contributing landscape to the LWSCNHD.
Seattle District Commanders are legally bound to protect the LWSCNHD by upholding NHPA through ER-1130-2-540. This plan was created with the Washington State Historic Preservation Officer and the Advisory Council on Historic Preservation.

The use of this plan is the manual that guides all management by civilian managers at LWSC to identify, assess, evaluate, plan and fulfill properly, management actions to preserve and maintain the LWSCNHD.

6.6 1994 LWSC Master Plan

Required under ER-1120-2-400, MPs set the use and development of civil works projects and guide many other process decisions and operations decision.

This plan is 25 years old while at once being the most current master plan. It is no longer appropriate for some current use and management actions at LWSC because of its age.

Despite the delay in an updated master plan, the 1994 MP is still fundamental in evaluating if actions taken in the garden are appropriate and responsible to maintaining the LWSCNHD.

6.7 Locks archives and University of Washington Special Collections: photographs, plans, maps, artifacts, and documents

The Locks archives both in physical and digital form are rich in material. Thousands of photographs, plans, maps, letters, artifacts, and documents may be easily accessed. The work of Locks employees, former employees, and FOBL in creating and maintaining these archives is invaluable to the preservation of Locks and garden history.

The majority of the photos are cataloged in a Past Perfect computer program available to both LWSC employees on USACE network computers and to FOBL on a designated computer for their use at the project. The work of scanning, compiling, and describing these photos is the result of more than a decade of labor by LWSC employees and FOBL.

The University of Washington Special Collections home of the Gould Family Papers yielded two primary source information related to the construction of the Locks.

The “Locks archives” also refers to internal garden and NRS documents, notes, or computer files. Many these computer files are undated and have no author. In other instances “Locks archives” may refer an internal work plan or Microsoft Word document describing an action with the author unknown, hand written notes, or internal receipts. In some cases “Locks archives” may refer to an internal receipt or a saved internal email.
6.7.1 Letters of A.W. Sargent and Commanders 1915-22

The rediscovery by FOBL of early correspondence between A.W. Sargent, assistant engineer and SD Commanders amongst themselves and the Seattle Board of Park Commissioners (SBPC) between 1915-1922 is revelatory.

These letters give primary insight in to the original intent for the Locks grounds by SD Commanders and Sargent. The letters also help make linkages between extant Original Era plants and those furnished by the SBPC.
6.7.2 Cornell University: English’s seed catalogs 1931-59

An anecdote held that English sent his seeds to Cornell University (Cornell). In 2013 the NRS investigated this claim.

After correspondence with Cornell it was found that there was some truth to this anecdote. Indeed, English had sent something to Cornell, yet they weren’t his seeds but rather his seed catalogs. The NRS received copies of English’s seed business catalogs from 1931-1959 along with two photographs.
Figure 9 An undated photograph likely circa 1939. One of the only youthful photos of English. Courtesy Cornell University
It was known that English and his wife operated a small business selling hundreds of plants and seeds (Dress 1957, Freier 1989). It was also well known that English travelled extensively regionally and abroad collecting seeds and also exchanging seeds ("Garden" 1938), (Kruckeberg 1959), (English 1972, Freier 1989, Locks archives, Lyon 1978, USACE 1976). Obtaining the catalogs and examining the plants offered is another rediscovery about English and the origins of plants in the garden.

The number of unique, rare, and hard to find plant species on offer is remarkable. Equally so is English’s apparent knowledge of the habitats of many rare plants that are difficult to access even today. During the 1930s the logistics required to access these habitats would have been much more difficult.
In the catalogs what can also be gleaned is the evolution in English’s plant interests. Initially, the catalogs offered seed of plants native to the Pacific Northwest from sea level to the alpine environs. By 1959, the final catalog known, the plants and seed offered has expanded to include much of the globe.

The 1959 catalog demonstrates an increased rate in exchange and illustrates an evolution in English’s plant interests from native and especially alpine in the 1930s to a truly cosmopolitan and global interest in plants by 1959.

Figure 11 English’s 1959 seed catalog inside flap. Courtesy Cornell University

6.8 Articles and papers written about garden

Due to the dedication and yeoman’s work of FOBL and USACE employees almost all articles and papers written about the garden and English are available. These works, which are referenced often here offer crucial primary and secondary source information about English and the garden.
6.9 *Trees of Seattle* 2nd. Edition 2004

Arthur Lee Jacobson's (ALJ) book contains a whole section on the significant trees and some shrubs in every planting bed in the garden. ALJ also designed a new bed map that more accurately shows the disposition of the planting beds in 2004. This map is the first updated planting bed map since 1984 and is adopted in this work. This book also serves as a valuable supplement to the garden accession database thanks to ALJ’s detailed and generous tree survey in service to the garden and public.

6.10 Interviews


6.11 Revised time periods of garden development

This report adapts and then modifies the previous three time periods established in garden development (Freier 1989). This is for two reasons. Firstly, thirty years have passed since the 1989 Report was prepared. An update is required. Secondly new information gleaned from the rediscovery of documents, letters, and interviews with Fleming add nuance to the previously established time periods and herald the introduction of new ones here.

6.11.1 Original Era

This first period of garden development is from 1915-1931 and represents that original wave of plantings that landscaped the grounds

6.11.2 Nascent Era

The second time period is from 1932-1940 and represents the heretofore relatively unnoticed influence of English on the grounds from a plant composition perspective

6.11.3 English Era

The third period is from 1941-1978 represents English’s career and four years of status quo continuing under Lyon

6.11.4 Fleming Era

The fourth period is from 1978-2004 and represents Fleming’s career

6.11.5 Present Era

The fifth period is from 2004-2019 and is notable for the lack of an SDH
6.12 Updated plant listing and bed and area descriptions

This section will follow the 1989 Report’s Appendices B and C updating bed and area detailed description where applicable and the plant inventory format (Freier 1989, Mendelson and Fleming 1981).

7. SUPPLEMENTAL HISTORIC GROUNDS REPORT

7.1 1989 Historic Grounds Report

This report is foundational to the understanding of the garden now and this report and plan would be impossible without it (See Appendix B).

The 1989 report collected a vast amount of information in order to contextualize all of the developments and changes to the garden over space and time.

The impetus for the preparation of the report was the designation of the LWSC as a national historic district as legislated by the NHPA and Section 106. The garden was determined to be a contributing factor to this designation.

“A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (NPS 1997).

Seven qualities were examined according to the register criteria including historic location, design, setting, materials, workmanship, feeling and association and the garden was assessed in relation to these qualities (Freier 1989).

Identified were three periods of garden development: 1915-1940, 1941-1974, and 1974-1989. The most important of these periods was 1941-1974 when English had a free hand at developing the garden (English 1972, Freier 1989).

The report the examined site circulation by visitors which states that ten percent of people visit the gardens themselves rather than head directly to the locks and fish ladder and that this number, even in 1989, was at the limit for what the garden could support. This site circulation estimation regarding percentage of visitors to the garden itself has remained consistent to the present day (Freier 1989).

Design trends of the garden and associated structures were examined and a plant inventory by Kathy Mendelson and Fleming was included in the appendix (see Appendix B).

Freier was able to interview many persons now deceased including Dr. Arthur Kruckeberg of the University of Washington, Brian Mulligan of the Washington Park Arboretum, and Lyon.

This report was prepared this report just fifteen years after English’s retirement and during the midpoint of Fleming’s career. This report was completed just before the
completion of Entryway Development Phase II (1989) and The Circular Drive reconstruction and paving projects (see 7.5). The changes to the sidewalks and roads layout was advised against (Freier 1989).

This report is integral to master planning, Locks management plans, NHPA considerations, and is the report of reference for the garden. After preparation the 1989 Report served as a guide of reference for the garden guiding all garden operations and management considerations and decisions (Carter 2018).

It also guided materials for infrastructure authorizing the use of concrete, rock, and wood and low barrier fencing preferably consisting of concrete bollards or the removal of wooden structures near the rose garden (Freier 1989).

7.2 Updated eras of garden development and supplemental information

The following contains new information obtained since the 1989 Report and covering the time period that the report described. An updated description of garden development since 1989 is also included in this section introducing a new era, “Nascent Era” from 1931-1940, covering 1998-2004 of the Fleming Era and 2004-Present in the Present Era.

7.3 The role of the firm Bebb and Gould during the Original Era

A camaraderie developed between the three principal figures in the construction of the Locks Army engineer Lieutenant Colonel J.B. Cavanaugh (LTC Cavanaugh), architect Carl F. Gould (Gould) of the firm Bebb and Gould, and civilian engineer Sargent.
Figure 12 Letter from Gould to Cavanaugh regarding request to serve in France during the Great War 16 May 1917. Gould family Papers courtesy University of Washington Special Collections.

Gould’s characterization of his working relationship with Sargent is familiar and breezy. His working relationship with LTC Cavanaugh is apparently one of enduring loyalty in service and shared mission.

What this letter implies is that the army and civilian engineers with the contracted architect formed a veritable triumvirate managing and implementing the construction of the Locks.

This letter helps to better understand the influence of the firm of Bebb and Gould on the construction of the Locks. In reference to Sargent, Gould relates to LTC Cavanaugh that
“whatever little odds and ends that Sargent needs we will of course be glad to advise him about.” The working relationship between Sargent and Gould was one of familiarity and an inference that a constant exchange of drawings between the two men was ongoing during Locks construction.

Primary source evidence pertaining to the reasons why the Locks were ornamented does not exist or has not been rediscovered. While the motives why the Locks were ornamented is elusive the Locks deliberately were.

The superstructure and light standards of the lock site was designed by the firm Bebb and Gould. Superstructure by definition would mean anything that was above ground associated with the substructure of the locks themselves. The superstructure thus included Administration Building of the Second Renaissance Revival Style and ten associated structures (USACE 1998).

Figure 13 Bebb and Gould description of work at U.S. Government Locks Gould Family papers. Courtesy University of Washington Special Collections Gould Family Papers

No extant records exist or have been found attesting to Bebb and Gould designing as to the roads and sidewalks while designs for the Administration Building and light poles have the stamp of Bebb and Gould.
Figure 14 Bebb and Gould light standard ornamentation. Note Gould’s name is written under the two Army engineers and the drawing is property of the architect. These lamps standards are still found at the south entrance of the Administration building and at the original main entrance to the project directly north of the Cavanaugh House. Locks archives
The drawings of the whole lock site that are available for review are consistently submitted by Sargent or his assistant C.A.D. Young (Locks archives).

![Figure 15 LWC-290 locks and grounds plan with firm of Bebb and Gould absent submitted by Sargent 31 March 1920. Locks archives](image)

It has been hinted that Bebb and Gould or an associated landscape architect submitted the first plans for the grounds and planting beds and plants at the Locks. The search for an original and complete planting plan has continued to prove elusive (Freier 1989).
Figure 16 C-2-3-17 dated 1915 showing a planting plan and plant species but the preparer is obscured. Locks archives

The plan C-2-3-17 does not have an indication of a preparer and thus a definitive declaration as to who prepared the drawing cannot be made. The role of the firm Bebb and Gould as to the landscape of the lock site reservation is still unknown or undiscovered.

There is also evidence that implies that the SBPC could have furnished this drawing in designing the planting beds after receiving lock site plans (Letter to LTC Cavanaugh [19 November 1915]).

And yet much like the ornamentation of the Locks superstructure it is unknown as to why there was a drive to “landscape” the lock site reservation. It is clear only that it was.

It is possible there is still yet much to discover regarding the early days of construction at the Locks. Perhaps there are more documents related to the early days of planning at LWSC that remain to be rediscovered in other archives.
7.4 Original Era: Letters written by Sargent between Seattle District Army Engineers and Seattle Board of Park Commissioners

The grounds of the lock site were to be ornamented with trees and shrubs just as the firm Bebb and Gould had ornamented the superstructure of the Locks.

A letter dated 19 November 1915 Sargent submits to LTC Cavanaugh the “plan of reservation grounds at the Locksite.”

Sargent reasoned that the SBPC should provide to the government plants to adorn the reservation grounds free of charge as the grounds will be open to the public. Further it is envisaged that “if properly laid out the grounds can be made one of the most attractive...
spots in Seattle” and be maintained modest cost to the government with Locks employees while not in care of the locks themselves (Letter to LTC Cavanaugh [19 November 1915]).

There is currently no evidence as to why Sargent thought the grounds at the lock site should be made “one of the most attractive spots in Seattle”, yet we know that Sargent, LTC Cavanaugh and successors commanding the Seattle District did exactly that.

Two years later Sargent is able to report to LTC Cavanaugh that 185 roses and 955 shrubs have been obtained to plant at the Locks but stating that no trees are available (Letter to LTC Cavanaugh [13 February 1917]).

Following Cavanaugh’s command Sargent requests yet again to Colonel C.L Sturdevant (COL Sturdevant) to ask SBPC to furnish dozens of trees and shrubs and nearly a hundred roses after the demise of the previously requested plant material (Letter to COL Sturdevant [10 February 1919]). Evidence of trees and shrubs in existing beds and detailed in later reports strongly suggests that SBPC did indeed provide the plants and they were planted (Freier 1989), (Koykka 1969).

Three years later under the command of Colonel E.H. Shulz (COL Shulz) there is a direct chain of communication in subsequent days from Sargent to COL Shulz to the Secretary of the SBPC in requesting over 70 trees (Letter to Sargent to COL Shulz [16 February 1922], Letter to the Secretary of the SBPC [17 February 1922]). The receipt of these trees and shrubs can be attested to by the planting of the poplars by the first full time gardener, Henry S. McCarty in the 1920s (1920-1925) (Koykka 1969).

In the autumn of the same year COL Shulz again requests two dozen sycamore trees from SBPC (Letter to Secretary SBPC[1 November 1922]). These trees can be attested to by their subsequent removal by English near the Cavanaugh House in the 1940s and 1960s (Koykka 1969).
February 17, 1922.

To the Secretary,
Board of Park Commissioners,
Seattle, Washington.

Dear Sir:

Your office has very kindly co-operated with this district in the past in furnishing trees and shrubbery for the Lake Washington Ship Canal, and there are now needed the following, which can be used advantageously in beautification of these grounds:

30 Lombardy Poplars
30 or 40 American Linden trees
3 Red Camellias,
3 Weeping Silver Birch,
3 Japanese Cut Leaf Red Dwarf Maples
2 Bamboo trees.

Will you kindly notify this office whether you can furnish the above stock, and when and where the same can be obtained.

Yours truly,

Edward H. Schulz,
Colonel, Corps of Engineers.

Figure 18 COL Shulz's correspondence for trees in aid of "beautification of these grounds". Locks archives

From 1915 to 1922 there is concerted effort by Sargent and Seattle District commanders to ornament the grounds of the lock site. It is unknown as to why this was done yet through this correspondence it is known that this effort was made repeatedly and was a facet of the original mission.
7.5 The Nascent Era: A new interpretation of English’s influence prior to 1941

English was hired in November of 1931 (Koykka 1969). Newly obtained information adds nuance to the time period English was a “Gardener’s Helper” (Locks archives).

FOBL rediscovered an internal document Locks document and 1938 newspaper article on English and the garden Locks changes the currently accepted interpretation of this time period and may provide hints that English may have had more influence between the years of 1932-1940.

A document suggesting increase in compensation for Locks employees is dated 30 March 1936. English is listed as “Gardener’s Helper” and his salary at that time was $1500 per year. English is the lowest paid employee listed and his senior colleague, Eckerstrom is salaried at $1680.
The document shows that the employees listed were to receive a $60 dollar increase in pay by July of that year. Of note is the remarks section which tend to either describe the employee position or remarks on the employee. The remarks are delivered with brevity.

For handyman James J. Holland hired in 1918 the remarks are clear. "Holland is very efficient in practically all lines."

English’s remarks follow. "Mr. English is very proficient in the propagating and care of plants. Present salary less than a lineman" (Locks archives).

A Seattle Daily Times (today’s Seattle Times) article from 3 May 1938 further illuminates English’s role in the garden before 1941.

“Within a stone’s throw of the Lake Washington Locks, where ships from foreign countries pass…there blossoms a rock garden filled with exotic plants from many a foreign land. The unusual garden spreads for 300 feet along the narrow concrete driveway at the Government Ship Canal Locks in Ballard. In it are more than 700 varieties of flowers and plants arrange so that at least one of them is in bloom nearly every day of the year. The garden is the work of Carl English Jr., 8546 30th Ave N.W., who has toiled painstakingly for four years to make the garden nearly as great an attraction as the Locks, which lure thousands of visitors a month."

The article goes on to mention that the plants are from all of North and South America, New Zealand, Europe and Asia. English raised all of these plants from seed he had exchanged from his vast resources of 600 native species he had collected for propagation and barter.

The article simultaneously illuminates and asks a question. Chiefly it explains that this rock garden (bed # 119 and 120) is the beginning of the English garden. This correlates with English’s own assessment that the garden began in 1932 (English 1972). It also contains the origin of a theme of many different plants in one place, blooming at all time of the year, with, presumably, a mixture of layers and textures (English 1972), (Freier 1989).

From here, beginning in 1932 to 1974 English’s vision for how a garden should look began and radiated outward. The article is also notable for the lack of any mention of Eckerstrom, while both Eckerstom and English are credited with constructing the rockery Eckerstrom goes unmentioned (Freier 1989), (Koykka 1969), (“Garden” 1938).

These two pieces of information help recreate this period of the garden. English was clearly being recognized both by his employer and by the press and public as a talented gardener whom was worthy of notice and acclaim.

Previously a first period of development between 1915-1940 was delineated as a time before the influence of English was prevalent on the grounds. A subsequent “cut-off” date
of 1941 was listed as the time in which radical changes characteristic of English and the garden as it is known today began. (Freier 1989).

This Nascent Era is a time when English was beginning to practice in his rock garden a gardening philosophy and practice that he would later reproduce, in different styles but not theory, over the entire grounds at the ”cut off” date. This philosophy and practice radiated out from the beds of 119 and 120.

7.6 Fleming Era post-1989 report: Construction of Entryway Phase I & II including the Circular Drive, and the subsequent expansion of bed(s) 215 band stage plaza and fountain

The preparation and publication of the 1989 report was mid-way into Fleming’s career. While some of the changes that had brought the writing of the 1989 Report such as planting of trees in lawn areas ceased after publication two major events occurred at the Locks.

These two events fundamentally changed the original character of the Locks. The change in the roads and sidewalks thus changed the shape of many bed and planting areas. The garden’s character was reactive to this change in superstructure and operations.

7.6.1 Rehabilitation of the North Entryway 1979-1989

This project reconstructed the north entrance to the Locks and was completed in two phases.

Phase I added a new parking lot with associated landscaping installed by a landscape architectural firm, a historical consistent concrete guardhouse structure replacing a wooden guardhouse, new paving, and fencing (USACE 1998).

Phase II repaved the entire promenade and associated walkways, sidewalks, and road ways adjacent to the Administration Building and was completed in 1989 after publication of the 1989 report (USACE 1998).

7.6.2 Entryway Phase I

Phase I was completed in 1982 and changed the north entrance to allow for two entrances, one for visitors and one for employees while also adding a new parking lot. Originally vehicles

The plantings made in the new parking lot and adjacent were completed by a landscape architecture firm and consisted of mass plantings of single species. This action did not conform to the qualities of the garden and was inconsistent with the features that contributed to the LWSCNHD (Freier 1989).
Figure 20 Summer 1988 prior to Phase II construction. Note new guardhouse and paving. This paving would soon repave the promenade and all adjacent hard surfaces. Locks archives

7.6.3 Entryway Phase II

Entryway Phase II changed the project hard surfaces including the hard surface areas adjacent to the Administration Building and Visitor Center and to all of the garden beds adjacent. These changes adjacent to the Administration Building were suggested to against and instead their preservation was advised (Freier 1989).

The removal of sidewalks and altering of the road in the area adjacent to the Administration Building had a significant effect on the layout of the grounds and so to the garden beds surrounding.

The justification for this change in roads was not found. The roads and sidewalks themselves were not listed as a contributing factor on the nomination for the
Historic Register (USACE 1978). This roadway development also occurred before the programmatic agreement on preservation was implemented (USACE 1998).

The Circular Drive construction project, File # C1845 was the 2000 repaving of the curved road that runs for a quarter mile west of the promenade (Locks archives).

This project united the paving design element found in Entryway Phase II with the reset of the roadways at the Locks. Compared to the Entryway Phase II plan the project had very little impact on the character of the Locks superstructure. It did however, place much strain on Fleming and he was able after much effort to make sure that no trees that lined the road were harmed during construction (Carter 2018).

![Figure 21 Looking north note the sidewalks, curbed promenade sidewalk, and planting beds. 21 May 1969. Locks archives](image_url)
Figure 22 C-2-3-196 grounds and garden beds 1984. Locks archives
Figure 23 Demolition plan for Entryway Phase II C-2-3-203. Locks archives
The exansion of bed(s) 215 including band stage and fountain

In reaction to the changes to the promenade and adjacent areas near the Administration Building the garden expanded at the southernmost end of the promenade.

In 1989 the NRS had developed a summer band program that hosted local musical acts free of charge on Saturdays and Sundays during the summer, the concerts were hosted on lawn in the center of the garden.

Due to the heavy traffic the lawns endured a temporary non-permanent band stage was installed. Although this action countermanded the 1989 Report the reasoning was that because of the change in use for the area there would be a heavily degraded lawn if the summer band program continued. Similarly, the garden beds adjacent the band stage expanded due to lawn degradation (Carter 2018).
Fleming also installed a water feature to the immediate south of the band stage. The justification, which was approved, was that this replaced a similar fountain that was located on the lawns to the west of the Cavanaugh House (Carter 2018). This fountain had been installed by Eckerstrom in 1928. English removed this feature circa 1942 because of pipe and foundation failures (Koykka 1969).
7.7 Present Era: Installation of a barrier fence at the Cavanaugh House

The Present Era has seen little change. The only notable event regarding a change of infrastructure was the 2012 installation of a security fence around the Cavanaugh House. There was a wooden fence that surrounded the residence and a portion of it remains today, although heavily degraded (Freier 1989).

This installation also produced the 2013 joint study on the landscape at the Locks ostensibly in mitigation for this action (NPS USACE 2013). The fence did not alter the beds themselves or cause either bed expansion or retraction.
8. **CARL S. ENGLISH JR. BOTANICAL GARDEN MANAGEMENT PLAN**

8.1 **Intent**

The intent of this plan is not to go into precise detail on each and every possible or probably eventuality the garden may face. An endeavor of that scale may prove impossible and even if it were achievable. Unforeseen variables and changes over time could easily be rendered useless and obsolete.

This plan needs to remain relevant and useful. The best way to assure this is to provide a basis of common understanding about the garden. This management plan is intended to provide the reader with a basis of “how to understand and think about the garden” in order to manage it properly for all eventualities rather than “what to do in the garden”.

This plan provides a foundation for how to approach management tactics and strategies in the garden. It is intended to give the reader proper situational awareness and to then compel that the right questions be asked before planning on a management action. In this way this plan encourages personal agency in management actions and it can be
used more effectively and provide guidelines on how to plan for both foreseen and unforeseen eventualities.

8.2 Operational context of garden within the mission of the LWSC

There are three primary operational facets of the LWSC mission:

- Provide navigation for vessels into and out of lakes Union and Washington to or from Puget Sound
- The freshwater level of lakes Union and Washington shall be maintained between 20 to 22 feet above sea level
- Minimize salt water intrusion into the inland lakes

The LWSC has an economic impact of 1.2 billion and is vital for dependent tribal governments, local government, private enterprise, and public use.

The LWSC is also the salmonid species passage artery provided by the Locks fish ladder to the Cedar and Sammamish river watersheds. This fish passage is a crucial mission and also is governed by federal law as related to ESA and treaty rights to the Muckleshoot and Suquamish nations.

A tourist attraction, the Locks hosts over a million visitors per year and provides pedestrian and bicycle access across the lock and dam to and from the Ballard and Magnolia neighborhoods in Seattle (McDowell 2017).

8.2.1 Garden in relation to LWSC operations

The garden’s operation is subordinate to the operation of the LWSC. In 7.6 the garden was reactive to changes as a result of operational changes to the infrastructure of the Locks. Planting beds expanded only after the roadways were expanded and sidewalks removed thus creating space for the beds to fill in.

The garden is also subordinate in day to day operations related to the maintenance of the Locks. An example of daily operation subordination could be pruning trees so a crane could travel down the promenade to assist in Locks maintenance. Or, the decision circa 2000 of not replacing a tree adjacent to Cavanaugh House so Locks maintenance could have better access to it (Carter 2018).

The garden is limited in exposure to affecting operation concerns due to the original design. The garden has potential to interfere with operations only adjacent the promenade, administration building, lock wall, and Cavanaugh House.

8.2.2 Legal, regulatory, and designation framework

The garden is a contributing factor to the LWSCNHD and was designated by USACE in honor of English in 1974. The garden is regulated by NHPA, NEPA, AHPA, PBCUA,
8.2.3 Garden visitation

Current estimates of visitation to the Locks are estimated at near 1.25 million annually (McDowel 2017). The majority of these visitors are headed directly to the lock sides and the fish ladder and fish ladder viewing room as they head down the promenade. About ten percent will visit the gardens themselves (Freier 1989).

8.2.4 Residence of the Seattle District Engineer

The James B. Cavanaugh House constructed in 1913 to provide a residence to then LTC Cavanaugh during locks construction. It has been continually occupied since that time. In 1967 it was made the official residence of the Seattle District engineer which has been, with one exception, and continues to be a Colonel of the U.S. Army (Locks archives), (USACE 1998). This residency creates yet another layer of operational responsibility as the Locks and garden is the private residency Seattle District Commander. The contentment and security of the residents is of paramount importance for the LWSC.

8.3 Layers of garden development over the five garden eras

The garden has multiple layers of development in space, substance, and time. 6.11 introduced a new interpretation of garden eras based on the three identified and delineated in the 1989 Report, the Original from 1915-1941, English from 1941-1974 and Present from 1974-1989 (Freier 1989).

8.3.1 Original Era 1915-1930

The early plantings of the garden of plants were furnished SBPC (English 1972, Freier 1989, Koykka 1969). The first full time gardener, Henry S. McCarty was hired in 1920 and Gustaf Julius Eckerstrom (Eckerstrom) was hired in 1925 and served in capacity of lead gardener until 1941 (Freier 1989). During this time period landscape architect Otto Humdahl designed the “formal beds” to the east of the administration building in 1927 (Koykka 1969). This action is significant as it shows probable original intent that the grounds be treated more as a garden rather than a park.

8.3.2 Nascent Era 1932-1940

The influence of English began in 1932. Chiefly this influence is seen in the development of the “rockery” of beds 119 and 120. So remarkable was this rockery garden it was written about in a local paper (“Garden” 1938).
A closer examination of plant introductions during this time hint that English very well could have propagated and/or planted them. *Sequoadendron giganteum* in bed 12 in 1933 and the *Cedrus libani* in bed 2 in 1934 hint at the aesthetic style and diverse species of plants English would later populate the grounds (Freier 1989, Koykka, 1969, USACE 1976).

Finally, English states plainly that the landscaping for the Lock’s grounds began in 1916 but the garden as it would be commemorated in 1974 began in 1932. It is likely he would be referring to construction and planting of beds 119 and 120 and the subsequent planting written about in 1938 (English 1972).

**8.3.3 English Era 1941-1974**

The 1941 “cut off date” is both the promotion of English to manage the grounds and is the beginning of a complete transformation of plant material and expansion of current beds and creations of new ones (Freier 1989).

This era featured an explosion of labor, creativity, and plant introductions. English was ruthless in the substitution of the existing plant material. It was reckoned that 80% of the existing plants as of 1932 had been replaced 40 years on (English 1972).

Yet English did not alter the extant planting beds by removing them or the extant lines of trees. Existing planting beds were expanded and the plant material within them were changed and the species and variety of trees lining the roadways were changed but the beds themselves were not altered.

The character of the planting beds changed or were expanded yet many were kept during the English Era and through to the Present Era more or less as they appeared in 1930.

Beds 16, 17, 22, 101, 102, 108, 109, 212, 213, 315 and the formal beds of 325 along with the locations of tree lining the roadways fit this description. Beds 1,2,3,5,14, 318, and 319 were expanded. It appears English accentuated the landscape that already existed and never removed any beds save for a water feature (Koykka 1969).

The plants that he propagated by collection or exchange and he subsequently used to replace the original era plantings were unique. Slowly, they began to attract notice nationwide and locally by other botanic gardens and botanists (Dress 1957, Kruckeberg 1959).

After English retired in 1974 his successor Lyon made only a couple changes were made to the garden during his tenure in charge from 1974-1978 (Fleming 2015, Lyon 1978, USACE 1974, USACE 1976).
Lyon added a row of *Malus* species to the bottom of the largest terraced lawn in beds 15B, C, and D. Lyon also added an espaliered apple tree adjacent to the west wall of the Cavanaugh House (Freier 1989).

Lyon also continued the changing out of older tree species lining the loop road, presumably just as English would have done. Lyon and Fleming removed most of the original maples using chainsaw and crane. These trees were replaced with the same *Aesculus carnea var. Briottii* that lined the promenade. Lyon and Fleming decided to keep a few of the remaining Original Era maples (Fleming 2015). These trees still exist in 2019 in beds 127 the Sycamore maple, *Acer pseudoplantanus*, and 125 and 129 Norway maples *Acer plantanoides*.

### 8.3.4 Fleming Era 1978-2004

This era is critical to the stewardship to the garden and represents a time period of structural change to the grounds. Fleming spent the beginning of the time period coming to grips with managing the garden. During this time Fleming worked out how to steward the garden. This endeavor was aided by the 1989 Report and the work of Fleming and his assistant for over a decade, Jonny Martin (Fleming 2015).

Features of the Fleming Era include:

- Following in the footsteps of English without a plan
- Significant guidance from Lyon was not provided other than maintaining the status quo.
- Learning better how to steward the garden by contacting English’s peers at the University of Washington and Washington Park Arboretum
- Developing management strategies for the maturing vegetation in planting beds
- Absorbing the hard surface and structural changes wrought by Entryway Phases I and II
- Additions to the garden (Rose garden) and later respecting recommendations of the 1989 Report
- Preservation of English’s plants
- Propagating existing English plants to have replacement on hand
- Maintaining lawn areas in respect to maturing vegetation and heavier traffic due visitation and new event series
- Trying to keep beds intact by preventing people walking through them
- Addition of notable plants to the garden
- Intent to develop a management plan
- Attempt, nearly completed in 2004, to inventory and tag all the plants of the garden
Lyon did not leave Fleming with a management plan upon retirement. Fleming scrambled to figure out the best way to manage the grounds in the absence of a plan. In his estimate many of the beds were overgrown and some of the significant plants were in danger of being lost. On his own initiative Fleming took counsel from English’s peers Mulligan of the Washington Park Arboretum and Kruckeberg to guide his decision making (Fleming 2015).

Fleming also experienced the most extensive reworking of the Lock’s superstructure during Entryway Phases I and II. This work necessitated areas of garden to expand as related in 7.6.

Fleming made some additions to the garden including the Rose garden and the planting of trees and addition of trails in lawn areas. The 1989 Report evaluated some of these actions and recommended that the trees and trails in lawns be removed while sparing the rose garden (Freier 1989).
Some notable additions is a trail and stairway that were added to in northwest part of the garden dubbed “The Cove”. The 1989 Report found this development inconsistent with the character of the garden. Its relative obscurity meant that it was of a low priority for removal (Freier 1989). Fleming viewed the stairs and trail as a way for people to experience an inaccessible part of the garden and enjoy the view afforded there (Fleming 2015). The path and stairway remain.

A rose garden adjacent the administration building in 1988 and two wooden trellis replacing a bed of open lawn and geometric shaped beds (Freier 1989). The reintroduction of roses and a rose bed was reasoned because beds 16 and 17 previously hosted roses thus providing a historical precedent (Carter 2018).

*Figure 29 Lawn and beds where rose garden was installed circa 1970. Locks archives*
The maintenance of lawn areas to not be reduced, recommended by the 1989 Report also proved difficult. As the trees and shrubs in the beds matured grass was sapped of sunlight and could no longer be grown.

Increased traffic to the garden also necessitated the use of plants to act as a border so people would not trespass and disturb the plants in the planting beds. Many of these plants consisted of thorny or rapidly growing species.

Fleming was constantly surprised and at times in awe at the technical proficiency of English and his uncanny ability to place hard to grow plants in exactly the right place (Fleming 2015). This presented problems as English’s extraordinary gifts as a botanist and horticulturalist made preserving his work difficult. Fleming was crestfallen by the loss of a plant English had raised and made much effort to build up a stock of replacements by vegetative cuttings (“Faces” 1992).
The garden began to experience two problems of operational management in respect to preservation of lawns and the preservation and integrity of English’s plant collection. Three dilemmas begin to be experienced in the garden.

First, where English’s trees and plants are preserved as they mature grass can no longer grow where it once did. Or a plant of English’s is lost, yet the surrounding vegetation makes it impossible to replace the lost plant as it required full sun to grow and the bed is now too shady. Thirdly, as English’s trees matures and grow, sometimes spectacularly so and of a far larger size than the tree grows in its native habitat, the associated shrubs and herbs English planted near these trees can no longer grow. While some English plants are preserved, some suffer, decline, and die in relation thus changing the character of the bed and of the garden.

To remedy the former and to add to the collection, during this period many significant new plants were added. Some arrived from the National Arboretum, some donated by Kruckeberg and his wife Mareen, and some purchased from specialty nurseries. Many of the plants introduced are rare in cultivation or in their native habitat.

Fleming also introduced a tradition of seasonal color displays featuring annuals and cold tender plants displayed in the spring and summer months.
Figure 31 Fleming and Jonny Martin planting a castle design filled with begonias for the 75th anniversary of the LWSC in 1992. Locks archives

Fleming was later promoted, like English, to SDH. He had intended that a management plan be prepared internally. He had planned to work with Seattle District Historic Landscape Architect Terry Taylor, who had developed planting plans at Fremont and Montlake Cuts, to draw up a management plan that would take into account historic features of the garden. The management plan went initially unfunded and Taylor’s death postponed the project indefinitely (Carter 2018).

During these final years of his career Fleming also began to document the plantings via a Microsoft Access accession database and a plant tagging program via a Gardenware program. Fleming was able to document much of the garden but he fell just short of this goal before his retirement.

During his career Fleming was much respected, admired, and liked by Locks and Seattle District employees for his exemplary service in stewardship of the garden (Carter 2018). Fittingly, a bronze plaque featuring him and describing his contributions adorns the garden adjacent to the pond and band stage in bed 214A.
8.3.5 Present Era 2004-2019

The present era is distinct in marking a break in the leadership structure that had managed the garden for the majority of its existence. This era marked was the first time in 63 years that there would be no SDH at the helm of the garden.

Two employees viewed by Fleming as possible successors, Alan Hernandez (Hernandez) and Brian Carter (Carter). At the time the staffing consisted of a General Salary (GS) 11 horticulturalist, Fleming, and two Wage Grade (WG) 8 gardeners, Hernandez and Carter. GS are white collar and managerial positions whilst WG are maintenance and non-managerial positions (OPM 2019).

Records show various tasks being handed off to Hernandez and Carter in the early 2000s that Fleming would have been in charge of to prepare them for the role as SDH (Locks archives). While this was accomplished and both employees were groomed for leading the garden neither would fulfill this role. Hernandez and Carter would soon leave the garden either through retirement or transfer by 2007 (Locks archives).

After 2007 the SDH position went unfilled and in the place of the previous staffing structure three WG level employees. By 2009, in place of the previous staffing structure of SDH and two gardeners three WG level gardeners filled those roles.

This left the role of managing the garden ostensibly to the NRM manager, a GS-12 position. It is unclear whether the job description associated with the GS-11 horticulturalist was thus also transferred to the GS-12 NRM manager.

Without a management plan in place the garden had lost a direct line of management style marked by authority and tradition in the form of an SDH. Like Fleming in 1978 the staff was adrift without a plan.

The three problems that plagued the garden during the Fleming era, maturing plants and loss of lawns, loss of plants and inability to replace them in kind due to cultural or physiological requirements, and the success of plants to the detriment of others, only became more pronounced.

While the loss of plants became more common due to maturity, disease, or damage cause by severe weather the garden still maintained accord with the LWSCNHD and the 89 Report. Yet the plant collection declined and there was difficulty in finding a remedy.

Questions continually presented themselves and could not be resolved effectively.

The unresolved questions follow:

- Who planted a plant?
- When did they plant it?
• What was the plants origin?
• What plants are important?
• What plants should be kept?
• What plants should be removed?
• What plants shall replace them?
• Shall and/or should a plant be replaced in kind?
• Which plants ought to be replaced?
• Which of English’s plants can be reintroduced?
• What shall the character of the beds be in different parts of the garden and what determines this?
• What happens to lawn areas that can no longer grow grass due to shade?
• What texts or authorities are to be followed related to garden management?
• Have the proper texts and authorities been consulted?
• Are the proper texts and authorities being followed?
• Is this action detrimental to the contributing historic value of the garden in relation to the LWSCNHD?

Adding complexity to the lack of an SDH and a management plan any decisions that are made could be viewed as subjective, haphazard, or ahistorical.

Despite this ambiguity without a plan, planting beds have been renovated and many new plants have continued to be introduced to the garden.

8.4 A Botanical Sanctuary: What the garden is

8.4.1 English’s botanical sanctuary

This garden is a “botanical sanctuary” (Kruckeberg 1959).

Carefully constructed and nurtured by a plant discovering botanist yet self-described “dirt gardener” (Dress 1957). English, who introduced four plant species to science (two of which would be given variety status) while scouring the mountains of Washington and Oregon made contributions to the knowledge of the currently accepted *Montiaceae, Plantaginaceae,* and *Talinaceae* (Freier 1989, Hitchcock and Cronquist 2018). He also introduced several hybrid plants to horticultural (Dress 1957, English 1947, Freier 1989).

What grew from these labors is a niche garden. This is the garden of a botanist with a gift for selecting plants suitable to horticulture and a highly skilled grower who could cultivate almost any plant he endeavored to. English also knew how to make the best of the challenging soil conditions at the Locks and had an uncanny ability to place a plant in exactly the right spot (English 1972, Lyon 1978). The garden is a reflection of
English’s wide ranging and eclectic use of plants and the garden should continue to emulate this vision and practice.

The key to defining this garden are the two attributes that makes it genuinely unique. These two things are the singular setting at of the Locks and garden and the rare and unique plants that English weaved into the landscape.

8.4.2 English’s plants

Figure 32 English’s plant discoveries on display during the “Garden Tea” commemorating the garden during the LWSC Centennial. From left to right is Lewisia columbiana var. rupicola, Penstemon euglaucus, Claytonia megarhiza var. nivalis, and Talinum okanoganense. 20 May 2017

The plant listing published for the XI Botanical Congress in 1969 features a dizzying collection of plants from every continent plants grow (USACE 1976). Indeed, to the “knowing eye” the plant list becomes even more impressive.

The trees, shrubs, and plants are composed of every conceivable type of plant from conifers to palm trees, showy rhododendrons to common though far less exotic
though still distinctive native huckleberries. The plants also hail from almost every imaginable habitat from the sub-alpine of the Himalayas to the sub-alpine of the Pacific Northwest, the arid regions of the Great Basin to the North African desert.

English seemed to favor plants in the *Ericaceae* and *Fagaceae* family although it was difficult to pin down if he had any favorites at all given the range of plants he grew (Lyon 1978). Using the 1976 brochure as a guide, English’s plantings are at once amazing and audacious.

English would grow any sort of plant from the hardscrabble and rugged jack pine (*Pinus banksiana*) and huckleberry oak (*Quercus vaccinifolia*) to ostentatiously beautiful and delicate plants of the genera *Magnolia* and *Rhododendron*. It is apparent that if English took a fancy to a plant he would propagate it and grow it and do this remarkably well.

English would also plant plants that he had collected that were perhaps not horticulturally significant but were botanically curious or of interest, such as the natural occurring “Azaleodendron”, a cross between *Rhododendron macrophyllum* and *occidentale* he collected where the two species natural ranges overlap in southwestern Oregon, likely in Curry County, Oregon.
Figure 33 English’s “Azaleodendron” in bed 211. This plant lacks the best attributes of both of its parents yet has a distinctive charm to itself as an individual and botanical and scientific specimen. Blooming 9 May 2019 it is at least 50 years old and could easily be missed by the unknowing eye. Stephen J. Munro

Not even weeds could escape the interest of English. A plant appeared on the grounds that was characteristic of the family Solanaceae. Lyon writes that English said it looked like a plant of the genus *Datura* while Lyon called it some kind of
“jimson weed”. A subtle “in joke” by Lyon, as “jimson weeds” are in the genus *Datura*. He and Lyon continued to let it grow in order to observe it careful that it did not go to seed (Lyon 1978).

At times English was unsuccessful in his attempts to cultivate plants he desired for the garden. The foxtail pine, *Pinus balfouriana*, an inhabitant of high places of California and particular favorite of English, would never be successfully grown in the garden. He and Lyon tried numerous times coax the tree into cultivation and Lyon himself was ultimately unsuccessful in this pursuit (Lyon 1978).

What remains a mystery is the breadth of plants that English had grown during his tenure that will stay unknown. The “700 varieties of flowers” described growing in beds 119 and 120 leaves a tantalizing hint as to what species of plants English did grow in the garden (“Garden” 1938). In 6.7.2 English’s seed catalogs represent a massive index of available seed that could have been used in the garden as well. These facts hint that English was an even more accomplished horticulturalist than he is even recognized as today. What other plants did English grow in the garden? This, at present unanswerable questions leaves much to contemplate regarding English’s horticultural and botanical nous.
During English’s career at the working the Locks grounds his contemporaries referred to the grounds as a “botanical garden in miniature” or “horticultural mecca” (Dress 1957, Kruckeberg 1959). The garden is the life’s work of a unique, hard-working, educated, dedicated, and creative individual thoroughly a product of the time he was
Japanese gardens reflect the philosophy, culture and art of Japan so too does the garden reflect the philosophy and creativity of English (Habib et al 2013). The garden itself is a reflection of English in its unassuming utilitarian nature while singular and distinctive in content and character.

Figure 35 English leading a tour for the 1969 XI Botanical Congress in front of bed 316 featuring xeric plants and place rocks, note Elisabeth Carey Miller of the Seattle Garden Club to English’s right. This bed has changed dramatically due to the success of oak trees English planted there. Locks archives

8.5 How to emulate English in managing the garden

There is only one article that recorded English’s commentary and aims for the garden. In the Summer 1972 article in *The Horticulturist* English writes clearly and with brevity
regarding his commentary on the garden and the “aims to be accomplished.” The following commentary and “tenets” are the only record of what English himself intended for the garden. The following is intended to establish a shared understanding of English’s philosophy and intentions for his garden (English 1972).

8.5.1 English’s commentary

- Significant that the construction of the Locks also included a full time residence and a civil works project that set aside seven acres of grounds to be landscaped
- The “landscaping” of the garden began 1916 yet the “garden” began in 1932
- English was afforded complete independence in development of the garden
- Garden budget was small
- English grew nearly everything from seed he collected himself of through exchange or from plants he obtained in exchange (one plant purchase is known via Lyon)
- 80% of the plants that were extant on the grounds in 1931 had been replaced by English by 1972
- The performance of grading the Locks grounds was done with technical precision yet the fill soil used (Lawton series clay from the dredging for the Locks) created severe if not impossible conditions to grow plants on parts of the grounds
- The climate and weather of the Puget Sound lowlands provides a suitable place to test the suitability to cultivation of a wide range of plants

8.5.2 English’s tenets

- Continuously test out plants new to cultivation in the garden
- Keep pace with the expansion of plants suitable to cultivation in the region
- Share the choicer forms of plants grown in the garden to other botanic gardens and interested citizens
- Collect seed from the wild collected locally, regionally, and globally to propagate for plants in the garden
- Exchange seed and plants with other botanic gardens and citizens interested in botany, horticulture, and gardening worldwide
- Garden should consist of significant trees and shrubs with a rich mixture of unique herbaceous plants
- Endeavor to have noteworthy features of plants on display at all times of year in the form of flowers, coloring, or arrangement of the plants
- Create a brochure for the garden to aid educational opportunities for visitors
• Provide tours of the garden to any and all interested parties
• Staff the garden with employees with significant training in horticulture
• Employees properly advised in the objectives and philosophy of the garden
• A free hand granted to garden employees to continue development of the garden
• Continue to nurture “a garden that not only would be a joyous sight to see but also a garden worthy of serious study”

8.6 The landscape style of the English garden and 89 Report recommendations to conform to LWSCNDH as a contributing landscape

The 1989 Report identified that the garden is landscaped in the English landscape style which is a form of gardening and garden design that mimics nature. This produced a landscape of lawns resembling meadows, large shade trees, planting beds with curving lines eschewing right angles, and finally planting beds with a rich variety of plants both in size, shape, and character. This style of landscape was championed by the Olmstead brothers in Seattle at Volunteer Park and the Washington Park Arboretum, now the University of Washington Botanic Gardens Arboretum (Freier 1989).

The 1989 Report recommendations to maintain the historic character of the garden follow verbatim but reordered:

• Maintain diversity and interest of plant species. Do not plant like species together in large clumps. Continue to use the garden for botanical experimentation
• Maintain open grass areas (maintain as much grass as possible)
• Maintain lines of individual trees where lines exist of existed as seen in historic photographs. Do not fill-in with understory between trees
• Maintain undulating lines along borders
• Maintain variety of textures, colors, and flower forms
• Plant beds with multiple layers of different vegetation
• Allow vegetation to take as natural a form as possible (excluding extant hedges)
• New trails should not be added where trails did not previously exist
• Protect overused areas with cable and concrete post barriers on an as need and temporary basis
• When identifying plant species with markers, place the marker close to the sidewalk of place stepping stones in the bed to prevent people from walking in the beds

8.7 1994 Master Plan Section on the Botanical Garden

Repeated here is the section on the botanical garden, this report has changed the numbering for clarity. This section provides an essential guide to formulating plans in the garden and as it is within the Master Plan (MP) guides planning at the project.
Subjects under numbers 2 and 3 appear relatively clear yet operationally and physiologically are far more complicated to put into practice. The preservation of maturing vegetation can complicate or make impossible operationally and physiologically the objectives in 2 and 3.

**Section 11.2.11 Botanical Garden**

Preserve, maintain, and restore the garden in the style set forth by Carl S. English Jr. The following are recommended developments within the garden:

1. **Remove elements which are inconsistent with the Historic District and Secretary of Interior’s Standards as described in the 1989 Historic Grounds Report.**
2. **Continue to actively pursue replacement of historically significant plant materials, which have died or been removed, with in-kind species. Tree species should be replaced as soon as feasible due to their impact upon visual and physical structure of the garden.**

The following are ongoing activities recommended to continue:

3. **Preserve the botanical diversity of the garden by supplementing existing planting beds with new or experimental plant species which fit the character and style of the garden. Original sizes and shapes of plants beds shall be maintained to the extent possible and not necessarily expanded for these purposes.**
4. **Maintain accurate records of plant material loss and replacement dates; collection, purchasing or propagation of replacement plants; and routine vegetative management performed within the garden.**
5. **Enhance visitor enjoyment and understanding of the garden by identifying and labeling major/significant plants within the garden. Tagging system shall be durable and readable, yet inexpensive to purchase, install, and maintain (USACE 1994).**

**8.8 Unique position of the garden in relation to LWSCNHD and NPS Treatment of Cultural Landscapes and desirability of garden as a cultural landscape**

**8.8.1 The USACE designation of the garden**

The USACE designated the grounds at the Locks be named after Carl S. English Jr. on 11 December 1974.

It is rare that a part civil works project is named after a living person yet the Seattle District did so in naming the gardens after English shortly after his retirement. The USACE honoring English by garden designation is accompanied by a command signature and is unique to the USACE and LWSC (USACE 1974).
This USACE designation also preceded the nomination and NPS designation of the LWSCNHD by four years (USACE 1978). Later the garden was listed as a contributing historic landscape feature of the LWSCNHD (USACE 1998).

To form a basis for management this plan establishes 11 December 1974 as the precise time when the grounds became the garden and also the attributes that became a contributing historic landscape. The career of English is seen as primary and fundamental to this contributing historic landscape.

In this way the operation of the garden can meet the “push” of landscape style of the garden as a contributing landscape and the “pull” of the botanical and physiological elements of the garden.

8.8.2 English garden as a cultural landscape

Cultural landscape guidelines as set forth by the NPS shall be respected to preserve and maintain the LWSCNHD regarding management and operations of the garden. It is a responsibility to preserve the garden as a contributing landscape to the LWSCNHD.

The NPS cultural landscape standards are not prescriptive and are devised for the formulation of responsible preservation of those landscapes (NPS 1996).

The English garden could be not just a contributing landscape to the LWSCNHD but a “historic designed landscape” or a cultural landscape on its own. The definition of a historic designed landscape is “a landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, engineer, or horticulturalist according to design principals, or an amateur gardener working in a recognized style or tradition” (NPS 1996).

It was identified that English worked in the English landscape style and his final title was SDH (Freier 1989). Clearly English met the above criteria for a historic designed landscape. It is an open question as to whether it would be advantageous in preserving the work and philosophy of English for the garden to be considered a “historic designed landscape” or simply remain a contributing landscape to the LWSCNHD.

Whatever designation that helps best protect the work and philosophy of English is recommended as the desired designation. The intent here to put the work of English above any particular designation.
9. CARL S. ENGLISH JR. BOTANICAL GARDEN PLAN: OPERATIONS AND MANAGEMENT

9.1 Plant Collection: 1982 and 2019

9.1.1 1982 Plant families, genera, and species

Mendelson’s 1982 plant inventory was a significant achievement and was completed “by hand” using typewriter set catalog cards and final list. Mendelson’s inventory yielded approximately:

- 76 families
- 216 genera
- 489 species

These numbers are approximate as they were hand counted from the inventory located in the 1989 Report’s appendices and therefore could contain some margin of error.

9.1.2 2019 Plant families, genera, and species

This plant inventory was made possible using Microsoft Access. The current plant inventory or “accession database” was begun by Fleming 2003. Many hands have contributed to this database in the 16 years since it was created.

In fall 2016 gardener Anna Welland revamped the format of the inventory and adopted the Chicago Botanic Gardens 2012 Plant Documentation Plan and Policy located in Appendix C. This revamped format improved the ease of use considerably and provided a stable framework to work from. The 2019 plant inventory would not have been possible in the period of time allowed without her reorganization of the Accession database.

A decade of experience added this endeavor in plant recognition and identification yet there was much field check work and identification to be completed. Beds were field checked in April and May 2019. Only significant individual plants were counted. Most of these were deliberately planted yet some could have been recruits that appear to have been planted. Generally, recruits of ornamental plants and weedy species were omitted. It is hard to specify exactly what are recruits in beds and what aren’t. Subjective as it is, experience working in the garden gives a good idea as to what types of plants commonly recruit in beds.

Results varied for families, genera, and species. These number variations were due to spelling errors, erroneous data entry, etc. As more effort was placed into correcting these errors combined with repeated field checks of plants in the garden the more
precise the inventory became. The final and inventory is both the most conservative
and most precise list. See Appendix A for full planting list.

The 2019 plant inventory yielded approximately:

- 144 families
- 400 genera
- 883 species

9.2 Plant Collections Policy Background and Recommendations

9.2.1 Background

The garden has never had a formal collections policy. Emphasis has continually been
placed on the propagation replacement of plants English had cultivated at the Locks
("Faces” 1992). There has also been a guideline to continue to experiment with new
plants in the garden (Freier 1989, USACE 1994).

English collected or exchanged for seed, scions, and cuttings and was a superb
propagator of plants so it followed that he grew the vast majority of plants for the
garden by himself. There was little budget to purchase plants and given the sort of
plants he was growing it is surmised to be highly improbably he could have purchased
them anyway (English 1972). There are few instances of the garden purchasing plants
under English (Locks archives, Lyon 1978).

During the Fleming Era vegetative propagation of plants continued but personal seed
collection or exchange of seed appears to have ceased. Plants were obtained from the
National Arboretum.

Nurseries began to offer unique and rare plants so purchases were made for them.
Examples include the then Forest Farm or Siskiyou Rare Plant Nursery of Oregon
which supplied the garden with many unique plants, some even that English
discovered, grown or were plant hybrids he had developed.

Into the Present Era the nursery purchases continued. Seed collection trips (like
English’s done on personal time) have renewed along with seed purchase and some
exchange of seed and plants with gardens and individuals.

9.2.2 Recommendations for Collections

Since English’s retirement the collections focused around propagating remaining Rank
1 plants. Many plants that English cultivated are sometimes extremely difficult to grow.
at English can again be emulated to guide a collections policy. Luckily, many more
nurseries and even some seed companies offer wild collected seed and/or rare or
unique plants in the region.
There is a shortage of space in the garden for the introduction of new plants. Care should be taken to select plants that follow the tradition of experimenting with rare plants in the garden. Propagation, cultivation, and purchase of common garden plants outside of use in seasonal color displays or on “formal beds” east of the Administration Building composed of commonly cultivated perennials and bulbs.

Collections recommendations:

- Collect seeds from the wild and then propagate for use in the garden
- Purchase wild collected seed some current companies include ALPLAINS, Inside Passage Seeds, and Northwest Native Seed
- Exchange for wild collected seed with gardens, clubs, and individuals
- Exchange for rare or unique seed from cultivation with gardens, clubs, and individuals
- Exchange rare and unique cuttings and plants with gardens, clubs, and individuals
- Purchase plants from nurseries that have grown their plants from wild collected seed or cuttings. Regional nurseries that currently practice this include Chimacum Woods Nursery, Cistus Design Nursery, Far Reaches Farm, Keeping it Green Nursery, Rhododendron Species Botanic Garden Nursery

9.3 Garden Plant Collections Documentation: Accession of plants

In 2003 the garden began to use Microsoft Access to inventory the plantings. This initial database was useful but incomplete. In 2016 the database was overhauled and the Chicago Botanic Garden’s Plant Inventory Plan accession methodology was adopted for use in the garden. This greatly enhanced the garden’s inventory capability and the current inventory would have proved impossible to accomplish in the time period allowed for preparation of this report and plan if this groundwork had not been laid.

9.4 Plant Significance Hierarchy

9.4.1 Introduction

As the garden matures and plants jostle for light and space crucial decisions regarding which plants are to be kept and protected and which need to be removed. As in 8.3.4 many of the difficulties encountered during Fleming’s tenure only became more pronounced.

In the garden all plants cannot be of equal importance or value. It would be impossible to manage the garden if they were. A useful syllogism helps explain.

“All plants in the garden are equal in value (either valuable or expendable). The plants found in this particular bed are thus all equal in value (either valuable or expendable). All of these plants shall be (kept or removed).”
This position is unrealistic in maintenance of the garden. Some plants need to thrive and some plants need be removed to accomplish this. How then is it to be determined which plants are valuable and which are less so? Which plants shall be kept, which plants preferred to be kept, which plants have an indifferent status, which plants shall be removed immediately?

The Plant Significance Hierarchy (PSH) provides a schema to remedy these questions and provides a framework for actions. Plant Significance Hierarchy Definition

The PSH is an assignment of a ranking of significance to plants in the garden. These ranks are derived from the overarching goal to preserve the work on English and to maintain the historic integrity of the garden (Freier 1989, USACE 1994).

9.4.2 Plant Significance Hierarchy Intent

The PSH is introduced here in order to establish a mechanism to develop a management strategy that maintains the integrity of garden in accordance with the 1989 Report and the 1994 LWSC Master Plan.

The PSH is intended to mitigate personal subjectivity from decision making processes and management and operations strategy within the garden.

The PSH is a mechanism to meet management objectives and is foundational to other decision making trees or schema.

This mechanism includes the ranking and preservation criteria of a plant and the corresponding removal and replacement criteria.

Preservation and removal are mirror actions yet they are separated here to aid decision making. Depending on the action the emphasis for an individual plant or bed could be on preservation or removal. The criteria for preservation or removal differ in number of options.

A plant’s preservation or removal status is not a call for action in itself. Instead, when action is necessary or being contemplated the preservation or removal status guides decision making and objectives.

By making a definitive ranking of plants a framework for objective decision making in garden management is now available. The ultimate intent of the PSH is to construct a process that leads to a relatively uniform agreement on the ranking and significance of plants in the garden by anyone who has read, understands, and applies it. A methodology for establishing the priorities for preservation, removal, replacement, and introduction of plants is introduced here.

Plants are ranked from 1 to 4 and follow:
9.4.3 Plant Significance Hierarchy Components

9.4.3.1 Rank

The rank of a plant determines its significance and this criterion then sets the preservation, removal, and replacement criteria. There are four ranks of plants in the garden and each corresponds to a different criterion.

9.4.3.2 Preservation Criteria

The rank of a plant corresponds to the preservation criteria of a plant. The preservation criteria are:

- Preserve always (excepting threat of imminent injury or death to Corps employees or visiting public and/or destruction to government property and/or if the plant is mortally diseased, dying, or dead)
- Preservation desired
- Preservation unnecessary or not required

9.4.3.3 Removal Criteria

The removal criteria is conditional upon the rank of the plant. The criteria for preservation are:

- Removal prohibited
- Removal not recommended
- No constraints on removal
- Remove

9.4.3.4 Replacement Criteria

The replacement criteria is utilized after a plant has been removed. There can be multiple replacement criteria and they are:

- Replace in place and in kind. If this is not possible for operational or physiologically significant reasons then replace in kind somewhere in the garden.
• Replace with plant of similar characteristics. Characteristics include plants of the same genus or family, a plant of a similar morphological similarity. This could be replacing a conifer with a conifer that is of a different genus or family yet appears, at first glance, similar. Or replacing a plant with one that possess a similar feature like peeling bark or showy blossoms.
• No criteria for replacement
• Replacement unnecessary
• Do not replace

9.4.4 Plant Significance Hierarchy

9.4.4.1 Rank 1: English Era Plants

The defining criterion are plants known to be planted by English by reference of the 1976 Brochure (except *Eucalyptus rodwayi*). In future the Accession data base shall contain all appropriate information on rank

• Preserve always
• Removal prohibited
• Replace in place and in kind where operationally and physiologically feasible

9.4.4.2 Rank 2: Significant plants of all other Eras

The defining criterion are plants from any of the four garden eras that are rare in the wild or cultivation, of distinct horticultural or botanical significance, of obvious aesthetic value, or of unique interpretive significance.

• Preserve always
• Removal prohibited
• Replace with plant of similar characteristics, no criteria for replacement, replacement unnecessary

9.4.4.3 Rank 3: Original Era plants

The defining criterion are the known remaining trees from the original plantings between 1917 and 1931.

English was ruthless in his removal and replacement of many of these plants that were typical of gardens east of the Mississippi (English 1972).
Lyon and Fleming had decided to preserve what known original trees were left after almost all of them had been deliberately removed by English, Lyon, and Fleming to make way for new and more horticulturally or botanically significant species (English 1972), (Fleming 2015), (Freier 1989) (Koykka 1969), (Kruckeberg 1959), (Lyon 1978).

- Preserve desired
- Removal not recommended
- Replace with plant of similar characteristics, no criteria for replacement

9.4.4.4  **Rank 4: All other plants**

The criteria for these plants are ones that don’t fall into the first three ranks of plants, they could ornamental plants deliberately planted, weeds or invasive weedy plants ornamental plants, and/or are recruits or wild volunteer plants

- Preservation unnecessary or not required
- No constraints on removal, remove
- No criteria for replacement, do not replace
9.5 Plant Significance Hierarchy Decision Tree

The garden is divided into dozens of beds. These beds may be on the edges of or in middles of lawns, and adjacent structures. In some cases bed numbers may denote individual trees. The majority of these single tree beds line the roads of the Locks and often have the same bed number specifically bed numbers 215 and 304.
Figure 36 The most current bed map of the garden drawn for Trees of Seattle 2004. Courtesy Arthur Lee Jacobson and Keala Hagmann

9.5.1 Context

In reference to 8.7 the 1994 LWSCMP 11.2.11 lays out the current policy for the garden:

Section 11.2.11 Botanical Garden

Preserve, maintain, and restore the garden in the style set forth by Carl S. English Jr. The following are recommended developments within the garden:

(1) Remove elements which are inconsistent with the Historic District and Secretary of Interior’s Standards as described in the 1989 Historic Grounds Report.
(2) Continue to actively pursue replacement of historically significant plant materials, which have died or been removed, with in-kind species. Tree species should be replaced as soon as feasible due to their impact upon visual and physical structure of the garden.
The following are ongoing activities recommended to continue:

(3) Preserve the botanical diversity of the garden by supplementing existing planting beds with new or experimental plant species which fit the character and style of the garden. Original sizes and shapes of plants beds shall be maintained to the extent possible and not necessarily expanded for these purposes.

(4) Maintain accurate records of plant material loss and replacement dates; collection, purchasing or propagation of replacement plants; and routine vegetative management performed within the garden.

(5) Enhance visitor enjoyment and understanding of the garden by identifying and labeling major/significant plants within the garden. Tagging system shall be durable and readable, yet inexpensive to purchase, install, and maintain (USACE 1994).

9.5.2 Obstacles to operational implementation of LWSCMP 1994

Numbers 2 and 3 both appear on their face rather straightforward but operational and physiological complexities present themselves routinely to hinder application of these policies practically.

Number 2 does not specify what exactly would be “historically significant plant materials”. The report and plan recognized historically significant plant materials as Rank 1 plants.

Section 3 forwards that “experimental plant species” should be used but also fails to specify. The recommendations for collections in 9.2.2 coupled with the Rank 2 designation should be used to understand this.

Complexities of decision making and accord with recommendations arise when plants physiologically cannot be replaced in kind and in place as stated in LWSCMP 11.2.11. In 2012 a Rank 1 and mature Pinus sabiana or grey pine suffered developed into a mortal injury because of the failure of a large limb just below the crown of the tree.

The wound left behind was severe enough that the tree had to be removed for operational regions, in this case visitor and employee safety. The tree could not be replaced in kind or in place. The surrounding understory trees and plants, particularly a mature Rank 2 Quercus philyraeoides, Ubame oak, was growing beneath it. This oak was added later to the collection and is a rare tree in Seattle circa 2004. The garden is one of two public places this species could be observed (Jacobson 2004).

The success of this Rank 2 Q. philyraeoides now physiologically prevents the reestablishment of the P. sabiana to the bed. The latter needs full sun to grow and the success of the former prevents this. A dilemma now arises.

Is the P. sabiana not replaced because of the Q. philyraeoides?
Is the mature and relatively rare *Q. phillyraeoides* removed in order to reestablish the *P. sabiana*?

In this case the *P. sabiana* is also found in bed 327. The tree is not replaced in place and in kind due to physiological reasons yet, luckily, it is also not lost from the collection as it is found elsewhere.

As the garden matures these dilemmas will only increase in frequency. The requirement to meet the LWSCNHD and honor English’s legacy presents difficult questions with answers that may be unsatisfactory and do not meet the objectives of 11.2.11 #2.

### 9.5.2.1 Beds

Beds are not to be expanded in accord with the LWSCNHD nor are they to be expanded for the sole purpose of introducing new plant materials. As discussed in 7.6, garden beds have been expanded where grass can no longer grow. Expansion of beds can be because of operations as in 7.6.1 and also in 7.6.2 reactive to construction or because of visitor use and activities 7.6.3. In each case the garden was reactive to operations of the LWSC.

The garden also reacts to maturing vegetation. Thin strips of lawn areas at the northwest and northeast sections of the garden eventually were turned into walking paths as turn could no longer grow there. While the 1989 Report states that no new trails should be added. Presumably, the grass was used for walking and in the absence of its ability to grow these walkways were presumably preserved.

### 9.5.2.2 Lawns

The 1989 Report and the LWSC MP both stress that lawns are to be maintained and preserved. Yet this trend has become increasingly difficult as vegetations matures.

Beds 121, 122 and 123 according to C-2-3-217 were constructed in the Original Era (Locks archives). These beds represent the greatest refugia of Rank 3 plants on the project consisting of conifers *Chamaecyparis pisifera* or Japanese cypress in beds 122 and 123 and *Thuja occidentale* var. *zebrina* a variegated Western Red Cedar in bed 123.

Apparently English approved of these Rank 3 plants in these beds and in beds 122 and 123 saw fit to accentuate the beds with other trees and shrubs including plants of the genus *Rhododendron*. 
The majority of these conifers are alive and continue to grow. The *Thuja occidentale* var. *zebrina* has matured from a pyramidal golden tree to a massive multi-branched specimen. It is probably that soon this area will soon no longer able to support grass. In that eventuality these two beds will have to merge.
Figure 37 Beds 121-122, and 123 May 2019. Note the isthmus of lawn between the two beds and lack of healthy grass as maturing vegetation closes in. Stephen J. Munro
9.5.3 Decision Tree processes for Solitary Tree Replacement

- Solitary tree dies along promenade
- What is the tree’s rank?

Determine rank of tree and cause of death

Tree to be replaced in place and in kind

- Rank 1 tree
- Death due to winter storm damage

Replace in place and in kind

- Can the tree be replaced from garden nursery?
- Can the tree be purchased?

- Solitary tree dies along loop road
- What is the tree’s rank?

Determine tree rank and cause of death

Tree to be replaced with Rank 2 tree

- Rank 2 tree
- Death due to fungal infection

Replace in place with suitable Rank 2 tree

- Is there a suitable replacement tree in nursery
- Is the tree of suitable interest and of a species better suited to site?
9.5.4 Decision Trees for solitary trees or shrubs in beds

- Solitary tree dies in lawn
  - What is the tree's rank?
- Determine trees rank and cause of death

Tree to be replaced with Rank 2 tree

- Rank 3 tree
  - Tree died due to co-leader failure
- Replace tree of similar appearance or within family
  - Is tree on hand? Or can one be purchased or exchanged?
- Replace in place with Rank 2 tree

- Solitary tree is dying in bed
  - What is the tree's rank?
- Determine tree rank and cause of decline

- Dying of multiple causes apparent senescence
  - Rank 1 tree
- Can the tree be replaced in place and in kind operationally and physiologically?

- Replacement tree will have sufficient light to grow
- Replacement tree is on hand
- Replace in place and in kind
- Tree is crowding and impeding growth of other known Rank 1 trees and shrubs
- What is the tree's rank?

**Determine tree rank**

- Tree can be pruned to allow space and light for other Rank 1 trees and shrubs
  - *Applicable to Rank 1, 2, and 3 trees*

**Explore mitigation options**

- Rank 1 tree

**Prune tree**

- Tree is crowding and impeding growth of known Rank 1 and 2 trees, shrubs, and herbs
- Determine rank of tree

**Explore mitigation options**

- Rank 2 Tree

**Remove**

- Tree cannot be pruned to mitigate deleterious affects
  - *Applicable to Rank 2, 3, and 4 trees, if Rank 1 tree to be left alone*
9.6 Bed Renovation or Preservation: Evaluating beds in context using history of bed, bed integrity related to population of Rank 1 plants, relative health aesthetic appearance of bed, opportunities for enhancement

The cause of indecision regarding planting beds in the garden is a lack of understanding the historical context of the bed and the population of Rank 1 plants. The questions could be posited this way. Is this bed preserving English’s work, is it healthy, and/or does it require improvement?

A lack of understanding of these factors leads to inertia in decision making and the degradation of planting beds over time. The lack of understanding is due to the lack of a management plan and the heretofore scattered information related to bed history and content. Information could be gathered on these beds but only after much study and the juxtaposition of multiple document.

Even equipped with all of the information available making a decision as to whether to renovate or preserve a bed is still difficult. Preservation of English’s work and accord with LWSCNHD is a priority yet as has been illustrated operational and physiological this is more complicated than at first glance.

Only a few beds retain the character and majority of Rank 1 trees, shrubs, and herbs as of 10 December 1974. These notable beds 5,6,7, and 8 conjoined beds 212/213, 318, 319, 327, 328, 330, 331, and 332 and to a lesser extent the conjoined beds 121/122. Every other bed in the garden has lost Rank 1 plants and has added Rank 2 and Rank 4 plants since 1974.
The following are recent bed renovations as examples of preservation or renovation.

9.6.1 Beds 212/213


At some stage since 1974 golden bamboo, *Phyllostachys aureus* had been introduced to the bed and had run rampant obscuring the view into, out of, and through the bed. In 2003 Fleming had suggested that the bamboo be removed from the bed as it was not historic and was degrading the bed's integrity (Locks archives).

In Summer of 2009 work began to remove the bamboo from the bed and after a series of mechanical removals and chemical control bamboo was extirpated from the bed. In 2010 the sweet gum failed and was removed yet was then replaced in place and in kind.
After this initial clearing smaller measures were made to improve the bed over time. The gunnera plant which died of cold weather in the late 1970s cannot be reestablish because of lack of water likely because of surrounding tree maturity and the amount of water these trees uptake (Lyon 1978).

Though not listed in the bed in 1974, umbrella plant, *Darmera peltata* is clearly visible in a 1982 photograph yet had been lost. Sections of this plant growing in bed 15 were divided and transplanted to this area. Skunk cabbage, *Lysichiton americanus*, is also seen in photographs of this time. Due to physiological reasons of large trees and less available water that affected gunnera reestablishment, the reintroduction of this plant has also been unsuccessful.
Two tree recruits had established themselves in the bed English yew, *Taxus baccata* and himalayan crab apple *Malus baccata var. himalaica*. The yew was removed in Autumn of 2018 before it became too large while the crab apple is growing at the edge of the bed and has been left because it is beautiful in bloom.

### 9.6.2 Bed 22

Dubbed the “Overlook Bed” this bed lies atop the largest terraced lawn with a concrete wall for viewing and stability of the surrounding concrete. It is a bed that has had a surprisingly little changes made to it during the English era given it consisted of plants present before his tenure.
As of 1974 the bed consisted of two large cherry laurels, *Prunus laurocerasus* on the flanks and in the center of the bed *Spiraea x Vanhoutei* with Fremont’s tassel bush, *Garrya fremontii*.

By 1989 the *Spiraea* remained yet the tassel bush was gone and the cherry laurels had been replaced by tan oak, *Notholithocarpus densiflorus* on the east end of the bed and Japanese cedar, *Cryptomeria japonica* on the east end. An Indian plum, *Oemleria cerasiformis*, possibly a recruit, had established itself there and was flourishing. A Japanese maple, *Acer palmatum*, with superb red coloring had been planted in the middle of the bed but there was no record of its planting in the garden accession.

In 2011 root rot killed the tan oaks on the west end. This was due to irrigation water overapplication or unnoticed leaking of the irrigation system. Initially a Texas live oak, *Quercus fusiformis* establish in 2013 yet it died of root rot as well in 2016. After this failure a Applebox, *Eucalyptus bridgesiana* replaced it due to its attractiveness, novelty to garden, and unrelated plant family to avoid and mitigate susceptibility to fungal infection.

In 2015 the Japanese cedars were removed on the east end to make way for a rare Baker’s cypress, *Cupressus bakeri* and a whiteleaf manzanita, *Artostaphylos viscida*. The *Spiraea* remained yet the plant had become unsightly and weed control was difficult with weeds growing amongst the stems of the plants. Garbage also collected in this area and was difficult to remove.

Since the bed was made up of Rank 3 plants excepting the tassel bush by 1974 and the plant editions since had either failed or were taking space that could be used by more meritorious specimens. This bed had little English Era influence on it and the plants that had been planted there since were not of sufficient merit to keep. The Japanese cedar could be found in two other beds of the project and the tan oak four other beds. The bed presented a wonderful opportunity to introduce many new plants to the garden due to the heat island effect it provided in addition to good drainage.
In 2017 a full renovation of the bed was planned and executed. The plan consisted of moving the *Spiraea* to a concrete pier in the operations area of the project (one small *Spiraea*, growing with the Indian plum was left to keep the plant extant in the bed). Subsequently the maintenance section move a crane there to place rocks in the bed to add to the radiant hear qualities. After this was completed dozens of plants new to the garden from Cistus Design Nursery and Forest Farm along with Locks grown wild collected plants were added to the bed. This bed was to feature some plants previously lost to the garden and would provide an opportunity for plants requiring full sun and good drainage. Here plant family *Cactaceae* would be introduced for the first time along with a dozen new genera.
When completed the bed had not only improved the operational safety and aesthetic condition of bed 22 and the overlook it had also added greatly to the plant diversity in the garden. It also provides a place to add plants English used to grow here in other beds but can no longer survive in their original beds due to physiological barriers such as shade.
In 2004 shortly after Fleming’s retirement the most iconic Rank 1 plant on the project was removed. The canyon live oak, *Quercus chrysolepis* was nominated to be a Seattle Heritage Tree in the 1990s. Plant Amnesty of Seattle informed the garden of the nomination and it became a Heritage Tree shortly thereafter (Locks archives).

After a catastrophic limb failure in 2004 and after much investigation by multiple arborists the tree was removed to ensure employee and public safety. The tree itself was irreplaceable yet there was opportunity to replace the tree in place and in kind.
Near the Heritage tree in bed 2 grew a Deodara cedar, *Cedrus deodara* (English had thought the tree was a Cedar of Lebanon, *Cedrus libani* and listed it as such in 1974). This tree’s appearance appeared frail in the 1990s and in a prescient action Carter planted a Cedar of Lebanon directly behind the tree in the early 2000s. In 2014 the Deodara cedar suffered a catastrophic failure of the branch and was removed. This left these beds with the loss of two major Rank 1 trees but there was opportunity to both renovate them and preserve their historic integrity.
After the removal of the Heritage Tree numerous changes had been made to the shrub and herb of the bed layer. An opportunity for replacing the Heritage Tree was captured by replacing it in place and in kind. In emulation of English, the replacement tree’s seed was collected near Collier tunnel Del Norte, Country California.

While this bed certainly will not look the same ever again it is still possible to renovate and preserve the work of English. In cases where it is possible it should be attempted.
Figure 45 Beds 1 and 2 cedar to left of shadow small oak above shadow three quarters to the right May 2019. Stephen J. Munro

9.6.4 Visitor Center bed renovation 2015

The bed directly abutting the Visitor Center to the west was a new one that owed it’s existence to the superstructure changes from Entryway Phase II in 1989. The bed has no historically precedent until then.

Consisting of a small number of Rank 1 trees adjacent to the building, this bed was composed of a variety of plants common to horticulture. In Winter of 2014 a large branch fell of a Himalayan white pine and destroyed the plants on the south side of the bed.

A large castle shaped hedge, in homage to the Corps of Engineers, which had been previously obscured from dense vegetation was now more visible.
Because of the novelty of this bed to the garden and the opportunity to add plants to the garden a renovation was planned in Spring of 2015. Large granite boulders had been added to the bed in 1993 and these were rearranged with some new granite stone added. A raised gravel bed was added and numerous new plant genera and species were added. These plants came from both wild collected seed grown plants from the Locks and from Far Reaches Farm Nursery. The concept for the bed envisaged a bed that could harbor new plants to the nursery and bring back plants previously lost to the garden.

Figure 46 Visitor Center bed Spring 2015. Stephen J. Munro

9.7 Bed Evaluation and Renovation Decision Processes

Bed evaluation and renovation should be evaluated upon the history of the bed to Rank 1 plants in the bed, and the operational and physiological advantages or disadvantages the
bed presents. All complexities cannot be envisaged yet the following decision trees are meant as an aid for evaluating beds.

What historical contexts should be considered when evaluating a bed? What era is this bed from? What plants inhabit the bed? What are the operational and physiological characteristic of the bed?

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Bed evaluation criteria
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- Rank of plants in bed: historical integrity of bed
- Historical context of bed: Era of origination?
- Operational and physiological characteristics of bed
Bed renovation decision process

Bed renovation should be documented. A brief overview of the bed, justification for renovation, and new plants added should be included.
10. BED AND AREA DESCRIPTIONS: A SUPPLEMENT TO THE 1989 REPORT

The 1989 Report is included in Appendix B and its bed and area descriptions starting on page 95 may be referenced along with this supplement. The objective of this section is not to reiterate the 1989 Report as the description there refer to the changes in the beds over time and their composition. This is a commentary on the current state of the beds.

An assessment on the historic disposition of the beds, commentary, and recommendations for near term changes are included below.

The most current map is reproduced again here:

Figure 47 The most current bed map of the garden drawn for Trees of Seattle 2004. Note Bed # 13 had been reintroduced and not shown here. Courtesy Arthur Lee Jacobson and Keala Hagmann

10.1 Bed and area descriptions and recommendations by number

The following is aided by a source which is a copy of 1976 Brochure with the description of extant plants in beds and in some cases their movement to other beds. The writing is in pencil and presumably done by Fleming circa 1978. ALJ also offers invaluable help with these descriptions from his 2004 tree survey. The Encyclopedia of Rhododendron
Species by Peter A. and Kenneth N.E. Cox was critical in sorting out the numerous rhododendrons growing in the beds and determining which were species or hybrids.

1, 2, 2A-These beds are in reality an amalgamation of beds previously distinct forming a triangle with a separate island of a lone canyon live oak *Quercus chrysolepis* just west of the main bed. This area has endured much change yet attempts have been made to reintroduce and preserve the original plants of the bed. Its historic integrity is high in because of the reintroduction of its Rank 1 trees.

Its location also makes it a notable interpretive feature of the garden. Bed 2A features a statuesque specimen of dawn redwood, *Metasequoia glyptostroboides*. The beds also are home to a display garden of daylilies, a partnership between the LWSC and the Puget Sound Daylily Society.

3-This bed has integrity in the tree layer with both *Poncirus trifoliata* and *Quercus glauca*. The shrub layer has changed with the addition of *Bupleurum* and *Camellia* species.

4-The original holly oaks, *Quercus ilex* are still in this bed but the tree and shrub layer has changed. Wet conditions in the bed have influenced these changes. Drainage is a significant concern in this bed and the bed was excavated and refilled to allow for better drainage after the holly oaks showed decline in 2010. Subsequently the oaks have slowly recovered. In the wet portion of the bed ferns, *Gunnera* and *Darmera* have been added to the bed to take advantage of these conditions while also hoping to sop up water before it reaches the roots of the oaks.

5,6,7,8-Colloquially known as the “bathroom beds” these beds surround the “Comfort station” that was constructed in 1948. Photos show that English planted outside of this structure immediately after construction. (Freier 1989, Locks archives). Some trees and shrubs are found in 1974 had been moved or perished since. A significant species loss to the garden that has yet to be reintroduced is the *Fremontodendron californicum*. Yet many Rank 1 plants still remain and the impressive growth of the remaining plants have cloaked the structure. The *Mahonia haematocarpa* were moved here by Fleming from 315A after 1978 (Locks archives).

Notably, the original rhododendrons of the bed have reached tree like proportions. Significant rhododendrons include Rank 1 *Rhododendron* x ‘Cynthia’ in bed 6 adjacent to the female entrance door. *Rhododendron fortunei* var. *discolor* ‘Houlstonii’ group. This, the largest of the rhododendrons in bed 7 was originally described as *Rhododendron houlstonii* yet over time it has been nested within the current position (9,10,11,12,13,14-These beds are with exception of beds 9 and 14 single trees. Beds 9 and 13 have changed species since 1974 with *Malus yunnanensis* in the former and Garry oak, *Quercus garryana* inhabiting the latter. Bed 14, featuring the giant sequoia is also populated with yucca. 106
15-This bed adjacent to the largest terraced lawn is composed of most of the original trees and shrubs. A robust population of *Darmera peltata*, perhaps relocated by Fleming is used to divide and repopulate this species in other areas of the garden. The two English *Rhododendron* hybrids also merit further investigation as to their registration.

16,17-These two beds the flank the stairs leading from the Locks monolith to the Cavanaugh House have high integrity with almost all of the original trees and shrubs still extant in the bed. The coast live oak, *Quercus agrifolia* is perhaps even more impressive than the Heritage Oak of bed 1. Two significant members of *Fagaceae* also inhabit he bed *Castanopsis cuspidata* from the National Arboretum planted in the Fleming Era a Rank 2 plant

and *Lithocarpus edulis* a Rank 1 plant.

18,18A,19,20,21,21A-These line of oaks and beech were planted by English late in his tenure. Regular pruning is required of these oaks to ensure the physiological health of the surrounding trees and beds.

22-As described in 8.5.2 this bed is wholly new in composition and can serve as a “refugia” for plants requiring full sun and xeric conditions.

23-“The Cove” applies to beds 23,24,25,26,27 and 28 but beds will be treated in together or individually.

Outside of the current fence line was home to a massive pacific madrone, *Arbutus menziesii* is composed of now of a mix of large oaks and pines. A leaning Italian alder, *Alnus cordata* is a unique inhabitant. Due to the slope and out of the way nature of the bed the shrub and herb layer are dominated by weeds.

24,25-These beds are composed of most of the Rank 1 plants. In 2015 two planted or possibly planted scarlet oaks, *Quercus coccinea* were removed as they were retarding the growth of surrounding Rank 1 trees particularly the Interior live oak, *Quercus wislizeni*, and the mountain hemlock *Tsuga mertensiana*. Both trees are remarkably small in comparison to other Rank 1 examples of these threes in the growing in the garden.

The area had also been plagued by drug and alcohol use due to the lack of visibility into the area. There was even a fire in the area due to the dropping of a superheated glass pipe in the dry vegetation. Visitors and employees were wary in this area and began to avoid it. Litter of alcohol containers and hypodermic needles spurned action to remove ivy in the bed and thin the area out in 2015.

Several interesting shrubs have been added to the understory particularly *Camellia grisii*, *Pseudotaxus chienii* and *Rhododendron sinofalconeri* the latter grown from wild collected seed from northern Vietnamese population. This bed can continue to be enhanced by the introduction of unique species that thrive in partial shade.
Notably this bed also harbors a large grove of the tan oak, *Notholithocarpus densiflorus*.

26-The Rank 1 conifers of this bed are still in evidence Bamboo that preceded Eckerstrom still inhabits the bed and is probably from some of the first plant deliveries from the SBPC (Freier 1989). Several large rhododendrons populate the bed which appear to be *Rhododendron x ponticum* hybrids. Several interesting *Acer* species have been added to the bed in recent years as well as the evolutionarily singular *Tetracentron sinense*.

This bed presents an opportunity to greatly expand the botanical collection particularly in the genus *Rhododendron* and other shade tolerant shrubs and herbs.

27-This bed contains many Rank 1 plants. A large *Rhododendron fortune* ssp. *discolor* was added to this bed as well as a smaller *Rhododendron yunnanense*. A superb Rank 1 example of *Rhododendron* ‘Mrs. E.C. Stirling’ with massive pink flowers is found at the northern edge of this bed.

Also found in this bed, and of curious origin in the rest of the garden, is a large *Rhododendron x ponticum* specimen. These large, purple flowered rhododendrons are found often in the garden particularly in beds 24,25,26,27,28,29,121,122,202,203, and 205. These are most likely the growth of root stock from rhododendron that English had grafted or are seedlings that were planted or allowed to grow. These rhododendrons are considered Rank 4 plants for the most part with a few Rank 2.

Whatever the origin for the majority of these plants in bed 27 the origin is obvious. A large *Rhododendron x ponticum* is found growing near the base of a rhododendron stump. If sufficient stock of replacement rhododendrons are built up (or other plants from the family *Ericaceae*) this specimen should be removed and replaced with a Rank 2 species.

28-The Rank 1 conifers of this bed are now either outside the fence or in the western white pine, *Pinus monticola* have died. New conifers have been added to the bed and several *Rhododendron x ponticum* hybrids are adjacent the loop road. As in bed 27 a stock of Rank 2 rhododendrons as replacement could hasten the removal and replacement of these hybrids with more desirable plants.

Of great significance and a new discovery for the garden, is the probable and original English hybrid *Rhododendron* ‘Rose Haines’ adjacent to the path. Efforts should be made to positively identify this rhododendron and propagate it extensively.

29-This bed retains only some of its Rank 1 plants and many recruit trees and shrubs now populate the bed. Several significant new species *Rhododendron* are now found here including *Rhododendron edgeworthii*, *Rhododendron insigne*, and (probably) *Rhododendron niveum*. 
A supposed *Pieris japonica* ‘Crispa’ resides here and is quite large. However, it is not as “crisp”, that is to say it is not as fine an example of this plant as the one located in bed 201.

This bed, all on the north border of the project is also populated by weedy species or Rank 4 recruits. Removal of these plants would aid aesthetically as well as providing more space for plant Rank 2 plants to be introduced.

**30**-This bed has lost two of its most significant Rank 1 trees, the Dove tree, *Davidia involucrata* and the Chilean cedar, *Libocedrus chilensis*. Attempts to reintroduce the latter have been unsuccessful and seed or nursery grown plants for the latter have not been found. Even so the bed has undergone renovation with many horticulturally and botanically significant plants have been added to this bed.

**101**-The flanks of this bed have historic integrity. The west end is the spot where English and Lyon unsuccessfully tried to cultivate *Pinus balfouriana*. This section of the bed still contains the Rank 1 Bristlecone pines, *Pinus aristata*. The east end of the bed contains the Rank 1 Japanese red pine, *Pinus densiflora* and yucca, *Yucca gloriosa*.

The conifers in the middle of the bed should be removed. They were added late in Fleming’s career and many new, more desirable species could be added in their place.

**101A**-These Lawson cypress, *Chamaecyparis lawsoniana* were added by Fleming. He suggested that they be removed while the other conifers in bed 101 be removed. Given the vulnerable status of Lawson cypress to phytophora root rot, and their apparent health here, the opposite should be done.

**102**-The Rank 1 scarlet oak, *Quercus coccinea* has reached impressive proportions in this bed. A mountain hemlock, *Tsuga mertensiana* and Oriental spruce, *Picea orientalis* Several small notable shrubs have been added to the bed in the genera *Kalmia* and *Rhododendron*.

**103**-Possibly from the Nascent Era, the undetermined Rank 1 or 3 *Tilia platyphyllos* is still there.

**104**-This weeping cherry is struggling physiologically here due to shade.

**105**-Rank 1 *Magnolia kobus* var. *borealis* is still extant here.

**107**-Rank 1 Tupelo, *Nyssa sylvatica* is still extant here.

**108,109**-The “driveway beds” are significant as they were developed in the Original Era. The Rank 1 and Rank 3 plants are mostly represented here. Care should be taken to preserve the Rank 3 *Pinus densiflora* in both beds. Mendelson comments that bed 109 contains three varieties of *Rhododendron* ‘Loderi’ hybrids, ‘Game Chick’, ‘King George’, and ‘Patience.’ A notable addition to these beds in 109 is the Japanese cleyera, *Ternstroemia gymnanthera*. 
110,111,112,113,113A,114,115,116,117,118: The Cavanaugh House Beds-The construction of a security fence sequestered these beds entirely or partially on private property of the SD Commander. These beds were recently renovated in April of 2019 with some plants added. 110 is notable as having no Rank 1 plants while all of the others were relatively intact. 110 recently had its Rank 1 Deodara cedar, *Cedrus deodara* reintroduced. Some plants growing adjacent the house in beds 116 and 117 were moved out to beds 110, 118, and 120. Numerous significant plants have been added to the house grounds after this renovation. In particular, the family *Orchidaceae* has been introduced from plants obtained from Keeping It Green Nursery, an adept propagator of orchids.

Growing in bed 114, the mutant tan-oak, *Notholithocarpus densiflorus f. attenuatodentatus*, is one of most rare, significant, and delicate plants in garden. Its location on the house grounds is no accident. Fleming used the house grounds as a sanctuary for sensitive plants and planted this specimen there with the intent of keeping it as sheltered and safe as possible (Carter 2018).

The mutant on the house grounds is the direct descendent of a group of mutant seedlings discovered under a “mother tree” at the Forest Service’s Challenge Experimental Forest in Yuba Co., California in 1962. The mutant seedlings grew more slowly and appeared weaker than their non-mutant seedling kin.

The mutant has distinct morphological characteristics such as narrower and cut leaves and fewer stomata. On a plant eco-physiological level the mutant shows distinct differences in having lower nutrient uptake, yet higher photosynthetic rate, drought tolerance, and ability to grow in shade. The genetics that lead to this unique mutation appear to be present across the whole of the genus *Notholithocarpus* and mutant seedlings have occurred in other places. The survival rate is near zero for these seedlings (McDonald et al. 2013).

In 1974 the mother trees at the Challenge Experimental Forest were lost with no new mutant seedlings found. Due to the distinct rarity of this mutant and its apparent sensitivity cuttings were taken from surviving mutants and were sent far and wide to public horticultural operations in Washington and California. Mareen and (Arthur) Kruckeberg, were among these recipients (McDonald et al. 2013).

Mareen was the most successful of all propagators of this notoriously difficult to propagate plant. While working part-time in the garden, her son, Arle, presented a particularly robust cutting to Fleming in the early 1980s. Fleming later planted the tree at the house for the plant’s safety (Arle Kruckeberg 2016).

Mutants are only in cultivation in a few sites in Washington, Oregon, California, United Kingdom and the Netherlands. The trees all live in well-tended gardens and rich fertile soil along with fertilizer amendments are recommended to keep the mutants healthy (McDonald et al. 2013).
Due to the rarity of the mutant much care needs to be taken of the specimen at the house grounds. Our specimen is found in Bed 114 adjacent to the driveway. It is leaning and only 15' tall. Its health and survival is of primary importance to the garden and to botany.

118A-Fleming planted this bed in 1981 with four scarlet horse chestnuts, *Aesculus carnea* var. *Briottii*. He had found these in pots hidden near the stairway in 1981 seven years after English’s retirement. English would leave plants as gifts for people in the garden and Fleming surmised that someone simply forgot to pick these up. He planted bed 118A with these trees as an homage to English (Fleming 2015).

The 1989 Report makes clear that this bed is not consistent with the landscape style of the rest of the garden as the trees are planted with understory. It is desirable to be in accord with the 1989 Report yet the bed is populated by many mature and significant shrubs. It is recommended to investigate if these shrubs can be safely moved. If feasible the bed should be reverted to lawn with the four extant scarlet horse chestnuts left remaining. The Rank 2 shrubs should be moved to other areas of the garden particularly in the northwest and northern beds of the project.

119,120-The “Rockery” beds are of interest as these were where English believed the garden had begun and were notable for the hundreds of plants they once contained when the beds were exposed to more sun (English 1972, “Garden” 1938). These beds still have many Rank 1 trees and shrubs. Recent renovations have added plants from adjacent the Cavanaugh House and the garden nursery to the north side of bed 120.

121,122-The “Forest” beds are a notable refugia of Rank 3 conifers and are beds of the Original Era. Many Rank 1 plants still remain with the notable exception of the Chilean fire tree, *Embothrium coccinuem* which has been reintroduced to bed 214A.

Please refer to Figure 44. In this figure, at the bottom of the bed two pink plants are apparent just to the left of the large *Rhododendron decorum*. These are *Rhododendron reticulatum*. In their place now are several *Rhododendron x ponticum* hybrid trees. It is unknown whether these were planted or are seedlings or root stock growth. In any case should the garden propagate or purchase suitable rhododendrons as replacement these should be removed and replaced with more distinctive and rare rhododendrons.

123-This bed contains the Rank 3 variegated Western red cedar, *Thuja plicata* ‘Zebrina’. This tree has reached statuesque proportions and has undergone much pruning and cabling in the last decade to ensure structural integrity. This tree has had a dramatic change in form over the years. It has gone from a pyramidal form to the spreading octopus like proportions it currently displays. If this tree continues to thrive, almost inevitably this bed and the “Forest” beds will be amalgamated.

124-The Rank 3 Japanese cedar, *Chamaecyparis pisifera* of this bed split apart in 2015 and was replaced with the botanically significant *Foykenia hodgsonii* donated by Paul Jersky in 2018.
The trees that line this part of the loop road consist of maples in 125 and 127 that were spared by Fleming and Lyon in the late 1970s (Fleming 2015). Fleming also noted that the root systems of the maples he and Lyon removed (by crane) resembled those of conifers as the clay fill material prevented the roots from going deeper. These Rank 3 maples used to predominate the grounds before English removed most of them. 126 contains the Rank 1 California horsechestnut, *Aesculus californica*.

The two Norway maples of beds 125 and 129 are both poor in appearance but still in rather strong structural condition. While it is important to preserve the remaining Rank 3 plants if these plants continue to deteriorate they should be removed with haste. Rank 2 trees should replace these trees in the event of their demise.

**201, 202, 203, 204: The “North Border” beds** - These beds contain the vast majority of their Rank 1 plants from 1974. English cannily fortified the north part of his garden with giant sequoia, *Sequoiadendron giganteum* creating a veritable wall. Notable inhabitants of beds 202 and 203 include the Rank 1 Yellowwood, *Cladrastis kentukea*, and a delightful grove of paw-paw *Asimina triloba*.

While bed 201 has undergone significant renovation 202, 203, 204 could be thoroughly cleared out and replanted. Mulch and compost will need to be added to ensure new plantings survive due to the extensive root systems of mature conifers nearby. If sufficient mulch is added a significant improvement could be made to these beds both in species composition and appearance.

**205** - The parking lot bed, installed after Entryway Phase I, was initially planted by a contracted landscape architecture firm. The 1989 Report found these landscape additions to be inconsistent with the character of the garden. In the Fleming Era many interesting species were added piecemeal to this area. Notably species of *Callistemon* are thriving in the bed and a serpentine endemic oak, *Quercus durata* donated by Kruckeberg, flourishes in the southeast corner. In the present era, after the removal of many large conifers in 2008 a dwarf conifer bed was added to the east end. New species should continue to be added to this bed to ameliorate the inconsistent nature of this bed.

**205B** - These Lawson cypress, *Chamaecyparis lawsoniana*, were added in the Fleming Era to distract from the adjacent building.

**Garden Nursery** - Envisaged as an area to showcase the propagation of significant plants in the garden. The nursery is now in need of repair and repaving. It no longer functions as intended and is in a dilapidated state.

**206, 207, 208, 209, 210, 211: The Nursery Beds** - These beds surround what is now the garden nursery are relatively intact with Rank 1 plants. Many rhododendrons surround the bed, some Rank 1 and others from the Nordstrom garden or bred by Carter (Carter 2018).
These beds in conjunction with nursery renovation could be markedly improved. Of note is a newly identified *Pinus montezumae* in bed 211 and the Rank 1 Azaleodendron. Many new ferns have been added to the to the north side of 211 and are thriving.

Bed 206 is choked with Rank 4 plants and presents an opportunity for renovation.

**214**-This bed was original but was changed dramatically after Entryway Phase II. The pond was added circa 2000 and many shrubs were added as well as a dry river bed of cobbles. Chilean firetree, *Embothrium coccineum* was added here for visitor enjoyment due to its proximity to the Visitor Center. It also mitigates the absence of it from the Forest beds of 121 and 122.

**214A**-This bed was added in conjunction with heavy visitor use as in 7.6.3. Several new plants have been added to this bed including *Halesia carolina* ‘Rosy Ridge’ and two *Rhododendron reticulatum*. Interesting introductions into the herb layer could be made here as this bed experiences a good balance of sun and shade exposure.

**215**-These are the Rank 1 scarlet horsechestnuts, *Aesculus carnea* var. *Briottii*. A Nuttall oak, *Quercus texana* grown from seed collected in East Baton Rouge Parish, Louisiana replaced one of the loop road trees that spilt apart in and was removed in 2013.

**301**-These are Fleming Era Rank 4 red oaks, *Quercus rubra* added Fleming in the Fleming era. The southernmost one could be removed to aid the physiological health of plants in bed 302.

**302**-This bed is home to the favorite trinity of Lyon, the combination of Austrian pine, *Pinus nigra*, gingko, *Gingko biloba*, and grape vine, *Vitis coignetiae*. Apparently these were planted as a memorial yet the significance of this has been lost (Koykka 1969). The Fleming Era saw many choice rhododendrons added to this bed and features an outstanding ‘Loderi’ rhododendron ‘King George’ and several fine examples of *Rhododendron augustinii*. In 2018 many of these rhododendrons were cut back drastically as they were encroaching nearly six feet out into the paved plaza area. Recently a *Rhododendron macabeanum*, a superb large leaved and yellow flowered species, has been added to this bed.

**304**-“Visitor Center” discussed in 9.6.4. This bed has not historic precedent except immediately adjacent to the Visitor Center itself. The rest of the bed was filled in and created after Entryway Phase II in 1989. All Rank 1 plants directly adjacent to the building are extant.

In the 2000s a castle hedge, the USACE emblem, was added in form of an *Ilex* hedge. This hedge was planned and installed chiefly by Carter. Fleming formerly would design a castle shape using begonias and other seasonal plant species. Later these displays became too costly and labor intensive ushering in the addition of the permanent castle hedge. (Carter 2018).
305-This bed contains the original palm tree featured on English’s plant brochure. It was in bed 304 but was moved. In addition many Rank 1 plants are still found here notably Cretan maple, *Acer orientale*, a nearly evergreen maple and the wheel tree, *Trochodendron araliodes*. Several significant Rank 2 plants have been added including ligiri tree, *Idesia polycarpa*, *Mallotus japonicus*, *Parrotiopsis jaquemontiana* and the Rehder tree, *Rehderodendron macrocarpum*, and the endangered Florida torreya, *Torreya taxifolia* donated by Paul Jersky.

In the island bed adjacent is a fine *Edgeworthia chryanthra*, two *Lilium hansonii* and two rare and notable rhododendron species *Rhododendron platypodum* and *zaleucum* as well as the Chinese mayapple from Far Reaches Farm from in situ collected seed, *Sinopodophyllum hexandra*.

308-Rank 1 Ubame oak, *Quercus phillyraeoides*.

313-This bed was also altered dramatically due to Entryway Phase II. While it has no extant Rank 1 plants this bed is notable for the plethora of Rank 2 plants planted during the Fleming Era. Many unique and notable antipodean species inhabit this bed. Save for a couple of species all of the plants are from South America, Australia, or New Zealand. It is now customary to plant strictly antipodean species in this bed.


314-The two Rank 1 trees of this bed remain, yet in an altered state. In winter 2019 the Washington State champion huckleberry oak, *Quercus vaccinifolia* fell over due to heavy snow. The tree was resurrected by crane later but was coppiced at breast height due to employee safety concerns. Of note is the fact that the tree roots near the building turned fibrous and did not degrade the foundation. The tree is currently sprouting from the stump. The *Magnolia campbelli* var. *mollicomata* is flourishing in the extra light now provided.
Figure 48 LWSC maintenance employees resurrect the State Champion huckleberry oak. February 2019. Note the branch pruning to reduce weight and alleviate the heave of the bed adjacent building. Stephen J. Munro

315-The “Fuchsia Bed”. This bed originally was filled with ericaceous shrubs and English would plant fuchsias here after storing them inside all winter (Fleming 2015). Currently the Greater Seattle Fuchsia Society uses this bed as a display garden for fuchsias and two Rank 1 Enkianthus campanulatus are still found in the bed.
Figure 49 In front of the “Fuschia bed" COL Dewey presenting a safety award to LWSC Project Engineer Ralph C. Follestad while English looks on far left 15 May 1963. Locks archives

315A-These beds contained conifers in the Original Era, xeric plants in the English Era, and in the Fleming Era two weeping Alaska cedars, Callitropsis nootkatensis. In the Present Era these beds still contain the Alaska cedars and the Rank 1 Mahonia dictoya.

316-This bed is home to what Lyon deemed English’s proudest achievement, the thriving netleaf and silverleaf oaks that he collected in Arizona, Quercus hypoleucoides and rugosa. This bed is also indicative of garden dilemmas. Refer to Figure 35 and the small xeric plants English had growing in this bed can no longer grow here due to the unforeseen rampant success of the oaks. Currently, the only Rank 1 shrubs to remain are several stunted Yucca harrimanae.
**Rose Garden and adjacent beds to north and south** - The rose garden plants, not counted in the inventory consist of newer rose varieties. The older rose varieties, originally obtained from the Woodland Park Zoo were replaced in 2015. The beds immediately to the north and south of the rose garden contain many significant Rank 2 herbaceous species.

317 - This bed still contains the Rank 1 or possibly even Rank 3 Hinoki cypress, *Chamaecyparis obtusa*. A fine Akebono Yoshino cherry *Prunus x yedoensis* ‘Akebono’ inhabits this bed as well as several fine rhododendrons added during the Fleming Era. Many significant herbaceous specimens could continue to be added to this bed.

318,319 - These beds are fairly intact in Rank 1 plants. A fan palm, *Trachycarpus fortunei* a Rank 1 tree in bed 318 was in decline for several years before removal in 2016 and replanting in 2019. 319 had two notable Rank 2 plants the Californian Summer holly, *Comarostaphylis diversifolia* and *Exbucklandia populnea*.

320,321,322 - These beds are cherry trees introduced in the Fleming Era and are ‘Kwanzan’ and Yoshino cherries.

323,324 The **“Corner Beds”** - Bed 323 contains the possible dwarf canyon live oak found on serpentine, *Quercus chrysolepsis* ‘Nana’. Many Rank 2 shrubs, herbs, and bulbs have been introduced to this bed notably the newly described *Rhododendron eastmanii* from the uplands of South Carolina. Several western trilliums, *Trillium ovatum* have been introduced to this bed as well as checker lilies, *Fritillaria meleagris*. This bed should be continued to be used for choice and rare shrubs, herbs, and bulbs.

324 contains the Rank 1 *Magnolia x watsonii* and the neighboring netleaf oak, a Rank 2 plant has been heavily pruned to afford this magnolia better growing conditions. A fine display of bulbous plants including *Fritillaria imperialis*, *Nerine bowdenii*, and *Scilla peruviana* are notable specimens here.

325 The **“Formal Beds”** - These beds were installed by Otto Holmdahl circa 1927 (Koykka 1969). Currently the corners of these beds have cherry trees, two ‘Whitcomb” on the east two beds and a Yoshino and ‘Shirofugen’ on the west beds. The beds mostly contain commonly found showy perennials. Of particular significance is a fine angel’s fishing rod, *Dierama pulcherrimum* in the southwest bed.

326 - This bed contains the reintroduced Rank 2 plant to replace the lost Rank 1 *Magnolia stellata*. This bed also contains common showy perennials.

327 - This bed contains nearly all of the Rank 1 plants save two lost rhododendrons that are found growing elsewhere in the garden. A notable Rank 2 plant is the hybrid stewartia *Stewartia x Henryae*. A deformed Texas madrone, *Arbutus xalapensis* also clings to life there.
**328,329,330,331,332,333 “Greenhouse Beds”**—These beds are not visited by the public as they now lie behind the security fence, installed after September 11th, 2001 (Carter 2018). The majority of Rank 1 plants remain in these beds. Due to the proximity of many of the trees to buildings if any of them perish they will be replaced by shrubs and herbaceous plants.

Notable features of these beds include rampant male and female kiwi vines, *Actinidia chinensis*, California dutchman’s pipe, *Aristolochia californica*, a venerable hedge of *Callistemon subulatus* and curiously, the humble Jack pine, *Pinus banksiana*.

**11. FUTURE RECOMMENDATIONS**

11.1 **Update LWSCMP**

Outside the scope of this paper it is critical that an updated LWSCMP be prepared in order to better manage the LWSC and consider the recommendations here for inclusion. Changes in management and assignment of the garden in various respect have to be done via OMPs and these must correspond to the current MP. Simply put, the garden cannot improve until the LWSCMP is updated.

11.2 **Refurbish garden nursery**

The garden nursery needs repairs. This area no longer functions as intended efforts should be made to plan and complete repairs.

11.3 **Global atmospheric carbon dioxide levels, pests and invasive species**

11.3.1 **Global Carbon levels and affects and effects to plants in garden**

Current carbon dioxide levels in the atmosphere are above 400 parts per million and precipitously rising per annum. This is an unprecedented and the concentration has not been this high in more than a million years (Keeling 2019). It is unclear what exactly will occur in the near term from this level of carbon dioxide. What is clear is the levels are unprecedented and an undeniable scientifically proven certainty.

The suitability of the plants currently growing in the garden could be tested by the continuing higher concentration of carbon dioxide in the atmosphere. In addition, rising carbon dioxide levels could exacerbate a suite of knock on effects including pest proliferation, arrival of new pests, and spread of invasive plant species.

The garden has thrived despite adverse conditions since its inception, especially in relation to the soils at the lock site (English 1972, Lyon 1978). Much effort has been made to carve out suitable niches for plants to grow in light of the poor drainage. Weather and climate have traditionally been recorded and evaluated at the garden, yet this was in regards to cold temperatures and tender plants new to cultivation. If
temperature rise and the longer dry seasons continues strategies for preserving the garden will have to be considered.

**Winter Damage at the Carl S. English, Jr., Gardens**

*Hiram M. Chittenden Locks (Ballard)*

Since the microclimate of the gardens at the "Ballard Locks" in Seattle is moderated by their proximity to Puget Sound, the damage (or lack of it) experienced there should be of particular interest to those who garden in a similar locality. During the winter of 1978/79, the lowest temperature recorded at the Locks was 18°F. This is eight or more degrees milder than temperatures recorded at the Arboretum during the same period.

The following information was supplied by Greg Simmons, Assistant Gardener.

Plants that suffered leaf drop or browning, shoot dieback or died to the ground:

- *Billardiera longiflora* — shoot dieback.
- *Callistemon citrinus 'Spendens' — dead to the ground.
- *Cistus salviifolius* — 60% leaf drop and browning, some shoot dieback.
- *Danae racemosa* — 25% leaf drop and browning.
- *Deidromecon rigida* ssp. hartfordii — 10% leaf browning, some shoot dieback.
- *Eucalyptus sp.* — 80% leaf drop and browning.
- *Gaultheria shalton* — 40% leaf browning and shoot dieback.
- *Hypericum androsaenum* — dead to the ground.
- *Lapageria rosca* var. *albiflora* — dead to the ground.

- *Lithocarpus densiflorus* — 50% leaf drop and browning.
- *Pernettya mucronata* — 30% leaf browning.
- *Quercus durmose* — 60% leaf drop and browning.

Plants that suffered snow damage:

- *Ceanothus thyrsiflorus* — all branches broken.
- *Pinus sabina* — 40-foot tree came down.
- *Quercus suber* — 20-foot tree lost its top.

Plants that showed little or no damage:

- *Callistemon subulatus*  
- *Chamaecyparis humilis*  
- *Camellia reticulata*  
- *Choisyia arizonica*  
- *Pinus patula*  
- *Quercus agrifolia, gleucu, xypoleucoides* reticulata, *suber, vaccinifolia, wishitenii*  
- *Trachycarpus fortunei*

*Figure 50 Garden cold damage Arboretum Bulletin 1979. Locks archives*

For example, warmer temperatures or an introduced pest may prevent the continual planting of Scarlet horse chestnut, *Aesculus carnea* var. *Briottii* on the main promenade. In response future gardeners could plant an *Aesculus* relative from Mexico in the form of *Bilia* trees. Or, to have a tree with showy blooms and a similar stature like the South American *Jacaranda mimosifolia*, with impressive bluish purple blooms could be planted. There is some excitement and anticipation in the changes
that temperature averages, weather, moisture regimes, and climate may bring in the introduction of new plants in the region.

These potential and perhaps imminent changes to the garden should be planned for and suitable remedies recognizing the legal, regulatory, and designatory framework should be kept in mind.

11.3.2 Pathogens, pests and invasive species

Knock on affects and effects from higher carbon levels directly relate to the increased occurrence introduced pests and invasive species. Sudden oak death, caused by a water mold *Phytophora ramorum* and prevalent in California and southern Oregon recently was found at Bloedel Reserve on Bainbridge Island. This organism destroys members of plant families *Ericaceae* and *Fagaceae* in particular. This organism was unknown in Washington State until recently (O'Neill 2017). As weather patterns become less predictable it is probable that arrivals of previously unknown or exotic organism in the region will become accelerate.

Compounding the changes in predictable weather patterns is the rapid introduction of introduced species to the region, some of which may have be deadly to the garden’s plants. Washington State University Extension offices have recorded the introduction of 67 invertebrate species to the state since 1991 (‘First” 2016). Increased introduction of species and disruption of weather patterns possibly increase the likelihood of introduced invertebrate pest outbreaks. The garden will continue to follow King County’s regulations for invasive plant species in operation and management actions.

11.4 Accession Database and Plant tagging

Now that a thoroughly field checked list of plants is available the Accession Database can continue to be improved. While filling in all of the fields available in the database can continue apace several other actions should also be pursued. Firstly, the plants known to be planted by English should be identified in the database. Secondly, the plants in Mendelson’s 1982 Inventory should be identified. Thirdly, Original Era plants should be identified.

Further analysis of the plants in the garden should be considered including measuring the changes in nomenclature with the relative increase or decrease in family, genera, and species number.

Plant tagging using metal tags should be completed shortly thereafter.

11.5 Events at the Garden

The 2017 Centennial celebrations at the LWSC were a great success and if celebrations occur on land and outside at the Locks they inevitably take place in the garden. Efforts should be directed to encourage other gardens, USACE entities, non-profit partners, and
clubs and societies to host events at the garden. Not only will they enhance the value of the garden it will also subtly let the public experience the beauty of the garden setting and expose them to the different plant species there.

Figure 51 COL John G. Buck with wife Kimberly to his left and Arthur Lee Jacobson to her left. 20 May 2017. Locks archives

11.6 “Serious Study”: The opportunities for study and partnerships with higher education, other botanic gardens, USACE entities, and individuals

The garden is an ideal place for study and this should be encouraged through partnerships and personal relationships.

11.7 Reinvigorate exchange

Efforts should be doubled in building relationships with gardens, societies, and individuals in exchange of seeds and plants.
11.8 Garden bed barriers

Increased visitation to garden will continue. In order to mitigate damage to beds by mammals of all kinds, barriers should be installed around all beds.

The first choice would be concrete bollards with black cabling (Freier 1989).

The second choice would be black metal posts and black cabling.

11.9 Update maps and geographic information systems data

The last map drafted for the garden was prepared in 1984 by Esko and Cook (Locks archives).

Updated geographic information systems (GIS) data should be collected and new planting bed maps drafted.

Plant information should also be collected to aid interactive mapping and interpretive opportunities for the visiting public.

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https://www.opm.gov/FAQs/QA.aspx?fid=de14aff4-4f77-4e17-afaa-fa109430fc7b&pid=39c889e9-b372-4d97-b2e4-8497cfded65  
APPENDIX A: PLANT INVENTORY

The following plant inventory was completed using Microsoft Access and converting the data into an Excel spreadsheet pivot table and exporting to Microsoft Word. After much effort this was the least, worst option. Data used is available on a volunteer accession computer at the Locks.

The phylogenies of plants as well as the position of plants in families, genera, and species designations have changed dramatically with the advent of DNA analysis since the 1982 inventory. The 2018 edition of *Flora of the Pacific Northwest* is generally followed. Even so this inventory places families *Aceraceae* and *Hippocastanaceae* within *Sapindaceae* yet retains *Mahonia* as a genus rather than lumping it with *Berberis*. The latter has changed multiple times recently and further research should be reviewed before a change is accepted definitively.

The garden accession should maintain some independent discretion as to what nomenclature changes to accept and when to accept them.

Key for inventory:

- Bed number
- Accession number
- Family
- Genus
- Species
- Subspecies
- Variety
- Date of field check
- Initials of field check personnel

8 June 2019 Carl S. English Jr. Botanical Garden Plant Inventory

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<th>var.</th>
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002  F12.02.01.e  Onagraceae  Fuchsia  magellanica  globosa  5/4/2019 SM
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002  S17.02.00.a  Stachyuraceae  Stachyurus  praecox  5/4/2019 SM
002  C36.05.00.c  Cornaceae  Cornus  stolonifera  5/4/2019 SM
002  S27.01.00  Iridaceae  Sisyrinchium  striatum  5/4/2019 SM
002  B01.05.01  Berberidaceae  Berberis  thunbergii  'Crimson Pygmy'  5/4/2019 SM
002  I03.00.00.b  Iridaceae  Iris  x  5/4/2019 SM
002  I03.00.00.a  Iridaceae  Iris  x  5/4/2019 SM
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002  H07.00.01  Liliaceae  Hemerocallis  x  'Sublime Lime'  5/4/2019 SM
002  H07.00.03  Liliaceae  Hemerocallis  x  'Ashwood Still Night'  5/4/2019 SM
002  H07.00.04  Liliaceae  Hemerocallis  x  'Black on Black'  5/4/2019 SM
002  H07.00.05  Liliaceae  Hemerocallis  x  'Buttered Popcorn'  5/4/2019 SM
002  H07.00.06  Liliaceae  Hemerocallis  x  'Double Gardenia'  5/4/2019 SM
002  H07.00.07  Liliaceae  Hemerocallis  x  'Fight of the Raven'  5/4/2019 SM
002  H07.00.08  Liliaceae  Hemerocallis  x  'Hawaiian Coral'  5/4/2019 SM
002  H07.00.09  Liliaceae  Hemerocallis  x  'Jancie Brown'  5/4/2019 SM
002  H07.00.10  Liliaceae  Hemerocallis  x  'Joan Hood'  5/4/2019 SM
002  H07.00.11  Liliaceae  Hemerocallis  x  'King of Swing'  5/4/2019 SM
002  H07.00.12  Liliaceae  Hemerocallis  x  'King's Citillon'  5/4/2019 SM
002  H07.00.13  Liliaceae  Hemerocallis  x  'Long Stacking'  5/4/2019 SM
002  H07.00.14  Liliaceae  Hemerocallis  x  'Little Fat Dazzler'  5/4/2019 SM
002  H07.00.15  Liliaceae  Hemerocallis  x  'Margaret Dickson'  5/4/2019 SM
002  H07.00.16  Liliaceae  Hemerocallis  x  'Move Over'  5/4/2019 SM
002  H07.00.17  Liliaceae  Hemerocallis  x  'Olympic Arrowhead'  5/4/2019 SM
002  H07.00.18  Liliaceae  Hemerocallis  x  'Olympic Mystery'  5/4/2019 SM
002  H07.00.19  Liliaceae  Hemerocallis  x  'Oly Plum Custard'  5/4/2019 SM
002  H07.00.20  Liliaceae  Hemerocallis  x  'Open My Eyes'  5/4/2019 SM
002  H07.00.21  Liliaceae  Hemerocallis  x  'Pandora's Box'  5/4/2019 SM
002  H07.00.22  Liliaceae  Hemerocallis  x  'Pink Playmate'  5/4/2019 SM
002  H07.00.23  Liliaceae  Hemerocallis  x  'Primal Scream'  5/4/2019 SM
002  H07.00.24  Liliaceae  Hemerocallis  x  'Raspberry Summer'  5/4/2019 SM
002  H07.00.25  Liliaceae  Hemerocallis  x  'Ruffled Apricot'  5/4/2019 SM
002  H07.00.26  Liliaceae  Hemerocallis  x  'Shaded Sunshine'  5/4/2019 SM
002  H07.00.27  Liliaceae  Hemerocallis  x  'Siloh John and Liam'  5/4/2019 SM
002  H07.00.28  Liliaceae  Hemerocallis  x  'Shinta Etching'  5/4/2019 SM
002  H07.00.29  Liliaceae  Hemerocallis  x  'Sherry Larr Carr'  5/4/2019 SM
002  H07.00.30  Liliaceae  Hemerocallis  x  'Silkam Rose Dawn'  5/4/2019 SM
002  H07.00.31  Liliaceae  Hemerocallis  x  'Spider to the Fly'  5/4/2019 SM
002  H07.00.32  Liliaceae  Hemerocallis  x  'Super Seventy Three'  5/4/2019 SM
002  H07.00.33  Liliaceae  Hemerocallis  x  'Tupac Amaru'  5/4/2019 SM
002  H07.00.34  Liliaceae  Hemerocallis  x  'Underneath the Ice'  5/4/2019 SM
002  H07.00.35  Liliaceae  Hemerocallis  x  'Victorian Lace'  5/4/2019 SM
002  H07.00.36  Liliaceae  Hemerocallis  x  'Vira-zoza'  5/4/2019 SM
002  H07.00.37  Liliaceae  Hemerocallis  x  'Voices in the Fog'  5/4/2019 SM
002  H07.00.38  Liliaceae  Hemerocallis  x  'Yellow Ribbon'  5/4/2019 SM
002  H07.00.39  Liliaceae  Hemerocallis  x  'Wally'  5/4/2019 SM
002  H07.00.40  Liliaceae  Hemerocallis  x  'Silkam Tee Tiny'  5/4/2019 SM
002  H07.00.41  Liliaceae  Hemerocallis  x  'Grand Rough'  5/4/2019 SM
002  H07.00.42  Liliaceae  Hemerocallis  x  'Crimson Ninja'  5/4/2019 SM
| 002 | H07.00.43 | Liliaceae | Hemerocallis | x | 'Funky Valentine' | 5/4/2019 SM |
| 002 | H07.00.44 | Liliaceae | Hemerocallis | x | 'Autumn Minaret' | 5/4/2019 SM |
| 002 | D14.00.00 | Plantaginaceae | Digitalis | x | 5/4/2019 SM |
| 002 | A34.00.00 | Ranunculaceae | Aquilegia | x | 5/4/2019 SM |
| 002 | H06.00.00 | Ranunculaceae | Helleborus | x | 5/4/2019 SM |
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| 003 | B07.01.00.a | Apiales | Bupleurum | fruticosa | 5/3/2019 SM |
| 003 | Q01.06.00.b | Fagaceae | Quercus | glauca | 5/3/2019 SM |
| 003 | C07.02.00.a | Theaceae | Camellia | japonica | 5/3/2019 SM |
| 003 | P55.01.00 | Rutaceae | Poncirus | trifoliata | 5/3/2019 SM |
| 003 | R02.00.21.s | Ericaceae | Rhododendron | x | Unknown hybrid | 5/13/2019 SM |
| 004 | B05.03.01 | Orchidaceae | Epipactis | gigantea | 5/3/2019 SM |
| 004 | Q01.08.00.d | Fagaceae | Quercus | ilex | 5/3/2019 SM |
| 004 | Q01.08.00.a | Fagaceae | Quercus | ilex | 5/3/2019 SM |
| 004 | G13.01.00 | Asteraceae | Grindelia | intergrifolia | 5/3/2019 SM |
| 004 | G07.01.00.d | Gunneraceae | Gunnera | manicata | 5/3/2019 SM |
| 004 | G07.02.00 | Gunneraceae | Gunnera | monica | 5/3/2019 SM |
| 004 | H15.04.00.a | Clusiaceae | Hypericum | patulum | 5/3/2019 SM |
| 004 | C24.01.00.a | Calycanthaceae | Chimonanthus | praecox | 5/3/2019 SM |
| 004 | B05.03.02 | Orchidaceae | Epipactis | royleana | Pinkish | 5/3/2019 SM |
| 004 | T11.01.00 | Liliaceae | Tricyrtis | x | 5/3/2019 SM |
| 004 | C42.01.00.a | Iridaceae | Crocosmia | x crocosmiiflora | 5/3/2019 SM |
| 004 | E06.03.00 | Apiaceae | Engruium | yuccifolium | 5/3/2019 SM |
| 005 | M02.01.02 | Berberidaceae | Mahonia | aquifolium | dictyota | 5/3/2019 SM |
| 005 | E03.01.00.a | Ericaceae | Enkianthus | campanulatus | 5/3/2019 SM |
| 005 | B01.01.00.e | Berberidaceae | Berberis | darwinii | 5/3/2019 SM |
| 005 | M02.03.00 | Berberidaceae | Mahonia | haematocarpa | 5/3/2019 SM |
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| 005 | I03.10.02.b | Iridaceae | Iris | hollandica | 'Excelsior' | 5/3/2019 SM |
| 005 | C43.01.00.d | Taxodiaceae | Cryptomeria | japonica | 5/3/2019 SM |
| 005 | C43.01.00.e | Taxodiaceae | Cryptomeria | japonica | 5/3/2019 SM |
| 005 | C43.01.00.f | Taxodiaceae | Cryptomeria | japonica | 5/3/2019 SM |
| 005 | S28.03.01.b | Lamiaceae | Salvia | nemorosa | 'Caradonna' | 5/3/2019 SM |
| 005 | H15.04.00.b | Clusiaceae | Hypericum | patulum | 5/3/2019 SM |
| 005 | V03.07.02.a | Caprifoliaceae | Viburnum | plicatum | tomentosum | 5/3/2019 SM |
| 005 | R02.38.00.c | Ericaceae | Rhododendron | racemosum | 5/3/2019 SM |
| 005 | F07.01.00.d | Oleaceae | Forsythia | suspensa | 5/3/2019 SM |
| 005 | C27.01.00.a | Rutaceae | Choisya | ternata | 5/3/2019 SM |
| 005 | N04.00.04.b | Amaryllidaceae | Narcissus | x | 'Dutch Master' | 5/3/2019 SM |
| 005 | F12.01.00.a | Onagraceae | Fuchsia | x | 5/3/2019 SM |
| 005 | C42.01.00.b | Iridaceae | Crocosmia | x crocosmiiflora | 5/3/2019 SM |
| 006 | B01.01.00.f | Berberidaceae | Berberis | darwinii | 5/3/2019 SM |
| 006 | C03.01.00.a | Cupressaceae | Calocedrus | decurrens | 5/3/2019 SM |
| 006 | C07.02.13.a | Theaceae | Camellia | japonica | 'Tricolor Red' | 5/3/2019 SM |
| 006 | R02.74.01.a | Ericaceae | Rhododendron | oreodoxa | fargesii | 5/3/2019 SM |
| 006 | C24.01.00.b | Calycanthaceae | Chimonanthus | praecox | 5/3/2019 SM |
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| 006 | R04.01.00.a | Grossulariaceae | Ribes | sanguineum | 5/3/2019 SM |
| 006 | S30.01.00 | Asparagaceae | Scilla | tubergeniana | 5/3/2019 SM |
| 006 | R02.00.04 | Ericaceae | Rhododendron | x | 'Broughtonii Aureum' | 5/3/2019 SM |
| 006 | R02.16.01 | Ericaceae | Rhododendron | x catawbiense | 'Cynthia' | 5/3/2019 SM |
| 007 | R07.01.00 | Liliaceae | Ruscus | aculeatus | 5/3/2019 SM |
| 007 | L11.01.00.a | Cupressaceae | Libocedrus | decurrens | 5/3/2019 SM |
| 007 | N05.02.00.a | Fagaceae | Nothofagus | densiflorus | 5/3/2019 SM |
| 007 | I03.02.00.a | Iridaceae | Iris | douglasiana | 5/3/2019 SM |
| 007 | R02.13.02 | Ericaceae | Rhododendron | fortunei | sap. discolor | Houlstonii | 5/6/2019 SM |
| 007 | C07.02.13.b | Theaceae | Camellia | japonica | 'Tricolor Red' | 5/3/2019 SM |
| 007 | R02.62.00 | Ericaceae | Rhododendron | micranthum | 5/23/2019 SM |
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007 P19.04.00.a Ericaceae Pieris taiwanensis 5/3/2019 SM
007 R02.00.15 Ericaceae Rhododendron x ‘Princess Elizabeth’ 5/6/2019 SM
007 R02.00.06 Ericaceae Rhododendron x ‘Cory Koster’ 5/6/2019 SM
007 M01.13.01 Magnoliaceae Magnolia x soulangiana ‘Alba’ 5/3/2019 SM
008 C35.01.00 Agavaceae Cordyline banksii 5/3/2019 SM
008 C19.03.00.c Rosaceae Cercoocarpus betuloides 5/3/2019 SM
008 P19.02.00.e Ericaceae Pirets formosa 5/3/2019 SM
008 H09.03.00 Saxifragaceae Heuchera glabra 4/23/2019 SM
008 C23.01.00.c Arecaceae Chamaerops humilis 5/3/2019 SM
008 Q01.07.00.c Fagaceae Quercus hypoleucoides 5/3/2019 SM
008 H09.02.00 Saxifragaceae Heuchera micrantha 4/23/2019 SM
008 L20.01.00 Rosaceae Leucoisodeum sericea 5/3/2019 SM
009 M04.06.00 Rosaceae Malus yunnanensis veitchii 5/6/2019 SM
010 C21.03.00.a Cupressaceae Chamaecyparis pisifera 5/6/2019 SM
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011 A05.04.00.b Sapindaceae Aesculus indica 5/23/2019 SM
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014 Y01.03.00.g Agavaceae Yucca gloriosa 5/6/2019 SM
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015 R06.02.00.b Rosaceae Rubus deliciosis 5/6/2019 SM
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015 R02.00.21i Ericaceae Rhododendron x Unknown hybrid 5/10/2019 SM
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015 A M04.04.01.b Rosaceae Malus x purpurea ‘Eleyi’ 5/6/2019 SM
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015 M04.01.01.d Rosaceae Malus zumi calocarpa 5/6/2019 SM
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016 P34.01.00 Pinaceae Pseudolarix amabilis 5/6/2019 SM
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016 S14.01.00.f Rosaceae Sorbus aucupariae 5/6/2019 SM
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016 C36.03.00.a Cornaceae Cornus mas 5/6/2019 SM
016 A03.08.00.a Sapindaceae Acer maximowiczianum 5/6/2019 SM
016 C04.01.00.a Calycanthaceae Calycanthus occidentalis 5/6/2019 SM
016 S17.02.00.c Stachyuraceae Stachyurus praecox 5/6/2019 SM
016 M01.09.00 Magnoliaceae Magnolia salicifolia 5/6/2019 SM
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017 M01.01.00 Magnoliaceae Magnolia acuminata cordata 5/6/2019 SM
017 Q01.01.00.b Fagaceae Quercus agrifolia 5/6/2019 SM
017 A03.01.00 Sapindaceae Acer buergerianum 5/6/2019 SM
017 P21.03.00.b Pinaceae Pinus bungeanae 5/6/2019 SM
017 U01.01.00.a Lauraceae Umbellularia californica 5/6/2019 SM
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Iridaceae  Iris  douglasiana
Fagaceae  Lithocarpus  edulis
Fagaceae  Quercus  myrsinifolia
Ericaceae  Rhododendron  polyplepis
Fagaceae  Castanopsis  sieboldii
Fagaceae  Quercus  vaccinifolia
Magnoliaceae  Magnolia  x velchii
Fagaceae  Quercus  cerris
Fagaceae  Quercus  robur
Fagaceae  Quercus  x
Fagaceae  Quercus  mongolica
Fagaceae  Fagus  grandifolia
Fagaceae  Quercus  gambelli
Plantaginaceae  Penstemon  barrettiae
Cactaceae  Opuntia  basilaris  basilaris
Cactaceae  Opuntia  'Peachy'
Fagaceae  Quercus  berberidifolia
Myrtaceae  Eucalyptus  bridgesiana
Onagraceae  Zauschneria  californica  'Silver Select'
Rhamnaceae  Rhamnus  californica  'Eve Case'
Roseaceae  Oemleria  cerasiformis
Ranunculaceae  Aquilegia  chrysantha  chrysantha
Ericaceae  Arctostaphylos  columbiana  'Lost Lake'
Fagaceae  Notholithocarpus  densiflorus  var. echinoides
Rhamnaceae  Ceanothus  dentatus
Fagaceae  Quercus  douglasii  Cache Creek
Berberidaceae  Mahonia  druckerei
Fagaceae  Quercus  dumosa
Cactaceae  Opuntia  fragilis  'Columbiana'
Berberidaceae  Mahonia  fremontii
Fagaceae  Quercus  garryana  breweri
Ericaceae  Arctostaphylos  glandulosa  'Rogue Gem'
Berberidaceae  Mahonia  haematocarpa  'Santa Fe'
Ericaceae  Arctostaphylos  hookeri  'Green on Black'
Asparagaceae  Triteleia  hyacinthina
Cactaceae  Opuntia  imbricata  'Guadalupe'
Liliaceae  Fritillaria  lanceolata
Crassulaceae  Sedum  laxum
Rosaceae  Cercocarpus  ledifolius
Rhamnaceae  Ceanothus  maritimus  'Point Sierra'
Ericaceae  Arctostaphylos  mendoceoensis
Ericaceae  Arctostaphylos  nummularia
Sapindaceae  Acer  palmatum
Cactaceae  Opuntia  phaeacantha  'Millard County'
Berberidaceae  Mahonia  piperiana  'Spoonleaf'
Cactaceae  Opuntia  polyantha  'Imnaha Blue'
Amaryllidaceae  Nerine  sarniensis  'Antique Rose'
Onagraceae  Zauschneria  septentrionalis  'Waynes Silver'
Ericaceae  Arctostaphylos  viscid
Amaryllidaceae  Nerine  x  'Blue Flash'
Ericaceae  Arctostaphylos  x  'Game Lake'
Ericaceae  Arctostaphylos  x  'Pacific Mist'
Montiaceae  Lewisia  x  Locks hybrid
Myrtaceae  Callistemon  x  'Woodlanders Hardy Red'
Rosaceae  Spirea  x vanhouttei
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110 R02.00.18a Ericaceae Rhododendron x Loderi 'King George' 5/13/2019 SM
110 R02.00.20 Ericaceae Rhododendron x Loderi 'Patience' 5/13/2019 SM
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110 R02.00.21a Ericaceae Rhododendron x 5/7/2019 SM
110 R02.00.21i Ericaceae Rhododendron x Unknown Hybrid 5/10/2019 SM
110 R02.00.21o Ericaceae Rhododendron x Unknown hybrid 5/13/2019 SM
110 R02.05.00.d Ericaceae Rhododendron augustinii 5/13/2019 SM
110 L08.01.00.b Ericaceae Leucothoe davisiae 5/13/2019 SM
110 P19.01.00.c Ericaceae Pieris floribunda 5/13/2019 SM
110 L08.02.00b Ericaceae Leucothoe fontanesiana 5/13/2019 SM
110 M04.03.01.a Rosaceae Malus halliana 'Parkmani' 5/13/2019 SM
110 C07.02.00.e Theaceae Camellia japonica 'Parkmanii' 5/25/2019 SM
110 M01.07.00 Magnoliaceae Magnolia liliflora 5/13/2019 SM
110 C36.03.00.c Cornaceae Corrus mas 5/13/2019 SM
110 C01.01.00.a Verbenaceae Calliopsis mollis 5/13/2019 SM
110 C01.12.00.b Fagaceae Quercus palustris 5/13/2019 SM
110 P32.12.03.a Rosaceae Prunus pendula Pendula Pl. Rosea' 5/13/2019 SM
110 P32.12.03.b Rosaceae Prunus pendula 'Pendula' 5/13/2019 SM
110 V03.08.00.a Caprifoliaceae Viburnum rhytidophllum 5/13/2019 SM
110 C07.04.01 Theaceae Camellia xasangua 'White Doves' 5/13/2019 SM
110 P32.06.06.b Rosaceae Prunus serrulata 'Shogetsu' 5/13/2019 SM
110 A15.02.00.c Ericaceae Arbutus unedo 5/23/2019 SM
110 Q01.20.00.b Fagaceae Quercus wislizenii 5/13/2019 SM
110 R02.00.21q Ericaceae Rhododendron x Unknown hybrid 5/13/2019 SM
110 R02.18.00.a Ericaceae Rhododendron x gandavense 5/13/2019 SM
110 R02.24.00.j Ericaceae Rhododendron x kosteranum 5/13/2019 SM
110 R02.24.00.j Ericaceae Rhododendron x kosteranum 5/13/2019 SM
110 P32.10.01.a Rosaceae Prunus x yedoensis 'Akebono' 5/13/2019 SM
110 P32.10.00.a Rosaceae Prunus x yedoensis 5/13/2019 SM
110 R02.05.00.e Ericaceae Rhododendron augustinii 5/14/2019 SM
111 Z02.01.00 Onagraceae Zauschneria californica 5/13/2019 SM
113 B02.01.00g Saxifragaceae Bergenia cordifolia
113 W02.01.00a Poly podiaceae Woodwardia fimbriata
113 C36.01.00.a Cornaceae Cornus florida
113 F15.01.00.b Hamamelidaceae Fo thengilla gardenii
113 C36.03.00.b Cornaceae Cornus mas
113 R02.62.00a Ericaceae Rhododendron micranthum
113 R02.40.00.a Ericaceae Rhododendron schlippenbachii
113 P28.02.00b Dryopteridaceae Polystichum setiferum
113 C25.01.00 Oleaceae Chionanthus virginicus
113 D17.00.00 Caryophyllaceae Dionthus x
113 R02.00.21m Ericaceae Rhododendron x Unknown hybrid
113 G09.03.2 Rosaceae Geum x ‘Borisi’
113 H06.05.01.b Ranunculaceae Helleborus x hybridus ‘Cherry Blossom’
113 R02.46.00.f Ericaceae Rhododendron yunnanense
113 A03.02.00 Betulaceae Betula pubescens
113 A03.16.00.a Sapindaceae Acer capillipes
113 G02.04.01 Garryaceae Garrya issaquahensis ‘Carl English’
113 C07.02.01.b Theaceae Camellia japonica ‘Auburn White’
113 O02.02.00 Liliaceae Ophiopogon japonicus
113 P02.02.01.b Paon iaceae Paonia lutea ludlowii
113 R02.30.00.a Ericaceae Rhododendron mucronulatum
113 R02.103.00 Ericaceae Rhododendron nova
113 C38.02.00 Hamamelidaceae Corylopsis pauciflora
113 R02.108.00 Ericaceae Rhododendron periclymenoides
113 R02.38.00.d Ericaceae Rhododendron racemosum
113 A03.17.00 Sapindaceae Acer sieboldianum
113 C38.01.00.e Hamamelidaceae Corylopsis sinensis sinensis
113 R02.100.00b Ericaceae Rhododendron x Azaleodendron’
113 R02.00.21k Ericaceae Rhododendron x Unknown hybrid
113 A03.03.01.d Sapindaceae Acer davidii grosseri
113 C14.02.00.c Pinaceae Cedrus deodara
113 A13.02.00.b Araliaceae Aralia elata
113 M04.03.01.b Rosaceae Malus halliana ‘Parkmanii’
113 C27.02.01 Rutaceae Choisy a arizonica ‘Aztec Pearl’
113 F13.09.00b Liliaceae Fritillaria cam schatcensis
113 H25.02.01 Helwingiaceae Helwingia chinensis
113 H25.02.02 Helwingiaceae Helwingia chinensis
113 P38.01.00b Poly podiaceae Polypodium guttatum
113 S38.01.00b Berberidaceae Sinopodophyllum hexandrum chinese MD97150 ex Yunnan
113 R02.23.00.c Ericaceae Rhododendron indicum
113 P19.03.00.c Ericaceae Pieris japonica
113 P21.10.01.a Pinaceae Pinus mugo mugo ‘Carsten's Wintergold’
113 P21.10.02 Pinaceae Pinus mugo
113 B03.01.00.b Betulaceae Betula nana
113 V01.05.01 Ericaceae Vaccinium nova
113 S19.03.00.b Theaceae Stewartia rostrata
113 R02.33.00.a Ericaceae Rhododendron rubiginosum
113 P28.02.00.d Dryopteridaceae Polystichum setiferum
113 A28.02.00 Pteridaceae Adiantum shastense
113 M01.12.00 Magnoliaceae Magnolia sieboldii
113 C13.04.02 Rhamnaceae Ceanothus thysiflorus ‘Skylark’
113 S04.01.00.b Saxifragaceae Saxifraga umbosa
113 C66.00.01 Orchidaceae Cypripedium x ‘Emil’
113 C66.00.02 Orchidaceae Cypripedium x ‘Philip’
113 C66.00.03 Orchidaceae Cypripedium x ‘Gisela’
113 F38.01.00a Poly podiaceae Polypodium guttatum
113 P19.03.00.d Ericaceae Pieris japonica
113 R.02.100.00b Ericaceae Rhododendron liliiflorum
L14.08.00  Liliaceae  Lilium  mackliniae  4/16/2019  SM
M02.01.00.d  Berberidaceae  Mahonia  aquifolium  5/11/2019  SM
T18.01.01.a  Liliaceae  Tulipa  bakeri 'Lilac Wonder'  5/13/2019  SM
P06.07.00b  Plantaginaceae  Penstemon  barrettiae  4/2/2019  SM
P22.01.00.b  Anacardiaceae  Pistacia  chinensis  3/21/2019  SM
C27.01.00.a  Cistaceae  Cistus  creticus  5/14/2019  SM
V03.03.00.b  Caprifoliaceae  Viburnum  davidii  5/14/2019  SM
P19.02.00.c  Ericaceae  Pieris  formosa  5/14/2019  SM
P19.03.00.e  Ericaceae  Pieris  japonica  5/10/2019  SM
L23.00.00  Fabaceae  Lupinus  latifolius  3/21/2019  SM
C01.03.00  Asteraceae  Olearia  macrodonta  4/9/2019  SM
H14.01.00.c  Hydrangeaceae  Hydrangea  macrophylla  4/9/2019  SM
H14.01.00.d  Hydrangeaceae  Hydrangea  macrophylla  12/2/2009  SM
T10.03.00.d  Pinaceae  Tsuga  mertensiana  5/14/2019  SM
P21.10.00.a  Pinaceae  Pinus  mugo  5/11/2019  SM
L02.01.00  Ericaceae  Rhododendron  neoglandulosum  5/11/2019  SM
C13.04.04  Rhamnaceae  Ceanothus  thyrsiflorus 'Millerton Point'  5/11/2019  SM
E03.01.00.e  Ericaceae  Enkianthus  campanulatus  5/14/2019  SM
E03.03.00  Ericaceae  Enkianthus  chinensis  5/14/2019  SM
C46.01.00  Betulaceae  Corylus  heterophylla yunnanensis  5/14/2019  SM
C39.05.00.g  Rosaceae  Cotoneaster  horizontalis  5/14/2019  SM
C38.02.00.b  Cornaceae  Cornus  kousa  5/14/2019  SM
C38.03.00.a  Hamamelidaceae  Corylosis  spicata  5/14/2019  SM
C03.01.00.b  Caprifoliaceae  Viburnum  x bodnantense  5/14/2019  SM
C03.05.00.c  Caprifoliaceae  Viburnum  x burkwoodii  5/14/2019  SM
A05.02.01.o  Sapindaceae  Aesculus  x carnea 'Briotii'  5/22/2019  SM
A05.02.01.p  Sapindaceae  Aesculus  x carnea 'Briotii'  5/22/2019  SM
A05.02.01.q  Sapindaceae  Aesculus  x carnea 'Briotii'  5/23/2019  SM
A05.02.01.n  Sapindaceae  Aesculus  x carnea 'Briotii'  5/23/2019  SM
H06.01.00  Ranunculaceae  Helleborus  argutifolius  5/25/2019  SM
A03.16.00.b  Sapindaceae  Acer  capillipes  5/23/2019  SM
I01.03.01.a  Aquifoliaceae  Ilex  crenata 'Helleri'  5/25/2019  SM
A03.03.00.b  Sapindaceae  Acer  davidii  5/23/2019  SM
O03.03.00  Oleaceae  Osmanthus  heterophyllus  5/25/2019  SM
V02.01.00.a  Berberidaceae  Vancouveria  hexandra  5/25/2019  SM
P19.03.00.f  Ericaceae  Pieris  japonica  5/25/2019  SM
S15.01.00.c  Fabaceae  Spartium  junceum  5/14/2019  SM
H14.01.01  Hydrangeaceae  Hydrangea  macrophylla  4/9/2019  SM
T10.03.00.c  Pinaceae  Tsuga  mertensiana  5/11/2019  SM
P10.01.00.a  Ericaceae  Pernettya  mucronata  5/25/2019  SM
M02.06.00  Berberidaceae  Mahonia  nervosa  5/25/2019  SM
M02.06.00.b  Berberidaceae  Mahonia  nervosa  5/25/2019  SM
M06.03.00.a  Ranunculaceae  Helleborus  niger  5/25/2019  SM
I01.05.00.a  Aquifoliaceae  Ilex  pedunculosa  5/25/2019  SM
E01.02.00.d  Elaeagnaceae  Elaeagnus  pungens  5/25/2019  SM
M01.15.00  Magnoliaceae  Magnolia  stellata  5/25/2019  SM
M01.16.00.a  Magnoliaceae  Magnolia  tripetala  6/4/2019  SM
B01.00.00  Berberidaceae  Berberis  x  7/24/2006  SM
P16.01.00.b  Rosaceae  Photinia  x fraseri  5/25/2019  SM
R02.31.00  Ericaceae  Rhododendron  x obtusum 'Hi No Crimson'  5/13/2019  SM
R02.31.01.a  Ericaceae  Rhododendron  x obtusum 'Hi No Digin'  5/25/2019  SM
R02.31.02  Ericaceae  Rhododendron  x obtusum  5/25/2019  SM
A26.01.00.d  Rosaceae  Amelanchier  alnifolia  5/25/2019  SM
T19.01.00  Cephalotaxaceae  Torreya  californica  3/21/2019  SM
R02.11.00.b  Ericaceae  Rhododendron  davidsonianum  4/25/2019  SM
I03.02.00.c  Iridaceae  Iris  douglasiana  5/25/2019  SM
G02.01.00.c  Garryaceae  Garrya  elliptica  5/25/2019  SM
P19.01.00.e  Ericaceae  Pieris  floribunda  5/25/2019  SM
120 T08.01.00.e Areceae Trachycarpus fortunei 5/11/2019 SM
120 Q01.08.00.c Fagaceae Quercus ilex 5/25/2019 SM
120 P19.03.02 Ericaceae Pieris japonica 'Pygmaea' 5/25/2019 SM
120 C36.02.00.a Cornaceae Cornus kousa 5/25/2019 SM
120 L06.01.00.a Myrtaceae Leptospermum lanigerum 5/25/2019 SM
120 H14.01.00.b Hydrangeaceae Hydrangea macrophylla 4/9/2019 SM
120 R02.54.00 Ericaceae Rhododendron macrophyllum 3/21/2019 SM
120 R02.99.02 Ericaceae Rhododendron nitidulum nitidulum 5/11/2019 SM
120 M01.01.00.c Magnoliaceae Magnolia obovata 5/25/2019 SM
120 R02.32.00.b Ericaceae Rhododendron occidentale 4/25/2019 SM
120 R02.74.01.b Ericaceae Rhododendron oreodoxa fargessii 4/9/2019 SM
120 A03.11.01 Sapindaceae Acer palmatum 'Autumn Glory' 5/25/2019 SM
120 A03.11.03 Sapindaceae Acer palmatum 'Dissectum' 5/23/2019 SM
120 M02.07.00.b Berberidaceae Mahonia pumila 5/25/2019 SM
120 R02.38.00.b Ericaceae Rhododendron racemosum 4/25/2019 SM
120 M14.01.01 Saxifragaceae Mükdenia rossii 'Crimson Fandango' 5/25/2019 SM
120 P12.06.05.c Rosaceae Prunus serrulata 'Shiro-fugen' 5/25/2019 SM
120 G04.03.00 Fabaceae Genista tincctoria 5/11/2019 SM
120 D07.02.00b Saxifragaceae Deutzia x kamiflora 3/21/2019 SM
120 M04.07.01.a Rosaceae Malus baccata 'Himalaya' 5/14/2019 SM
120 M08.01.00.a Asparagaceae Maianthemum bifolium 'Kamtschatcicum' 5/14/2019 SM
120 A03.03.01.b Sapindaceae Acer davidii grosseri 5/14/2019 SM
120 S10.01.00.e Rutaceae Skimmia japonica 5/14/2019 SM
120 M01.01.00.b Magnoliaceae Magnolia obovata 5/14/2019 SM
120 C21.03.00.e Cupressaceae Chamaecyparis pisifera 5/14/2019 SM
120 C21.03.01.b Cupressaceae Chamaecyparis pisifera 'Squarrosa' 5/14/2019 SM
120 S14.05.00 Rosaceae Sorbus rehderiana 5/14/2019 SM
120 R02.00.21d Ericaceae Rhododendron x Unknown Hybrid 5/7/2019 SM
120 R02.15.01.b Ericaceae Rhododendron x caucasicum 'Rosa Mundi' 5/14/2019 SM
120 M08.01.00.b Asparagaceae Maianthemum bifolium 'Kamtschatcicum' 5/14/2019 SM
120 G05.01.00.a Ginkgaceae Ginkgo biloba 4/16/2019 SM
120 R02.89.00c Ericaceae Rhododendron calophyllum 5/23/2019 SM
120 S31.01.00 Hydrangeaceae Schizophragma corylemum 5/14/2019 SM
120 R02.12.00.a Ericaceae Rhododendron decorum 5/14/2019 SM
120 P19.01.00.f Ericaceae Pieris floribunda 5/14/2019 SM
120 S43.01.00 Hydrangeaceae Schizophragma integrifolia 5/18/2019 SM
120 P19.03.00.g Ericaceae Pieris japonica 5/14/2019 SM
120 S10.01.00.f Rutaceae Skimmia japonica 5/14/2019 SM
120 C43.01.00.c Taxodiaceae Cryptomeria japonica 5/14/2019 SM
120 C07.02.00.g Theaceae Camellia japonica 5/14/2019 SM
120 C34.01.00 Liliaceae Corvalaria majalis 5/14/2019 SM
120 H03.02.00.b Hamamelidaceae Hamamelis mollis 5/14/2019 SM
120 K04.01.00.b Sapindaceae Koeltreuteria paniculata 5/14/2019 SM
120 R02.34.00 Ericaceae Rhododendron ponticum 5/13/2019 SM
120 Q01.21.00.a Fagaceae Quercus prinus 5/10/2019 SM
120 S07.01.00.a Taxodiaceae Sequoia sempervirens 'Liliae' 5/14/2019 SM
120 P05.01.00.b Paulowniaceae Paulownia tomentosa 'Gomer Waterer' 5/13/2019 SM
120 R02.69.00 Ericaceae Rhododendron x arborellum 4/30/2019 SM
120 T06.01.00.b Cupressaceae Thuja occidentalis 'Aurea Variegata' 5/14/2019 SM
120 T06.01.00.a Cupressaceae Thuja plicata 'Zebrina' 4/9/2019 SM
120 F16.01.00 Cupressaceae Fokienia hodgskini 5/14/2019 SM
120 A03.13.00.b Sapindaceae Acer platanoides 5/14/2019 SM
120 A05.01.00.a Sapindaceae Aesculus californica 5/23/2019 SM
120 A05.01.00.b Sapindaceae Aesculus californica 5/23/2019 SM
120 A03.14.00 Sapindaceae Acer pseudoplatanus 5/14/2019 SM
120 H15.10.00 Clusiaceae Hypericum bellum 5/11/2019 SM
128 T08.01.00.i Areceae Trachycarpus fortunei 5/3/2019 SM
128 H15.07.00 Clusiaceae Hypericum lancasteri 5/11/2019 SM
128 H15.04.00.c Clusiaceae Hypericum patulum 5/11/2019 SM
128 H15.08.00 Clusiaceae Hypericum pseudohenryi 5/11/2019 SM
128 H15.02.00 Clusiaceae Hypericum subsessil 5/11/2019 SM
129 A03.13.00.a Sapindaceae Acer platanoides 5/14/2019 SM
16 R02.13.01.a Ericaceae Rhododendron fortunei discolor 5/18/2019 SM
201 B02.01.01 Saxifragaceae Bergenia af. Purpurascens 5/6/2019 SM
201 C32.02.00.a Clethraceae Clethra alnifolia 5/6/2019 SM
201 K05.01.00.a Caprifoliaceae Kolkwitzia amabilis 5/6/2019 SM
201 I02.01.00.a Schisandraceae Illicium anisatum 5/6/2019 SM
201 I01.01.00.a Aquifoliaceae Ilex aquifolium 5/6/2019 SM
201 R03.03.01 Anacardiaceae Rhus aromatica ‘Low Grow’ 5/6/2019 SM
201 R02.05.05 Ericaceae Rhododendron augustini augestini ‘Whaley Farm’ 5/6/2019 SM
201 R02.05.06 Ericaceae Rhododendron augustini augestini ‘RSF Best Purple’ 5/6/2019 SM
201 R02.05.04 Ericaceae Rhododendron augustini augestini 5/6/2019 SM
201 C19.03.00.b Rosaceae Cerocarpus betuloideus 5/6/2019 SM
201 D23.01.01 Colchicaceae Disporum cantonense 5/6/2019 SM
201 B14.01.00.a Berberidaceae Berberidopsis corallina 5/6/2019 SM
201 D07.03.01 Saxifragaceae Deutzia crenata ‘Niko’ 5/6/2019 SM
201 H20.01.00.b Fabaceae Hippocrepis emerus 5/6/2019 SM
201 D12.02.01.a Dryopteridaceae Dryopteris filix-mas ‘Barnesi’ 5/6/2019 SM
201 C36.01.00.b Cornaceae Cornus florida 5/6/2019 SM
201 I03.03.00 Iridaceae Iris foetidissima 5/6/2019 SM
201 I03.09.01 Iridaceae Iris germanica ‘Red Zinger’ 5/6/2019 SM
201 S08.01.00.a Taxodiaceae Sequoiadendron giganteum 5/6/2019 SM
201 Y01.03.00.d Agavaceae Yucca gloriosa 5/6/2019 SM
201 S17.01.00 Stachyuraceae Stachyurus himalaciu 5/6/2019 SM
201 I03.10.01.a Iridaceae Iris hollandica ‘Carmen’ 5/6/2019 SM
201 I03.10.02.a Iridaceae Iris hollandica ‘Excelsior’ 5/6/2019 SM
201 C39.05.00.c Rosaceae Cotoneaster horizontalis 5/6/2019 SM
201 C39.07.00 Rosaceae Cotoneaster integrifolius 5/6/2019 SM
201 D04.02.00.a Nyssaceae Davidia involucrata 5/6/2019 SM
201 P19.03.01.b Ericaceae Pieris japonica ‘Crispa’ 5/6/2019 SM
201 S22.02.00 Oleaceae Syringa lacininta 5/6/2019 SM
201 C27.06.00.c Cistaceae Cistus ladanifer ‘Maculates’ 5/6/2019 SM
201 P21.09.00.a Pinaceae Pinus lambertiana 5/6/2019 SM
201 R02.57.00.a Ericaceae Rhododendron leucaspis 5/6/2019 SM
201 R02.57.00.b Ericaceae Rhododendron leucaspis 5/6/2019 SM
201 P12.01.00c Hydrangeaceae Philippehus lewisii ludlowii 5/6/2019 SM
201 P12.02.01.c Paoniacaeae Paonia lutea ‘Goldcrest Wilma’ 5/6/2019 SM
201 C54.01.01 Cupressaceae Cupressus macrocarpa ‘Goldcrest Wilma’ 5/6/2019 SM
201 C50.01.00.a Dryopteridaceae Cyrtomium macrophyllum ‘Albostriata’ 5/6/2019 SM
201 C34.01.02 Asparagaceae Convallaria majalis 5/6/2019 SM
201 C34.01.01 Asparagaceae Convallaria majalis ‘Variegata’ 5/6/2019 SM
201 H09.02.02.a Saxifragaceae Heuchera micrantha ‘Dark Secret’ 5/6/2019 SM
201 H09.02.03.a Saxifragaceae Heuchera micrantha ‘Lime Marmalade’ 5/6/2019 SM
201 A29.04.01 Ranunculaceae Anemone nemorosa ‘Stars in the Night’ 5/6/2019 SM
201 G01.01.00.b Amaryllidaceae Galanthus nivalis 5/6/2019 SM
201 N02.01.00 Nothofagaceae Lepironzia obliqua 5/6/2019 SM
201 G10.00.00 Rubiaceae Galium odoratum 5/6/2019 SM
201 S20.05.01 Styraceae Styrax officinale ‘Redivivus’ 5/6/2019 SM
201 M09.02.00 Asparagaceae Maianthemum olearceum ‘Silver and Pink’ 5/6/2019 SM
201 I06.02.01 Balsaminaceae Impatiens omeana 5/6/2019 SM
201 O06.01.00 Oxalidaceae Oxalis oregana 5/6/2019 SM
201 F10.01.00.b Oleaceae Fraxinus ornus 5/6/2019 SM
201 C09.04.01 Cyperaceae Carex oshimensis ‘Everillo’ 5/6/2019 SM
201 T12.01.00d Melanthiaceae Trillium ovatum 4/9/2019 SM
201 C13.06.01 Rhamnaceae Ceanothus pallidus ‘Marie Simon’ 5/6/2019 SM
Arecaceae
Garryaceae
Oleaceae
Clethraceae
Taxaceae
Iridacea
Ericaceae
Fagaceae
Elaeagnaceae
Pinaceae
Hydrangeaceae
Cornaceae
Garryaceae
Ginkoaceae
Fabaceae
Rosaceae
Saxifr...
203 S08.01.00.b Taxodiaceae Sequoiadendron giganteum
203 S18.01.00.a Lardizabalaceae Stauntonia hexaphylla
203 M02.04.00 Berberidaceae Mahonia japonica
203 B01.02.00.a Berberidaceae Berberis juliana
203 P12.01.00b Hydrangeaceae Philadelphia lewissii
203 D09.03.00 Ebenaceae Diospyros lotus
203 P40.01.00.c Pinaceae Pseudotsuga menziesii
203 R02.106.00 Ericaeeae Rhododendron mollicomum
203 C21.03.01.a Cupressaceae Chamaecyparis pisifera 'Squarrosa'
203 T06.02.00.g Cupressaceae Thuja plicata
203 S07.01.00.c Taxodiaceae Sequoia sempervirens
203 L16.01.00.a Hamamelidaceae Liquidambar styraciflua
203 C27.01.00.g Rutaceae Choisya ternata
203 A19.01.00.b Annonaceae Asimina triloba
203 L31.01.00.a Amaryllidaceae Leucojum aestivum
203 E12.01.00 Celastraceae Euonymus alatus
203 C46.04.02 Betulaceae Corylus avellana 'Contorta'
203 A03.02.00 Sapindaceae Acer circinatum
203 G02.01.00.h Garryaceae Garrya elliptica
203 R02.95.01 Ericaeeae Rhododendron falconeri eximium
203 S08.01.00.c Taxodiaceae Sequoiadendron giganteum
203 H13.01.00.b Liliaceae Hyacinthoides hispanica
203 S02.01.01.b Buxaceae Sarcococca hookeriana humilis
203 C39.05.00.d Rosaceae Cotoneaster horizontalis
203 J01.01.00.a Oleaceae Jasminum humile
203 P19.03.00.h Ericaceae Pieris japonica
203 S13.01.00 Fabaceae Sophora japonica
203 S16.02.01 Rosaceae Spirea japonica
203 C07.02.00.h Theaceae Camellia japonica
203 C17.01.00.d Cercidiphyllaceae Cercidiphyllum japonicum
203 C14.03.01 Pinaceae Cedrus libani 'Nana'
203 P40.01.00.e Pinaceae Pseudotsuga menziesii
203 T06.02.00.h Cupressaceae Thuja plicata
203 V03.08.00.c Caprifoliaceae Viburnum rhytidophillum
203 S02.02.01.c Buxaceae Sarcococca ruscifolia 'Chilensis'
203 P32.06.04.b Rosaceae Prunus serrulata 'Shiro-fugen'
203 P32.06.05.e Rosaceae Prunus serrulata 'Shirotae'
203 C27.01.00.h Rutaceae Choisya ternata
203 D12.03.00 Dryopteridaceae Dryopteris tokyoensis
203 R02.39.01.b Ericaceae Rhododendron x ponticum 'Purple Splendor'
203 R02.46.00.e Ericaceae Rhododendron yunnanense
203 P18.01.00.a Pinaceae Pinus cembroides 'Cembroides'
203 P18.01.00.a Pinaceae Picea abies
203 C27.02.00 Cistaceae Cistus albidus
203 A26.01.00.a Rosaceae Amelanchier alnifolia
203 C13.01.00.b Rhamnaceae Ceanothus arboreus 'Concha'
203 O03.01.00 Oleaceae Osmanthus arnautus
203 P32.12.00 Rosaceae Prunus armeniaca
203 S41.01.00 Poaceae Sesleria autumnalis
203 P21.02.01 Pinaceae Pinus banksiana 'Schoodic'
203 G05.01.01 Ginkgoaceae Ginkgo biloba 'Maknien'
203 P21.03.01 Pinaceae Pinus bungeana 'Diamant'
203 A02.06.01 Pinaceae Abies cephalonica 'Meyer’s Dwarf'
203 P22.01.00.a Anacardiaceae Pistacia chinoensis
203 C02.01.00 Myrtaceae Callistemon citrinus
203 P36.01.00.a Rosaceae Pyracantha coccinea
203 P21.04.02 Pinaceae Pinus contorta 'Spann's Dwarf'
203 P35.01.00.b Styracaceae Pierosyrrax corymboius

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210 Q01.18.00.a Fagaceae Quercus suber
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210 R02.00.22a Ericaceae Rhododendron x 'Earl of Athlone'
210 R02.00.24 Ericaceae Rhododendron x Unknown Loderi Hybrid
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211 F15.01.01 Hamamelidaceae Fothergilla gardenii 'Blue Mist'
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302 P19.02.00.d Ericaceae Pieris formosa 5/14/2019 SM
302 H13.01.00.c Liliaceae Hyacinthoides hispanica 5/14/2019 SM
302 S02.01.01.a Buxaceae Sarcococca hookeriana humilis 5/14/2019 SM
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302 C07.02.00.j Theaceae Camellia japonica 5/14/2019 SM
302 C07.02.00.e Cornaceae Cornus kousa 5/25/2019 SM
302 P54.01.00 Theaceae Polyspora longicarpa 4/22/2019 SM
302 R02.102.00 Ericaceae Rhododendron macabeanum 5/14/2019 SM
302 C49.02.00 Iridaceae Crocos minimus 4/25/2019 SM
302 M02.06.00.a Berberidaceae Mahonia nervosa 5/14/2019 SM
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302 H18.01.02 Asparagaceae Hyacinthus orientalis 'Valentine Mix' 5/14/2019 SM
302 S06.01.00 Sciadopityaceae Sciadopitys verticillata 5/14/2019 SM
302 R02.00.07 Ericaceae Rhododendron x 'Dormouse' 5/14/2019 SM
302 R02.00.11.a Ericaceae Rhododendron x 'Maxwellii' 5/14/2019 SM
302 R02.00.18b Ericaceae Rhododendron x Loderi 'King George' 5/14/2019 SM
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302 R02.19.01 Ericaceae Rhododendron x 'Gandavense' 5/14/2019 SM
302 R02.46.00.b Ericaceae Rhododendron yunnanense 5/14/2019 SM
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302 H04.05.00 Plantaginaceae Hebe ochracea 5/25/2019 SM
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302 C07.01.00 Caryophyllaceae Cerastium arvense 5/14/2019 SM
302 M18.01.00 Lamiaceae Monarda austroappalachiana 5/14/2019 SM
302 A34.03.00 Ranunculaceae Aquilegia barneyi 5/14/2019 SM
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302 T19.01.00 Saxifragaceae Toimia menziesii 5/14/2019 SM
302 A43.01.00.b Saxifragaceae Asibie nova 5/14/2019 SM
302 R02.32.00.a Ericaceae Rhododendron occidentale 5/14/2019 SM
302 E20.02.00a Liliaceae Erythronium oregnum 5/14/2019 SM

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313  L06.01.00.c  Myrtaceae  Leptospermum  lanigerum  4/23/2019 SM
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317  R02.38.00.e  Ericaceae  Rhododendron  racemosum  5/2/2019  SM
317  R02.33.00.b  Ericaceae  Rhododendron  rubiginosum  5/2/2019  SM
317  C65.01.00  Brassicaceae  Cardamine  trifolia  5/25/2019  SM
317  C60.01.01  Ericaceae  Cassiope  x  'Muirhead'  5/11/2019  SM
317  R02.00.11.b  Ericaceae  Rhododendron  x  'Maxwellii'  5/2/2019  SM
317  R02.00.21r  Ericaceae  Rhododendron  x  Unknown hybrid  5/13/2019  SM
317  C42.01.01.b  Iridaceae  Crocus  x  crocoshitoflora  5/13/2019  SM
317  R02.31.01.c  Ericaceae  Rhododendron  x  obtusum  'Hi No Crimson'  5/13/2019  SM
317  P32.10.01.e  Rosaceae  Prunus  x yedoensis  'Akebono'  4/23/2019  SM
317  S21.01.01.a  Caprifoliaceae  Symphoricarpos  albus  'Laevigatus'  4/23/2019  SM
317  A11.01.00.b  Amaryllidaceae  Amaryllis  belladonna  4/23/2019  SM
317  B02.01.00.d  Saxifragaceae  Bergenia  cordifolia  4/23/2019  SM
317  M01.03.01.a  Magnoliaceae  Magnolia  grandiflora  4/23/2019  SM
317  H03.01.00  Hamamelidaceae  Hamamelis  japonica  4/23/2019  SM
317  C24.01.00.c  Calycanthaceae  Chimonanthus  praecox  4/23/2019  SM
317  C07.03.00.c  Theaceae  Camellia  reticulata  4/23/2019  SM
317  R04.01.00.e  Saxifragaceae  Ribes  sanguineum  5/14/2019  SM
317  P04.01.00.a  Vitaceae  Parthenocissus  tricuspidata  5/14/2019  SM
317  B02.01.00.e  Saxifragaceae  Bergenia  cordifolia  5/14/2019  SM
317  A16.08.00  Ericaceae  Comarostaphylis  diversifolia  4/23/2019  SM
317  M01.03.01.c  Magnoliaceae  Magnolia  grandiflora  'Kwanzan'  5/14/2019  SM
317  E22.01.00  Hamamelidaceae  Exbucklandia  populnea  4/23/2019  SM
317  R04.01.00.f  Saxifragaceae  Ribes  sanguineum  4/23/2019  SM
317  P04.01.00.b  Vitaceae  Parthenocissus  tricuspidata  4/23/2019  SM
317  V03.01.00.a  Caprifoliaceae  Viburnum  x bodnantense  4/23/2019  SM
317  L21.01.00  Caprifoliaceae  Lonicera  x heckrottii  4/23/2019  SM
317  P32.06.02.h  Rosaceae  Prunus  serrulata  'Kwanzan'  5/14/2019  SM
317  P32.06.02.i  Rosaceae  Prunus  serrulata  'Kwanzan'  5/14/2019  SM
317  P32.10.00.e  Rosaceae  Prunus  x yedoensis  5/14/2019  SM
317  P32.10.00.g  Rosaceae  Prunus  x yedoensis  5/14/2019  SM
317  P32.06.02.k  Rosaceae  Prunus  serrulata  'Kwanzan'  4/25/2019  SM
317  P32.06.02.l  Rosaceae  Prunus  serrulata  'Kwanzan'  4/25/2019  SM
317  P32.06.02.m  Rosaceae  Prunus  serrulata  'Kwanzan'  4/25/2019  SM
317  Q01.04.01  Fagaceae  Quercus  chrysolepis  4/23/2019  SM
317  T12.05.00  Melanthiaceae  Trillium  erectum  4/23/2019  SM
317  C60.01.00b  Orchidaceae  Cypripedium  formosanum  6/1/2018  SM
317  L14.08.00  Liliaceae  Lilium  hansonii  4/23/2019  SM
317  P02.04.00  Paeoniaceae  Paeonia  mairei  4/23/2019  SM
317  T12.01.00c  Melanthiaceae  Trillium  ovatum  4/23/2019  SM
317  S19.02.00.e  Theaceae  Stewartia  pseudocamellia  4/23/2019  SM
317  A47.01.00  Araceae  Arisaema  sikokianum  4/23/2019  SM
317  R02.80.00  Ericaceae  Rhododendron  tephropeum  5/13/2019  SM
317  A26.03.00  Pteridaceae  Adiantum  venustum  5/11/2019  SM
317  N04.05.00  Amaryllidaceae  Nerine  bowdennii  5/14/2019  SM
317  C45.03.00  Primulaceae  Cyclamen  purpurascens  5/14/2019  SM
317  Q01.15.00.b  Fagaceae  Quercus  rugosa  5/14/2019  SM
317  E20.00.01  Liliaceae  Erythronium  x  'Pagoda'  4/2/2019  SM
317  M01.19.00  Magnoliaceae  Magnolia  x watsonii  5/14/2019  SM
317  E06.01.00  Apiaceae  Eryngium  alpinum  5/14/2019  SM
317  B16.01.00  Fabaceae  Baptisia  australis  5/11/2019  SM
317  T20.01.00b  Saxifragaceae  Tellima  grandiflora  5/3/2019  SM
317  L21.02.00  Caprifoliaceae  Lonicera  involucrata  5/3/2019  SM
317  C27.00.00.c  Cistaceae  Cistus  laurifolius  5/20/2019  SM
317  S30.03.00  Asparagaceae  Scilla  peruviana  5/3/2019  SM
317  E06.02.00  Apiaceae  Eryngium  planum  5/2/2019  SM
317  D21.02.00  Iridaceae  Dierama  pulcherrimum  5/20/2019  SM
317  P32.06.05.f  Rosaceae  Prunus  serrulata  'Shiro-fugen'  5/14/2019  SM
317  L14.07.00b  Liliaceae  Lilium  tigrinum  1/5/2018  SM
| 325 | F06.01.00.b | Rosaceae | Filipendula | vulgaris | 5/14/2019 | SM |
| 325 | H01.00.01 | Saxifragaceae | Heuchera | x | 5/14/2019 | SM |
| 325 | H01.00.02 | Saxifragaceae | Heuchera | x | 5/14/2019 | SM |
| 325 | H01.00.03 | Saxifragaceae | Heuchera | x | 5/14/2019 | SM |
| 325 | P32.09.05.b | Rosaceae | Prunus | x subhirtella | 5/14/2019 | SM |
| 325 | P32.09.05.c | Rosaceae | Prunus | x subhirtella | 5/14/2019 | SM |
| 326 | A35.01.00 | Ranunculaceae | Aconitum | carmichaelii | 5/14/2019 | SM |
| 326 | L15.01.00 | Limnanthaceae | Limnanthes | douglasii | 5/14/2019 | SM |
| 326 | H01.01.00 | Poaceae | Hakonechloa | macra | 5/14/2019 | SM |
| 326 | M10.01.01 | Poaceae | Miscanthus | sinensis | 5/14/2019 | SM |
| 326 | M01.15.00.c | Magnoliaceae | Magnolia | stellata | 5/14/2019 | SM |
| 326 | N04.05.00.b | Amaryllidaceae | Narcissus | x | 5/14/2019 | SM |
| 326 | C42.01.01.a | Iridaceae | Crocosmia | x crocosmiiflora | 1/5/2018 | SM |
| 326 | C42.01.02 | Iridaceae | Crocosmia | x crocosmiiflora | 5/14/2019 | SM |
| 326 | C42.01.03 | Iridaceae | Crocosmia | x crocosmiiflora | 5/14/2019 | SM |
| 326 | W01.00.01 | Caprifoliaceae | Weigela | x | 4/23/2019 | SM |
| 327 | T09.01.00.b | Trochodendraceae | Trochodendron | aralioides | 4/23/2019 | SM |
| 327 | A13.01.00.c | Araliaceae | Aralia | californica | 4/23/2019 | SM |
| 327 | C10.01.00.b | Hydrangeaceae | Carpenteria | californica | 4/23/2019 | SM |
| 327 | B02.01.00.f | Saxifragaceae | Berberis | cordifolia | 4/23/2019 | SM |
| 327 | L08.01.00.a | Ericaceae | Leucothoe | davisi | 4/23/2019 | SM |
| 327 | A04.01.02.c | Actinidiaceae | Actinidia | delicosa | 6/15/2009 | SM |
| 327 | E13.01.00 | Boraginaceae | Ehretia | dicksonii | 4/23/2019 | SM |
| 327 | T08.01.00.g | Araliaceae | Trachycarpus | fortunei | 4/23/2019 | SM |
| 327 | E10.01.00.a | Cunoniaceae | Eucryphia | glutinosa | 4/23/2019 | SM |
| 327 | H13.01.00.d | Liliaceae | Hyacinthoides | hispanica | 4/23/2019 | SM |
| 327 | C23.01.00.d | Arecaceae | Chamaerops | humilis | 4/23/2019 | SM |
| 327 | C07.02.09.a | Theaceae | Camellia | japonica | 4/23/2019 | SM |
| 327 | P21.08.00.b | Pinaceae | Pinus | jeffreyi | 4/23/2019 | SM |
| 327 | S19.01.00.b | Theaceae | Stewardia | monadelpha | 4/23/2019 | SM |
| 327 | A03.09.00.b | Sapindaceae | Acer | negundo | 5/23/2019 | SM |
| 327 | J03.01.00 | Juglandaceae | Juglans | nigra | 5/23/2019 | SM |
| 327 | A05.05.00 | Sapindaceae | Aesculus | octandra | 5/23/2019 | SM |
| 327 | C24.01.00.d | Calycanthaceae | Chimonanthus | praecox | 5/23/2019 | SM |
| 327 | S19.02.01 | Theaceae | Stewardia | pseudocamellia | 5/23/2019 | SM |
| 327 | P21.18.00.c | Pinaceae | Pinus | sabiniana | 5/23/2019 | SM |
| 327 | F07.01.00.c | Oleaceae | Forsythia | suspensa | 5/23/2019 | SM |
| 327 | A06.02.00 | Lardizabalaceae | Akebia | trifoliata | 5/23/2019 | SM |
| 327 | M01.18.00 | Magnoliaceae | Magnolia | virginiana | 5/23/2019 | SM |
| 327 | R02.43.00.c | Ericaceae | Rhododendron | williamsonianum | 5/23/2019 | SM |
| 327 | M01.10.00 | Magnoliaceae | Magnolia | x loebneri | 5/23/2019 | SM |
| 327 | A15.03.00.a | Ericaceae | Arbutus | xalapensis | 5/23/2019 | SM |
| 327 | A17.01.00 | Aristolochiaceae | Aristolochia | californica | 5/23/2019 | SM |
| 327 | H02.01.00 | Styracaceae | Halesia | carolina | 5/23/2019 | SM |
| 327 | R02.12.00.d | Ericaceae | Rhododendron | decorum | 5/23/2019 | SM |
| 327 | G02.02.00 | Garryaceae | Garrya | flavescens | 5/23/2019 | SM |
| 327 | L10.01.00.b | Iridaceae | Libertia | formosa | 5/23/2019 | SM |
| 327 | C15.01.00 | Ulmaceae | Celtis | occidentalis | 5/23/2019 | SM |
| 327 | K04.01.00.a | Sapindaceae | Koelreuteria | paniculata | 5/23/2019 | SM |
| 327 | C02.04.00.a | Myrtaceae | Callistemon | subulatus | 5/23/2019 | SM |
| 327 | H03.04.00.b | Hamamelidaceae | Hamamelis | virginiana | 5/23/2019 | SM |
| 327 | H11.01.00 | Lardizabalaceae | Holboellia | angustifolia | 5/23/2019 | SM |
| 327 | P36.01.00.c | Rosaceae | Pyracantha | coccinea | 5/23/2019 | SM |
| 329 | L14.03.00 | Liliaceae | Lilium | columbianum | 5/30/2019 | SM |
| 329 | L10.01.00.a | Iridaceae | Libertia | formosa | 5/3/2019 | SM |
| 329 | F13.06.00d | Liliaceae | Fritillaria | lanceolata | 5/3/2019 | SM |
| 329 | F13.06.00b | Liliaceae | Fritillaria | lanceolata | 5/3/2019 | SM |
329 E20.02.00b Liliaceae Erythronium oreganum
329 C15.02.00.a Ulmaceae Celtis reticulata
329 D09.01.00.d Ebenaceae Diospyros virginiana
330 S11.01.01.b Liliaceae Smilax aspera ‘Maculata’
330 P21.02.00.b Pinaceae Pinus banksiana
330 A12.01.00.a Vitaceae Ampelopsis brevipedunculata ‘Marmowiczii’
330 F05.01.00.a Moraceae Ficus carica ‘James Roof’
330 G02.01.02 Garryaceae Garrya elliptica ‘Black and Tan’
330 C23.01.00.b Arecaaceae Chamaerops humilis
330 A20.01.00 Liliaceae Asparagus officinalis
330 Q01.19.00.a Fagaceae Quercus vaccinifolia
331 S11.01.01.a Liliaceae Smilax aspera ‘Maculata’
331 N04.01.00.a Rosaceae Oemleria cerasiformis
331 A04.01.01. Actinidiaceae Actinidia deliciosa
331 P36.02.00.a Rosaceae Pyracantha fortuneana
331 C23.01.00.a Arecaaceae Chamaerops humilis
331 C02.04.00.b Myrtaceae Callistemon subulatus
332 A06.01.00.a Lardizabalaceae Akebia quinata
CP1 S42.02.00 Sarraceniaceae Sarracenia alta
CP1 D29.02.00 Droseraceae Drosera filiformis
CP1 D29.01.00 Droseraceae Drosera intermedia
CP1 D28.01.02 Droseraceae Dionaea muscipula ‘BSZ’
CP1 D28.01.03 Droseraceae Dionaea muscipula ‘G16’
CP1 D28.01.04 Droseraceae Dionaea muscipula ‘DC XL’
CP1 S42.03.00 Sarraceniaceae Sarracenia purpurea
CP1 D29.02.00 Droseraceae Drosera rotundifolia
CP1 S42.00.02 Sarraceniaceae Sarracenia x ‘Black and Tan’
CP1 S43.00.01 Sphagnaceae Sphagnum x ‘Black and Tan’
CP1 S43.00.01 Sphagnaceae Sphagnum x ‘Caroline’
CP2 P54.00.00 Lentibulariaceae Pinguiicula grandiflora
CP2 S42.01.02 Sarraceniaceae Sarracenia leucophylla ‘Burgundy’
CP2 S42.01.00 Sarraceniaceae Sarracenia leucophylla
CP2 S42.01.01 Sarraceniaceae Sarracenia leucophylla
CP2 D28.01.01 Droseraceae Dionaea muscipula ‘King Henry’
CP2 S42.00.01 Sarraceniaceae Sarracenia x ‘Caroline’
CP2 S42.00.01 Sarraceniaceae Sarracenia x ‘Caroline’
GH S26.01.00.c Lauraceae Sassafras albidum
GH B13.02.00 Solanaceae Brugmansia aurea
GH I06.01.00 Solanaceae Iochroma austrole
GH E08.04.00 Myrtaceae Eucalyptus bicostata
GH T12.02.00 Melanthiaceae Trillium chloropetalum
GH A03.12.00 Sapindaceae Acer caurataefolium
GH C52.01.00 Fagaceae Castanea dentata
GH A03.21.01 Sapindaceae Acer glabrum
GH H25.01.01 Helwingiaceae Helwingia himalaica
GH T23.01.00 Saxifragaceae Telesonix jamesii
GH W01.01.00 Caprifoliaceae Weigela middendorffiana
GH H02.02.00.a Styracaceae Halesia monticola ‘Arnold Pink’
GH H02.02.01.b Styracaceae Halesia monticola ‘Arnold Pink’
GH P53.01.00 Blechnaceae Parablechnum nova-zelandiae
GH C36.04.00.b Cornaceae Cornus nuda
GH T13.01.00 Tanacetaceae Tanacetum okanoganense
GH P11.01.01 Hamamelidaceae Parrotia persica ‘Persian Lace’
GH A03.15.00 Sapindaceae Acer shirasawanum
GH P16.02.01 Pinaceae Picea stichensis
GH C52.01.01 Bignoniaceae Chitalpa tashkentensis
GH T20.01.00 Melastomataceae Tibouchina urvilleana
GH B13.00.01 Solanaceae Brugmansia x ‘Cherub’
GH B13.01.01 Solanaceae Brugmansia x candida 'Grand Mamier' 6/4/2019 SM
GH A05.02.01.i Sapindaceae Aesculus x carnea 'Briotii' 5/23/2019 SM
RGN P25.02.01 Campanulaceae Platycodon astra white 5/14/2019 SM
RGN N04.01.00 Amaryllidaceae Narcissus cantabricus 5/14/2019 SM
RGN C62.01.00 Zingiberaceae Caultleya cathcartii 5/11/2019 SM
RGN P39.03.00.a Primulaceae Primula elatior 5/14/2019 SM
RGN D12.02.01.b Dryopteridaceae Dryopteris filix-mas 'Barnesi' 5/14/2019 SM
RGN I04.01.00 Campanulaceae Isotoma fluviatilis 5/14/2019 SM
RGN I07.01.01 Brassicaceae Iberis gibraltarica Lavish 5/14/2019 SM
RGN V02.01.00.c Berberidaceae Vancouversia hexandra 5/14/2019 SM
RGN C50.01.00.b Dryopteridaceae Cyrtomium macrophyllum 5/14/2019 SM
RGN L23.02.01 Lamium maculatum 'White Nancy' 5/14/2019 SM
RGN H09.02.02.b Saxifragaceae Heuchera micrantha 'Dark Secret' 5/14/2019 SM
RGN H09.02.03.b Saxifragaceae Heuchera micrantha 'Lime Marmalade' 5/14/2019 SM
RGN T15.00.01 Ranunculaceae Thalictrum nova CDHM 14584 9/18/2017 SM
RGN R11.00.01 Saxifragaceae Rodgersia nova aff. Sambucifolia 5/14/2019 SM
RGN S25.01.00 Caryophyllaceae Saponaria ocymoides 5/14/2019 SM
RGN T11.02.00 Liliaceae Tricyrtis ohsumiensis 5/11/2019 SM
RGN P28.03.00.c Dryopteridaceae Polystichum polyblepharum 5/14/2019 SM
RGN P51.01.00 Papaveraceae Pteridophyllum racemosum 5/14/2019 SM
RGN S23.01.01.a Asteraceae Santolina rosmarinifolia 'Lemon Fizz' 5/14/2019 SM
RGN H09.01.02 Saxifragaceae Heuchera sanguinea 'Bressingham Hybrid' 5/14/2019 SM
RGN G08.02.01 Geraniaceae Geranium sanguineum 'Vision Pink' 5/14/2019 SM
RGN A31.01.00.b Aspleniaceae Asplenium sclopiedium 'Goetterdammerung' 5/14/2019 SM
RGN C55.01.00 Papaveraceae Corydalis solida 'China Town' 5/14/2019 SM
RGN D08.01.01.a Papaveraceae Dicentra spectabilis 'Alba' 5/14/2019 SM
RGN S04.03.01 Saxifragaceae Saxifraga stolonifera 'Lime' 5/14/2019 SM
RGN B05.01.02 Orchidaceae Bletilla striata 'Big Bob' 5/14/2019 SM
RGN B05.01.00.b Orchidaceae Bletilla striata 'Ringsabell Mulberry Rose' 5/11/2019 SM
RGN C08.00.01 Campanulaceae Campanula x 'Samartha' 5/11/2019 SM
RGN C08.00.02 Campanulaceae Campanula x 'Goetterdammerung' 5/14/2019 SM
RGN D12.01.00.a Gentianaceae Gentiana x 'China Town' 5/14/2019 SM
RGN T18.00.01 Liliaceae Tulipa x 'Whitewater' 5/11/2019 SM
RGN V08.00.01.b Plantaginaceae Veronica x 'Fragrant Fantasy' 5/14/2019 SM
RGN A34.00.01 Ranunculaceae Aquilegia x 'Evening Star' 5/14/2019 SM
RGN T15.01.01 Ranunculaceae Thalictrum x 'Mango Lassi' 5/14/2019 SM
RGN G09.00.01.a Rosaceae Geum x 'Kate' 5/14/2019 SM
RGN B05.02.01.a Orchidaceae Bletilla yokohama 5/14/2019 SM
RGP1 L24.01.02 Montiaceae Lewisia columbiana columbiana 5/14/2019 SM
RGP1 P06.06.00 Plantaginaceae Penstemon davidsonii menziesii 5/14/2019 SM
RGP1 A34.05.00 Ranunculaceae Aquilegia flavescens 5/14/2019 SM
RGP1 L35.01.00 Apiaceae Lomatium grayi 5/14/2019 SM
RGP1 C64.01.01a Montiaceae Claytonia megahiza nivalis 5/14/2019 SM
RGP1 L24.03.00 Montiaceae Lewisia nevadensis 5/14/2019 SM
RGP1 P06.05.00 Plantaginaceae Penstemon procerus 5/14/2019 SM
RGP1 S29.03.00 Crassulaceae Sedum spathulifolium 5/14/2019 SM
RGP2 A02.08.00 Pinaceae Abies amabilis 'Spreading Star' 5/13/2019 SM
RGP2 F13.09.00a Liliaceae Fritillaria camschatcensis 4/9/2019 SM
RGP2 L24.01.01a Montiaceae Lewisia columbiana rupicola 4/1/2019 SM
RGP2 L24.01.03 Montiaceae Lewisia columbiana wallowensis 5/14/2019 SM
RGP2 D19.03.00 Ranunculaceae Delphinium menziesii 5/13/2019 SM
RGP2 A46.00.00 Caryophyllaceae Arenaria nova 5/14/2019 SM
RGP2 S29.05.00 Crassulaceae Sedum oreganum 5/14/2019 SM
RGP2 T12.01.00a Melanthiaceae Trillium ovatum 5/11/2019 SM
RGP2 C06.01.00.d Asparagaceae Camassia quamash x rupicola x 5/14/2019 SM
RGP2 P06.00.01 Plantaginaceae Penstemon barrestrae 'Edithae' 5/14/2019 SM
RGP3 L24.02.00 Montiaceae Lewisia cotyledon cotyledon 4/1/2019 SM
14. HISTORIC GROUNDS REPORT: CARL S. ENGLISH JR. BOTANICAL GARDEN HIRAM M. 
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