Lake Washington Ship Canal Project
Historic Property Management Plan

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Seattle District
Corps of Engineers

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List of Abbreviations and Acronyms

ACHP	Advisory Council on Historic Preservation
AHPA	Archeological and Historic Preservation Act
AIA	American Institute of Architects
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
CRM	Cultural Resource Management
DAHP	Department of Archaeology and Historic Preservation
EP	Engineer Pamphlet
ER	Engineer Regulation
Garden	Carl S. English, Jr. Botanical Garden
GLO	General Land Office
GPS	Global Positioning System
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HPI	Historic Property Inventory
HPMP	Historic Property Management Plan
Locks	Hiram M. Chittenden Locks
MPD	Multiple Property Document
LWSC	Lake Washington Ship Canal Project
MFR	Memorandum for Record
MOA	Memorandum of Agreement
MP	Master Plan
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NRM	Natural Resources Manager
NPS	National Park Service
O&M	Operation and Maintenance
OMP	Operational Management Plan
OPM	Operations Project Manager
PA	Programmatic Agreement
PSH	Plant Significance Hierarchy
SHPO	State Historic Preservation Office/Officer
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Office
USACE	US Army Corps of Engineers

1 Purpose

The US Army Corps of Engineers (USACE), Seattle District, owns and operates the Lake Washington Ship Canal (LWSC) Project (Figure 1). The LWSC Project includes the Hiram M. Chittenden Locks (Locks or Locks Site; often referred to as Ballard Locks or Government Locks), a navigation channel (often referred to as LWSC or Ship Canal), the Fremont Cut, Montlake Cut, a reservoir (which includes two natural lakes, Lake Washington and Lake Union), and submerged tidelines (Figure 1). This LWSC Project Historic Property Management Plan (HPMP) provides the framework for USACE management of cultural resources at the LWSC Project. The LWSC Project is unique among USACE, Seattle District operating projects as it is not only a Historic District[1] listed in the National Register of Historic Places (NRHP, or National Register) for its culturally significant buildings, features, and landscapes, but is also home to the Carl S. English Botanical Garden (Garden), which is USACE's only botanical garden.

This HPMP updates the 1994 HPMP for the LWSC[2]. USACE developed this document in accordance with federal mandates for effective management and protection of cultural resources on lands under USACE jurisdiction. Engineer Regulation (ER) 1130-2-540, paragraph 6-2b requires each USACE operating project to develop a cultural resource management plan. This HPMP was prepared by USACE staff in accordance with the requirements in ER 1130-2-540 and it will serve as the LWSC project's cultural resource management plan. USACE should integrate this HPMP and the activities described herein into USACE's overall management and daily activities. It is intended to be a useful tool to USACE staff in planning and management roles.

[1] A historic district is a geographically definable area, urban or rural which possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A district may also comprise of individual elements separated geographically but linked by associated or history (36 CFR § 60.3 Definitions).

[2] USACE, *Historic Property Management Plan for Lake Washington Ship Canal,* prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings (1994).

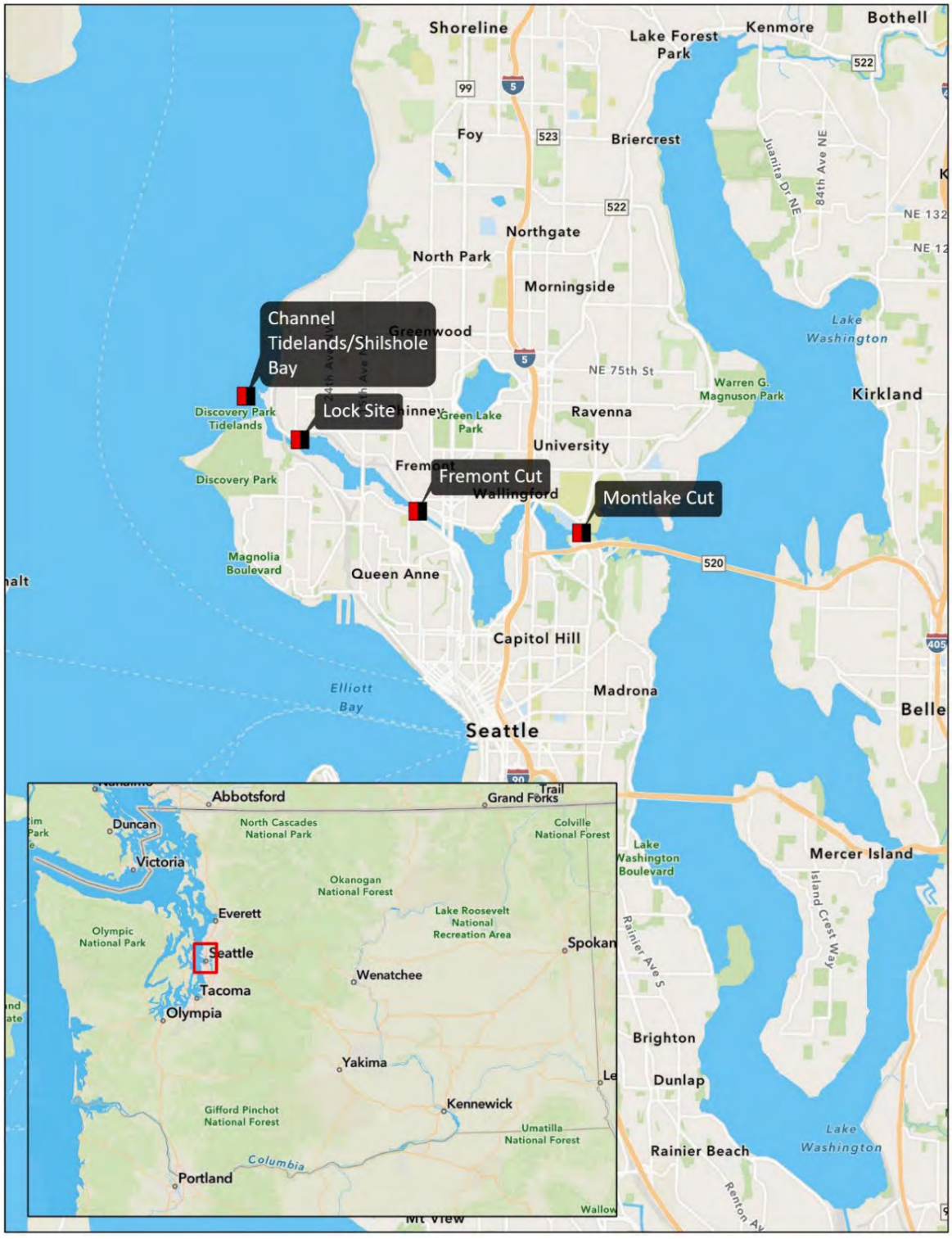

Figure 1. Location of the LWSC Project lands in Washington State and in the City of Seattle. The Channel Tidelands/Shilshole Bay are not discussed further because they are not part of the Historic District. Note: Section 4.5 contains detailed land descriptions.

2 Scope

The National Historic Preservation Act (NHPA), the Archeological Resources Protection Act (ARPA), and the Native American Graves Protection and Repatriation Act (NAGPRA), among others, are the cultural resources laws which pertain to the LWSC Project. Applicable federal statutes are reviewed in greater detail in Section 2.

The USACE has worked to meet these requirements in the past, primarily through project-specific archaeological surveys, establishment of the LWSC Historic District, and establishment of the Programmatic Agreement regarding Operations and Maintenance of the LWSC Project (Section 3.8). All previous cultural resource management activities occurred within the defined boundaries of the government owned LWSC Project lands which is also considered the Area of Potential Effect (APE) for the LWSC Project (Section 4). The APE is defined as "the geographical area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects for an undertaking may be different for different kinds of effects caused by the undertaking."[3]

2.1 Schedule

This HPMP provides the framework for management of cultural resources at the LWSC Project over a five-year period. The HPMP is a living document to be reviewed and updated as information becomes available. USACE shall review and update Section 8, Management Needs and Long-Term Planning, on a five-year schedule. USACE shall also review Appendix B: Contributing Buildings, Structures and Gardens on a five-year schedule and update as necessary. USACE will review the overall HPMP for effectiveness and update as needed on a 10-year schedule.

2.2 Authorized Purposes

Congressional authorization for dredging a ship canal to connect Salmon Bay, Lake Union, and Lake Washington, including any necessary locks and appliances, began in 1892 with House Document 1, 52nd Congress. House Document 2, 57th Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. House Document 3072, 59th Congress in 1906 authorized the canal construction from Puget Sound to Lake Washington. House Document 953, 60th Congress in 1908, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the federal government.

USACE operates the LWSC Project for its original purpose for providing navigational access between Puget Sound, Lake Union, and Lake Washington. As detailed in the LWSC Master Plan, subsequent

[3] Code of Federal Regulations, "36 CFR 800.16: Definitions," Up to date as of January 14, 2025, eCFR :: 36 CFR Part 800 -- Protection of Historic Properties.

legislation augmented the USACE mission, thus the Project also operates as a park and recreational facilities for use by the public.[4]

2.3 Organization and Relationship of the Master Plan and Operational Management Plans

USACE, Seattle District Operations Division operates and maintains the LWSC Project. The Operations Project Manager (OPM) is responsible for overall operations of the LWSC Project including, but not limited to, budgeting, personnel management, engineering and design, and district office coordination. In addition, activities of the LWSC staff include natural resource management, locks operations, administration, and maintenance. Overall budgetary authority for Cultural Resource Management (CRM) lies with the OPM with input from the Natural Resources Manager (NRM). As all CRM work takes place on lands USACE administers, responsibility for the overall coordination of such activities lies with the NRM. The NRM also serves as the primary point of contact between the LWSC Project and the public for matters concerning cultural resources. The USACE, Seattle District archaeologist/architectural historian is responsible for conducting cultural resource review of actions at the LWSC Project and for ensuring compliance with Section 106 of the NHPA.

The planning process used for Master Plans (MP) and Operational Management Plans (OMP) brings together laws and directives, and regional and operating project inventory and analysis. USACE will use this HPMP to inventory cultural resources affected by the LWSC Project, as well as to develop land-use or management classifications and project resource objectives on public lands. Alternatives developed during this step must include consideration of impacts on cultural resources. The HPMP will assist the MP and OMP Interdisciplinary Teams in identifying consulting parties, with respect to impacts on cultural resources.

The USACE Planning and Environmental and Cultural Resources Branch will use the HPMP in developing environmental impact studies, feasibility studies, and CRM. USACE should incorporate the information and procedures developed in this HPMP into both the MP and OMP, as described in Engineer Pamphlet (EP) 1130-2-540 Section 6-8.f.(1).

3 Legal and Regulatory

Historic preservation is an equal and integral component of resource management and is to be given equal consideration along with other resource objectives. USACE manages cultural resources on lands under its jurisdiction in a spirit of stewardship for the benefit of the public, both present and future.

This HPMP is governed by federal laws[5], executive orders and regulations, policy, agreements, authorizations, and the federal government's overarching trust responsibility to Native American people and tribes. While there are several laws, regulations, and stipulations governing the protection and preservation of cultural resources, the most salient authorities are summarized below. Of these, the NHPA of 1966 is the cornerstone of the Federal government's legislated responsibility for the protection of archaeological and historic properties.

[4] USACE, *Lake Washington Ship Canal Project Master Plan, King County, Washington,* In Progress (USACE, Seattle District: 2021).

[5] A comprehensive list of Federal preservation laws can be found at https://www.nps.gov/subjects/historicpreservation/laws.htm.

3.1 American Antiquities Act of 1906. Title 54 U.S.C. 312501-312508

President Theodore Roosevelt signed the American Antiquities Act of 1906 (Antiquities Act) into law on June 8, 1906. The Antiquities Act is the first act to establish protections for archaeological resources on public lands. The Antiquities Act acknowledges the importance of archaeological resources and holds government agencies responsible for the management of these resources. Further, the Antiquities Act sets important precedence for the care and management of archaeological sites and collections. The Antiquities Act was also first act to prescribe legal fines and punishments for individuals who damage archaeological resources.

3.2 National Historic Preservation Act (NHPA) of 1966, as amended. Title 54 U.S.C. 300101 et seq.

President Lyndon Johnson signed the NHPA into law October 15, 1966. Congress amended the NHPA on December 19, 2014. This amendment moved the law from Title 16 of the U.S. Code to Title 54. As a result of decades of use, the original sections from Title 16 (Section 106 and Section 110) are still recognized when referencing the law. The NHPA is the most extensive piece of legislation for the management of archaeological sites, districts, historic buildings and structures, and objects to date. The NHPA establishes roles for the Advisory Council for Historic Preservation (ACHP), State Historic Preservation Officers, Tribal Historic Preservation Officers, and the National Register of Historic Places (NRHP, or National Register). The NHPA holds Federal agencies responsible for the preservation and management of historic properties.

Section 106 of the NHPA requires federal agencies with jurisdiction over a proposed federal or federally assisted undertaking (e.g., a project or permit) to consider the effects of the undertaking on any district, site, building, structure, or object that is included in, or eligible for, inclusion in the National Register ("historic property").[6]

Section 110 of the NHPA requires that federal agencies assume responsibility for the preservation of historic properties on lands owned or managed by such agency. Of relevance, Congress amended Section 110 (a)(2) in 1992 to require federal agencies to establish a historic preservation program for properties under their jurisdiction. Section 110 also describes the role the NHPA plays in the National Environmental Policy Act (NEPA) process and sets the requirements for documenting the Section 106 decisions of federal agencies.

Under the NHPA, all cultural resources identified within an undertaking's APE must be evaluated for inclusion in the National Register of Historic Places. For a site, building, or structure to be considered "evaluated," a National Register eligibility determination must be made by a qualified professional, and concurrence must be received from the Washington State Historic Preservation Office (SHPO).

For a historic property to become listed in the National Register, it must first be nominated using National Park Service (NPS) Form 10-900. Listing in the National Register provides formal recognition of a property's historical, architectural, or archeological significance based on national standards used by every state. Formal nominations are prepared by or reviewed/approved at USACE, Seattle District, then USACE Northwestern Division, then USACE Headquarters prior to submitting the documentation to the

[6] Code of Federal Regulations, "Title 36, Chapter VII: Protection of Historic Properties," Up to date as of January 14, 2025, eCFR :: 36 CFR Part 800 -- Protection of Historic Properties.

Washington SHPO. The USACE Federal Preservation Officer will sign for the agency and transmit to the National Park Service for final review and listing by the Keeper of the National Register. The Washington State Office of Archaeology and Historic Preservation prepared the LWSC Historic District's nomination form in 1977. USACE reviewed and gave approval for the nomination to be submitted to the Keeper, and the Historic District was listed in the National Register in 1978.

A property is eligible for National Register listing if it is 50 years old or more, has tangible boundaries, maintains integrity, and meets one or more of the four criteria for evaluation contained in 36 CFR § 60.4. As described in 36 CFR § 60.4, the following four criteria provide a systematic, definable means to evaluate historic properties for nomination to the National Register. Eligible properties are properties:

> **Criterion A**: that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> **Criterion B**: that are associated with the lives of persons significant in our past; or
>
> **Criterion C**: that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> **Criterion D**: that have yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting the above criteria, a historic property must also satisfy at least one of the factors of integrity, which include location, design, setting, materials, workmanship, feeling, and association. NPS National Register Bulletin 15 'How to Apply the National Register Criteria for Evaluation, Bulletin 36 'Guidelines for Evaluating and Registering Archaeological Properties', and Bulletin 38 'Guidelines for Evaluating and Documenting Traditional Cultural Properties' explore how to apply these criteria and assess integrity in detail. There are several exceptional categories of historic properties that may, in certain cases, also be eligible for the National Register even though they fail to meet all the necessary and sufficient conditions and above criteria. For example, resources that are not yet 50 years old may still qualify if they are of "exceptional importance." Reconstructed or relocated buildings and structures may also be eligible even though they have lost most or all their original contextual integrity, for example, if they are the sole remaining examples of a significant architectural style or period. In some cases, guidelines on determining eligibility of specific historic property types are provided in other documentation such as relevant National Register Multiple Property Documents (MPD).

3.3 National Environmental Policy Act (NEPA) of 1969, as Amended

The National Environmental Policy Act, or NEPA, established a national policy for environmental protection and created the Council on Environmental Quality, whose purpose is to develop environmental policies and initiatives. Because of NEPA, federal agencies must consider the significance of the impact of an action during project planning and execution prior to implementation and develop a detailed statement of effects to the environment resulting from any major federal actions. This process ensures the public is informed about the action and environmental concerns considered during the decision-making process.

Federal agencies' statutory obligations under NEPA and the NHPA are independent, but integrating the processes creates efficiencies, promotes transparency and accountability, and supports a broad discussion of effects to the human environment. NHPA Section 106 review should be complete prior to issuance of a federal decision under NEPA, so that a broad range of alternatives may be considered during the planning process. The timing of both reviews should be coordinated because the information gathering and consultation done in the Section 106 review should inform the NEPA review, and vice versa.

3.4 Archeological and Historic Preservation Act of 1974. Title 54 U.S.C. 312501-312508

Also known as the Archeological Recovery Act (AHPA), the Act requires that federal agencies provide for "the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as a result of…any alteration of the terrain caused as a result of any Federal construction project of federally licensed activity or program". The goal of this statute is to protect and recover data from archaeological sites that would be destroyed by a federal undertaking. The statute establishes that federal agencies are authorized to fund archaeological reports, research, and other activities to mitigate the impacts of federal undertakings on important archaeological resources. Section 5 of the AHPA gives statutory authorities for the government-wide regulations for curation and care of federal archeological collections and associated records.[7]

3.5 Archaeological Resource Protection Act of 1979, as Amended. Title 16 U.S.C. 469 to 469c-2

The ARPA preserves and protects resources and sites on federal and Indian lands by fostering cooperation between governmental authorities, professionals, and the public. The ARPA prohibits the removal, sale, receipt, and interstate transportation of archaeological resources obtained illegally (i.e., without permits) from federal or Indian lands. It also authorizes federal permit procedures for investigations of archaeological resources on federal lands under an agency's control. Permits are required to excavate and remove archaeological resources that are 100 years old or greater. ARPA includes both civil and criminal penalties. Depending on the circumstances, individuals convicted of violating ARPA can be fined up to $100,000 and imprisoned for up to five years. ARPA permitting and investigations are the responsibilities of the land managing agency.

3.6 Native American Graves Protection and Repatriation Act of 1990. Title 25 U.S.C. 3001 et seq.

NAGPRA requires Federal agencies and institutions that receive Federal funding to work with the lineal descendants or culturally affiliated Native American Tribes or Native Hawaiian organizations that can show a relationship to human remains and "cultural items" in their possession about the disposition of those remains and items. Cultural items include funerary objects, sacred objects, and objects of cultural patrimony.

NAGPRA also encourages more deliberative removal of human remains and cultural items from federal lands by requiring that procedures under ARPA be followed and requiring discovery plans be in place where excavations could encounter burials or cultural items. NAGPRA also requires federal agencies to

[7] Code of Federal Regulations, "Part 79 – Curation of Federally Owned or Administered Archeological Collections," Up to date as of January 14, 2025, eCFR :: 36 CFR Part 79 -- Curation of Federally Owned or Administered Archeological Collections.

consult with Native American and Native Hawaiian organizations about the removal and disposition of burials and cultural items.

NAGPRA also establishes criminal penalties for "whoever knowingly sells, purchases, uses for profit, or transports for sale or profit, the human remains of a Native American without the right of possession to those remains." The same applies to "cultural items." Penalties are dependent on the number of offenses and can range from 12 months to five years imprisonment and fines of up to $100,000.

3.7 USACE Engineer Regulations and Policies

Historic properties are addressed in a variety of USACE regulations. These regulations outline actions and procedures involved in the management of cultural resources. ER 1130-2-540 and EP 1130-2-540, Environmental Stewardship and Maintenance and Guidance Procedures, are the most salient. They detail actions and procedures used to manage collections, preserve and curate archaeological and historical materials, and establish a Historic Preservation Program followed when historic resources are discovered during a USACE undertaking or when federally owned lands are accessed. ER 1130-2-540, paragraph 6-2 b, requires development of cultural resource management plans for USACE operating projects.

3.8 LWSC Programmatic Agreement

USACE, Seattle District, the Washington SHPO, and the ACHP signed a programmatic agreement (PA) in 1994 regarding Operations and Maintenance of the Lake Washington Ship Canal Project, Seattle, WA. The PA includes measures Seattle District will conduct in respect to the LWSC Project. These measures include: SHPO will have the opportunity to review and approve any proposed undertaking before rehabilitation or construction begins; all contributing properties in the Historic District will be rehabilitated in accordance with the Secretary of Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings and the LWSC Stewardship standards (Appendices to the PA). In addition, the PA lays out undertakings that can occur without further Section 106 review. Finally, the PA lays out qualifications necessary for the person or people supervising architectural plans and specifications, maintenance work, landscaping, and site maintenance in the Carl S. English, Jr. Botanical Garden.

A USACE, Seattle District archaeologist or architectural historian assigned to the LWSC Project must review all proposed projects to determine if the proposal meets the PA stipulations or if the project must undergo further Section 106 consultation.

3.9 Engineering Regulations and Pamphlets

In addition to the above laws, USACE has several ERs and EPs that provide further guidance specific to cultural resources, NHPA, and various USACE programs. The two commonly referenced ERs and EPs relating to cultural resources are:

- EP 1130-2-540, Project Operations Environmental Stewardship and Maintenance Guidance and Procedures
- ER 1105-2-100, Planning Guidance Notebook, Appendix C Cultural Resources

4 Historic Property Boundary

The LWSC Project boundary defines and documents the cultural resource management responsibility of USACE (see Section 3.2). The entire boundary LWSC Project encompasses 93.9 acres, of which 68.5 acres are government fee owned lands, 20.7 acres are in easements, and 4.6 acres are in annotated revised code of Washington 1901 lands. The APE includes both uplands and submerged lands. The LWSC Historic District is smaller than the overall Project boundary and is comprised of 77.2 acres. The Historic District includes the Hiram M. Chittenden Locks, the Fremont Cut, and the USACE perpetual right-of-way at the Montlake Cut, including submerged lands. The Historic District does not include the channel tidelands or Shilshole Bay submerged lands. USACE will determine a separate Area of Potential Effect (APE) on a project-by-project basis for individual undertakings that occur within the LWSC Project.

4.1 Hiram M. Chittenden Locks Site

The Locks Site is about 17-acres in size and contains the Cavanaugh House, the Carl S. English, Jr. Botanical Garden, and maintenance and administrative buildings as well as the Locks, spillway dam and fish ladder (Figure 2).

Figure 2. Historic District Boundary of the Hiram M. Chittenden Locks Site.

4.2 Fremont Cut

The Fremont Cut is located between Salmon Bay and Lake Union and is surrounded by industrial and commercial development. The Fremont Cut is approximately 5,800 feet long by 300 feet wide (including both land and water) and has an authorized depth of 30 feet (Figure 3). It is lined with concrete

revetments on either side which are bolstered by riprap. Landward of the revetment are 15 foot wide shoulders available for pedestrian use.

Figure 3. Historic District Boundary of Fremont Cut.

4.3 Montlake Cut

The Montlake Cut is at the eastern end of LWSC between Portage Bay and Union Bay. USACE has an easement interest on the property acquired from the State of Washington (Figure 4). The Montlake Cut property boundaries are 2,500 feet long by 350 feet wide, with a 200-foot-wide navigation channel and an authorized depth of 30 feet. The original 500-foot-wide right-of-way was reduced to its current 350-foot width in 1965 when the United States conveyed its easement interest in the northern 150 feet back to the State of Washington.

Figure 4. Historic District Boundary of Montlake Cut.

5 Environmental and Cultural Context

5.1 Environmental Setting, Geology and Soils

The LWSC Project is situated within the Puget Trough, a physiographic province dominated by Puget Sound and bounded by the Olympic Range to the west and the Cascade Range to the east.[8] The Locks span the mouth of Salmon Bay, which flows into Puget Sound at Shilshole Bay. The Fremont Cut is located between Salmon Bay and Lake Union, and the Montlake Cut is between Portage Bay and Union Bay. The LWSC Project connects Salmon Bay and Lake Union. Lake Washington and Lake Union are located to the east of Salmon Bay. Green Lake is located northeast of the project area.[9]

The landscape within the Puget Trough was formed by glacial scouring during the Vashon Stade (a period associated with high glacier activity) of the Fraser Glaciation 12,000 years ago. Between 2.4 million years ago and the beginning of the Holocene about 10,000 years ago, ice sheets advanced southward covering the Puget Sound region in thick layers of ice. The last glaciation was the Vashon Stade of the Fraser glaciation which began 17,000-18,000 years ago and reached its maximum extent about 15,000 years ago near Centralia, Washington. With the onset of climatic warming about 14,000

[8] Jerry F. Franklin and C.T. Dyrness, *Natural Vegetation of Oregon and Washington* (Corvallis, OR: Oregon State University Press, 1988).

[9] US Geological Survey, *Shillshole Bay, Wash.* 7.5-Minute Series Topographic Map (US Geological Survey, 1969, photo-revised from 1949).

years ago, the ice sheets began retreating northward.[10] As a result of glacial scouring, the geomorphology of the Seattle area is dominated by north or southward trending drainages and lakes.[11] Lake Washington, Lake Union, and Green Lake were created during the retreat of the Vashon ice sheet. Glacial till is the most extensive glacial deposit located within the LWSC Project area and is comprised of unsorted, unstratified highly compact mixture of clay, silt, sand, gravel, and boulders, and can contain interbedded stratified sand, silt, and gravel.[12] Construction of the LWSC Project significantly altered the natural landscape and much of the LWSC Project is comprised of disturbed glacial deposits.

5.2 Ethnohistory

The area was home to the Duwamish (*Dxwdewabs*) Tribe prior to construction of the Ship Canal and the Locks and to the arrival of Euro-Americans into what is present day Seattle. The name Duwamish is said to mean "inside the bay people" and their territory included the Black River, Cedar River, Green River and White River drainage area, extending from Puget Sound to the foothills of the Cascades. The Duwamish also included the Lake Washington people, the *Thluwi'thalbsh* at Union Bay, the Sammamish at the mouth of the Sammamish River, and the *Colcol-a oc* people of Salmon Bay.[13] The Duwamish were the first to meet the white settlers in what was to become the city of Seattle. The Duwamish were assigned to the Port Madison Reservation on the Kitsap Peninsula in the traditional homeland of the Suquamish with the signing of the 1855 Point Elliott Treaty. By 1856, many Duwamish left the Port Madison Reservation to return to their traditional homeland. Some Duwamish settled on the Muckleshoot Reservation. The Duwamish who chose not to settle on a reservation continue efforts to gain federal recognition from the US government.[14] The LWSC Project falls within the ceded territory and "usual and accustom" places of the Muckleshoot Indian Tribe, Suquamish Tribe, and Tulalip Tribes of Washington. The Muckleshoot Indian Tribe is made up of tribes who signed the 1854 Treaty of Medicine Creek and includes the Sekamish who occupied territory around the White River, the Skopamish on the upper Green River, and the Smulkamish on the upper part of the White River. The Suquamish and the Tulalip Tribes were signatories of the Port Elliott Treaty of 1855 when the Port Madison Reservation for the Suquamish and the Tulalip Reservation for the Tulalip Tribes were

[10] Donald W. Alt and David D. Hyndman, *Roadside Geology of Washington* (Missoula, MT: Mountain Press, 1994); Kathy Goetz Troost and Derek B. Booth, "Geology of Seattle and the Seattle Area, Washington," in *Landslides and Engineering Geology of the Seattle, Washington Area,* Edited by Rex L. Baum, Jonathan W. Godt, and Lynn M. Highland (The Geological Society of America, Inc., 2008), 1-35.

[11] B.A. Leisch, C.E. Price, and K.L. Walters, *Geology and Groundwater resources of northwestern King County, Washington,* Washington Division of Water Resources Water Supply Bulletin 20 (1963).

[12] Booth, et al.; Joe D. Dragovich, et al., *Geologic Map of Washington – Northwest Quadrant,* Washington Division of Geology and Earth Resources (Olympia, WA: Washington Department of Natural Resources, 2002).

[13] David Burge, "Seattle before Seattle: We live on ground that has been settled for perhaps 7,000 years," The *Weekly,"* (December 17, 1980); David Burge," Lost Seattle: Our Shameful Neglect of a Rich Archaeological Past," *The Weekly* (March 6-13, 1985); Wayne Suttles and Barbara Lane, "Southern Coast Salish," In *Handbook of North American Indians,* vol. 7. Northwest Coast, Edited by Wayne Suttles (Washington, DC: Smithsonian Institution, 1990); John R. Swanton, *The Indian Tribes of North America,* Bureau of American Ethnology, Bulletin 145 (Washington, DC: US Government Printing Office, Smithsonian Institution, 1952); Marian Smith, "The Coast Salish of Puget Sound," In *American Anthropologist* (1941) 197-211.

[14] Robert H. Ruby and John A. Brown, *A Guide to the Indian Tribes of the Pacific Northwest, Revised Edition* (Norman and London, OK: University of Oklahoma Press, 1992).

established. The Tulalip Tribes were Snohomish, Stillaguamish, Snoqualmie, Skykomish, Skagit, and Samish Indians, as well as remnants of other tribes.[15]

The subsistence of Coast Salish Tribes was based upon seasonal harvesting of resources. Saltwater resources included herring, smelt, flounder, lingcod, and rockfish. Shellfish resources included butter clams and horse clams, geoducks, and native oysters. Tribes caught a variety of fish including salmon, cutthroat, rainbow trout, mountain white fish, and suckers in freshwater rivers and lakes.[16] Lake Washington, Lake Union, and Green Lake historically had populations of suckers, kokanee, and chub.[17] Plants and berries were gathered and included camas, hazelnuts, wild carrot, dandelion root, onion, and wapato. Berries included blackberries, salmonberries, red elderberries, thimble berries, and salal berries.[18] Large game was hunted including deer, elk, and bear. The settlements consisted of permanent villages made up of cedar plank longhouses. Villages were located along waterways and temporary pole and mat structures were utilized during the summer months.[19]

5.3 Native American Place Names in the LWSC Project

Early histories and ethnographies point to village locations, food gathering places, descriptive place names, and supernatural and mythical happenings in the vicinity of the LWSC Project. Descriptive place names include *Cllco'l* or "shoving thread through a bead" for Salmon Bay, whichrefers to the way the narrow estuary invades the shoreline. This estuary was used as a highway and canoes "threaded" their way to the other side, now the location of the University of Washington. There was also a village location on the north shore of Salmon Bay where the Ballard neighborhood now sits.[20] Other descriptive place names include *Gwa'xwop* or "Outlet," for an opening on Lake Union that drained into Salmon Bay, which currently drains into to the Ballard Locks and *Qe'^{1}L^{E}bEd*, or "Meadow Point," for a sandy promontory north of Ballard township.[21]

Subsistence place names include *Ctc1wa't-qo,* or "Where One Whips the Water," for a small creek located east of the Burlington-Northern Railway Bridge that is downstream of the Locks in Ballard. Residents used to hit the water to drive fish into the narrow brook, where the fish were then captured easily. *Tce'dkedad,* or "Lying Curled on a Pillow," refers to a curved promontory in present-day Ballard at the entrance to Salmon Bay. The sand spit is curled around itself and was an excellent clamming location.[22]

Place names representing mythical or supernatural events include *Bit'da'kt,* or "A Kind of Supernatural Power," for a small creek that entered the north side of Salmon Bay. At this location a person was able to go to the underworld to regain a guardian spirit and shamans held dances at this creek.[23]*Lə'pləpl,* or

[15] Ibid.

[16] Suttles and Lane.

[17] David Burge, "Indian Lake Washington," *The Weekly* (August 1-7, 1984).

[18] Suttles and Lane.

[19] Ibid.

[20] T.T. Waterman, "The Geographical Names Used by the Indians of the Pacific Coast," *The Geographical Review,* 12: 175-194 (1922); T.T. Waterman, *Puget Sound Geography,* Edited by VI Hilbert, Jay Miller, and Zalmai Zahir (Federal Way, WA: Lushotseed Press, 2001).

[21] Waterman (2001).

[22] Waterman (1922); Waterman (2001).

[23] Ibid.

"Four-Mile Rock," is named for a boulder at the foot of Magnolia bluff where the ancient hero *Sta'kub* would throw a giant net over the rock while standing on the distant beach.[24]

Village locations included the previously mentioned *Cllco'l,* which was likely destroyed during the construction of the Locks. Other nearby village sites included five longhouses that were located along the northern margin of Union Bay and included buildings at the present-day locations of the University of Washington Steam Plant, the Edgewater Park area, and the Battelle Memorial Institute.[25]

Early newspaper accounts and anecdotal evidence indicate that the precise locations of burial grounds, village sites, and other native locations have been destroyed over time or forgotten. A shell midden, with "flint and bone" artifacts and likely associated with a village north of the Locks, was destroyed during the LWSC Project's construction by USACE. The construction of LWSC also destroyed a promontory where the Duwamish couple Charles (*Hwehlchtid*) and Madellene (*Chilohleeet'sa*) lived during the early 1900s.[26] Prior to the construction of the Locks, a pioneer to Ballard recalled Indians would often gather near the current location of the Burlington-Northern Railway Bridge and the Locks. A burial ground was noted on the hill west of the Burlington-Northern Railway Bridge.[27]

5.4 History of the Locks[28]

The idea of a ship canal linking Puget Sound to Lake Washington was a point of discussion from the beginning of the city of Seattle's history. It is common lore that the earliest recommendation for a canal to connect Lake Washington with Puget Sound originated in 1853 with George B. McClellan, then serving as a First Lieutenant of Engineers in the area. However, McClellan did not in fact propose a canal but instead praised the quality of the harbor at Elliot Bay in a letter to Governor Isaac Stevens.[29] It was in 1854 that Thomas Mercer, one of Seattle's earliest settlers, described the advantages of a canal in a speech at a Fourth of July picnic, referring to a union of lakes and bays and so naming Lake Union and Union Bay. Ensuing years saw much of the possibility, but little action, on the development of a ship canal as various ideas and locations for a ship canal were considered. Early attempts at creating a ship canal included an attempt by early settler Harvey Pike, who took pick and shovel to the area between Lake Washington and Lake Union in 1860, hoping that a small ditch eventually would become a large channel by erosion. However, this attempt failed, and Pike lost money.[30]

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[24] Waterman (2001).

[25] Burge (1985); Burge (1984); Lynn Larson and Dennis Lewarch, *The Archaeology of West Point, Seattle, Washington: 4,000 years of Hunter-Fisher-Gatherer Land Use in Southern Puget Sound. Volume 1, Part 1.* (1995). On file at the Washington Department of Archaeology and Historic Preservation, Olympia, WA.

[26] Burge (1985); Coll Thrush, "City of the Changers," *Pacific Historical Review,* vol. 75, no. 1, 89-117 (February 2006); Margaret I. Wandrey, *Four Bridges to Seattle: Old Ballard 1853-1907,* (Seattle, WA: Ballard Printing and Publishing, 1975).

[27] Wandrey.

[28] Section 5.4 History of the Locks is taken from the 1994 Master Plan but has been revised and updated as appropriate.

[29] Linda Holden Givens, "James Bates Cavanaugh takes charge of Army Corps of Engineers Seattle District and Lake Washington Ship Canal construction on August 1, 1911" (2017) https://www.historylink.org/File/20398; William F. Willingham, *Northwest Passages: A History of the Seattle District US Army Corps of Engineers, 1896-1920* (1992).

[30] David Williams, "Lake Washington Ship Canal (Seattle)" (2017) https://historylink.org/File/1444; Willingham.

USACE involvement with the idea of a ship canal began after the Civil War. During the late 1860s, a study of Puget Sound's defense needs was conducted, and engineering officers determined that Lake Washington was an ideal location for a naval station due to its proximity to much-needed resources. First Lieutenant Thomas H. Handbury conducted a survey in 1871 of two possible routes for a ship canal. The first and favored route was the shortest and was known as the Mercer Farm route. This route would extend from Lake Union to Elliott Bay. The second route followed the Seattle Coal and Transportation Company tramway, which ran from a coal bunker at the bottom of Pike Street to the current location of Westlake Avenue, and then north to Lake Union.[31] Neither route was pursued beyond the survey stage, and the decision was made for the naval station to be located at Port Orchard Bay rather than in Seattle.[32] In 1881, the Washington Improvement Company was formed by Seattle investors including David T. Denny, John McGilvra, and Thomas Burke. In 1885, a 16-foot-wide passage between Lake Washington and Lake Union was constructed. J.J. Cummings and Co. was originally hired to complete construction. Due to increased budget, construction was finished by the Wa Chong Company which provided Chinese laborers.[33] This new passage, known as the Portage canal, served to transport logs to sawmills on Lake Union. The Washington Improvement Company's goal was to sell the Portage Canal to the federal government, but the federal government was not interested in making such a purchase.[34] The 1889 Great Seattle Fire resulted in numerous lumber mills being relocated from Elliott Bay to Lake Union.

Congress made its first appropriation in 1890 for the proposed commercial waterway in Seattle, and a survey was authorized to find the most feasible route. The resulting government survey report, dated December 15, 1891, considered five possibilities. The first possibility was the Black River-Duwamish outlet, the second and third routes consisted of a Lake Union-Elliott Bay passage, and the fourth and fifth options were from Lake Union west to Salmon Bay, from which the canal would either continue west to Shilshole Bay or south to Smith Cove on Elliott Bay.[35] The Black River-Duwamish outlet was rejected as being impracticable and the second and third routes were rejected due the high cost of associated land. The remaining two options were determined to be feasible.[36] However, there was a lack of support for the canal outside of the city of Seattle and the project was not included in the 1892 Rivers and Harbors Bill.[37] Local efforts took up the challenge of constructing a canal and former Washington Governor Eugene Semple proposed to excavate two waterways. One would be at the mouth of the Duwamish River and the second would be a canal through Beacon Hill and Rainier Valley to Lake Washington. Semple began work at the mouth of the Duwamish River in 1895, and within a year had dredged 2,000 feet of waterway and filled 70 acres of tide land.[38] Congress approved a new study in 1894 for USACE to consider the northern option of the earlier-proposed canal routes. Captain Symon of USACE, Portland District was assigned to the project but was transferred to the USACE, Buffalo District due to a conflict of interest in his involvement with Eugene Semple's project. Captain Symon completed

[31] Williams; Willingham.

[32] Ibid.

[33] Ibid.

[34] Ibid.

[35] A.W. Sargent, "Lake Washington Ship Canal, Seattle, Wash." *The Military Engineer,* vol. 12, no. 64, 321-330 (July-August 1920).

[36] Ibid.

[37] Willingham.

[38] Ibid.

a survey prior to his transfer that covered the area from Lake Union west to Salmon Bay and Shilshole Bay.[39] However, there was disagreement among various local groups and the Great Northern Railroad between the Shilshole route or the Smith Cove route. Captain Harry Taylor advised the selection of the Smith Cove route, and in 1896 the War Department announced that the canal would be built through to Smith Cove. However, the Great Northern Railroad filed a protest. Ultimately, the Shilshole Bay route was chosen.

As part of the 1894 Congressional approval, King County was required to obtain rights of way for the project. It was not until June 1900 that all rights of way were formally acquired by the federal government. Contractors for USACE, Seattle District began cutting a passage between Puget Sound and the mouth of Salmon Bay in 1901. A second contract involved digging a canal from Salmon Bay to Lake Union. This work was completed in 1903.[40] Eugene Semple began construction of his own Lake Washington Canal in 1901, and the prospect of two competing canals eventually led representatives of both projects - Semple's Lake Washington Canal and the northern canal route - to be called to testify before Congress in 1902. Congress authorized a new USACE study analyzing both canal routes rather than choosing one route over the other. A special engineering board, chaired by Colonel William Heuer, visited Seattle in August and November of 1902 to study the areas and hold meetings with project representatives. The engineering board determined the south route to be less favorable due to the height of Beacon Hill and the ridge to the east that would require the removal of five times more material than needed to be moved to accomplish the Shilshole Bay route. While the board determined the north route was entirely feasible from an engineering perspective, they questioned whether the benefits of the project would outweigh the annual costs of operations and maintenance, as they found many of the supporting arguments were exaggerated.[41] The board advised against the northern canal route and this decision was confirmed in 1905 by USACE, citing a lack of economic benefit.[42] Seattle residents, upset by the lack of federal progress, rallied behind James A. Moore, who proposed to build a wooden lock at the end of Salmon Bay and lower the level of Lake Washington. Congress authorized the use of the right-of-way for Moore's project in 1906.

Major Hiram M. Chittenden[43] became the new District Engineer of the USACE, Seattle District in 1906. Despite the 1905 USACE determination that the northern route lacked economic benefit, Major Chittenden decided the canal was the most important matter before the district and its completion would make a fitting end to his military career.[44] Major Chittenden did not think Moore's proposal would be feasible and was able to sow doubt about Moore's plan with city leaders through his own connections. Congress commissioned a new survey of the project in 1906 which was completed by Major Chittenden by the end of 1907. Major Chittenden recommended significant changes in the nature and placement of the lock, advocating a double lock of permanent masonry construction rather than a wooden lock. Local controversy flared over the location of the locks. Mill operators who had been compensated by King County to move to higher land in the 1890s were opposed to the proposed lock site, citing the recent increase of value to their land. Major Chittenden worked to gain local support for

[39] Ibid.
[40] Ibid.
[41] Ibid.
[42] Ibid.
[43] See Section 6.4.1 for more detailed information on Hiram M. Chittenden.
[44] Willingham.

building the lock at his preferred location, and at a federal meeting it was shown that only mill owners, a small minority, were in opposition to Chittenden's proposal. The Board of Engineers approved Major Chittenden's project in 1908. However, due to ill health, Major Chittenden was forced to retire in 1909. His replacement, Major Charles W. Kutz, determined the location of the lock site should be left to local interests, thus reigniting the contentious discussion of location. The mill owners again opposed the proposed location. Through the State court system, opposing mill owners challenged the legality of the local assessment used to raise funds for the project and the $750,000 bond issued by the County voters.

While Congress had authorized the construction of the locks in 1910, providing that state and local interests made funds available for the connecting links, the War Department determined construction could not proceed until the case worked its way through the courts. However, the Washington State Legislature appropriated $25,000 to USACE in 1910. The appropriated state funds were used to contract work for what was to become the Montlake Cut between Lake Washington and Lake Union.[45] In 1911, the Washington Supreme Court overruled previous decisions, thus validating the planned structure and protecting the government from damage suits.[46] With the Washington Supreme Court decision, the War Department issued its approval on June 29, 1911. Construction began in September 1911, with the locks themselves being built beginning in November 1911.[47] Major James B. Cavanaugh, who become the USACE, Seattle District Engineer in mid-1911, oversaw construction of the locks.[48]. Designs for the Lock and Spillway Dam structures were created in-house. In February 1913, the first concrete was set into forms to build the Locks. July 1916 marked the first closing of Salmon Bay.

The water level of Lake Washington decreased eight feet to the level of Lake Union by October 1916 because of the construction of the Locks. This caused it to drain into Lake Union, reversing the flow of the lower end of the Cedar River which began to drain into Lake Washington. The Black River, with both its sources' flows reversed, dried up permanently and ceased to exist (Figures 5 and 6). With the completion of the Fremont Cut, Salmon Bay was raised to the height of Lake Union and became freshwater (Figures 7 and 8). The Montlake Cut between Lake Union and Lake Washington was opened in May 1917 near the abandoned portage excavated by the Lake Washington Improvement Association.

The completed project was dedicated on July 4, 1917, with congratulations from former President Theodore Roosevelt. Boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Peary during his 1907 Arctic expedition, crossed though the Locks to celebrate the occasion.

The total cost of the project at the time of the dedication was reported to have been $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewers, and water tunnels, and regrading streets where necessary. Remaining costs were divided between the State of Washington and King County, which were responsible for acquisition of rights of way as well as excavation and construction costs upstream from the Locks, and the federal government, which constructed the Locks and accessory works.

Originally referred to as the "Government Locks" or "Ballard Locks," Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by renaming the Locks after him. At the time they were

[45] Ibid.
[46] Ibid.
[47] Sargent; Willingham.
[48] See Section 6.4.2 for more detailed information on James B. Cavanaugh

built, the Locks were second in scale among American projects only to those at the Panama Canal, but now are surpassed by several others in the United States.

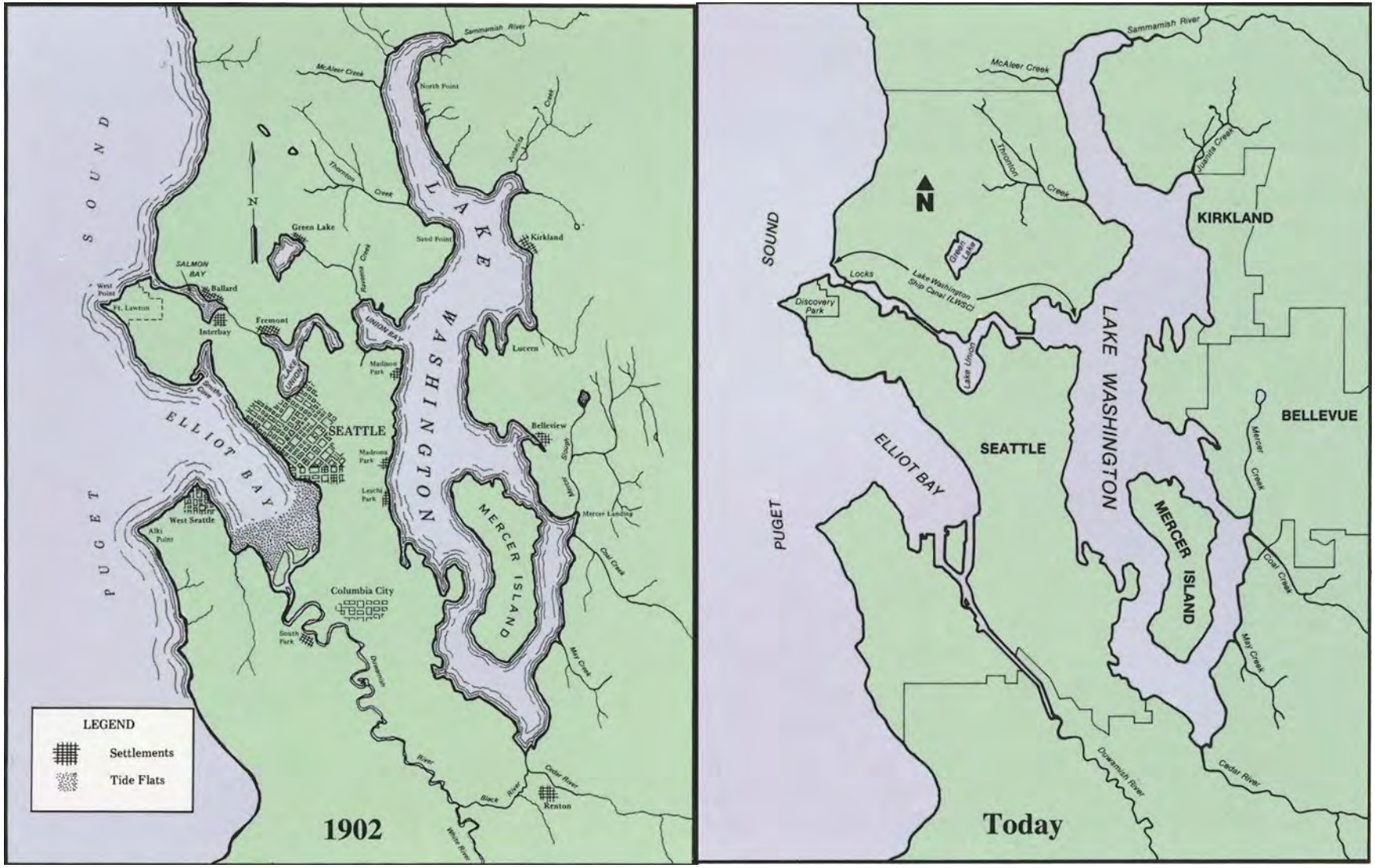


Figure 5. Seattle prior to the construction of the Lake Washington Ship Canal, left, compared to the present-day shape of its waterways. Note the Black River (lower right of 1902 map) is no longer in existence.

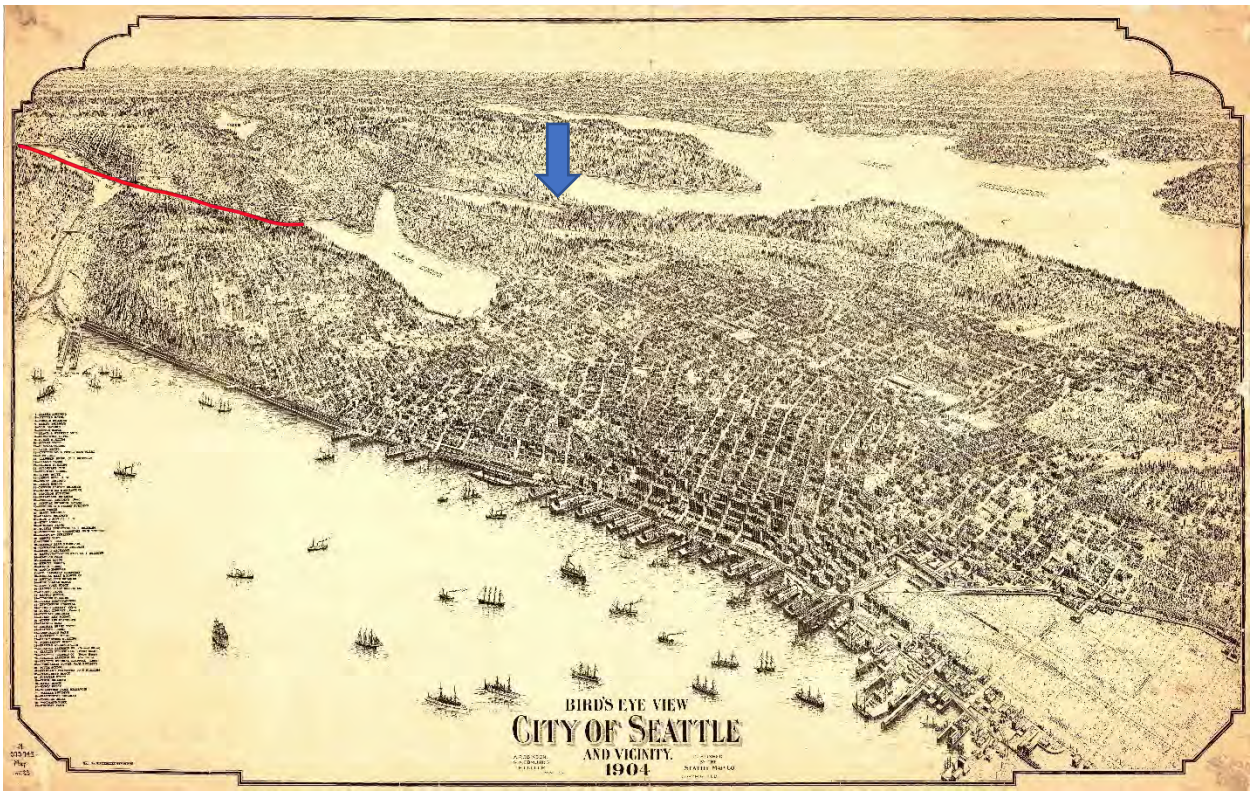


Figure 6. 1904 bird's eye view of the City of Seattle. The red line indicates the approximate location of the Fremont Cut and Locks. The blue arrow points to the approximate location of the Montlake Cut (Seattle Map Company. On file at the University of Washington Special Collections).

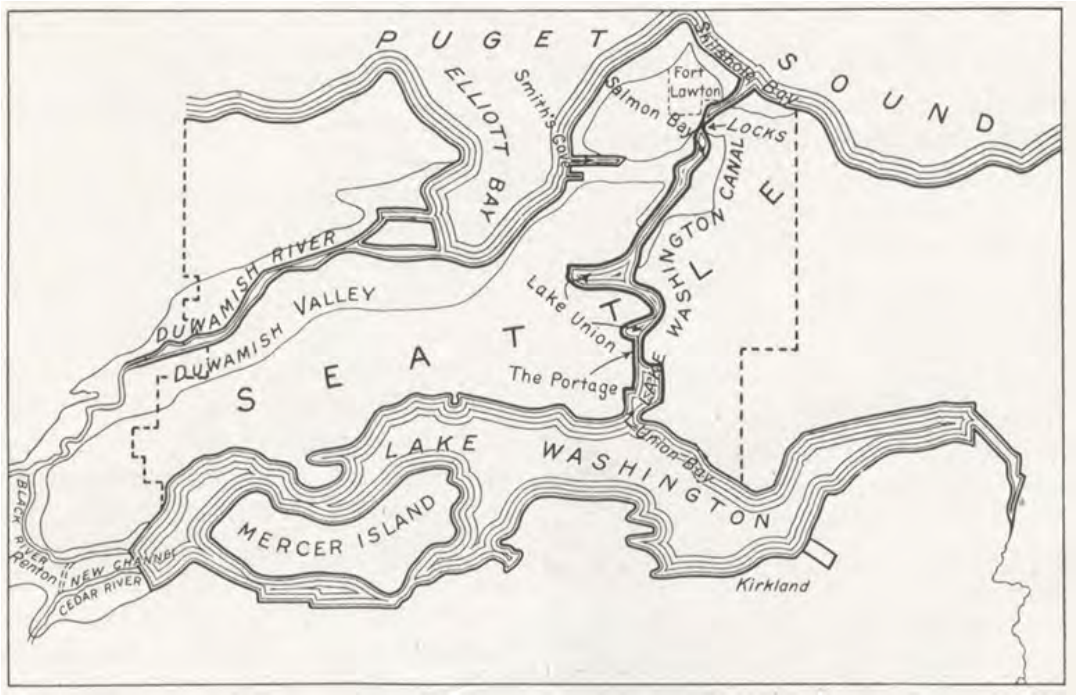
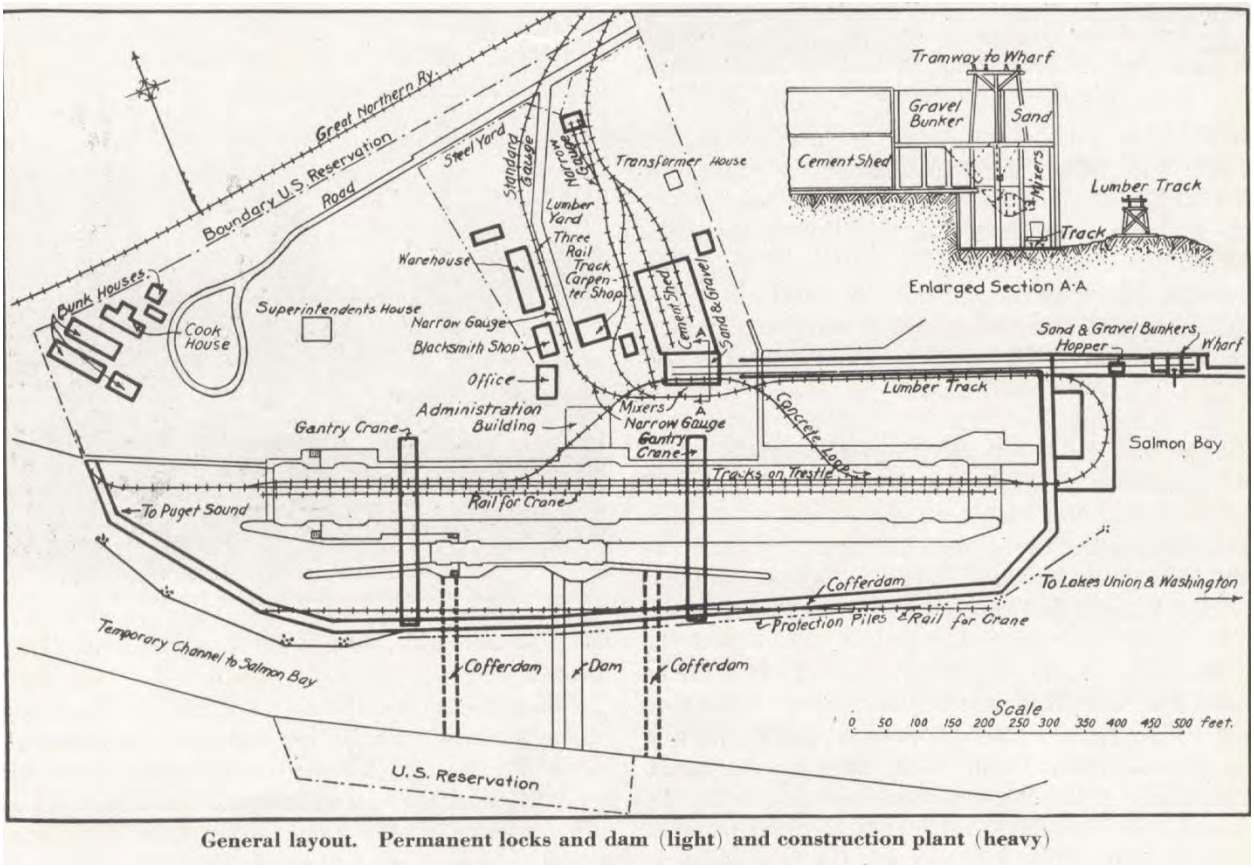


Figure 7. Seattle Harbor and Lake Washington Ship Canal (no date). Figure adapted from Sargent 1920.



General layout. Permanent locks and dam (light) and construction plant (heavy)

Figure 8. General layout of LWSC (no date). Figure adapted from Sargent 1920.

6 Cultural Resources at the Project

6.1 Previous Investigations

Most previous cultural resource investigations at the LWSC Project have focused on the built environment due the listing of the Historic District in the National Register. One archaeological survey was conducted within the boundaries of the Historic District during Section 106 review of a security gate around the Cavanagh House. Table 1, below, lists all previous investigations that have occurred within the APE of the LWSC Project. Table 2 lists previous investigations within 0.25 miles of the LWSC Project, including the Fremont Cut and the Montlake Cut.

Table 1. Cultural Resources Investigations, Reports, and Mitigation Documentation that have occurred within the LWSC Project APE.

Author	Date	Title	Description
Freier	1989	Historic Grounds Report, The Carl S. English, Jr. Botanical Garden, Lake Washington Ship Canal	Historic overview of the Locks, landscape, and botanical garden; a site inventory and analysis in reference to the historic character of the landscape and its elements; and recommendations as to how the historic character should be maintained.
USACE	1994	Historic Property Management Plan for Lake Washington Ship Canal	Historic Property Management Plan-Developed to manage the LWSC Project and a requirement of the Programmatic Agreement.
Forsman, Lewarch and Larson	1997	Lake Washington Ship Canal Resource Assessment Listing of Known Artifacts	Review of repositories that may have had collections related the Locks; examined the collection held at the Burke Museum of Natural History and Culture.
Gregory, et al.	2009	Analysis and Interpretative Plan for Hiram M. Chittenden Locks, Seattle WA	Overview of Native American use of area prior to the Locks; reviewed the artifact collection reportedly from the Locks that is held at the Burke Museum. Presented ideas for interpretation.
Kiest	2010	South Entry Landscape-Inventory, National Register Eligibility Evaluation, and Management Study	Overview of the South Entry Landscape. Provides recommendations for the South Entry Landscape, Fish Ladder, and Commodore Park, plus recommendations for future management plans. Did not provide a determination of National Register eligibility for the South Entry Landscape. Focused on management strategies.
Kanaby	2011	Cultural Resources Survey for the Proposed Barrier Fence at the Cavanaugh House at the Hiram M. Chittenden Locks, Seattle, WA	Archaeological survey for a barrier fence around the Cavanaugh House.

Author	Date	Title	Description
McCormick	2012	Level II Mitigation: Documentation of Hiram M. Chittenden Locks Pumping Plant, Seattle, King County, WA	Documentation for the Pumping Plant under the Administration Building. Pumping Plant has been replaced with new equipment
McCormick	2011	Level II Mitigation: Documentation of Historic Properties Hiram M. Chittenden Locks, Boathouse, Seattle King County, WA	Documentation of Boathouse prior to demolition.
National Park Service (NPS)	2013	Landscape Chronology: Carl English Jr. Botanical Garden Hiram M. Chittenden Locks Seattle, WA	Summarized the development of the Carl S. English Jr. Botanical Garden and documented physical changes to the Garden over time.
Weisgerber	2017	Emergency Crane Hoist House Lake Washington Ship Canal Conditions Assessment and Treatment Recommendations	Assessment of the condition of the Hoist House and provided guidance to for design process during repairs.
Munro et. al. (Appendix C)	2020	Supplemental Cultural Landscape Report for the Carl S. English Jr. Botanical Garden at the Hiram M. Chittenden Locks, Seattle Washington.	This supplemental report elaborated upon the 1989 Historic Grounds Report by documenting the undertakings in and around the cultural landscape since its completion. The 2020 report identified and inventoried the historic integrity of the Garden as a cultural landscape and recommended preservation treatments.

Table 2. Cultural Resource Investigations within 0.25 miles of the LWSC Project, including the Fremont Cut and the Montlake Cut.

Author	Date	Title	Cultural Resources Identified
Dellert and Lockwood	2018	SPU WWPS043 Emergency Force Main Replacement Project, Cultural Resources Assessment-Short Report, King County WA (Revised)	No
Stevenson et al.	2018	Data Recovery at 45KI1298, Seattle Washington. DAHP Excavation Permit 2016-69	45KI1298
Hoyt and Johnson	2010	Archaeological Monitoring of Sonic Borings within the Multi Use Facility, West Point Treatment Plant, Waste-to-Energy Project	No
Perrin et. al.	2010	Cultural Resources Assessment of the Proposed Burke-Gilman Trail Extension Project, Segment 4, Seattle, King County Washington.	No
Major	2009	Salmon Bay Piling Removal Review	No

Author	Date	Title	Cultural Resources Identified
Thompson	2008	Cultural Resources Assessment of the Nordic Heritage Museum Project Site, City of Seattle, King County, Washington	No
Kaehler and Gillespie	2008	Cultural Resources Assessment of the Proposed Burke-Gilman Trail Extension Project, King County, Washington	No
Piper	2008	Cultural Resources Assessment for 5425 Shilshole Ave. NW (Ballard Hotel), Seattle, King County, Washington	No
Blukis Onat	2007	Cultural Resources Background Investigations for the Revised Ballard Siphon Replacement Project, King County, Washington	No
Kaehler	2007	Archaeological Resources and Historic Buildings and Structure Assessment of the Proposed Ballard Blocks 2 Project, City of Seattle, King County, Washington	No
Zuccotti	2006	Results of Archaeological Monitoring for the West Point Treatment Plant Underground Storage Tank Removal Project, King County, Washington	No
Juell	2006	Archaeological Site Assessment of Sound Transit's Sounder: Everett to Seattle Commuter Rail System, King and Snohomish Counties, Washington	No
Trudel and Larson	2005	Burke-Gilman Trail Extension Project Archaeological Monitoring	No
Parvey	2004a	Cultural Resources Investigation for the Ship Canal Trail Extension Project Seattle, Washington	No
Roedal et al.	2004	Final Burke-Gilman Trail Extension Archaeological Resources and Traditional Cultural Places Assessment, City of Seattle, King County, Washington	No
Forsman et al.	1997	Lake Washington Ship Canal Cultural Resource Assessment Listing of Known Artifacts	Artifacts associated with unrecorded site
Goetz	1995	Archaeological Resources Assessment of the University of Washington, Bothell Branch and Cascadia Community College Collocation Project at the Truly Farms/Stringertown Site, Bothell, Washington	No
Thompson et al.	1995	Cultural Resources Assessment of Alternative Sites Proposed for Army and Navy Armed Forces Reserve Center Seattle, Washington	No

6.2 Archaeological Sites

There are no known archaeological sites within the boundaries of the LWSC Project. However, there are three sites located with 0.25 miles (Table 3). Site 45KI1000 is located 0.09 miles to the west of the Locks site and has been identified as a shell midden. It is possible this is the same site that was observed, and from which artifacts were collected, in 1923 by A.G. Colley and F.S. Hall. The third site is 45KI1298, a historic or prehistoric site. These archaeological sites, along with ethnographic information, strongly indicate that there was a Native American village located either at or within close proximity to the Locks site, of which evidence was destroyed during the LWSC Project's construction.

Table 3. Recorded Archaeological Sites within 0.25 mile of the project area.

Site Number	Description	Approximate Distance	Reference
No Site #	Burials and hearth features	Either within or adjacent to the LWSC project. Exact location is unknown	Colley circa 1923
45KI01000	Precontact shell midden	0.09 mile west	Major 2010
45KI1298	Historic or precontact site	0.18 northwest	Stevenson et al. 2018

6.3 LWSC Historic District

The LWSC Historic District was listed in the National Register of Historic Places in 1978 as a Historic District. The 1978 National Register nomination paperwork does not articulate the Criteria of Significance associated with the Historic District, but lists its Areas of Significance as Architecture, Commerce, Engineering, Landscape Architecture, Military, Politics/Government, and Transportation.

An update to the 1978 National Register nomination is currently in process by USACE, Seattle District cultural resource staff. The LWSC Historic District is significant under Criterion A in the areas of Commerce, Engineering, Military, Politics/Government, and Transportation. The Historic District is a significant engineering achievement completed under governmental auspices that created a navigable waterway joining Puget Sound to Lake Union and Lake Washington, thus enhancing the commercial and recreational maritime transportation capabilities of the city of Seattle and the Pacific Northwest region. The connectivity afforded by the Locks would further be a regional asset as the nation prepared for and engaged in World War II. The LWSC Project is also eligible for listing under Criterion B, for its association with engineer and historian Major Hiram Martin Chittenden, who served as Seattle District Engineer as he developed and promoted the plan for the canal. In addition, the LWSC Project is eligible under Criterion C in the areas of Architecture, Engineering, and Landscape Architecture. Its eleven original concrete accessory buildings are distinctive examples of classically ornamented early 20th century commercial architecture. It further represents a feat of engineering, and the Carl S. English, Jr. Botanical Garden's carefully designed and cultivated landscapes represent an artistic vision for the site which took decades to bring to fruition. Section 6.4 discusses the individuals who helped shape the Historic District and the LWSC Project and Section 6.5 discuss provides information on its contributing buildings. Appendix B provides more in-depth information on the District's contributing buildings, structures, and landscapes.

6.4 Significant Individuals

6.4.1 Hiram M. Chittenden - Champion of the Lake Washington Ship Canal

Hiram M. Chittenden (1858 - 1917), born in Cattaraugus County, New York, became a civil engineer. He began his studies at Cornell University before attending West Point, where he graduated third in his class and obtained an assignment with USACE[49] He attended the Engineer School of Application in New York after graduating from West Point, before being assigned to the Department of the Platte in Omaha as engineer officer. As an engineer officer, Chittenden was assigned to various locations by USACE, including the Missouri River Commission, Yellowstone, and Louisville.[50] Chittenden first achieved national acclaim in 1897 for his report, *Preliminary Examination of Reservoir Sites in Wyoming, and Colorado*[51] which he prepared during his second assignment to the Missouri River Commission in 1896. This report was the idea of Senator Francis E. Warren, who championed a survey of reservoirs in Wyoming and Colorado to help reduce floods in the Missouri and Mississippi Basins[52] The report advocated for federal construction of irrigation dams and is said to have become the basis of the Newland Act of 1902[53].

Chittenden returned to Yellowstone Park After serving in the Spanish-American War. He took charge of completing the road system at Yellowstone Park that he had helped lay out earlier.[54] He was promoted to the rank of Major in 1904; soon after he was appointed to the federal commission to determine the boundaries of Yosemite Park. Chittenden was an early advocate of multiple-purpose resource use, a concept which is widely applied today.[55] Among his substantial publication credits are *The Yellowstone National Park* (1895), *The History of Early Steamboat Navigation on the Missouri River* (1903), *The Life, Letters and Travels of Father Pierre Jean de Smet* (1905), and his monumental work, *The American Fur Trade of the Far West* (1902).

Between 1906 and 1908, during his active period as Seattle District Engineer, Chittenden directed the planning and construction of the majority of the 25-mile tourist road stretching from the western boundary of Mount Rainier National Park to Camp of the Clouds.[56] From his predecessor he inherited the ongoing task of constructing fire control towers for the coastal artillery batteries at Fort Flagler, Fort Casey, and Fort Worden, which comprised the defenses for Seattle and its harbor in Elliott Bay. He was promoted to Lieutenant Colonel upon leaving the Seattle District.[57]

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[49] Gordon B. Dodds, *Hiram Martin Chittenden, His Public Career* (Lexington, KY: The University Press of Kentucky, 1973).

[50] ibid.

[51] U.S, Congress, House, "Preliminary Examination of Reservoir Sites in Wyoming and Colorado, prepared by Hiram Martin Chittenden. 55th Congress, 2nd Session, 1987, House Doucment 141, series 3666

[52] David P. Billington, Donald C. Jackson, and Martin V. Melosi, *The History of Large Federal Dams: Planning, Design, and Construction in the Era of Big Dams* (Denver, CO: US Department of the Interior, Bureau of Reclamation, 2005); Dodds.

[53] The Newland Act of 1902 (Lowlands Reclamation Act or National Reclamation Act) funded irrigation projects for arid lands of 20 states in the West by the sale and disposal of public lands.

[54] Dodds.

[55] Ibid.

[56] Ibid.

[57] Ibid.

During his later years Chittenden suffered from a debilitating paralysis known as locomotor ataxia, but his astonishing dedication to his work seldom flagged. By mid-1908, however, his condition had worsened to such an extent that he was forced to withdraw from duty as a Lieutenant Colonel. At the urging of several associates, including City Engineer Reginald Thompson, Secretary of the Interior Richard Ballinger, and a former Seattle Mayor, Chittenden's promotion to the rank of Brigadier General was secured prior to his disability retirement on February 10, 1910. After his retirement, Chittenden remained active as a consulting engineer in the Seattle area. He continued to write despite his frail health, authoring *War of Peace, Flood Control,* and a revised and expanded edition of his guidebook to Yellowstone National Park. He also continued to take part in public life as president of the Seattle Port Commission from 1911 to 1915. Chittenden wrote extensively for the journals of the American Society of Civil Engineers until his death in 1917.

6.4.2 James B. Cavanaugh (1869-1927)

James B. Cavanaugh was born in Carrollton, Illinois in 1869. His father, Thomas Cavanaugh, moved the family first to Salina, Kansas and then to Olympia, Washington in 1883.[58] James Cavanaugh graduated from Olympia Collegiate Institute in 1887 and entered the US Military Academy at West Point, New York a year later. He graduated in 1892 as a Second Lieutenant and as first in his class for that year. The same year he graduated from West Point, he enrolled in the Engineering School of Applications, graduating in1895.[59] Cavanaugh's first assignment following graduation was to USACE, Detroit District overseeing the Soo Locks at Sault Ste. Marie and was promoted to First Lieutenant in 1897. His other early assignments included a stint in Mobile, Alabama, where he oversaw torpedo defense work during the Spanish-American War. He was later assigned to the Philippines to command the Battalion of Engineers.

Cavanaugh had been promoted to rank of Captain by 1901; he continued to climb his way through the ranks of the Army Corps of Engineers. He held the position of Assistant to the Chief of Engineers between October 10, 1907 and July 31, 1911, and was promoted to Major in 1908. In 1911, Cavanaugh assumed command of the Seattle District. During this assignment he oversaw construction of the LWSC.[60]With the United States' entry into World War I, Cavanaugh was tasked by the War Department to assemble an engineering regiment for service in France. However, he was able to attend the dedication ceremony for the LWSC just prior to deploying to France. Cavanaugh retired from USACE in August 1922 and was made a Colonel in December 1922. He died of pneumonia in 1927.[61] The lockkeeper's house was named to honor his legacy in 1967 and is now known as the Cavanaugh House.[62]

6.4.3 Architectural Firm of Bebb and Gould.

6.4.3.1 Charles H. Bebb (1856-1942)

Charles H. Bebb was born in 1856 in Mortlake, Surrey, England. He studied civil engineering at the University of Lausanne, Switzerland and the School of Mines in London. Bebb began his career in South Africa, where he worked on the Cape Town-Kimberly Railroad from 1877 to 1882.[63] He first looked for

[58] Givens.

[59] Ibid.

[60] Ibid; Willingham.

[61] Givens.

[62] Friends of the Ballard Locks, "House on the Hill at the Locks: Cavanaugh House," (2011) http://blog.friendsoftheballardlocks.org/search/label/James%20Bates%20Cavanaugh.

[63] David A. Rash and Ennis Alan Anderson, "Bebb & Mendel," In *Shaping Seattle Architecture: A Historical Guide to the Architects,* Edited by Jeffrey Karl Ochsener, (Seattle, WA: University of Washington Press, 2014).

work on the American railway system upon his arrival in the United States but became employed by the Terra Cotta Lumber Company in the development of commercial fireproofing. In 1888, Bebb was hired by the Alder and Sullivan Company and in 1890 he came to Seattle to oversee the construction of the Seattle Opera House. He relocated permanently to Seattle in 1893 and worked for the Denny Clay Company before opening his own office in 1898.[64]. Bebb formed a partnership in 1901 with Leonard Mendel, who started as a draftsman working under Bebb. The pair worked together until the partnership was dissolved in 1914. Bebb then went on to work with the architect Carl Gould. Bebb was the first Washington architect to be elected as a Fellow of the American Institute of Architects (AIA). He helped organize the AIA Washington Council in 1894 and served several terms as its president. From 1911 to 1935, Bebb served as Consulting Architect for the State Capitol Group in Olympia.[65]

6.4.3.2 Carl F. Gould (1873-1939)

Carl F. Gould was born in 1873 in New York City. He graduated from Harvard's School of Architecture in 1898, and then spent four years at the Ecole des Beaux Arts in Paris. On his return to the United States, he worked as an intern for the New York architecture firm McKim, Mead, and White.[66] After suffering a lengthy illness, Gould relocated to Seattle in 1908. He was one of the few professionally trained architects in the city and he worked as a draftsman for the firm Everett and Baker, and then later with Daniel Huntington. Gould formed a partnership with Charles Bebb in 1914. Gould, like Bebb, became active in the affairs of the AIA Washington Council. Gould was the president of the Fine Arts Society (1912 to 1916 and 1926 to 1929), he lectured at the University of Washington, and he was active in the Architectural League of the Pacific Coast.[67] Gould founded the Department of Architecture at the University of Washington and served as its head from 1914 to 1926.

6.4.3.3 Bebb and Gould Firm

The partnership between Bebb and Gould brought together two architects with complementary strengths. Bebb had connections to the region's political establishment and was the partner in charge of management, contracts, and specifications. Gould, with his connections to the arts community, was the principal designer and planner. The firm designed the twelve original concrete buildings at the LWSC Project. After their success at the LWSC, the firm was commissioned to design the University of Washington Campus, including Suzzallo Library and Anderson Hall. Between 1914 and 1924, the firm designed more than 200 buildings that ranged from single-family residences to schools, churches, commercial buildings, and monuments. After 1924, Bebb's involvement in the firm declined but he remained an advisor to Gould. Coupled with Bebb's limited involvement, the number of buildings designed by Gould declined as well. Bebb and Gould won design awards form the Architectural League of New York for their design of the US Marine Hospital and Campus and the Seattle Art Museum, now the Seattle Asian Art Museum.[68] The original buildings designed by Bebb and Gould at LWSC have classical lines but are solid and straightforward in a manner appropriate to their function and setting along the massive Lock walls.

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[64] Ibid.

[65] Ibid.

[66] William T. Booth and William H. Wilson, "Bebb & Gould," In *Shaping Seattle Architecture: A Historical Guide to the Architects,* Edited by Jeffrey Karl Ochsener (Seattle, WA: University of Washington Press, 2014).

[67] Ibid.

[68] Ibid.

6.4.3.4 Carl S. English, Jr (1904-1974)

Carl S. English, Jr. was born in 1904 in Camas, Washington. He showed an interest in gardening early in his life, and at the age of sixteen he built a greenhouse with his own funds. English's early interest in plants led him to take a high school course in botany, which inspired him to pursue the field in college. He graduated from the State College of Washington at Pullman in 1929 with a degree in botany.[69] English settled in Portland, Oregon following graduation, where he worked for the Swiss Floral Company and ran a small seed and plant business.[70] English and his wife moved to Seattle in 1931, and by that November English was working for USACE, Seattle District as a gardener at what was then known as the Government Locks. In addition, English and his wife brought their seed and plant business with them. By 1940, English was the head gardener at the LWSC Project and began the transformation of the site from mostly blank areas of turf into the gardens as we know them today. The landscaping at LWSC prior to English's involvement at the Locks was sparse and consisted of grass and shrubs which had been donated by the Seattle Park Development Group.[71] English had to contend with poor drainage which posed difficulties. Through his seed business and his involvement in the horticultural world that allowed him to trade seeds with other botanical gardens, English was able to establish plants, trees, and shrubs from around the world at LWSC. The Locks became a place for locals and tourists to enjoy as the gardens expanded under English. By 1969, English developed a list of all the plants in the Garden for the visiting public. He also led free hour-long tours of the Garden, which ultimately became so popular that reservations had to be made a year in advance.[72] English discovered, named, and published about two plants of the purslane family: *Talinum okanoganense,* from the Okanogan Highlands of north-central Washington, and *Claytonia nivalis* from the Wenatchee Mountains of central Washington. Additionally, English produced at least two horticulturally worthy hybrids of mountain dwellers: *Penstemon X Edithiae*; and a *Lewisia* hybrid.[73] English received many awards, including the Army's Meritorious Civilian Service Award in 1967 and the American Horticultural Society Professional Citation in 1971. The Hiram M. Chittenden Locks Gardens were named in honor of him in 1974. English died in 1974 at the age of 71.

6.5 Contributing Buildings, Structures and Carl. S. English Garden to the Historic District

Table 4 lists the buildings, structures, and landscapes that are contributing resources to the Historic District. There are a several differences between the contributing elements to the Historic District listed in the 1978 nomination form and the inventory provided in the 1994 HPMP. These differences are attributed to the date the nomination form was completed in 1978, and the fact that the Office of Archaeology and Historic Preservation completed the 1978 nomination, whereas the 1994 HPMP was prepared by the Seattle District's Technical Center of Expertise for the Preservation of Historic Buildings and Structures, whose staff reevaluated the contributing and noncontributing elements of the Historic District. Changes to the Historic District have occurred since it was listed on the National Register, including demolition of the Guardhouse and Boathouse, and removal and replacement of the Hoist

[69] Liberty Hyde Bailey, "Plantsmen in Profile, III Carl S. English, Jr.," In *Baileya,* vol. 5, 141-146 (September 1957); Sara Peterson, "Carl S. English, Jr.: The Man behind the Ballard Locks" (2015) http://blog.friendsoftheballardlocks.org/search?q=Carl+S.+English.

[70] Ibid.

[71] Peterson.

[72] Ibid.

[73] Bailey.

House Crane. Appendix B contains descriptions of the buildings, structures, and landscapes that are part of the Historic District.

Table 4. List of LWSC resources mentioned in both the 1978 Register Nomination Form and 1994 HPMP.

Historic Buildings, Structures, and Landscapes at the LWSC	Mentioned in the 1978 Nomination Form	Listed in the 1994 HPMP as a Contributing Resource
Hiram M. Chittenden Locks[74]	Yes	Yes
Fremont Cut	Yes	Yes
Mountlake Cut	Yes	Yes
Lockkeeper's (Cavanaugh) House (1913)	Yes	Yes
Administration Building (1914-1915)	Yes	Yes
Operating House Nos. 1, 2 3 and 4 (1914)	Yes	Yes
Mechanic Shop (1914)	Yes	Yes
Transformer House (1914)	Yes	Yes
Office and Shop Building (1916)	Yes	Yes
Machine Shop (1914)	Yes	Yes
Gas and Oil Building (1916)	Yes	Yes
Carpenter and Blacksmith Shops (1921)	Yes	Yes
Emergency Dam Hoist House (1922)	Yes	Yes
Steel Shop (1941)	Yes	Yes
Warehouse No. 2 (1941)	Yes	Yes
District Garage (1941)	Yes	Yes
Public Comfort Station (1947)	Yes	Yes
Boathouse (1949)[75]	Yes	Yes
Greenhouse (1949)	Yes	Yes
Gatehouse (1949) (replaced in the 1980s)	Yes	No
Open storage Shed (1980s)[76]	Yes	No
Quonset Hut (1949)[77]	Yes	No
Carl S. English Jr., Botanical Gardens	No- but inferred from nomination form	Yes

6.6 Carl S. English, Jr. Botanical Garden

The Carl S. English, Jr. Botanical Garden is one of the most unique features of the LWSC Project and is the only botanical garden USACE manages. Its design and landscaping occurred after the construction of

[74] The Locks include the Locks, Spillway Dam, Guide Piers and Waiting Piers.

[75] The Boathouse was demolished in 2012.

[76] The 1978 Nomination form lists the Open Storage shed as having been constructed circa 1940s whereas the 1994 HPMP has its date for construction as the 1980s. It is currently assumed that neither date is correct.

[77] The Quonset Hut was removed at some point after 1976.

the Locks, using the terracing and pathways constructed during the LWSC Project's initial development in the 1910s. Carl S. English, Jr. expanded the existing planting beds during his tenure from 1931 to 1974 and introduced rare, native, exotic, and experiential plants to the Garden, which is a contributing element to the Historic District and a significant cultural landscape. Appendix C contains in-depth information on the Garden and changes that have occurred over the years.

6.6.1 Noncontributing Resources to the Historic District

Five resources are currently considered noncontributing resources to the Historic District as they do not date from the period of significance of the Historic District (Table 5). These elements need to be evaluated as they reach 50 years of age to determine if they are significant to the National Register Historic District on their own merits. Future evaluation may result in their inclusion as part contributing resources to the Historic District.

Table 5. Current Noncontributing Resources to the Historic District.

Current Noncontributing Resources to the Historic District	
Control Tower (1969)	Added to the middle Lock wall in 1969. Currently 50 years of age. Determined not eligible in 2021.
North Entry Area	Constructed in the mid-1970s. Currently does not meet the age threshold under NHPA to be evaluated.
South Entry Area	Constructed in the mid-1970s. Currently does not meet the age threshold under NHPA to be evaluated. USACE contracted in 2010 to have it evaluated; however, the report did not provide recommendations regarding the South Entry's eligibility but focused on management strategies
Fish Ladder (1976)	Constructed in 1976. Currently does not meet the age threshold under NHPA to be evaluated.
Storage Shed	Constructed in the late 1980s, not historic as of 2021.

6.7 Existing Archaeological Collections

Locks engineer T.E. Christenson discovered a jade adze imbedded in a tree root and other artifacts along the north bank of the Locks Bay in 1923. These finds were reported to amateur archaeologists A.G. Colley and F.S. Hall, who collected 57 items from a shell midden located in the same location.[78] Of the 57 items collected, only 27 are artifacts. The artifact collection is comprised of incised stone, scrapers, a net weight, a pestle, a jadeite adze, a wedge, an awl, projectile points, a knife blade, an anchor stock, and wood stakes for fish weirs. Colley also found at least three burials and collected partial remains from one. The collection is housed at the Burke Museum of Natural History and Culture in Seattle.[79] An unknown donor gifted a jadeite axe blade to the Burke Museum in 1918. The accession record notes that the axe blade was found at the same site below the Locks.

[78] Leonard Forsman, Dennis Lewarch, and Lynn Larson, *Lake Washington Ship Canal Resource Assessment Listing of Known Artifacts* (1997) Report on file at USACE, Seattle District.

[79] Ibid.

7 Methodology for the Management of Cultural Resources at the LWSC Historic District

The NHPA requires federal agencies to consider the effects of federal undertakings on historic properties. Management of cultural resources at the LWSC Project is guided by both Sections 106 and 110 of the NHPA (Section 3.2). Implementing regulations at 36 CFR Part 800 describe the procedural steps that federal agencies must complete to comply with Section 106 of NHPA. Standard procedures for carrying out steps of the Section 106 process are briefly outlined below.

- **Step One: Initiate Section 106 Process**
  - **Establish undertaking.** An undertaking means a project, activity or project funded in whole or in part under the direct or indirect jurisdiction of a federal agency. USACE determines if an undertaking could affect the character or use of historic resources eligible for listing on the National Register of Historic Places. If so, USACE notifies the appropriate State Historic Preservation Office/Tribal Historic Preservation Office (SHPO or THPO), tribes, and other consulting parties, and begins to plan the public involvement process. If the intent is to use an existing project-specific Programmatic Agreement (PA) or Historic Property Management Plan (HPMP), compliance should be done in accordance with the existing LWSC PA. If there is a dispute on the established undertaking, NHPA stipulates that the ACHP be allowed to review and comment on the undertaking and its potential effects on historic properties prior to the approval of the undertaking.

- **Step Two: Identify Historic Properties**
  - **Determine the APE**. If the proposed activity is an undertaking, USACE must identify the geographic area potentially affected by the undertaking.

  - **Identify historic properties.** Through consultation with the SHPO or THPO and tribes, field surveys, and review of background information, the Agency must consider buildings, structures, archaeological sites, TCPs, etc. Such properties previously unevaluated must be evaluated for eligibility to the National Register. 36 CFR Part 60 describes the criteria for evaluating the significance of cultural resources.

- **Step Three: Assess Effects**

  If historic properties are identified, USACE must assess the potential effects of the undertaking. In consultation with the SHPO or THPO and other consulting parties, USACE makes one of the following possible determinations:
  - There will be no effect on historic properties (no effect)
  - There will be an effect on historic properties, but the effect will not be adverse (no adverse effect)
  - There will be an adverse effect on historic properties (adverse effect)

  If a no effect or no adverse effect determination is made, the undertaking can proceed.

- **Step Four: Resolve Adverse Effects**

  If it has been determined adverse effects to historic properties are likely to occur as the result of an undertaking, USACE must consult with the SHPO or THPO and consulting parties to resolve the adverse effects. This process should result in the development of a Memorandum of Agreement (MOA) with the SHPO or THPO that identifies steps the Agency will take to avoid, minimize, or mitigate the adverse effect. USACE must also provide an opportunity for the ACHP to comment on the development of an MOA resulting from the determination of an adverse effect. Once an MOA has been developed and signed, USACE may proceed with the undertaking, following the terms of the MOA.

7.1 Permitting

If individuals, states, or other agencies want to conduct archaeological investigations on USACE-owned land, USACE requires them to obtain an ARPA permit (Section 3.5). This requirement applies to all leased land or permitted land holdings. ARPA permits are not required by USACE personnel acting in an official capacity, or by USACE contractors pursuant to contract requirements. A permit request must be accompanied by an application form and a written proposal that provides the documentation specified in 32 CFR Parts 229.6 and 229.8. ARPA permits are obtained through the USACE, Seattle District Real Estate Division.

7.2 Initiate Section 106 Process

Initiation of the Section 106 process is conducted by a USACE cultural resource specialist. Upon receiving a project description and map showing the project location, the cultural resource specialist reviews the project information and the LWSC Project PA to determine if the LWSC Project PA applies or if further Section 106 consultation needs to occur.

7.2.1 Routine Actions

Stipulation II of the LWSC PA presents a list of routine activities that are considered to have no effect on historic properties and can proceed with no further review. To determine whether a specific activity is an undertaking that does not require further review, a USACE cultural resource specialist will review the proposed action in adequate detail to determine if the action falls within the list of routine activities. The cultural resource specialist may request additional project details if the project description lacks sufficient detail.

If the cultural resource specialist determines the activity can be classified as a routine activity with no effect on historic properties as outlined in the PA, then USACE has no further obligation to consult on that routine activity and will document the finding of no potential to cause effects in a memorandum for record (MFR) or within a Categorical Exclusion document. The MFR shall document, at a minimum, the specific routine activity, the review or identification efforts and their results; identify any avoidance or protective measures taken; indicate the reviewer and date reviewed; and provide maps showing the location of the APE. Documentation shall be filed in USACE, Seattle District files. If the cultural resource specialist finds the activity to have an effect on historic properties as outlined in the PA and not fall under the Stipulation II of the PA, then the proposed activity will be reviewed as part of further Section 106 consultation.

7.2.1.1 Stipulation II of the PA- Undertakings that do not Require Review

The following types of undertakings shall be considered to have no effect on historic properties and may proceed without further review. The cultural resource specialist will make the final determination as to whether a project can be classified as one of the undertakings listed below.

a. Sidewalk replacement or repair.

b. Roadway replacement or repair.

c. Maintenance of existing landscaping and Carl S. English, Jr. Botanical Gardens.

d. Interior rehabilitation of Operating Houses, Warehouses, Shop Buildings, Control Tower, Visitor Center, Boathouse, and Cavanaugh House.

e. Maintenance of the existing Large and Small Locks and Spillway Dam, Guide Piers, and Waiting Piers.

f. Maintenance of the existing fish ladder.

g. Maintenance and minor in-kind repair or replacement of the existing concrete walls and landscape colonnade at the Fremont cut.

h. Maintenance and minor in-kind repair or replacement of the existing concrete walls at the Montlake cut.

i. Maintenance and minor in-kind repair or replacement of building or site features, elements, or materials within the historic district.

j. Repair and replacement of existing utility lines and poles in their present configuration and alignments.

7.2.2 Non-Routine Activities

Activities proposed at the LWSC Project that do not fall under the category of routine activities outlined in Stipulation II of the LWSC Project PA require USACE to determine whether the type of activity has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties are present, the agency has no further obligations under Section 106.

If USACE determines the undertaking could affect the character or use of historic properties, then the agency, in consultation with the SHPO or Tribal Historic Preservation Office (THPO), shall determine and document the APE, as defined in 36 CFR § 800.16(d).

7.3 Identification

For every undertaking where an activity is deemed to have the potential to affect historic properties, the federal agency shall make a reasonable and good faith effort to identify historic properties. Identification may include background research of previously recorded resources within and adjacent to the APE, consultation, oral history interviews, sample field investigation, and field survey. Most of the land at the LWSC Project was significantly disturbed during construction of the Locks and much of the area was graded down to glacial till. The necessity of an archaeological survey will be determined by the scope of each project, its location within the Historic District and whether it is within an area known to have been previously disturbed by the construction of the Locks.

Built environment surveys may be necessary if a proposed project will have an effect on a contributing element of the Historic District. Surveys for both archaeological and built environment resources are done to identify the presence or absence of cultural resources. Surveys are typically necessary when an area has not been previously surveyed, or when prior inventories are deemed to be incomplete, outdated, or inadequate. In the case of the LWSC Project, which is a Historic District, this could involve the re-evaluation of contributing buildings or landscapes to the Historic District based on their individual level of significance, and evaluation of noncontributing resources if they have reached 50 years of age. For every undertaking requiring inventory, a professional archaeologist or historian will visit and complete a survey of cultural resources within the designated APE. Inventory may include presence/absence shovel probes, recording of building features, and updating of records as necessary for any previously identified or recorded cultural resources within the APE, as well as the recordation of any newly identified cultural resources.

Once an inventory is complete, and if necessary, an archaeological or built environment report is written that details the proposed undertaking, documents background research, field methods, and results, and that provides management recommendations for any cultural resources identified within the APE. Survey and reporting completed under contract with USACE, or by USACE personnel, must meet Washington SHPO standards, the Washington State Standards for Cultural Resource Reporting.

7.3.1 Inventory Methods for Built Environment Resources

As noted above, the LWSC Project is a Historic District and was listed in the National Register in 1978. Built environment inventories at the project should consider what has been previously recorded and any changes that have occurred to the building, structure, or landscape since it was last recorded. A historic property inventory (HPI) should be completed for each building and periodically updated. HPIs can be used to document changes to each building over time. In addition, background research should be conducted to fill information gaps. Background research includes reviewing historic archival records, engineering as-built drawings, previous built environment documentation and, and relevant USACE documents.

7.3.2 Inventory Methods for Archaeological Surveys

One archaeological survey has previously been conducted at the LWSC Project. The following protocols should be followed if additional archaeological surveys occur:

- Conduct background research to apprise archaeologists doing fieldwork of previously recorded resources within and adjacent to the study area, as well as the presence and results of previous investigations. This includes historic archival records (such as General Land Office maps) and relevant ethnographic data, and relevant USACE documents.
- Space pedestrian transects no greater than 20 meters apart, applied in as systematic a manner as the topography allows.
- Using sub-meter accuracy Global Positioning System (GPS) units, record survey transects and any shovel test probes excavated.
- Use sub-meter accuracy GPS units to record any in-situ artifacts or archaeological features.
- Using a digital camera, take at least two overview photographs of each area surveyed and the areas of any identified cultural resources, as well as individual photographs of features, diagnostic artifacts, representative soil profiles, and areas being impacted.
- If present, inspect all animal burrows for visible cultural material.
- For subsurface surveys, utilize a grid pattern spaced no greater than 30 meters apart.
- Excavate shovel test probes to a diameter no less than 30 centimeters (cm) and no larger than 50 cm.
- Excavate shovel test probes in arbitrary 10 cm levels and screen all soils through quarter--inch mesh hardware, at a minimum.
- Plot the inventory, location, and placement of any shovel test probes on a 1:24,000-scale US Geological Service quadrangle map and aerial or satellite photograph.

During a survey, controlled surface and subsurface artifact collection may be determined necessary. Artifacts should be collected if they are diagnostic, such as projectile points or ground stone, and are

threatened by inundation, looting, erosion, or other activity. Non-diagnostic artifacts identified through subsurface survey should be placed back in the shovel test probe from which they were removed and reburied.

7.3.3 Identifying Traditional Cultural Properties

No Traditional Cultural Properties (TCPs) have been identified at the LWSC Project. However, it should be noted the LWSC Project is located within the traditional homeland of the Duwamish Tribe, Muckleshoot Indian Tribe, and Suquamish Tribe. Recorded archaeological sites in the vicinity of the Locks shows that the area has been continuously occupied by Native Americans. A Native American village is known to have been located at the LWSC Project prior to its construction.

7.3.4 Evaluation

All cultural resources identified within an undertaking's APE must be evaluated for inclusion in the National Register. As previously mentioned, the LWSC Project is a Historic District that is listed in the National Register. While most of the buildings and landscapes are contributing resources to the Historic District, there are some components that have not been evaluated either on their own merits or as part of the Historic District. For example, the Control Tower on the Lock Wall was built in 1969 and is currently 50 years of age but has not been evaluated for inclusion on the National Register. Currently, the Control Tower is not considered a contributing element of the Historic District. Evaluation of cultural resources assists in the assessment of effects an undertaking may have on historic properties. This evaluation also aids in determining appropriate potential avoidance, minimization, and mitigation measures to consider when resolving adverse effects to the historic properties. See Section 2.3 for the National Register Criteria.

7.4 Evaluative Testing for Archaeological Sites

There are no known archaeological sites located within the boundaries of the LWSC Project. However, if an archaeological site is discovered, subsurface testing will occur to determine the boundaries of the site, the depth and variation of cultural deposits, and to investigate the integrity of cultural materials and features that exist subsurface. Subsurface testing within a recorded archaeological on USACE land does not require an ARPA permit if the work is being done by either a USACE archaeologist or a contractor for USACE. An Evaluative Testing Plan shall describe the guiding research questions for the recovery, field methods to be used, artifact collection procedures, potential post-field analyses (carbon 14 dating, Accelerator Mass Spectrometry dating, etc.) and the rationale behind them, artifact processing location, and the final curation location.

7.5 Assessment of Adverse Effects

Because the LWSC Project is a Historic District, particular attention is paid to the effects any proposed project may have to its historic integrity. When an undertaking is proposed, a USACE cultural resource specialist will assess its potential immediate and ongoing adverse effects. USACE will make a determination that 1) There will be no historic properties affected (no effect); 2) There will be an effect on historic properties, but the effect is not likely to adversely[80] affect them (no adverse effect); or 3) There will be an adverse effect on historic properties (adverse effect). USACE will then consult with the

[80] An adverse effect is the result whenever an undertaking may alter (directly or indirectly) any of the characteristics of a historic property that qualify it for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Washington SHPO on its determination, and the SHPO will respond with concurrence or nonconcurrence with USACE's determination. USACE will only invite the ACHP to comment when there is a disagreement between USACE and SHPO on the determination of effects.

7.6 Resolution of Adverse Effects

If an undertaking is determined to have an adverse effect on historic properties, USACE will follow the below guidance to resolve said adverse effects. Resolution of adverse effects may vary significantly depending on the nature of the undertaking and the historic property affected. In general, avoidance of adverse effects to historic properties is always the priority. Avoidance is preferable to all other treatment methods. However, as USACE must perform ongoing operation and maintenance (O&M) at the LWSC Project for it to meet its authorized purpose, there will be instances where adverse effects cannot be avoided. Other treatment options become necessary in these situations.

The five primary treatment strategies for the resolution of adverse effects on historic properties for the LWSC Project are avoidance, preservation, alternative (creative) mitigation, Department of Archaeology and Historic Preservation (DAHP) Level I or II Mitigation, or recordation in the Historic American Buildings Survey (HABS) or Historic American Engineering Record (HAER). Data recovery is an option for archaeological sites, however there are no known archaeological sites within the LWSC Project. Mitigation strategies may include the development of context statements, public interpretation or education, or, in the case of buildings and structures, either the DAHP Level I or II Mitigation or HABS/HAER recording or other mitigation as determined in consultation with the Washington SHPO. Mitigation measures will be developed on a case-by-case basis in consultation with the Washington SHPO, the cultural resource specialist and the appropriate LWSC Project staff.

A Memorandum of Agreement (MOA) between USACE and DAHP is required to address adverse effects to historic properties. An MOA is developed through consultation with the SHPO and other interested consulting parties. An MOA is a legal agreement that documents the mitigation measure(s) that USACE will undertake to mitigate the undertaking's adverse effect the on a historic property or properties. USACE has several MOAs in place at the LWSC Project that were developed to the mitigate adverse effects to contributing properties to the Historic District.

Preservation implies the protection or stabilization of a historic property - whether an archaeological site, standing structure, or TCP - that is threatened or affected by project undertakings. Preservation differs from avoidance because it involves either active protection of historic properties during an undertaking or treatment of existing or potential adverse effects before they increase in severity. Preservation includes activities such as recordation, documentation, curation, protection, active management, rehabilitation, restoration, stabilization, maintenance, and reconstruction of historic properties. Examples of preservation measures that may be employed for the LWSC Historic District include, but are not limited to:

- Signage,
- In-depth documentation (such as DAHP Level I or Level II mitigation or Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation),
- Public education and outreach,
- Building repair or rehabilitation,
- Restricting access to the area (in cases where the public is causing issues such as overuse damaging a landscape),

- Graffiti removal or restoration,
- Stabilization or reconstruction with like materials or treatment (for example, concrete repair at the historic concrete buildings)

7.6.1 Addressing Emergency Situations

Emergencies at the LWSC Project could include fires, earthquakes, accidents, or mechanical failure of operating equipment. Responses to these emergencies have the potential to adversely affect the Historic District. The District Commander is empowered to waive the requirements of Section 110 of the NHPA pursuant to 36 CFR Part 78 in the event of a major natural disaster or an imminent threat to national security (as declared by the President or Governor in response to immediate threats to life or property). Waiver of responsibilities under Section 110 does not affect USACE's Section 106 responsibility for taking the effects of emergency activities on properties included in or eligible for the National Register into account and for affording the ACHP an opportunity to comment on such activities. USACE shall notify the Secretary of the Interior within 12 days of the effective date of an emergency Section 110 waiver.

In the case of such emergencies, compliance with Section 106 can be met by the District Commander by notifying the ACHP, SHPO, and interested Tribes and allowing seven days for the consulting parties to comment (36 CFR Part 800.12 (b)(2)). An agency official shall notify the consulting parties and request comments in the time available if the nature of the emergency requires action sooner than the seven-day period allows. This waiver does not apply to emergency actions implemented 30 or more days after the occurrence of the emergency. The District Commander shall coordinate Section 106 compliance with USACE cultural resource staff.

7.6.2 Unanticipated Discoveries

USACE has the responsibility under Federal law to address cultural resources that are inadvertently discovered on federally managed land or during federally funded projects. Unanticipated discoveries include post-review discovery of any archaeological object or other cultural resource pursuant to Section 106 (36 CFR 800.13) as well as inadvertent discovery pursuant to NAGPRA (43 CFR 10.4) at the LWSC Project.

Although there are procedural differences between the ways that post review discoveries and inadvertent discoveries are addressed, some common steps can be taken at the outset when there is an unanticipated discovery. All ground disturbing activity should be immediately discontinued. Objects should not be touched or moved. The confidentiality of the site should be maintained. The removal of bone fragments, artifacts, or other items from any archaeological site without proper authorization is against the law. Violators could be charged in state or federal court, resulting in fines or imprisonment.

The appropriate procedure when an unanticipated discovery is made is to contact the LWSC Project's NRM office and the USACE archaeologist immediately. Further instruction will be based on the circumstances and the condition of the discovery. Attention should not be drawn to the area with obvious flagging or markers. Work may not continue in the area of the discovery until the USACE archaeologist has given written approval that work may proceed.

7.6.3 Post Review Discoveries (36 CFR 800.13)

Post-review discoveries normally occur at a point when Section 106 consultation has concluded, and construction has started. Normally, post review discoveries are archaeological in nature, but they can

also occur in projects involving built environment resources. For example, historic murals may be discovered behind walls or original features revealed that had been covered by additions. All activity will cease in the event of a post review discovery and the NRM and cultural resource specialist will be contacted within four hours of discovery. USACE will then follow the post review discovery process laid out at 36 CFR 800.13(3).

7.6.4 Inadvertent Discoveries (43 CFR 10.4)

If human skeletal remains are encountered within the LWSC Project at any time, all activity will cease immediately within a 200-foot buffer of the discovery. The remains will not be touched, moved, or further disturbed. LWSC Project staff shall notify appropriate law enforcement (City of Seattle) and the USACE Seattle District archaeologist as soon as possible, but no more than four hours after the discovery of remains. If the county coroner has not already been notified, USACE will do so. Contact information for the City of Seattle law enforcement and the USACE cultural resource specialist shall be coordinated through the NRM office. Information regarding the remains shall not be released for publication nor disseminated to the public. No one, including the discoverer, USACE staff, or contractor staff, will photograph the remains or allow anyone else to photograph the remains. This applies to cameras, cellular phones, or any device that has photographic capabilities.

The responsible county coroner will assume jurisdiction over the human skeletal remains and make a determination as to their forensic or non-forensic nature. If it is determined that the remains are recent or represent a crime scene, then the appropriate law enforcement will take possession of the remains. If the responsible county coroner determines that the remains are non-forensic, they will report that finding to USACE and DAHP, who will then take responsibility over the remains. If the remains are found on USACE fee-owned lands of the LWSC Project, USACE will repatriate the remains in accordance with NAGPRA (43 CFR 10.4).

No further work or ground disturbance will take place within the buffered zone of the remains until the USACE archaeologist provides written permission to proceed.

7.7 Curation

According to 36 CFR 79, archaeological collections recovered from Federally owned or administered lands under the authority of the Antiquities Act (16 USC 431-433), the Reservoir Salvage Act (16 USC 469-469c), the National Historic Preservation Act (16 USC 470h-2), or the Archaeological Resources Protection Act (16 USC 470aa-mm) and their associated records must be preserved and maintained. Such collections are the property of the United States government. The remains and documentation must be curated by an institution or repository with adequate long-term curatorial capabilities. Currently, the Burke Museum of Natural History and Culture houses an archaeological collection associated with the LWSC Project. As previously mentioned, the collection was begun in 1923 and the artifacts' precise original location is unclear.

8 Management Needs and Long-Term Planning

The LWSC Project is a Historic District which includes the only botanical garden owned and operated by USACE. It is a unique property within the USACE portfolio of locks and dams. Managing effects to the Historic District while ensuring the LWSC Project can meet its authorized purposes is a balancing act that takes coordination between LWSC staff and the cultural resources specialist. This section describes current and future management needs of the LWSC Project cultural resources and Historic District.

8.1 Built Environment

The majority of the LWSC Project's built environment is included in the Historic District; however, there are several buildings and structures (Section 6.6.1) that were built fewer than 50 years ago. Several of these will pass the 50-year mark within the next decade. These buildings and structures should be evaluated under NRHP criteria for significance, resulting in a determination of their eligibility as contributing resources to the Historic District. Buildings and structures within the Historic District will likely undergo preservation or restoration actions at some point in the future. According to the NPS, preservation focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time. Rehabilitation activity acknowledges needs to alter or add to the historic property to meet continuing or changing uses while retaining the property's historic character.[81] USACE will follow the NPS Standards for Preservation and Rehabilitation laid out in its *Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings* when undertaking preservation or restoration actions at any building or structure within the Historic District. In addition, USACE will consult the appropriate NPS Preservation Briefs found at https://www.nps.gov/tps/how-to-preserve/briefs.htm.

The LWSC Project has been listed in the NRHP since 1978. The NRHP nomination form has not been updated since 1978, and there have been several changes to the Historic District since then. These changes include the removal of the guard shack, boathouse, and hoist house crane. While mitigation measures for the removal of the Hoist House Crane and Boathouse were agreed to in MOAs with the Washington SHPO, these changes and others have altered aspects of the Historic District. Revising the nomination form will allow the description of the Historic District to be updated with the most up-to-date and accurate information. This will include the documentation of buildings or structures that are now 50 years of age and may have become eligible for inclusion in Historic District as contributing resources after 1978. Updating evaluations of National Register eligibility is a benefit to the LWSC Project and is a responsibility USACE has under Section 110 of the NHPA (Section 3.2). In addition to Historic District-wide evaluations, each building, structure, and landscape within the Historic District will have a corresponding HPI form completed, either during the National Register Nomination update or on a project-by-project basis as appropriate.

8.2 Carl S. English Botanical, Jr. Garden

The Carl S. English, Jr. Botanical Garden (the Garden) is a contributing element to the LWSC Historic District and the only botanical garden owned and operated by USACE. The primary management goal for the Garden is to maintain planting beds in their current size and shape. Therefore, the introduction of new planting beds and the removal of existing planting beds should be avoided. It is recommended that new plantings match the existing design style within their planting bed. Other management recommendations include the preservation of lawns in their current state, maintained diversity of plant species, growth of vegetation to its natural form, and protection of areas experiencing overuse with cable and concrete post barriers. See Appendix C for additional information about the cultural landscape of the Garden.

Furthermore, the management recommendation is to preserve plants—particularly those plants that are ranked 1 or 2 within the Plant Significance Hierarchy (PSH) based on their botanical and historic

[81] National Park Service, *Technical Preservation Services* (National Park Service, US Department of the Interior, 2021) https://www.nps.gov/tps/standards/four-treatments/treatment-preservation.htm.

significance. However, it must be noted that there may be cases where significant plants may need to be removed and replaced, such as the death of a plant or a tree creating life and safety issues. Section 106 consultation shall occur for the modification of bed size or shape, addition or alteration of trails, the removal of any HPI-listed plant, or if a plant is being replaced with a different species.

8.3 Archaeological

No known archaeological sites are located with the boundaries of the LWSC Project. Construction of the LWSC Project disturbed the ground surface to the degree that much, if not all, of the land within the LWSC Project has been scraped down to glacial deposits. Archaeological survey will be conducted as necessary on a project-by-project basis.

8.4 Updating the Programmatic Agreement regarding the Operations and Maintenance of the Lake Washington Ship Canal Project

USACE, Seattle District, the Washington SHPO, and the ACHP signed the Programmatic Agreement (PA) regarding Operations and Maintenance (O&M) of the LWSC Project, Seattle, Washington in 1994. See Section 2.8 for further information on the current PA. USACE has determined the current PA needs to be updated to account for changes that have occurred to the historic district since the PA was signed. USACE will review and reevaluate the existing PA, including the list of routine activities that do not require Section 106 consultation.

8.5 Review of Existing MOAs

USACE, Washington SHPO, and other consulting parties have entered several MOAs mitigating for adverse effects within the Historic District. These MOAs should be reviewed to ensure USACE has met all listed stipulations. If necessary, USACE will develop a plan to complete their responsibilities and ensure any outstanding stipulations are met.

8.6 Periodic Cultural Resources Training for LWSC Staff

The LWSC staff work in a Historic District and interact with all aspects of the Project. Periodic cultural resource training for LWSC Project staff will provide an overview the Historic District's significance, its components within the LWSC Project, and the legal framework of the NHPA and USACE's resulting legal obligations.

8.7 Public Education & Outreach

Public education and participation are important tools in the preservation of cultural materials and properties. USACE continually strives to find opportunities for appropriate public education and participation at the LWSC Project. Examples of ongoing public education at the LWSC Project include:

- A Visitor Center that allows the public to learn about the LWSC Project and Historic District, and offers free tours of the Locks and Garden;
- A Fish ladder viewing area that allows the public to see fish navigating the LWSC on their inland journey and educates them on the process and its importance;
- Public access on the LWSC grounds. The public can wander the grounds, view the buildings and Garden, and observe the operation of the Locks and Dam; and
- Guided tours of the Administration Building's basement pumping plant.

Future public education opportunities include:

- Articles published on the USACE website;
- Specialized tours focusing on different aspects of the LWSC Project. For example, tours could cover architecture, the Garden, or construction of the Locks;
- Rotating or visiting displays in the Visitor Center;
- A lecture series featuring a variety of topics relevant to the LWSC Project and its history. Examples could include the Native American history and archaeology of the area or the technology of the Locks; or,
- Plaques set at various points around the Historic District providing information for visitors.

9 Consultation and Coordination

In accordance with Section 106 and its implementing regulations (36 CFR 800) and USACE regulations (EP 1130-2-540), communication, coordination, and consultation are important aspects of historic properties management. Effective management of cultural resources requires close consultation and coordination between Federal agencies, Tribes, and other consulting parties. Consultation is necessary to identify the concerns of Tribes and other stakeholders throughout the Section 106 process. Later in the Section 106 process, consultation can help define mitigation for adverse effects of an undertaking.

9.1 Protection of Culturally Sensitive Information

In accordance with the NHPA and ARPA Section 9, ER-1130-2-540, 6.3(a) states that any information regarding the location or character of historic properties on project fee or easement lands shall not be released to the public if the disclosure of such information will create a substantial risk of harm, theft, or destruction to the properties or to the area where the properties are located. Furthermore, District Commanders must ensure that all documents and reports which are prepared pursuant to ER 1130-2-540 and other ERs, including HPMPs, MPs, and OMPs, do not contain location or other sensitive data if they are to be released to the public.

9.2 Tribal Consultation

Pursuant to 36 CFR 800.2(c)(2)(B)(ii) agencies are required to consult with Tribes that attach religious and cultural significance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of the historic property.

Tribal consultation is a process of communication designed to discuss and consider the views of the Tribes and, whenever possible, seek agreement on the management of historic properties. The Section 106 process requires Tribal consultation at specific times. The unique relationship between federally recognized Tribes and the US Government provides the basis for consultation.

9.3 SHPO Consultation

Consultation with the SHPO is a requirement under 36 CFR 800. The Washington SHPO represents the interests of the state and its citizens in the preservation of cultural heritage. The role of the SHPO is to advise and assist Federal agencies in carrying out their Section 106 responsibilities. The SHPO also reviews determinations of eligibility for the National Register and determinations of effect as part of the Section 106 process.

10 Conclusion and Summary

This HPMP seeks, above all else, to outline a process by which USACE, Seattle District can achieve compliance with Federal cultural resource laws at the LWSC Project. The overarching theme of these laws is to protect cultural resources while managing the Project's authorized purposes of providing navigational access and public park and recreational facilities (USACE 2021).

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Appendix A: Programmatic Agreement Regarding the Operation and Maintenance of the Lake Washington Ship Canal Project, Seattle WA

APPENDIX F

PROGRAMMATIC AGREEMENT REGARDING THE OPERATION AND MAINTENANCE OF THE LAKE WASHINGTON SHIP CANAL PROJECT

Advisory
Council On
Historic
Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

Reply to: 730 Simms Street, #401
Golden, Colorado 80401

May 16, 1994

Rex N. Osborne
Lt. Colonel, Corps of Engineers
District Engineer
Seattle District, Corps of Engineers
P.O. Box 3755
Seattle, WA 98124-2255

REF: Programmatic Agreement Regarding the Operation and Maintenance of the Lake Washington Ship Canal Project, Seattle, WA

Dear Colonel Osborne:

The enclosed Programmatic Agreement (PA) regarding the operation and maintenance of the Lake Washington Ship Canal Project has been executed by the Council. The Council's execution of this agreement evidences our comments as required by Section 106 of the National Historic Preservation Act and the Council's regulations. We note that the PA requires the Corps to notify the SHPO and comply with the Native American Graves Protection and Repatriation Act if Native American graves are discovered at the project site. This provision does not substitute for the consultation required under 36 CFR §800.11, and we would expect the Corps to follow the procedures set out in the Council's regulations if there was such a discovery. Please forward a copy of the fully executed agreement to the Washington State Historic Preservation Officer and your Federal Preservation Officer.

The Council appreciates your cooperation in reaching a satisfactory resolution of this matter.

Sincerely,

Claudia Nissley
Director, Western Office
of Review

Enclosure

PROGRAMMATIC AGREEMENT
AMONG THE U.S. ARMY CORPS OF ENGINEERS,
THE WASHINGTON STATE HISTORIC PRESERVATION OFFICE,
AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING IMPLEMENTATION OF
THE LAKE WASHINGTON SHIP CANAL PROJECT

WHEREAS, the Seattle District, U.S. Army Corps of Engineers proposes to administer the Lake Washington Ship Canal Project authorized by the River and Harbors Act of June 25, 1910; and

WHEREAS, the Lake Washington Ship Canal Project has been listed on the National Register of Historic Places as an historic district on December 18, 1978. and

WHEREAS, the Seattle District, U.S. Army Corps of Engineers has determined that the Lake Washington Ship Canal Project may have an effect upon properties included on the National Register of Historic Places and has consulted with Washington State Historic Preservation Office (Washington SHPO) and the Advisory Council on Historic Preservation (Council) pursuant to Section 800.13 of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (NHPA); (16 U.S.C. 470), and Section 110(a.1) of the same (16 U.S.C 470h-2) and

WHEREAS, the Seattle District, U.S. Army Corps of Engineers, the Washington SHPO and the Council agree that it is advisable to accomplish the development and execution of the Programmatic Agreement in accordance with 36 CFR 800.13 and ER 1130-2-438, and

NOW, WHEREFORE, the Seattle District, U.S. Army Corps of Engineers, the Washington SHPO and the Council agree that Lake Washington Ship Canal Project shall be administered in accordance with the following stipulations to satisfy the Seattle District, U.S. Army Corps of Engineers Section 106 responsibility for all individual aspects of the project and meets the Section 110 requirement for stewardship standards.

Stipulations

The Seattle District, U.S. Army Corps of Engineers will ensure that the following measures are carried out:

I. Treatment of Properties and Review of Undertakings

a. The Seattle District, U.S. Army Corps of Engineers shall ensure that the Washington SHPO has the opportunity to review and approve any proposed undertaking, except those listed in Stipulation II, before any rehabilitation or construction begins. The Washington SHPO will review and comment on plans for the undertaking within 30 days, provided that all the information is complete. If the Washington SHPO does not comment within 30 days, it will be presumed that it concurs with the proposal.

b. Rehabilitation. All of the contributing properties of the historic district will be rehabilitated in accordance with the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings, (U.S. Department of the Interior, National Park Service) and the Lake Washington Ship Canal Stewardship Standards adopted as part of the Project Master Plan, attached hereto as Appendix A & B.

c. Except for those undertakings that consist solely of actions exempt from review under Stipulation II, a plan for each rehabilitation project, including architectural specifications and drawings will be provided to the Washington SHPO for review and concurrence before the project begins.

d. The U.S. Army Corps of Engineers will program funds through normal budgetary channels. Should appropriation in any given year be insufficient the agreement shall not be voided, but all parties to the agreement will vigorously support appropriations sufficient to continue the plans.

II. Undertaking That Do Not Require Review

The following types of undertakings shall be considered to have no effect on historic properties and may proceed without further review.

a. Sidewalk replacement or repair.

b. Roadway replacement or repair.

c. Maintenance of existing landscaping and Carl S. English, Jr, Botanical Gardens.

d. Interior rehabilitation of Operating Houses, Warehouses, Shop Buildings, Control Tower, Visitor Center, Boathouse and Cavanaugh House.

e. Maintenance of the existing Large and Small Locks and Spillway Dam, Guide Piers, and Waiting Piers.

f. Maintenance of the existing fish ladder.

g. Maintenance and minor in-kind repair or replacement of the existing concrete walls and landscape colonnade at the Fremont Cut.

h. Maintenance and minor in-kind repair or replacement of the existing concrete walls at the Montlake Cut.

i. Maintenance and minor in-kind repair or replacement of building or site features, elements, or materials within the historic district.

j. Repair and replacement of existing utility lines and poles in their present configuration and alignments.

III. Qualification of Personnel

a. The Seattle District, U.S. Army Corps of Engineers shall ensure that all architectural plans and specifications carried out pursuant to this agreement are carried out by or under the direct guidance and supervision of a person or persons meeting the minimum Secretary of the Interior's Professional Qualifications Standards.

b. The Seattle District, U.S. Army Corps of Engineers shall ensure that all Maintenance and minor in-kind repair or replacement of building features carried out pursuant to this agreement will be performed by the Lake Washington ship canal project staff under the direct supervision of a person or persons meeting at a minimum the Office of Personnel Management (OPM), Job Qualification Standards for Trades and Labor Occupations - Handbook X-118C.

c. The Seattle District, U.S. Army Corps of Engineers shall ensure that all landscape work, site maintenance and in-kind replacement of site features at the Carl S. English, Jr, Botanical Gardens, Fremont Cut and Montlake Cut will be carried out pursuant to this agreement under the direct guidance and supervision of a person or persons meeting the minimum Office of Personnel Management (OPM), Job Qualification Standards for Trades and Labor Occupations - Handbook X-118C, with appropriate expertise in horticulture and gardening.

IV. Historic Property Management Plan

a. Within three years from the date of this agreement, the Seattle District, U.S. Army Corps of Engineers will develop and implement a Historic Property Management Plan (HPMP) for the Lake Washington Ship Canal Project in accordance with the standards and guidelines attached as Appendix C. The Seattle District, U.S. Army Corps of Engineers will ensure that the HPMP is developed in consultation with the Washington SHPO and the Council before implementation.

b. When the HPMP is complete in draft form, the Seattle District, U.S. Army Corps of Engineers will provide copies of the draft to the Washington SHPO and the Council for review and acceptance. Disagreements or questions about the draft HPMP will be resolved through consultation among the parties.

c. Upon acceptance of the HPMP by the Washington SHPO and the Council, the Seattle District, U.S. Army Corps of Engineers will finalize and implement it in lieu of compliance with 36 CFR 800.4 through 800.6.

d. The Seattle District, U.S. Army Corps of Engineers will prepare a report annually on the implementation of the HPMP, and

provide this report to the Washington SHPO and Council for review, comment, and consultation as needed.

V. Future Discovery

a. In the future, if artifacts from Native American or European settlements, or deposits associated with the construction of the canal, are discovered on the project site, the Seattle District, U.S. Army Corps of Engineers will comply with all Section 106 requirements and enter into consultation with the Washington SHPO and the Council.

b. If Native American graves are discovered at the project site, the Washington SHPO will be notified and the provisions of the Native Americans Grave Protection and Repatriation Act (NAGPRA) will be carried out.

VI. Dispute resolution

Should the Washington SHPO and the Council object within 30 days to any actions proposed pursuant to this agreement, the Seattle District, U.S. Army Corps of Engineers, shall consult with the objecting party to resolve the objection. If the Seattle District, U.S. Army Corps of Engineers, determines that objection cannot be resolved the Seattle District, U.S. Army Corps of Engineers shall forward all documentation relevant to the dispute to the Council. Within 30 days after receipt of all pertinent documentation, the Council will either:

a. provide the Seattle District, U.S. Army Corps of Engineers with recommendations, which the Seattle District, Corps of Engineers will take into account in reaching a final decision regarding the dispute; or

b. notify the Seattle District, U.S. Army Corps of Engineers that it will comment pursuant to 36 CFR 800.6(b), and proceed to comment. Any Council comment provided in response to such a request will be taken into account by the Seattle District, Corps of Engineers in accordance with 36 CFR 800.6(c)(2) with reference to the subject of the dispute.

Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; the Seattle District, U.S. Army Corps of Engineers responsibility to carry out all actions under this agreement that are not the subjects of the dispute will remain unchanged.

VII. Monitoring

The Washington SHPO and the Council may monitor activities carried out pursuant to this Programmatic Agreement, and Section 110 of the NHPA and the Council will review such activities if so requested.

The Seattle District, U.S. Army Corps of Engineers will cooperate with the Washington SHPO and the Council in carrying out their monitoring and review responsibilities.

VIII. Amendments

Any party to this Programmatic Agreement may request that it be amended, whereupon the parties will consult in accordance with 36 CFR 800.13 to consider such amendment.

IX. Termination

Any party to this Programmatic Agreement may terminate it by providing thirty (30) days notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendment or other actions that would avoid termination. In the event of termination, the Seattle District, U.S. Army Corps of Engineers will comply with 36 CFR 800.4 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.

X. Noncompliance with Agreement

In the event the Seattle District, U.S. Army Corps of Engineers does not carry out the terms of this Programmatic Agreement, the Seattle District, U.S. Army Corps of Engineers will comply with 36 CFR 800.4 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.

Execution and Implementation of this Programmatic Agreement evidences that the Seattle District, U.S. Army Corps of Engineers has satisfied its Section 106 responsibilities for all individual undertaking of the program and meets the requirements for program stewardship standards.

SEATTLE DISTRICT, U.S. ARMY CORPS OF ENGINEERS

By: Walter J. Cunningham Jr. Date: 24 FEB 94
Colonel Walter J. Cunningham, Commander

WASHINGTON STATE HISTORIC PRESERVATION OFFICE

By: Mary M. Thompson Date: 3/10/94
Mary M. Thompson, State Historic Preservation Officer

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: Robert D. Bush Date: 5/6/94
Robert D. Bush, Executive Director

APPENDIX B

Lake Washington Ship Canal
Stewardship Standards

GENERAL

The Stewardship Standards have been developed for application in the restoration and rehabilitation of the buildings at the Lake Washington Ship Canal. These Standards will be applied and used in conjunction with and in supplement to the Secretary of Interior's Standards for Rehabilitation of Historic Buildings and guidelines for treatment of Historic Landscapes. In some instances the Stewardship Standards are more specific than the Secretary of the Interior's Standards in addressing what is appropriate for the buildings, structures or site features, in these instances the Stewardship Standards should take precedence.

The LWSC stewardship standards stress the importance of the repair, replacement, and rehabilitation of architecturally significant building structural or site elements, while recognizing the need to accommodate current operation and fiscal responsibilities. In some instances, exterior and interior alterations to buildings may be needed to assure their continued use, but it is most important that such alterations do not radically change, obscure, or destroy original character-defining spaces, materials, and finishes. The LWSC standards identify certain of the original character-defining attributes, and offer guidance as to their maintenance and rehabilitation.

SITE OBJECTIVES

Preserve the relationship between buildings, landscape elements and open space.

Retain site elements which are important in defining the overall character of the historic district. Retain and maintain structures, furnishings and objects that remain from the period of significance.

Remove and replace as required furnishings and objects that were placed in the landscape after the period of significance and which do not contribute to the overall character of the historic district. For example light fixtures, fences, benches, and trash receptacles.

Accommodate required parking including access for the physically disabled without intrusion to the buildings or significant areas.

Screen parking from public view areas to reduce its impact on the historic district.

Acquire furnishings and objects which are similar to these that existed, in the landscape during the period of significance. New furnishings and objects should match the original in size, materials, finishes and placement into the site design.

EXTERIOR OBJECTIVES

Maintain concrete elements which are important in defining the overall historic character of each building. Remove and replace concrete that is inconsistent with the original concrete in color, texture and workmanship.

Analyze existing concrete so that a compatible mix can be made for repairs. New concrete should match the old in color, texture and workmanship.

Masonry surfaces shall be protected and maintained close to the original design. When repair is no longer practical, replacement of elements will be done to match the original. Repair chimneys to match original designs.

Metal elements which contribute to the architectural character of the buildings should be retained and preserved. Also, retain and preserve the type of finish, historic color, size, and shape.

Copper and bronze should not be painted or coated. Other metals should be painted to protect them from the elements.

Retain, rather than replace, architectural metal elements when repair of the element and limited replacement of deteriorated or missing parts can be accomplished.

Reinstall copper gutters to match the original design where a replacement material now exists.

WOOD OBJECTIVES

Interior and exterior wood elements that are important in defining the overall historic character of the building should be retained and preserved. Original cornices and brackets, architraves, door surrounds, pediments, newels, bannisters, railings, moldings, casings, etc., wood elements should remain as original fabric with repairs. Replace only if the original cannot be repaired. Replace elements that were once a part of the original fabric and are now missing.

Retain historic finishes to preserve the historic character of the exterior. Repaint wood only as needed with materials that are appropriate to the historic district.

Remove paint buildup from woodwork, sand, prime, and repaint; reglaze windows and doors as required. Caulk as required.

Repairs shall match the original woodwork in design, size and shape.

DOOR AND WINDOW OBJECTIVES

Doors and windows together with their trim define the historic character of the buildings and therefore shall be retained and preserved. Remove non-original doors and windows that compromise the integrity of the original and replace with units to match the original or that is standard for adjacent structures. Retain, repair, and maintain historic hardware where it exists. Replace hardware to match the original in size, shape and configuration.

Maintain the operating condition of doors and windows. Locate weatherstripping to facilitate operation.

Maintain the historic appearances of windows and doors and their frames though retention of designs, materials, finishes and colors including the configuration of sashes and muntins, depth of reveals, molding profiles, and the reflectivity and color of the glazing.

Energy conservation will be achieved by appropriate insulation or other appropriate methods that do not radically change, damage or destroy character-defining features.

Maintain integrity of caulking and sealants at doors and windows.

ROOFING OBJECTIVES

Retain character-defining roof shapes and roofing materials, rather than introducing incompatible designs or improper installation techniques. Retain the configuration of existing roofs without the addition of new elements that diminish the historic character.

Roofing material shall be appropriate to the style and period of the buildings. Retain original sound historic clay tile and slate roofing materials and architectural metal.

All repairs shall match the original design and materials.

BUILDING ENTRANCE OBJECTIVES

Retain historic entrances and porches which are character defining elements of the building. Significant elements include doors, entablaters, columns, brackets, rails, and stairs.

Provide barrier-free access where necessary through removable or portable, rather than permanent, ramps. Do not remove historic steps, but rather, ramp above them. Locate barrier-free access so as to minimize visual intrusion and impact on the structure.

INTERIOR OBJECTIVES

Retain and preserve interior elements and finishes that are important in defining the overall historic character of the buildings. These elements include but are not limited to columns, cornices, chair rails, baseboards, fireplaces and mantels, light fixtures, hardware, flooring, plaster and may include plumbing fixtures.

Public spaces such as entrance spaces, and entrance halls are important in defining the overall historic character of the building. Size, configuration, and proportion of these spaces should be maintained. Where alterations have occurred they should be removed to restore the plan to the original design.

Maintain character-defining interior spaces by not cutting through floors, lowering ceilings, or removing walls.

Reuse decorative material or elements that were removed during rehabilitation work including wall and baseboard trim, door moulding, paneled doors, and wainscoting.

Remove excessive paint build-up from character defining elements with due regard to disposition of hazardous materials. Prime and repaint from approved palette of colors.

Maintain the finishes or colors of historic woodwork. For example, do not paint a previously varnished wood element, or strip historically painted wood surfaces to bare wood to create a "natural look".

New materials that obscure or damage character-defining interior elements shall not be installed. Likewise, paint, plaster, or other finishes on historically finished surfaces shall not be removed in an effort to create a new appearance.

Remove, clean, lacquer, and reinstall original hardware. Return original doors to designated openings.

HVAC OBJECTIVES

Remove all asbestos from heating and water lines.

Install mechanical systems and service equipment when required, that causes minimal alteration to the building's floor plan and the principal exterior elevations, and the least damage to historic building materials and volume of principal rooms. Remove intrusive ductwork from principal rooms and provide alternate sources of supply.

Install mechanical systems and service equipment so that character-defining structural or interior elements are not radically changed, damaged, or destroyed.

Exterior walls shall not be cut for installation of HVAC units. Remove units that have been cut through exterior walls.

ELECTRICAL OBJECTIVES

Provide underground supply of power, phone and cable. Rewire buildings to new service entries. Internally wire for cable and phone, removing existing conduits and wiring from exterior. Conceal all exposed conduits and ensure adequacy of outlets. Replace missing character-defining light fixtures with those appropriate to the character of the original exterior and interior. Where possible, replicate existing original fixtures or introduce fixtures appropriate to the period.

STRUCTURAL OBJECTIVES

Correct any structural deficiencies before rehabilitation or restoration.

CAVANAUGH HOUSE OBJECTIVES

These additional Cavanaugh House standards will identify certain character-defining attributes, and offer guidance as to house maintenance and rehabilitation.

Public spaces such as entrance halls, parlors, and dining rooms that are important in defining the overall historic character of the house. Size, configuration and proportion of these spaces should be maintained. Where alterations have occurred they should be removed to restore the plan to the original design.

Sand wooden floors only when it is absolutely necessary, rather than at the change of occupancy.

Maintain character-defining interior elements and finishes throughout the house.

APPENDIX C

HISTORIC PROPERTY MANAGEMENT PLAN
STANDARDS AND GUIDELINES

The Historic Property Management Plan (HPMP) for the Seattle District, U.S. Army Corps of Engineers - Lake Washington Ship Canal Project shall be prepared in accordance with the following standards and guidelines.

1. The HPMP will be prepared by or under the direct guidance and supervision of an individual who meets, or individuals who meet, at a minimum, the Professional Qualifications Standards for historic architecture, landscape architecture, and archeology in the Secretary of the Interior's Professional Qualifications Standards. (48 FR 44738-9).

2. The HPMP will be prepared with reference to Secretary of the Interior's Standards and Guidelines for Preservation Planning (48 FR 44716-20); the Section 110 Guidelines (53 FR 4727-20) and U.S. Army Corps of Engineers, Engineering Regulation (ER) 1130-2-438.

3. The essential purpose of the HPMP will be to establish processes for integrating the preservation and use of historic properties with the mission and programs of the Seattle District, U.S. Army Corps of Engineers in a manner appropriate to the nature of the historic properties involved, the nature of the Lake Washington Ship Canal Project and the nature of the Seattle District, U.S. Army Corps of Engineers mission, programs, and planning processes.

4. In order to facilitate such integration, the HPMP, including all maps and graphics, will be made consistent with the CADD systems used by the Seattle District, U.S. Army Corps of Engineers.

5. The HPMP will include the following:

a. Foreword. The foreword shall explain the basis upon which the HPMP is being prepared.

b. Introduction. The introduction shall explain the organization and use of the various sections of the HPMP.

c. Overview. This element of the HPMP will synthesize available data on the history, architecture, architectural history, and landscape architecture of the Lake Washington Ship Canal Project and its surrounding area, to provide a context in which to evaluate and consider alternative treatment strategies for different classes of historic properties. The overview shall include, but not be limited to information on the Lake Washington Ship Canal Project and its historical site patterns, architecture of the facilities and landscape design of the Carl S. English, Jr. Botanical Gardens, Fremont Cut and Montlake Cut.

d. Inventory. This element of the HPMP will include descriptions of all properties within the Lake Washington Ship Canal Project that are known or thought to meet the National Register criteria (36 CFR 60.4). This documentation will include the National Register nomination form for the historic district and photographs.

e. Management System. The element of the HPMP will establish procedures for the management of historic properties within the Lake Washington Ship Canal Project, including but not limited to:

i. procedures for promoting the use of historic properties for agency purposes or the purposes of others, in a manner that does not cause significant damage to or deterioration of such properties;

ii. procedures for the maintenance of historic buildings, and site properties with prioritized building-by-building recommendations and rehabilitation;

iii. procedures for the avoidance or mitigation of adverse effects on historic properties, incorporating the review procedures set forth in this Programmatic Agreement;

iv. procedures of consultation with relevant parties during the implementation of the HPMP.

Appendix B: Contributing Buildings, Structures and Gardens to LWSC Historic District

2024 Resource Name	Built Date	Determination of Eligibility
Ballard Locks – Pipe Shop	1941	Survey/Inventory
Ballard Locks - Steel Shop	1941	Eligible as Contributing
Chittenden Locks - Warehouse	1916	Survey/Inventory
Hiram M. Chittenden Control Tower	1969	Not Eligible
Carpenter and Blacksmith Shop	1921	Contributing
Corps of Engineers Administration Building	1915	Contributing
Operating House #1-4	1914	Contributing
Visitor Center		Contributing
Maintenance Shop		Contributing
Transformer House	1914	Contributing
Machine Shop	1916	Contributing
Mechanics Shop	1914	Contributing
Office and Shop Building	1916	Contributing
Gas and Oil Building	1916	Contributing
Ballard Locks - Emergency Dam Hoist House	1922	Contributing
Warehouse No. 2	1941	Contributing
District Garage	1941	
Public Comfort Station	1947	Contributing
Boathouse	1949	
Greenhouse	1949	Contributing
Gatehouse	1949	Contributing
Open Storage Shed	1940s	Contributing
Quonset Hut	1949	Contributing
Lake Washington Ship Canal Botanical Garden		Determined Eligible
Hiram M. Chittenden Large Lock	2024	Not Contributing

2024 Resource Name	Built Date	Determination of Eligibility
Hiram M. Chittenden Small Lock	1911	Contributing
Warehouse 1/Carpenter Shop/Building 6	1916/1922	Contributing
Ballard Locks Pipe Shop	1941	Contributing
Carl English Gardens	1931-1971	Contributing

Historic Property Report

Resource Name: Corps of Engineers Administration Building

Property ID: 725557

Location

Address: Hiram M Chittenden Locks

Geographic Areas: Seattle Certified Local Government, King County, T25R03E11, SHILSHOLE BAY Quadrangle

Information

Number of stories: 2.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1915	☐

Historic Use:

Category	Subcategory
Government	Government - Administrative Facility
Government	Government - Administrative Facility

Historic Context:

Category
Maritime

Architect/Engineer:

Category	Name or Company
Architect	Bebb and Gould

Historic Property Report

Resource Name: Corps of Engineers Administration Building

Property ID: 725557

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-07-04644, , Lake Washington Ship Canal, Hiram M. Chittenden Locks Proposed Physical Access Security System Upgrade		Survey/Inventory	

Historic Property Report

Resource Name: Corps of Engineers Administration Building

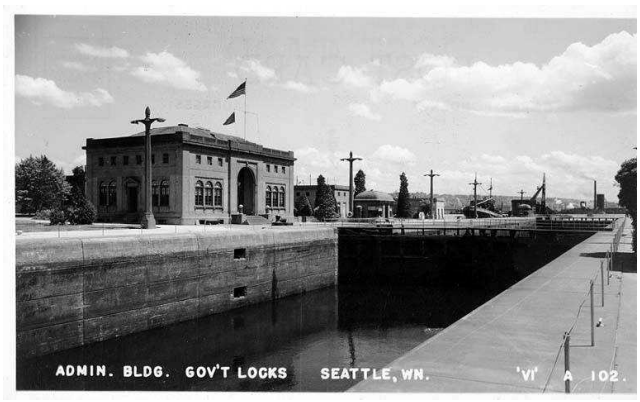
Property ID: 725557

Photos

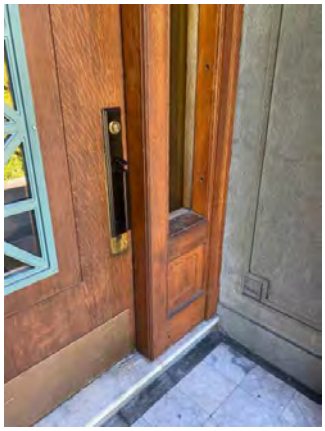
IMG_0258.jpg

crane 1916.jpg

IMG_0257.jpg



1930.jpg



View of the Door where a CAC reader will be installed

IMG_0218.jpg

Historic Property Report

Resource Name: Corps of Engineers Administration Building

Property ID: 725557

Register nomination form

Historic Property Report

Resource Name: Corps of Engineers Administration Building

Property ID: 725557

Inventory Details - 8/9/2021

Common name: Admin Building

Date recorded: 8/9/2021

Field Recorder: Sarah MacIntosh and Lys Opp-Beckman

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Articulated Frame - Concrete
Roof Type	Hip

Styles:

Period	Style Details
Early 20th Century Revivals (1900-1940)	Classical Revival

Surveyor Opinion

Significance narrative: The Administration Building is a contributing element of the National Register listed Lake Washington Ship Canal (LWSC) historic district. The LWSC Historic District was listed on the National Register of Historic Places in 1978 as a Historic District. The Administration Building retains high integrity in most aspects. Moderate interior renovations have impacted office space over the years. The Administration building contributes under Criterion A. It is the hub for engineering support at the LWSC

The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood)

and barnacles from the hulls of ocean-going vessels without the expense of dry-docking. In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government. The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910)and numerous other officials were present. Overhead flew a plane built by the one-year old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were divided between the State of Washington and King County, for acquisition of right-of-way's and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works. Originally referred to as the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States. Today, this property is referred to by a number of names including the Lake Washington Ship Canal, and the Ballard Locks. It is the busiest lock in the United States due to the volume of recreational boaters. Approximately 50,000 ships a year pass the 104-year-old complex.

Historic Property Report

Resource Name: Corps of Engineers Administration Building

Property ID: 725557

Physical description:

The Administration Building was completed in 1915 in the second Renaissance Revival style sits on a rectangular foundation area measuring 47-feet by 67-feet. It is a multi-story structure, including two upper stories and a basement, constructed of reinforced concrete with a tile-clad hipped roof with central deck. The basement contains the pumping plant for dewatering the Locks for annual repairs and the original electrical distribution panel (which is intact but functionally superseded). The ground story has cross-axial corridors with central lobby space and principal offices in each comer. The lobby opens to the second story gallery. It features an oval ceiling light of textured and colored glass, and terrazzo floor with geometric trim of Alaska and verde antique marble. Interior walls and ceilings, including coved cornices, are plaster-finished. Woodwork, including door and window trim, baseboards, pilasters, ogee wall panel moldings, and ionic stave columns flanking the main entry vestibule, is varnished oak. The second story storerooms open onto the lobby.

Each exterior elevation has tri-partite organization. Walls are topped with a decorative concrete parapet. Second story windows are covered with cast-iron grilles. Ground story arcuated windows and central pedimented doorways are in panels of concrete set off from the major wall surface by special texturing with a bush hammer. The main entry on the southwest, or waterway face, is recessed behind a two-story portal arch and surrounded by plate glass fronted by cast iron grilles. Surmounting either bulkhead of the concrete steps of this entrance are light globes mounted on fluted concrete drums with dolphin-supported bronze fittings. These are noteworthy because they are the only external lighting fixtures on the Locks Site which have remained intact.

The building has been only superficially altered, mostly on the interior. The building's lobby is open to the public, but the basement pumping plant is open to the public only on guided tours. The original dewatering pump system below the administration building was replaced in 2012-2013.

Bibliography:

Army Corps of Engineers. 2021. Draft Historic Property Management Plan for Lake Washington Ship Canal. Prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings for the Seattle District of the Army Corps of Engineers. On file at the U.S. Corps of Engineers, Seattle District.

Caldbick, John, Chittenden, Hiram Martin (1858-1917), Historylink, Publishes 2017, https://www.historylink.org/File/20329, accessed 5/21/2021.

Lake Washington Ship Canal locks under construction, Seattle, May 22, 1913 Courtesy Seattle Municipal Archives (Image No. 6325).

Mcdowell Group, Ballard Lock Study, Port of Seattle, 2017. Opening day, Government (later Hiram M. Chittenden) Locks, Seattle, July 4, 1917 Courtesy U.S. Army Corps of Engineers, Seattle District. Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District. Steam shovel excavating ship canal, Fremont to Salmon Bay, 1915 Courtesy U.W. Special Collections (PEMCO Webster & Stevens Collection, Image No. 1983.10.6932).

Williams, David B., Lake Washington Ship Canal construction starts on October 27, 1909., Historylink, Published 2016, https://www.historylink.org/File/684, accessed 5/21/2021.

https://www.seattle.gov/documents/Departments/CityArchive/Gazette/gazette60.pdf, accessed 6/30

Historic Property Report

Resource Name: Ballard Locks - Steel Shop

Property ID: 725561

Location

Address: Hiram M Chittenden Locks

Geographic Areas: SHILSHOLE BAY Quadrangle, Seattle Certified Local Government, T25R03E11, King County

Information

Number of stories: 1.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1941	☑
Addition	1990	☑

Historic Use:

Category	Subcategory
Government	
Government	

Historic Context:

Category
Military

Architect/Engineer:

Category	Name or Company
Architect	Bebb and Gould

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-07-04644, , Lake Washington Ship Canal, Hiram M. Chittenden Locks Proposed Physical Access Security System Upgrade		Survey/Inventory	

Historic Property Report

Resource Name: Ballard Locks - Steel Shop

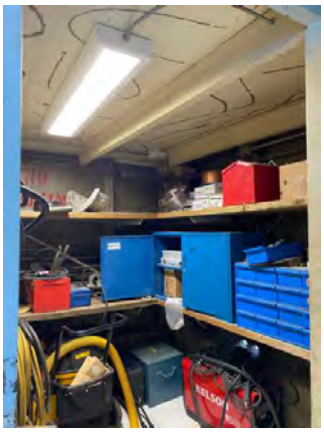
Property ID: 725561

Photos

Steel Shop 2021.jpg

IMG_0255.jpg

IMG_0253.jpg



IMG_0252.jpg

IMG_0251.jpg

IMG_0250.jpg

Steel Shop 1941.jpg

Historic Property Report

Resource Name: Ballard Locks - Steel Shop Property ID: 725561

Inventory Details - 8/9/2021

Common name:

Date recorded: 8/9/2021

Field Recorder: Sarah MacIntosh and Lys Opp-Beckman

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Cladding	Metal
Foundation	Concrete - Poured
Cladding	Metal
Roof Type	Gable - Front
Roof Material	Metal

Styles:

Period	Style Details
No Style	No Style

Surveyor Opinion

Significance narrative: The Steel Shop is a contributing element of the National Register listed Lake Washington Ship Canal (LWSC) historic district. The LWSC Historic District was listed on the National Register of Historic Places in 1978 as a Historic District. The Steele Shop retains high integrity in most aspects. Moderate interior renovations have been made to provide recreation space and storage The Steele Shop contributes under Criterion A, its supports the LWSC's engineering narrative and mission This is a unique frame and panel metal WWII era warehouse that is not a Quonset hut or 700-800 series building.
The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility

of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood) and barnacles from the hulls of ocean-going vessels without the expense of dry-docking. In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government. The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910)and numerous other officials were present. Overhead flew a plane built by the one-year old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were divided between the State of Washington and King County, for acquisition of right-of-way's and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works. Originally referred to as the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States. Today, this property is referred to by a number of names including the Lake Washington Ship Canal, and the Ballard Locks. It is the busiest lock in the United States due to the volume of recreational boaters. Approximately 50,000 ships a year pass the 104-year-old complex.

Physical description: The Steel Shop was constructed in 1941. Currently, it is used as the welding and plumbing shops, lunch and locker rooms, and offices for the chief of maintenance and yard crew foreman. It is a high ceiling, single-story, metal-clad, steel frame building with a built-up roof and a foundation area measuring 40-feet by 102-feet. The roof is supported by a style truss system. The metal cladding is stamped sheet metal with a decorative geometric border at the edge of each panel. The pattern repeat creates a weave or grid type pattern. Additional geometric decorative elements can be seen on the interior steel I-beams, they have a scallop pattern cut into the vertical.

Bibliography:

Army Corps of Engineers. 2021. Draft Historic Property Management Plan for Lake Washington Ship Canal. Prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings for the Seattle District of the Army Corps of Engineers. On file at the U.S. Corps of Engineers, Seattle District.

Caldbick, John, Chittenden, Hiram Martin (1858-1917), Historylink, Publishes 2017, https://www.historylink.org/File/20329, accessed 5/21/2021.

Lake Washington Ship Canal locks under construction, Seattle, May 22, 1913 Courtesy Seattle Municipal Archives (Image No. 6325).

Mcdowell Group, Ballard Lock Study, Port of Seattle, 2017. Opening day, Government (later Hiram M. Chittenden) Locks, Seattle, July 4, 1917 Courtesy U.S. Army Corps of Engineers, Seattle District. Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District. Steam shovel excavating ship canal, Fremont to Salmon Bay, 1915 Courtesy U.W. Special Collections (PEMCO Webster & Stevens Collection, Image No. 1983.10.6932).

Williams, David B., Lake Washington Ship Canal construction starts on October 27, 1909., Historylink, Published 2016, https://www.historylink.org/File/684, accessed 5/21/2021.

Historic Property Report

Resource Name: Ballard Locks-Warehouse #1 Property ID: 725558

Location

Address: 3015 NW 54th St, Seattle, Washington, 98107

Tax No/Parcel No: 1025039051, 1125039012,

Geographic Areas: T25R03E11, Seattle Certified Local Government, SHILSHOLE BAY Quadrangle, King County

Information

Number of stories: 1.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1916	☐
Built Date	1922	☐
Addition	1945	☑
Remodel	1945	☑

Historic Use:

Category	Subcategory
Government	
Government	

Historic Context:

Category
Maritime
Maritime - Water Highways

Architect/Engineer:

Category	Name or Company
Architect	Bebb and Gould
Architect	U.S. Army Corps of Engineers-Seattle District
	Chittenden, Hiram
Engineer	Chittenden, Hiram
Engineer	Cavanaugh, James

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-04-02415, , Lake Washington Ship Canal- Hiram M. Chittenden Locks- Building 6- Chimney Demolition		Survey/Inventory	

Photos

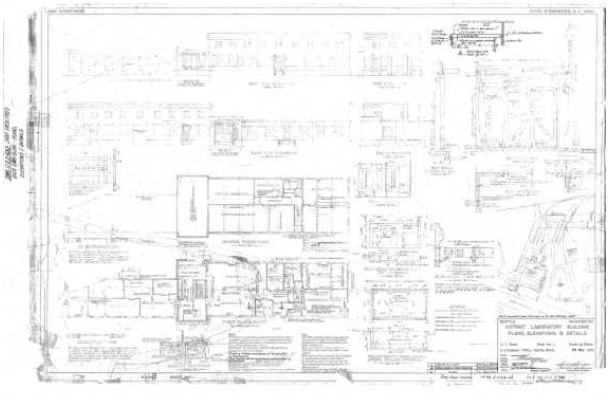
Warehouse 1

Ages Sketch.jpg

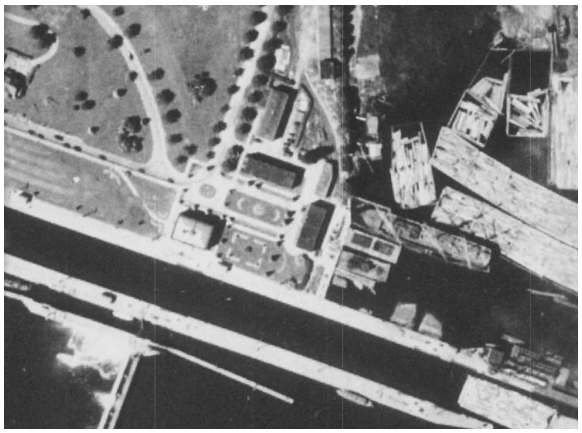
LWSC Chimney_view 1_210428.jpg

005.086.044.088.jpg

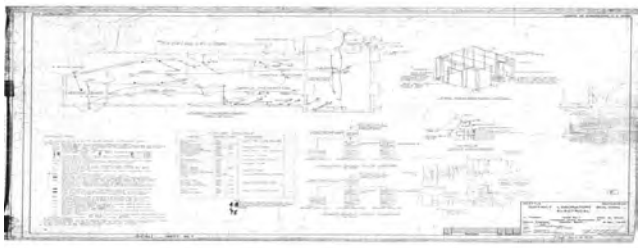
001.061.040.032.JPG



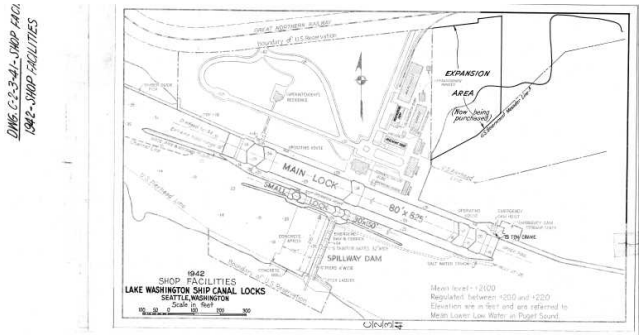
building 6-V2.jpg



1936 king county aerial.png



C-2-3-061 sht7-1945.jpg



C-2-3-041-1942 Shop facilities.jpg

1940 aerial.jpg

Warehouse 1

Warehouse 1

Warehouse 1

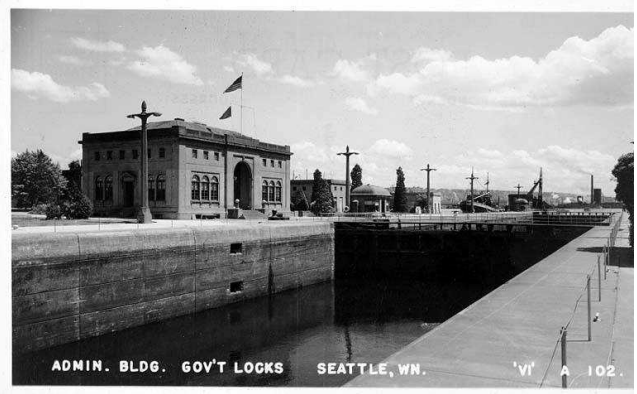
Warehouse 1

BallardLocks_Seattle (3).jpg

BallardLocks_Seattle (2).jpg

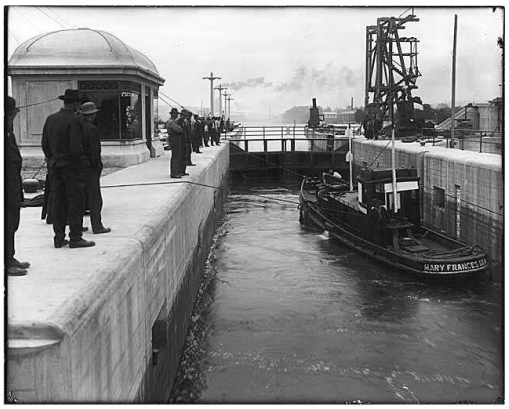
BallardLocks_Seattle (1).jpg

BallardLocks_1917.jpg



BallardLocks_Seattle (5).jpg

BallardLocks_1949.jpg



BallardLocks_Seattle (4).jpg

BallardLocks_1955.jpg

F14 W.JPG

F14 E.JPG

F14 garage W.JPG

F14 S&E.JPG

20210416_104551.jpg

20210416_104528.jpg

LWSC Chimney_view 1_210428.jpg

001.061.040.032.JPG

005.086.044.088.jpg

005.111.000.000.jpg

no chimney 1939.jpg

C-2-3-041-1942 Shop facilities.pdf

C-2-3-041-1942 Shop facilities.pdf

Register nomination form

Historic Property Report

Resource Name: Ballard Locks-Warehouse #1 Property ID: 725558

Inventory Details - 7/1/2021

Common name: Ballard Locks-Building 6; Hiram Chittenden Locks Bldg 6

Date recorded: 7/1/2021

Field Recorder: Kara Kanaby

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Utilitarian
Cladding	Concrete - Poured
Roof Material	Asphalt/Composition - Built Up
Structural System	Masonry - Poured Concrete
Plan	Irregular
Roof Type	Flat with Eaves

Styles:

Period	Style Details
Early 20th Century American Movements (1900-1940)	Commercial

Surveyor Opinion

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): Yes

Property potentially contributes to a historic district (National and/or local): Yes

Significance narrative: The Lake Washington Ship Canal (LWSC) Historic District was listed on the National Register of Historic Places in 1978 as a Historic District (The District). The district's-built features are eligible under two NR criterions, A, B and C. Criteria A as a significant major engineering achievement completed under government auspices that created a navigable waterway joining Puget Sound to Lake Union and Lake Washington; Criteria B, as it is associated with significant individuals: Major Hiram M. Chittenden, the Seattle District Engineer who developed and promoted the plan for the canal; Colonel James B. Cavanaugh, who supervised the construction of the project; and Bebb and Gould, the architectural firm who designed the layout and complex of concrete buildings around the Chittenden Locks and Criterion C as the original eleven concrete accessory buildings are distinctive examples of classical ornamented early 20th century commercial architecture. Warehouse 1 (the warehouse) is a contributing resource to the District. The warehouse retains high integrity in most aspects. Extensive interior renovations have impacted the interior space of this building over the years. The warehouse is eligible under Criterion A, it supports the LWSC's engineering narrative and mission and is part of the initial period

of construction.
The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood) and barnacles from the hulls of ocean-going vessels without the expense of dry-docking. In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government. The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. In November 1911, ground was broken for the locks and in February 1913, the first concrete was deposited in the forms. July 1916 marked the first closing of Salmon Bay. Lake Washington was lowered approximately eight feet to the level of Lake Union by October 1916. This caused Lake Washington to drain into Lake Union and reversed the flow of the lower end of the Cedar River, causing it to drain into Lake Washington. The Black River which prior to the construction of LWSC flowed from the south end of Lake Washington into the Duwamish River ceased to exist. . With the completion of the Fremont Cut, Salmon Bay was raised to the height of Lake Union and became fresh water. In May 1917, the Montlake Cut between Lakes Union and Washington was opened near the vicinity of the abandoned portage excavated by the Lake Washington Improvement Association. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910) and numerous other officials were present. Overhead flew a plane built by the one-year-old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were divided between the State of Washington and King County, for acquisition of right-of-way and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works. Originally referred to as

the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States.

Warehouse #1 is known by several different names. Currently, Warehouse #1 is known as Building # 6 and has in the past been referred to as Warehouse #1, Paint Shop, Garage and the Office and Shop Building. Warehouse #1 has undergone many changes over the years both in use and footprint and include two additions. The earliest date and structure associated with Warehouse #1 is the 1916 the two-story original warehouse which was a part of the original group of accessory buildings constructed within the District. As it names suggest the building functioned as a warehouse. In 1922, a single-story building was constructed to the north of the warehouse and has been referred to as a garage/paint shop. A 1942, shop facilities map shows that the 1916 warehouse is still a warehouse and the 1922 garage/paint shop is identified as a garage. In addition, the 1942 map shows the 1916 warehouse, and the 1922 garage/paint shop are still separate buildings. Between 1942 and1945, the 1916 warehouse and the 1922 garage had been connected by a single-story addition and a chimney was added to the north end of the 1922 building on what use to be the paint shop as shown on plans from 1945. The plans titled District Laboratory building indicate that usage of both the 1916 warehouse and the 1922 garage has changed. The plans show interior changes such as the removal of partitions, the removal and replacement of floor slabs as well as the division of interior space for separate activities. The 1945 plan is very faint and it hard to tell exactly what each space was used for, but it appears a number of activities were occurring within this space including sample preparation and sample splitting, the addition connecting the two buildings together include crane prep. and other equipment including a consolidation and lateral pressure apparatus, Riehle P.M.U testing. The space in the 1916 warehouse has several rooms and it appears that additional soil testing is occurring, with rooms for compaction, concrete, a men's restroom, and what appears space for fine grading soils and consolidation. The 1945 electrical plan sheet is more legible and shows the paint shop has been converted into a heating plant with the remaining garage space divided up into four separate rooms identified as a storeroom, shop, sample perpetration and sample splitting. The addition that connects the 1922 garage/paint shop to the 1916 warehouse is labeled as testing. The 1945 electrical plans do not show the 1916 warehouse space. There is no evidence that there was a chimney associated with the 1922 building due to the location of the chimney on the end of the building where paint shop was located. A paint shop would likely not have included either a heat source or chimney due to the volatility of paint fumes in an enclosed space.

Physical description:

Building 6 (Warehouse No. 1) building was constructed in three parts. The Office and Shop building was completed in 1916; the seven-stall garage was completed in 1922. In 1945, the two structures were combined by covering the space between them to form the existing structure. The Warehouse is a two-story reinforced concrete structure with a built-up roof and a foundation area measuring 36-feet by 80-feet with the long walls at the east and west elevations. The west elevation is along the main promenade, and the east wall faces toward the maintenance yard. The warehouse has an attached garage on the north elevation (see below). Windows are ca. 1950s aluminum-sash units in original openings. Replacement windows at the main level are three light fixed and those at the clerestory are 1/1 double hung or single light fixed or awning.
Entries vary considerably in size and detail from for one elevation to the next. There is a formal main entry centered on the west wall. It has a recessed doorway in a stylized concrete surround with a flat cornice. The doorway retains its original wood-frame door

and transom. The door has a near full window with 3x4 lights and the transom is a narrow window with 4 vertical lights.
Entries on the east elevation are more indicative of the building's warehouse nature. They include: a person-sized entry with a replacement half-window door and aluminum transom window toward the south; a wider entry at center which has been modified with a half-window door and concrete infill; and a wider entry with a non-original but older roll up door made of corrugated metal toward the north. Former transom areas at the center and northern entries both were altered with concrete infill and board signage.

Three person-sized entries with transoms are evident on the south elevation. The entry to the west holds a half-window replacement door and aluminum-sash transom. The doorway and transom areas at the center and east entries have been infilled with concrete.
The warehouse's attached garage appears to be a fairly early addition, presumably constructed circa 1922. It occupies the once empty space that existed between the warehouse and the next original maintenance building to the north, the paint shop (no. 39). The garage is comparable in construction to the warehouse but distinguished by the smoother appearance of its concrete work and more simplified foundation and cornice details. A large garage opening on the west elevation holds an older but non original rollup door made of corrugated metal. An interior doorway allows for direct passage between the two buildings.
The paint shop (no. 39) is on the north side of the warehouse's attached garage. It joins the garage but there is no interior doorway between the two buildings.

The paint shop is a single-story building without a clerestory. It is unique among the other original maintenance buildings due to its irregular instead of rectangular plan. The northeast corner of the paint shop is cut away, creating a long-canted wall. The shop's longest wall is at the east elevation. In addition to its irregular plan, the paint shop is distinguished by an exterior chimney. Constructed of red brick, this chimney stands against the building's canted, northeast wall. The chimney is currently failing, and bricks are able to be pulled out the chimney by hand due to loose mortar. It is unclear when the chimney was added to building but historic photographs indicate it was sometimes after 1939 and likely occurred in 1945 when the two buildings were in the process of being combined into one buildings.
A modern shed addition is on the paint shop's east elevation. It is at the south end of that wall where it occupies an L-inset bound nestle between paint shop and the warehouse's attached. The shed addition has a shed roof, T-1-11 siding and large openings without doors on the east and north elevations (one each).

Bibliography:

Army Corps of Engineers. 2021. Draft Historic Property Management Plan for Lake Washington Ship Canal. Prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings for the Seattle District of the Army Corps of Engineers. On file at the U.S. Corps of Engineers, Seattle District.

Army Corps of Engineers. 1942. DWG C 2-3-41 Shop Facilities. Lake Washington Ship Canal Locks. Seattle Washington. On file at the U.S. Corps of Engineers, Seattle District.

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Army Corps of Engineers. 1945. File No. C-2-3-61 District Laboratory Electrical. Sheet no. 7. Seattle Washington. 30 Nov. 1945. On file at the U.S. Corps of Engineers, Seattle District.

Caldbick, John, Chittenden, Hiram Martin (1858-1917), Historylink, Publishes 2017, https://www.historylink.org/File/20329, accessed 5/21/2021.

Lake Washington Ship Canal locks under construction, Seattle, May 22, 1913 Courtesy Seattle Municipal Archives (Image No. 6325).

Mcdowell Group, Ballard Lock Study, Port of Seattle, 2017. Opening day, Government (later Hiram M. Chittenden) Locks, Seattle, July 4, 1917 Courtesy U.S. Army Corps of Engineers, Seattle District.

Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District.

Steam shovel excavating ship canal, Fremont to Salmon Bay, 1915 Courtesy U.W. Special Collections (PEMCO Webster & Stevens Collection, Image No. 1983.10.6932).

Williams, David B., Lake Washington Ship Canal construction starts on October 27, 1909., Historylink, Published 2016, https://www.historylink.org/File/684, accessed 5/21/2021.

Historic Property Report

Resource Name: Hiram M. Chittenden Control Tower Property ID: 724922

Location

Address: 3015 NW 54th St, Seattle, Washington, 98107

Geographic Areas: Seattle Certified Local Government, SHILSHOLE BAY Quadrangle, King County

Information

Number of stories: 2.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1969	☐

Historic Use:

Category	Subcategory
Government	
Government	

Historic Context:

Category
Maritime - Navigation and Lifesaving
Maritime - Trade and Commerce
Maritime - Water Highways

Architect/Engineer:

Category	Name or Company
Engineer	U.S. Army Corps of Engineers, Seattle District
Architect	U.S. Army Corps of Engineers, Seattle District
Landscape Architect	Carl S. English

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-04-02392, , Hiram M. Chittenden Locks -Large Lock Center Gate Replacement		Determined Not Eligible	Holly Borth, 6/22/2021

Photos

Control Tower-North Elevation.jpg

Control Tower Under Construction-1968-looking north.jpg

Control Tower under Construction-1968 looking southwest.jpg

Historic Property Report

Resource Name: Hiram M. Chittenden Control Tower Property ID: 724922

Inventory Details - 5/20/2021

Common name: Lake Washington Ship Canal or Ballard Locks

Date recorded: 5/20/2021

Field Recorder: Lys Opp Beckman

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Roof Type	Flat with Eaves
Roof Material	Asphalt/Composition - Built Up
Form Type	Utilitarian
Cladding	Concrete
Plan	Rectangle

Styles:

Period	Style Details
Modern Movement (1930-1970)	International

Surveyor Opinion

Property appears to meet criteria for the National Register of Historic Places: No

Property is located in a potential historic district (National and/or local): Yes

Significance narrative: The control tower is a non-contributing element of the Lake Washington Ship Canal (LWSC) Historic District (the LWWSC Historic District). It was constructed outside the districts period of significance in a non-compatible style, furthermore, it does not possess the necessary attributes for individual listing. The property was listed on the National Register of Historic Places in 1978 as a Historic District. The LWSC Historic District is significant under Criteria A, as a significant major engineering achievement completed under government auspices that created a navigable waterway joining Puget Sound to Lake Union and Lake Washington. The LWSC Historic District is also eligible for listing under Criteria B, as it is associated with significant individuals: Major Hiram M. Chittenden, the Seattle District Engineer who developed and promoted the plan for the canal; Colonel James B. Cavanaugh, who supervised the construction of the project; and Bebb and Gould, the architectural firm who designed the layout and complex of concrete buildings around the Chittenden Locks. Finally, the LWSC Project is also eligible for listing under Criteria C. The original eleven accessory buildings concrete buildings were designed and constructed in the classical style and were designed by the architectural firm Bebb and Gould. With the exception of the Cavanagh house which has stuccoed hollow tile walls, all original buildings are concrete. Taken together the original accessory buildings concrete buildings with the LWSC form a cohesive entity that showcases the LWSC and structures as a whole.

The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood) and barnacles from the hulls of ocean-going vessels without the expense of dry-docking.

In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government.

The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. In November 1911, ground was broken for the locks and in February 1913, the first concrete was deposited in the forms. July 1916 marked the first closing of Salmon Bay. Lake Washington was lowered approximately eight feet to the level of Lake Union by October 1916. This caused Lake Washington to drain into Lake Union and reversed the flow of the lower end of the Cedar River, causing it to drain into Lake Washington. The Black River which prior to the construction of LWSC flowed from the south end of Lake Washington into the Duwamish River ceased to exist. . With the completion of the Fremont Cut, Salmon Bay was raised to the height of Lake Union and became fresh water. In May 1917, the Montlake Cut between Lakes Union and Washington was opened near the vicinity of the abandoned portage excavated by the Lake Washington Improvement Association. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910)and numerous other officials were present. Overhead flew a plane built by the one-year old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were

divided between the State of Washington and King County, for acquisition of right-of-way's and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works.

Originally referred to as the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States.
The control tower was completed in 1969. The Control Tower now controls the small and large locks, and the spillway dam. The Control Tower is called out as an accessory structure within the historic district on the National Register Nomination form but there is no indication on if the Control Tower is considered a contributing element or not to the historic district. The inventory in the District listing does note there was discussion in the past about modifying the angular lines of the Control Tower to make it visually conformable with the earlier concrete buildings in the LWSC Historic District; however, that has not occurred as of the writing of this HPI. The 1994 Historic Property Management Plan (HPMP) lists the Control Tower as a noncontributing element to the historic district. It experienced alterations l in 1993 that included the replacement of doors and windows.

Physical description:

The LWSC Locks are comprised of four contiguous elements, the Large Lock, Small Lock, Spillway Dam, and Control Tower. The Control Tower is located on the Middle Lock wall and is constructed of reinforced concrete. The base of the tower covers a 19-foot x 24-foot area. The 1968 architectural floor plans show metal exterior doors located on the west and east elevations which is confirmed by the 1968 construction photographs. In 1993, upgrades were made to the Control Tower including the doors, scraping of floors and windows among other upgrades. The second level of the Control Tower, the observation level, is a glass-enclosed steel-frame overhang. Constructed in the later international style, ornamentation is non-existent. Its body is broken into two distinct sections. The lower section is a concrete pillar topped with a trapezoidal office/ control room. The upper trapezoid section consists of four walls of metal frame fixed windows; the frames are painted brown. The 1968 as-built shows the roof as a built-up roof with lightweight concrete underneath, visual inspection is not able to confirm this from the ground but it appears correct.

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Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District.

Historic Property Report

Resource Name: Lake Washington Ship Canal Botanical Garden

Property ID: 724728

Location

Address: 3015 NW 54th St, Seattle, Washington, 98107

Geographic Areas: King County, SHILSHOLE BAY Quadrangle, Seattle Certified Local Government, T25R03E11

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa

Historic Use:

Category	Subcategory
Government	Government - Public Works
Landscape	Landscape - Garden
Recreation and Culture	Recreation and Culture - Outdoor Recreation
Government	Government - Public Works
Landscape	Landscape - Garden
Recreation and Culture	Recreation and Culture - Outdoor Recreation

Historic Context:

Category
Landscape Architecture
Landscapes

Historic Property Report

Resource Name: Lake Washington Ship Canal Botanical Garden

Property ID: 724728

Architect/Engineer:

Category	Name or Company
Landscape Architect	Carl S English
Architect	Bebb and Gould
Engineer	Hiram M Chittenden
Engineer	James B Cavanaugh

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-04-02423, , Lake Washington Ship Canal Hiram M. Chittenden Locks -Greenhouse		Determined Eligible	Holly Borth, 6/24/2021

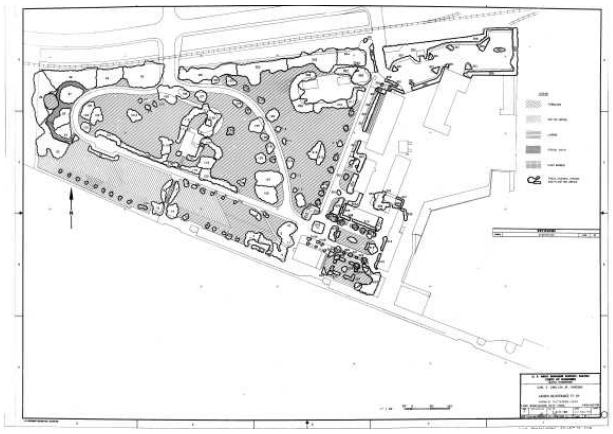
Historic Property Report

Resource Name: Lake Washington Ship Canal Botanical Garden

Property ID: 724728

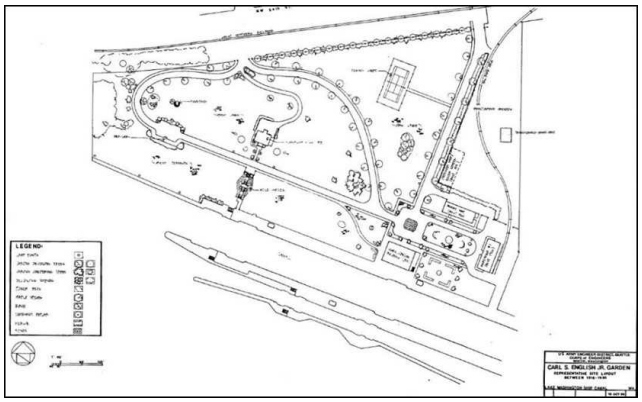
Photos

Welcome Sign to the Locks.jpg



Botantical Garden map.jpg

Garden Welcome Sign.jpg



Map of Garden circa 1930.jpg

Botantical Garden Entrance looking west.jpg

Garden bed in front of Visitor's center.jpg

Historic Property Report

Resource Name: Lake Washington Ship Canal Botanical Garden

Property ID: 724728

Overview of entrance to Botanical Garden.jpg

Overview of grass in foreground and plantings in front of Cavanaugh House.jpg

Overview with Locks in background.jpg

Register nomination form

Historic Property Report

Resource Name: Lake Washington Ship Canal Botanical Garden

Property ID: 724728

Inventory Details - 5/19/2021

Common name: Lake Washington Ship Canal Botanical Garden, Carl S. English Botanical Garden

Date recorded: 5/19/2021

Field Recorder: Kara Kanaby

Field Site number:

SHPO Determination

Detail Information

Styles:

Period	Style Details
No Style	No Style

Surveyor Opinion

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): Yes

Property potentially contributes to a historic district (National and/or local): Yes

Historic Property Report

Resource Name: Lake Washington Ship Canal Botanical Garden

Property ID: 724728

Significance narrative:

The Carl S. English Botanical Garden is a contributing element to the Chittenden (Hiram M.) Locks and Related Features of the Lake Washington Ship Canal (LWSC)Historic District and is associated with Carl S. English, the head gardener at the LWSC from 1940 to 1974. The Historic District was listed on the National Register in 1978 and is significant under Criteria A as a significant major engineering achievement completed under government auspices that created a navigable waterway joining Puget Sound to Lake Union and Lake Washington. The LWSC property is also eligible for listing under Criteria B, since it is associated with significant individuals--Major Hiram M. Chittenden, the Seattle District Engineer who developed and promoted the plan for the canal, Colonel James B. Cavanaugh, who supervised the construction of the project, and Bebb and Gould, the architectural firm who designed the layout and complex of concrete buildings around the Chittenden Locks.Finally, the LWSC Project is also eligible for listing under Criteria C. The original concrete buildings were designed and constructed in the classical style and were designed by the architectural firm Bebb and Gould. Taken together, the concrete buildings within the LWSC form a cohesive entity that showcases concrete structures as a whole and are framed by the Botanical Garden.

Lawn development and the planting of some trees began in 1916. During construction of the Locks, landscape architect Otto Holmdahl designed and installed a series of L-shaped formal style beds, one of which was a formal English-style garden east of the Administration Building, in 1927. The first part-time gardener at the Locks was Henry S. McCarthy, who maintained the overall landscape of the Locks site in a formal garden style. In 1931, Carl S. English, Jr. began working for the USACE, and it was under Mr. English that the Botanical Garden was developed into what it is today. From 1940 until when he retired in 1974, Mr. English was the head of the garden staff and became nationally known as one of the Northwest's leading horticulturists. Today, the Garden contains 140 plant families, 400 genera, and nearly 900 species of trees, shrubs, forbs, and grasses from many parts of the world. The garden has received worldwide recognition and has been featured in national horticultural journals and magazines as well as local publications. The Garden is a cultural and historic landscape unique to the USACE, as it is the only USACE owned botanical garden, where plants are grown for display to the public and for scientific study. Many of these plants are not native to the Pacific Northwest, and may be more rare than from the places where they originated. The lawn areas within the Garden are specially designed to highlight aspects of the Garden and the views of the Locks. The Carl S. English, Jr., Botanical Garden forms a background to the Locks, and it contrasts to the concrete structures and mechanical workings of the Locks

Bibliography:

Munro, Stephen, Sarah R MacIntosh and Ashley Dailide. 2020. Supplemental Cultural Landscape Report for the Carl S. English Jr. Botanical Garden at the Hiram M. Chittenden Locks, Seattle Washington. U.S. Army Corps of Engineers, Seattle District.

United States Army Corps of Engineers (USACE). 2021. Lake Washington Ship Canal Historic Property Management Plan.

Historic Property Report

Resource Name: Hiram M. Chittenden Large Lock Property ID: 724739

Location

Address: 3015 NW 54th St, Seattle, Washington, 98107

Geographic Areas: King County, SHILSHOLE BAY Quadrangle, Seattle Certified Local Government

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1911	☐
Built Date	1916	☐

Historic Use:

Category	Subcategory
Recreation and Culture	Recreation and Culture - Outdoor Recreation
Transportation	Transportation - Water-Related
Government	
Recreation and Culture	Recreation and Culture - Outdoor Recreation
Transportation	Transportation - Water-Related
Government	

Historic Property Report

Resource Name: Hiram M. Chittenden Large Lock Property ID: 724739

Historic Context:

Category
Maritime - Recreation
Maritime - Water Highways
Maritime - Trade and Commerce
Engineering

Architect/Engineer:

Category	Name or Company
Engineer	U.S. Army Corps of Engineers
Engineer	Hiram Martin Chittenden
Landscape Architect	Carl S. English Jr.
Architect	Bebb & Gould
Engineer	James B. Cavanaugh

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

Local Registers and Districts

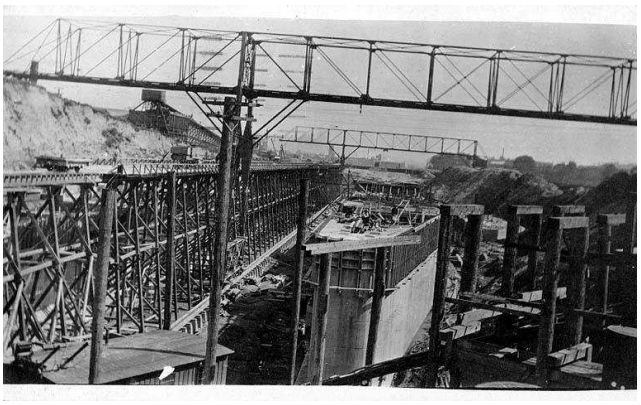
Name	Date Listed	Notes

Project History

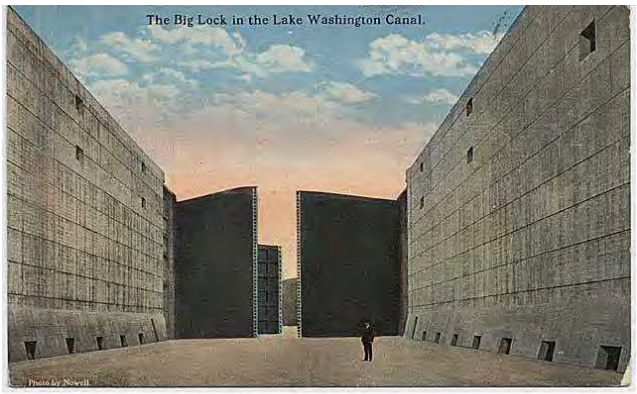
Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-04-02392, , Hiram M. Chittenden Locks -Large Lock Center Gate Replacement		Determined Eligible	Holly Borth, 6/17/2021

Photos

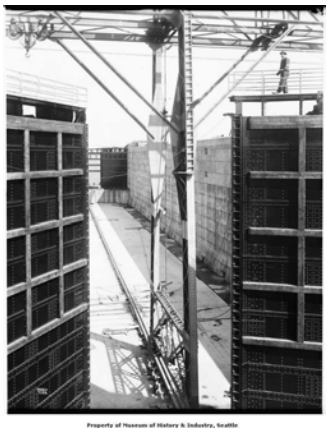
10. Inside Looking at DS Gate Far 2021-03-24.jpg



BallardLocks_Seattle (19).jpg

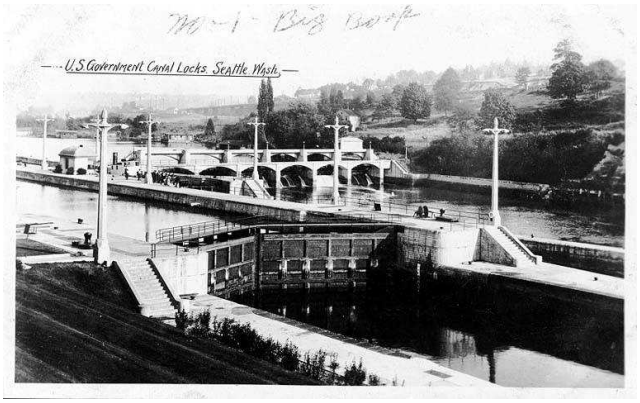


BallardLocks_Seattle (18).jpg



BallardLocks_Seattle (17).jpg

BallardLocks_Seattle (16).jpg

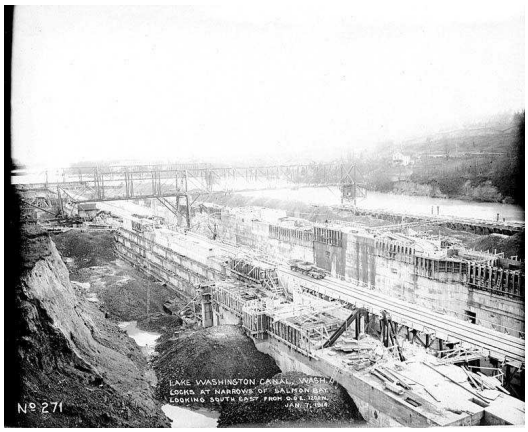


BallardLocks_Seattle (15).jpg

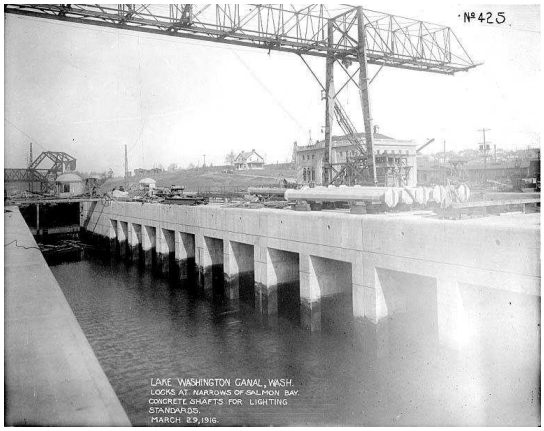
BallardLocks_Seattle (14).jpg

BallardLocks_1947.jpg

BallardLocks_Seattle (13).jpg

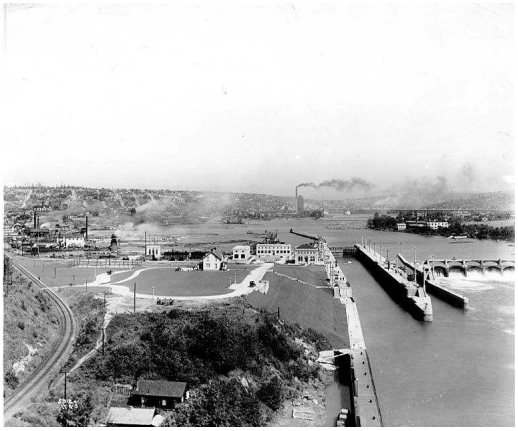


BallardLocks_Seattle (12).jpg



BallardLocks_Seattle (11).jpg

BallardLocks_Seattle (10).jpg



BallardLocks_Seattle (9).jpg

BallardLocks_Seattle (8).jpg

BallardLocks_Seattle (7).jpg

BallardLocks_1917.jpg

Property of Museum of History & Industry, Seattle

BallardLocks_Seattle (6).jpg

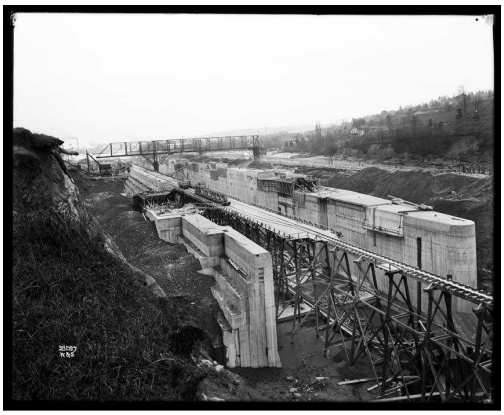
Property of Museum of History & Industry, Seattle

BallardLocks_Seattle (24).jpg

BallardLocks_Seattle (23).jpg

BallardLocks_Seattle (22).jpg

BallardLocks_Seattle (21).jpg



BallardLocks_Seattle (20).jpg

SMA_6325_1913.jpg

lwsc 1915.jpg

10. Looking at DS Gate 2021-03-24.jpg

Register nomination form

Historic Property Report

Resource Name: Hiram M. Chittenden Large Lock Property ID: 724739

Inventory Details - 5/20/2021

Common name: Lake Washington Ship Canal or Ballard Locks

Date recorded: 5/20/2021

Field Recorder: Lys Opp-Beckman

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured

Surveyor Opinion

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): Yes

Property potentially contributes to a historic district (National and/or local): Yes

Significance narrative: The Large Locks are a contributing element of the National Register listed Lake Washington Ship Canal (LWSC) historic district. The LWSC Historic District was listed on the National Register of Historic Places in 1978 as a Historic District. The Large Locks and its associated gates is a contributing element to the National Register listed Historic District and retains high integrity in all aspects. Since the listing of the Historic District the gates within the Large Lock has only undergone one alteration, replacement of timber planks at the top of the gates, circa 2015. They retain extremely high integrity in all aspects . The Large Lock contributes under Criterion A. They are the corner stone of the engineering feat that is LWCS.

The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood) and barnacles from the hulls of ocean-going vessels without the expense of dry-docking.

In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government.

The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. In November 1911, ground was broken for the locks and in February 1913, the first concrete was deposited in the forms. July 1916 marked the first closing of Salmon Bay. Lake Washington was lowered approximately eight feet to the level of Lake Union by October 1916. This caused Lake Washington to drain into Lake Union and reversed the flow of the lower end of the Cedar River, causing it to drain into Lake Washington. The Black River which prior to the construction of LWSC flowed from the south end of Lake Washington into the Duwamish River ceased to exist. . With the completion of the Fremont Cut, Salmon Bay was raised to the height of Lake Union and became fresh water. In May 1917, the Montlake Cut between Lakes Union and Washington was opened near the vicinity of the abandoned portage excavated by the Lake Washington Improvement Association. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910)and numerous other officials were present. Overhead flew a plane built by the one-year old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were divided between the State of Washington and King County, for acquisition of right-of-way's and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works.

Originally referred to as the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States.

Today, this property is referred to by a number of names including the Lake Washington Ship Canal, and the Ballard Locks. It is the busiest lock in the United States due to the volume of recreational boaters. Approximately 50,000 ships a year pass the 104-year-old complex.

Physical description: The LWSC Locks are comprised of four contiguous elements, the Large Lock, Small Lock, Spillway Dam, and Control Tower. The Large Lock is situated at the foot of Salmon Bay and is 825 feet long and 80 feet wide. The Large Lock is separated by a concrete wall from the Small Locks. The small lock was constructed without piles on a bed of hard clay. Concrete work was composed of one-part Portland cement, three parts sand, and six parts gravel. The concrete was mixed, lowered into the forms by bottom dump buckets, spread in layers and spaded, no tamping was required. Particular care was taken to protect the concrete from the action of salt water during the curing process. Three gates are located within the large lock and include two sets of two gates (miter and service gates) at the east end on the freshwater side and the west end located on the saltwater side. The center gate is a service gate. In addition, a saltwater barrier is located between the operating and miter gates at the east end of the Large Lock. The barrier is hinge mounted to the large lock floor. The saltwater barrier is raised or lowered as required to reduce the intrusion of salt water into the Lake Washington Ship Canal. All gates are of double skin construction (i.e. outer steel plates on both the upstream and down stream end). The lower sections of the large lock gates have air chambers which increase buoyancy and reduce the load on the bearing services. The gate consisted of two double skin gates that attached to the canal walls and open from the center. All of the Large Lock miter gates are of riveted steel construction and have double skin plates (i.e. a skin plate exists on both the upstream and downstream side of each miter gate, which creates virtually watertight compartments, or buoyancy chambers, between each gate girder). The sheet metal plates are black in color and have a layer of barnacles coating the submerged portion. Three quarters of the way up on both facades are oblong openings that allow water to drain from the gates. At the top of the gates wood planks have been bolted on to prevent damage to the gates themselves and the hulls of ships while they pass through. The original wood planks were replaced with PVC planks circa 2015.

Bibliography:

Army Corps of Engineers. 1994. Historic Property Management Plan for Lake Washington Ship Canal. Prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings for the Seattle District of the Army Corps of Engineers. On file at the U.S. Corps of Engineers, Seattle District.

Caldbick, John, Chittenden, Hiram Martin (1858-1917), Historylink, Publishes 2017, https://www.historylink.org/File/20329, accessed 5/21/2021.
Lake Washington Ship Canal locks under construction, Seattle, May 22, 1913 Courtesy Seattle Municipal Archives (Image No. 6325).
Mcdowell Group, Ballard Lock Study, Port of Seattle, 2017.

Opening day, Government (later Hiram M. Chittenden) Locks, Seattle, July 4, 1917 Courtesy U.S. Army Corps of Engineers, Seattle District.

Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District.

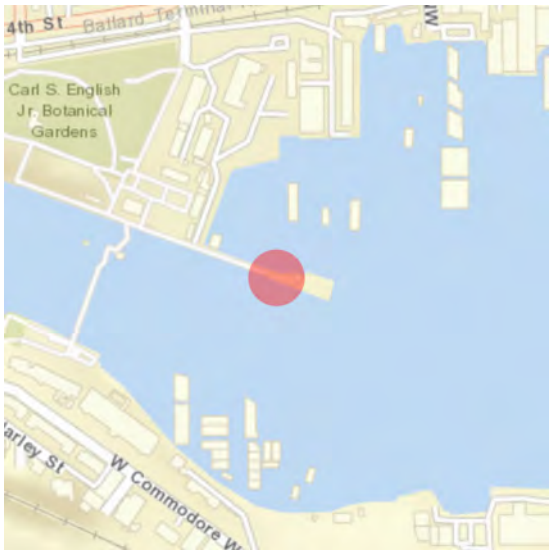
Steam shovel excavating ship canal, Fremont to Salmon Bay, 1915 Courtesy U.W. Special Collections (PEMCO Webster & Stevens Collection, Image No. 1983.10.6932).
Williams, David B., Lake Washington Ship Canal construction starts on October 27, 1909., Historylink, Published 2016, https://www.historylink.org/File/684, accessed 5/21/2021.

Historic Property Report

Resource Name: Ballard Locks - Emergency Dam Hoist House

Property ID: 725562

Location



Address: Hiram M Chittenden Locks

Geographic Areas: King County, T25R03E11, Seattle Certified Local Government, King County Certified Local Government, SHILSHOLE BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1922	☐
Remodel	1970	☐
Addition	2012	☐
Addition	2015	☐

Historic Use:

Category	Subcategory
Transportation	Transportation - Water-Related
Transportation	Transportation - Water-Related

Historic Context:

Category
Maritime

Architect/Engineer:

Category	Name or Company

Historic Property Report

Resource Name: Ballard Locks - Emergency Dam Hoist House

Property ID: 725562

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-07-04644, , Lake Washington Ship Canal, Hiram M. Chittenden Locks Proposed Physical Access Security System Upgrade		Survey/Inventory	

Historic Property Report

Resource Name: Ballard Locks - Emergency Dam Hoist House

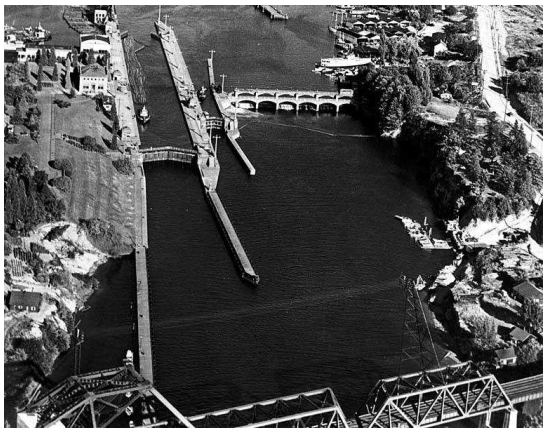
Property ID: 725562

Photos

Hoist House

crane 1950.jpg

crane 1916.jpg



1940 aerial.jpg

Register nomination form

Historic Property Report

Resource Name: Ballard Locks - Emergency Dam Hoist House

Property ID: 725562

Inventory Details - 8/9/2021

Common name:

Date recorded: 8/9/2021

Field Recorder: Sarah MacIntosh and Lys Opp-Beckman

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Cladding	Concrete - Poured

Surveyor Opinion

Significance narrative: Built 1922; Moderate alteration- exterior windows 1970; Moderate alteration- replacement of associated crane 2012; Minor alteration exterior security upgrade- 2015; The Emergency Dam Hoist House (the hoist house) is a contributing element of the National Register listed Lake Washington Ship Canal (LWSC) historic district. The LWSC Historic District was listed on the National Register of Historic Places in 1978 as a Historic District. The hoist house retains a moderate level of integrity. Moderate exterior alterations include window replacement and the replacement of its associated crane. The hoist house contributes under Criterion A. It supports the engineering association and mission at the LWSC.

The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood) and barnacles from the hulls of ocean-going vessels without the expense of dry-docking. In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation

channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government. The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910)and numerous other officials were present. Overhead flew a plane built by the one-year old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were divided between the State of Washington and King County, for acquisition of right-of-way's and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works. Originally referred to as the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States. Today, this property is referred to by a number of names including the Lake Washington Ship Canal, and the Ballard Locks. It is the busiest lock in the United States due to the volume of recreational boaters. Approximately 50,000 ships a year pass the 104-year-old complex.

Physical description: The Emergency Dam Hoist House was constructed in 1922. It is a double-height single-story structure of reinforced concrete measuring 20x20 feet exclusive of bayed south elevation, and contains emergency dam hoists and saltwater barrier air compressor. It entablature and base construction is classical tradition which confirms to patterns established by the original group of accessory buildings. Aluminum windows were installed circa 1969, its associated crane was replace circa 2012 and a security system upgrade took place in 2015.

Historic Property Report

Resource Name: Ballard Locks - Emergency Dam Hoist House

Property ID: 725562

Bibliography:

Army Corps of Engineers. 2021. Draft Historic Property Management Plan for Lake Washington Ship Canal. Prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings for the Seattle District of the Army Corps of Engineers. On file at the U.S. Corps of Engineers, Seattle District.

Caldbick, John, Chittenden, Hiram Martin (1858-1917), Historylink, Publishes 2017, https://www.historylink.org/File/20329, accessed 5/21/2021.

Lake Washington Ship Canal locks under construction, Seattle, May 22, 1913 Courtesy Seattle Municipal Archives (Image No. 6325).

Mcdowell Group, Ballard Lock Study, Port of Seattle, 2017. Opening day, Government (later Hiram M. Chittenden) Locks, Seattle, July 4, 1917 Courtesy U.S. Army Corps of Engineers, Seattle District. Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District. Steam shovel excavating ship canal, Fremont to Salmon Bay, 1915 Courtesy U.W. Special Collections (PEMCO Webster & Stevens Collection, Image No. 1983.10.6932).

Williams, David B., Lake Washington Ship Canal construction starts on October 27, 1909., Historylink, Published 2016, https://www.historylink.org/File/684, accessed 5/21/2021.

Historic Property Report

Resource Name: Machine Shop

Property ID: 725560

Location

Address: Hiram M Chittenden Locks

Geographic Areas: King County Certified Local Government, King County, T25R03E11, SHILSHOLE BAY Quadrangle, Seattle Certified Local Government

Information

Number of stories: 2.00

Construction Dates:

Construction Type	Year	Circa
Built Date	1916	☐

Historic Use:

Category	Subcategory
Government	
Government	

Historic Context:

Category
Maritime

Architect/Engineer:

Category	Name or Company
Architect	Bebb and Gould

Historic Property Report

Resource Name: Machine Shop

Property ID: 725560

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-07-04644, , Lake Washington Ship Canal, Hiram M. Chittenden Locks Proposed Physical Access Security System Upgrade		Survey/Inventory	

Historic Property Report

Resource Name: Machine Shop

Property ID: 725560

Photos

Machine Shop

IMG_0232.jpg

IMG_0231.jpg

IMG_0230.jpg

IMG_0229.jpg

1940 aerial.jpg

Register nomination form

Historic Property Report

Resource Name: Machine Shop

Property ID: 725560

Inventory Details - 8/9/2021

Common name: Machine Shop

Date recorded: 8/9/2021

Field Recorder: Sarah MacIntosh and Lys Opp-Beckman

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Form Type	Articulated Frame - Concrete
Roof Type	Flat with Parapet

Styles:

Period	Style Details
Early 20th Century Revivals (1900-1940)	Classical Revival

Surveyor Opinion

Significance narrative: The Machine Shop is a contributing element of the National Register listed Lake Washington Ship Canal (LWSC) historic district. The LWSC Historic District was listed on the National Register of Historic Places in 1978 as a Historic District. The Machine Shop retains high integrity in most aspects. The Machine Shop contributes under Criterion A, its supports the LWSC's engineering narrative and mission This building was used and still is used for crafting custom metal parts for the locks and associated buildings..
The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood)

and barnacles from the hulls of ocean-going vessels without the expense of dry-docking. In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government. The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910)and numerous other officials were present. Overhead flew a plane built by the one-year old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were divided between the State of Washington and King County, for acquisition of right-of-way's and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works. Originally referred to as the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States. Today, this property is referred to by a number of names including the Lake Washington Ship Canal, and the Ballard Locks. It is the busiest lock in the United States due to the volume of recreational boaters. Approximately 50,000 ships a year pass the 104-year-old complex.

Physical description: The Machine Shop was constructed in 1916. It is a two-story reinforced board-formed-concrete structure that was cast in place with a built-up flat roof and a foundation area measuring 30-feet by 85-feet (Figure 12). It features an ornament free entablature, a cast belt course, an ornate main entry with a cast surround meant to mimic columns and base in classical tradition conforming to the simple utilitarian style of the original group of accessory buildings. The windows were replaced with fixed-aluminum pane windows circa 1965 , but the original opening sizes were retained.

Bibliography:

Army Corps of Engineers. 2021. Draft Historic Property Management Plan for Lake Washington Ship Canal. Prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings for the Seattle District of the Army Corps of Engineers. On file at the U.S. Corps of Engineers, Seattle District.

Caldbick, John, Chittenden, Hiram Martin (1858-1917), Historylink, Publishes 2017, https://www.historylink.org/File/20329, accessed 5/21/2021.

Lake Washington Ship Canal locks under construction, Seattle, May 22, 1913 Courtesy Seattle Municipal Archives (Image No. 6325).

Mcdowell Group, Ballard Lock Study, Port of Seattle, 2017. Opening day, Government (later Hiram M. Chittenden) Locks, Seattle, July 4, 1917 Courtesy U.S. Army Corps of Engineers, Seattle District. Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District. Steam shovel excavating ship canal, Fremont to Salmon Bay, 1915 Courtesy U.W. Special Collections (PEMCO Webster & Stevens Collection, Image No. 1983.10.6932).

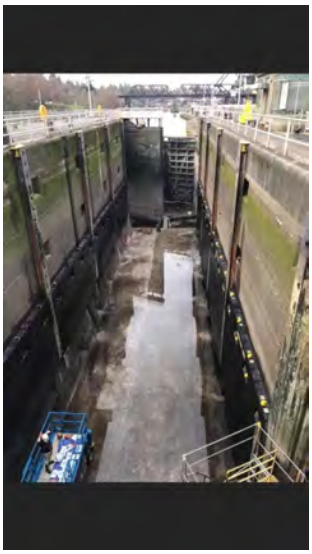
Williams, David B., Lake Washington Ship Canal construction starts on October 27, 1909., Historylink, Published

Historic Property Report

Resource Name: Hiram M. Chittenden Small Lock

Property ID: 724923

Location



Address: 3015 NW 54th St, Seattle, Washington, 98107

Geographic Areas: Seattle Certified Local Government, King County, SHILSHOLE BAY Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1911	☐
Built Date	1916	☐

Historic Use:

Category	Subcategory
Recreation and Culture	Recreation and Culture - Outdoor Recreation
Transportation	Transportation - Water-Related
Government	
Recreation and Culture	Recreation and Culture - Outdoor Recreation
Transportation	Transportation - Water-Related
Government	

Historic Property Report

Resource Name: Hiram M. Chittenden Small Lock Property ID: 724923

Historic Context:

Category
Maritime - Recreation
Maritime - Water Highways
Maritime - Trade and Commerce

Architect/Engineer:

Category	Name or Company
Engineer	U.S. Army Corps of Engineers- Seattle District
Engineer	James B. Cavanaugh
Engineer	Hiram M. Chittenden
Architect	Bebb and Gould
Landscape Architect	Carl S. English

Districts

District Name	Contributing
Chittenden Locks and Lake Washington Ship Canal	☑

Thematics:

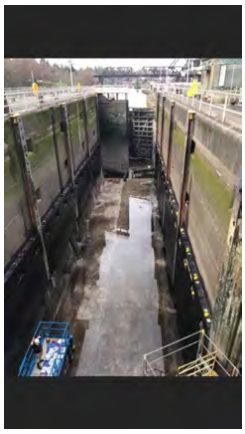
Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-04-02392, , Hiram M. Chittenden Locks -Large Lock Center Gate Replacement		Determined Eligible	Holly Borth, 6/22/2021

Photos



picture of small locks.jpg

SMA_6325_1913.jpg

lwsc%201915.jpg

010.025.000.000-View of small lock -looking upstream 1968.jpg

Register nomination form

Historic Property Report

Resource Name: Hiram M. Chittenden Small Lock Property ID: 724923

Inventory Details - 5/20/2021

Common name: Lake Washington Ship Canal or Ballard Locks

Date recorded: 5/20/2021

Field Recorder: Lys Opp Beckman

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Plan	Rectangle

Styles:

Period	Style Details
No Style	No Style

Surveyor Opinion

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): Yes

Property potentially contributes to a historic district (National and/or local): Yes

Significance narrative: The Lake Washington Ship Canal (LWSC) was listed on the National Register of Historic Places in 1978 as a Historic District (The District). The Small lock is a contributing element of the historic district and has been in continuous use since its construction.
The involvement of the U.S. Army Corps of Engineers (USACE) in the project on a lasting basis was marked by the beginning of Major Hiram Chittenden's term as District Engineer. Congress in 1902 authorized the study of locks and dams, and appropriated funds for the construction of a channel between Shilshole Bay and Salmon Bay to the wharves at Ballard, Washington. In 1906, proposed by a local citizen James A. Moore, Congress authorized the canal construction from Puget Sound to Lake Washington. In a report regarding the Moore proposal, dated December 1906, Major Chittenden itemized the government's interest in the matter. In essence, the government would be concerned with the commercial promise of a navigable waterway and would benefit indirectly from the lowering of the waters of Lake Washington. The latter would facilitate flood control and drainage of swamp lands. In his report, Major Chittenden also recommended significant changes in the nature and placement of the lock, advocating a double lock of more permanent masonry construction. If located at the narrows near the outlet of Salmon Bay, it would raise Salmon Bay out of tidal influence and lower Lake Washington waters to the level of the intervening body, Lake Union. Major Chittenden provided arguments which reversed the Army's prior negative findings on the feasibility of the project. The absence of tidal action would simplify cargo loading and unloading on the inland waters; Lake Union would offer a placid winter refuge for the fishing fleet, and fresh water would cleanse destructive teredos (a marine worm that bores holes in wood) and barnacles from the hulls of ocean-going vessels without the expense of dry-docking.

In 1908 Congress, provided the funds for construction of the lock and dam and dredging within the new canal between Puget Sound and Lake Washington. Construction was contingent upon King County or another local agency excavating the upstream navigation channel from the Locks to Lake Washington to a depth of 25 feet and 75 feet wide. The State of Washington and King County cost-shared the upstream excavation and construction with the Federal government.
The LWSC Project grounds were purchased by the Federal Government from Ole S. Shillestad, a cabinet maker who had moved there in 1876. Design of the lock and spillway dam structures were accomplished in-house by the Seattle District USACE. In September 1911, construction commenced under the direction of Colonel James B. Cavanaugh. In November 1911, ground was broken for the locks and in February 1913, the first concrete was deposited in the forms. July 1916 marked the first closing of Salmon Bay. Lake Washington was lowered approximately eight feet to the level of Lake Union by October 1916. This caused Lake Washington to drain into Lake Union and reversed the flow of the lower end of the Cedar River, causing it to drain into Lake Washington. The Black River which prior to the construction of LWSC flowed from the south end of Lake Washington into the Duwamish River ceased to exist. . With the completion of the Fremont Cut, Salmon Bay was raised to the height of Lake Union and became fresh water. In May 1917, the Montlake Cut between Lakes Union and Washington was opened near the vicinity of the abandoned portage excavated by the Lake Washington Improvement Association. The entire project was dedicated with due ceremony on July 4, 1917, with congratulations from Theodore Roosevelt (President 1901 - 1908). Brigadier General Chittenden (promoted in 1910)and numerous other officials were present. Overhead flew a plane built by the one-year old Boeing Company, while a parade of ships and boats led by the 184-foot Roosevelt, the flagship of Commodore Robert E. Perry during his 1907 Arctic expedition, crossed though the locks. At the time of the dedication the cost of the project was reported as $5,000,000. In addition to right-of-way acquisition costs, the City of Seattle bore the expense of building new bridges, sewer and water tunnels and regrading streets where necessary. The major costs were divided between the State of Washington and King County, for acquisition of right-of-way's and excavation and construction upstream from the locks, and the Federal government, which constructed the locks and accessory works.
Originally referred to as the "Government Locks" or "Ballard Locks", Congress officially honored Brigadier General Hiram M. Chittenden in 1956 by naming the Locks after him. At the time they were built, the Locks were second only to those at the Panama Canal, but now are surpassed by several others in the United States

Physical description:

The LWSC Locks are comprised of four contiguous elements, the Large Lock, Small Lock, Spillway Dam, and Control Tower. The small lock is adjacent to and south of the large lock. The small lock chamber is 150 feet long by 30 feet wide and has two gates which are an upper and lower guard gate and an upper and lower operating gate. The operating gates are used for normal locking operations and the guard gates are used for unwatering the locks and for repair and inspection of the operating gates. The small lock gates are single skin construction with steel plates on the upstream faces only. The small lock is used by smaller vessels with drafts up to16 feet. The small lock was constructed without piles on a bed of hard clay. Concrete work was composed of one-part Portland cement, three parts sand, and six parts gravel. The concrete was mixed, lowered into the forms by bottom dump buckets, spread in layers and spaded, no tamping was required. Particular care was taken to protect the concrete from the action of salt water during the curing process.

Bibliography:

Army Corps of Engineers. 1994. Historic Property Management Plan for Lake Washington Ship Canal. Prepared by the Technical Center of Expertise for Preservation of Historic Structures and Buildings for the Seattle District of the Army Corps of Engineers. On file at the U.S. Corps of Engineers, Seattle District.

Army Corps of Engineers. 1972. Operation and Maintenance Manual. Prepared by the Engieering Division, Mechanical Design Section, Operation and Maintenance Manual Unit. On file at the U.S. Army Corps of Engineers, Seattle District.

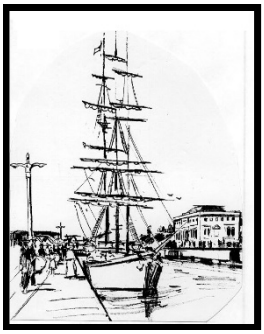
Potter, Elizabeth. 1977. National Register of Historic Places Inventory Nomination Form: Chittenden (Hiram M.) Locks and Related Features of Lake Washington Ship Canal Historic District. On file at the U.S. Corps of Engineers, Seattle District.

Appendix C: Supplemental Cultural Landscape Report for the Carl S. English, Jr. Botanical Garden at the Hiram M. Chittenden Locks, Seattle Washington

ECRB 20

Seattle District Environmental and Cultural Resources Brance

US Army Corps of Engineers ®
Seattle District



Supplemental Cultural Landscape Report for the Carl S. English Jr. Botanical Garden at the Hiram M. Chittenden Locks, Seattle Washington

Stephen J. Munro, Sarah R. MacIntosh, and Ashley M. Dailide

September 2020

ECRB 20
September 2020

Supplemental Cultural Landscape Report for the Carl S. English Jr. Botanical Garden at the Hiram M. Chittenden Locks, Seattle Washington

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U.S. Army Corps of Engineers
Lake Washington Ship Canal Hiram M. Chittenden Locks and Carl S. English Jr. Botanical Garden
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Final report

Abstract

The Carl S. English Jr. Botanical Garden is the only botanical garden managed by the United States Army Corps of Engineers. Located at the Hiram M. Chittenden Locks within the Lake Washington Ship Canal, the garden is a cultural landscape and a contributing feature to the Lake Washington Ship Canal (LWSC) Historic District

Since the garden is as contributing element of the LWSC Historic District, the USACE is legally required to meet the provisions of the 1966 National Historic Preservation Act (NHPA). USACE manages the LWSC Historic District in accordance within the NHPA. The National Park Service (NPS) provides professional standards and advice on maintaining historic districts and cultural landscapes.

This supplemental report aids the 1989 *Historic Grounds Report*. This report identifies and inventories the historic integrity of the garden as a cultural landscape and recommends preservation treatments. This report offers a brief and slightly updated version of the 1989 *Historic Grounds Report* by documents the undertakings in and around the cultural landscape since 1989.

Contents

List of Figures

List of Tables

Abbreviations

Term	Meaning
HPI	Historic Plant Inventory
HGR	1989 Historic Grounds Report
LWSC	Lake Washington Ship Canal
LWCSHD	Lake Washington Ship Canal Historic District
NHD	National Historic District
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NPS	National Park Service
PSH	Plant Significance Hierarchy
USACE	U.S. Army Corps of Engineers

1 Introduction

The Carl S. English Jr. Botanical Garden (Garden) at the Hiram M. Chittenden Locks (Locks) is part of the Lake Washington Ship Canal (LWSC) Project. The Seattle District of the U.S. Army Corps of Engineers (USACE) administer and operate the Locks, ship canal, and manage the Garden. The LWSC Project is listed on the National Register of Historic Places (NRHP) as a Historic District. As a consequence, the USACE is required to identify, inventory, and, if applicable, provide continuous preservation treatments to maintain the historic appearance (NPS 1996).

The 1989 *Historic Grounds Report* (HGR) was prepared for USACE to identify, inventory, and recommend preservations of the historic elements of the Garden as a contributing feature to the historic district. The HGR functioned as a form of a Cultural Landscape Report. Cultural Landscape Reports identify the historic elements of a cultural landscape, assess the historic integrity of the landscape, and recommend preservation treatments (Birnbaum 2000).

This report is prepared to supplement the HGR by documenting actions that have been completed by USACE at the Garden since 1989. This supplemental report differs from the HGR and other Cultural Landscape Reports by documenting undertakings in or around the landscape. It does not assess whether these actions had an adverse effect on the cultural landscape.

In addition, this report contains the historic plant inventory, a plant collection records, and a plant significance hierarchy specific to the Garden.

This report is divided into five chapters. **Chapter 1** provides the background, objective and scope, and the approach of this report. **Chapter 2** synthesizes the work found in the HGR prepared by Renee Freier in 1989, to aid the reader in understanding the subsequent chapters. It is recommended that the HGR be referred to for detailed information.

Chapter 3 describes the types of undertakings that have occurred in and around the cultural landscape since 1989. This chapter makes the distinction between a single major undertaking that occurred compared to the

several smaller undertakings and cultural landscape actions. Section 3.1 is solely concerned with describing the redesign of the roads and walkways, the most significant undertaking to occur at the Garden in and around the cultural landscape. Other sections in Chapter 3 document several smaller actions in and around the cultural landscape as well as documenting two materials actions that were completed using the recommendations found in the HGR.

Chapter 4 describes the development of the Historic Plant Inventory and plant collection records. **Chapter 5** is a summary.

1.1 Background

The LWSC civil work project was constructed by the USACE who continue to administer and operate the Lock today. The LWSC Project is an atypical USACE civil works project due to the Lock's unique history, mission, function, setting, design, architectural design, landscape, and personnel.

General Hiram M. Chittenden planned and designed the Lock from 1906-1910 with the intention of illuminating to others the industrial potential of Seattle. The LWSC Project was meant to be a source of civic pride and place of beauty (Chittenden 1910).

Construction began in 1911, under the supervision of Colonel James B. Cavanaugh and assistant engineer Arthur W. Sargent. The Locks was completed and opened on July 4, 1917. The project consists of a spillway dam and double locks with a fish ladder surrounded by a 17-acre reservation at Salmon Bay between the adjacent Seattle neighborhood of Ballard (Figure 1). Two channels, the Fremont Cut and the Montlake Cut, lie to the east of the spillway dam and Locks. The first channel, the Fremont Cut, is a mile-long channel, connecting Salmon Bay and Lake Union, while the second channel, the Montlake Cut, is a half-mile long channel that links Lake Union to Lake Washington.

In 1913, the USACE constructed a building to house Colonel Cavanaugh during construction of the LWSC Project. USACE hired the Seattle architectural firm of Bebb and Gould to design the buildings and structures of the LWSC Project. The Cavanaugh house was casted in concrete in the Second Renaissance Revival architectural style, which added a unique adornment to the utilitarian intent of these buildings.

Surrounding the buildings and structures of the LWSC Project, seven acres of grounds have been landscaped (USACE 1978). Arthur W. Sargent, assistant engineer to Colonel Cavanaugh, first submitted plans for the grounds in November 19, 1915. Successive Colonels followed the precedent of Colonel Cavanaugh and further adorned the grounds (Munro 2019). Sargent hired the first gardeners at LWSC Project in 1920 and 1925. In 1931, the botanist Carl S. English Jr. was hired as a gardener's helper. English worked at the LWSC Project until he retired in 1974 (Freier 1989). The improvements English made to the grounds resulted in USACE naming the grounds as the *Carl S. English Jr. Botanical Garden* (USACE 1974).

On December 14, 1978, the LWSC Project was officially designated as the Lake Washington Ship Canal National Historic District. The original nomination form listed the buildings and structures of the LWSC Project and the Freemont and Mountlake Cuts to be included in the National Historic District, and did not list any landscaping elements (i.e., the Carl S. English Jr. Botanical Garden) but the inclusion of the Garden can be inferred. In 1994, the Seattle District prepared a Historic Property Management Plan (HPMP) and a Programmatic Agreement (PA). The 1994 HPMP further defined buildings, structures and landscapes that are contributing elements to the Historic District and defined what buildings and structures are considered noncontributing elements

In 1998, USACE identified the Garden as a cultural landscape and contributing feature to the LNHD (USACE 1998). This identification and designation also made the HGR a point of reference for Sections 110 and 106.

1.2 Objective and Scope

This report is prepared to supplement the HGR, to aid with the preparation of a LWSC Project vegetation management plan, as per the recommendation of the 2021 Master Plan, and to potentially aid further plans and reports required for the cultural landscape at the NHD. No assessment of the undertaking has had an adverse effect on the landscape.

This report documents the undertakings at the LWSC Project and LHND in or around the cultural landscape since 1989. This report only documents. It does not make a judgment as to what, if any, effect was made to the cultural landscape.

1.3 Approach

The objective of the plan is to document undertakings in or around the landscape since 1989. Numerous images of the Garden are inserted into this document to show the transformations of the Garden over the years.

2 The Cultural Landscape to 1989

2.1 Summary of the Historic Grounds Report

The historic significance and integrity of the Garden is based on the original layout, the design, and the botanically significant plant collection. The original layouts of the grounds and roadways were prepared by USACE civilian engineers. The design and botanical significance of the Garden is attributed to the work of Carl S. English Jr., the first Seattle District Horticulturalist. An influential and nationally recognized horticulturalist, English transformed the grounds during his most influential period, 1941-1974, after he was promoted to lead gardener. English replaced 80 percent of the original plant material and introduced a profusion of botanically significant plant species in numerous planting beds he designed and installed.

The Garden is a mixture of formal and informal elements. The predominant style is informal reflecting some original design elements and the influence of English. The hills and expanses of rolling lawns and curvilinear road are accentuated by the naturalistic planting beds constructed by English. Formal elements pre-date English and are reflected in the straight roadways with trees planted at intervals in lawns and that formal planting beds that were installed in 1926.

Preservation of these formal and informal elements is recommended including the open lawns, lines of trees, naturalistic planting beds, original formal design elements, and the rich botanical diversity of plant species.

2.2 Historic Overview of the Cultural Landscape

2.2.1 National Historic Preservation Act and Historic Districts

The NHPA states that the nation and federal agencies preserve the nation's historic heritage. Sections 110 and 106 of the NHPA necessitate federal

agencies to safeguard their cultural resources which can be a historic or--pre-historic district, object, site, building or structure.

A historic district unites buildings, structures, and other physical features under a specific historical person, activity, or historical event. Cultural landscapes are commonly found inside a historic district. A historically designed landscape can be, as is in the case of the LWSC Project, one that is developed by an individual horticulturalist working in a landscape style (Birnbaum 2000).

2.3 Site Formation of the Cultural Landscape pre-construction of the Locks

The site of the cultural landscape prior to construction was covered with small trees that remain from a previous logging industry. The landscape rose steeply in the northwest section of the site to nearly 80 feet above sea level and slowly graded downward to 20 feet northeast of the site.

After construction commenced in November 1911, the northern area of the site where the monolith is currently located was leveled. The whole area had to be landscaped with the dredged materials during Lock construction (Figure 1). This material was used to smooth out the leveled areas, and terraces were installed in the northwest region at the steepest section of the site. This dredged material was composed of Lawton clay.

Figure 1. A view of the original topography of the cultural landscape at looking northwest from the present location of the Locks (USACE 1916).

2.3.1 Site Design and the Role of the Firm of Bebb and Gould

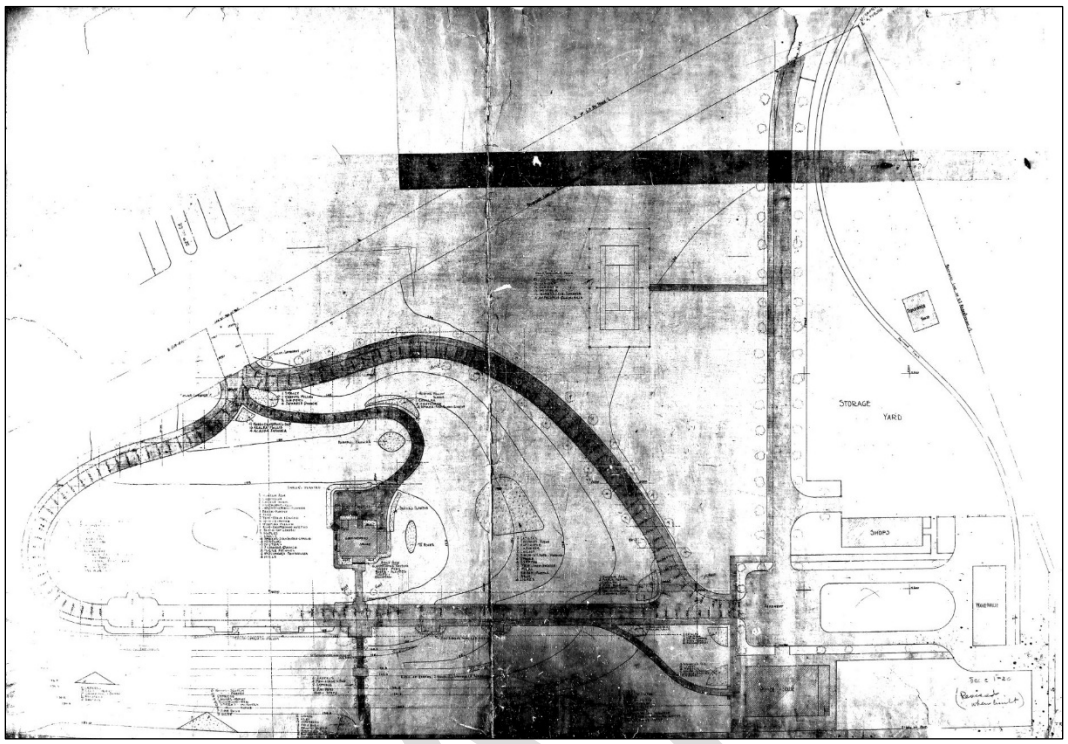
Carl F. Gould (1873-1939) formed the architectural firm of Bebb and Gould with Charles H. Bebb in 1914. Gould was a Harvard and Ecole des Beaux Arts (Paris, France) trained architect. He was instrumental in founding the University of Washington's School of Architecture and designed many notable buildings in Seattle. His most famous building is the Suzzalo Library at the University of Washington.

USACE hired the firm of Bebb and Gould to design the building and structures at the LWSC Project. The firm also contributed in varying degrees to the design of the roads, walkways, and landscape of the LWSC Project as well.

2.4 Early Planting Plans and Actions

An original planting plan does not exist. However, a series of planting plans do exist (Figure 2), but they do not mirror what is seen in the photographs of early tree plantings trees and the creation of planting beds.

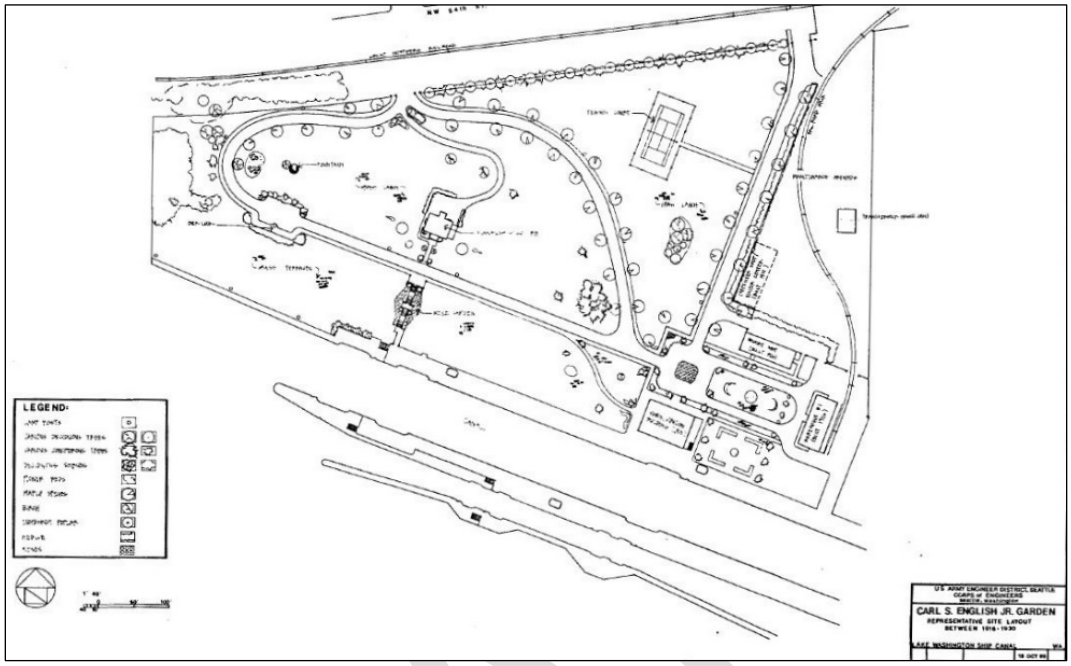
Figure 2. An early planting plan (USACE 1920).



In fact, many series of plantings were made between 1916 and 1922. Plant material was provided to the LWSC Project by the Seattle Park Board of Commissioners. Seattle District Commanders made several requests for plants in this period. In one case, the plants that were installed died shortly thereafter, so new plants were requested.

What is certain is that placement of trees along roadways and several planting beds that exist today in the cultural landscape were created between 1917 and 1930 (Figure 3). The trees were planted at intervals, though of different trees are still in the landscape as are the planting beds 16, 17, 101, 108, 109, 121/122, 212/213, and 325.

Figure 3. Disposition of trees and planting beds 1930 (Freier1989).



2.4.1 Original Plantings and Associated Personnel

The early, mostly formal planting style of the landscape was intensively managed. Trees were placed at intervals along roadways or at corners of buildings and consisted of maples or conifers. The coniferous trees were conical, and the hedges and shrubs of the landscape were clipped to have similar geometric shapes.

In 1927, landscape architect Otto Holmdahl designed and installed a series of L shaped formal style beds. Examples of other formal style beds were circular or crescent shaped. Informal planting beds of the landscape had an overall oval shaped footprint.

The first part-time gardener, Henry S. McCarty, was hired in 1920. McCarty planted a row of poplar trees at the north boundary of the project that were later removed by English circa 1967 and replaced with mostly giant sequoia *Sequioadendron giganteum*. Gustav Eckerstrom, the first full time gardener, was hired in 1925 and worked on the landscape until 1941. Eckerstrom maintained the landscape in a formal style. In 1931, English was hired to help Eckerstrom. English began to plant trees and install planting beds while working under Eckerstrom. English made significant

contributions to the landscape, which caused him to be promoted to lead gardener in 1941.

2.5 Carl S. English Jr.

2.5.1 Botanist and Seattle District Horticulturalist Carl S. English Jr.

The expansion of planting beds and the introduction of rare, native, exotic, and experimental plants is due solely to the work of English (Figure 4). He received his Bachelor of Science degree in Botany from Washington State College, which is now the University of Washington, in 1929. His influence and achievements occurred early in his career, since he identified several new plant species (Dress 1957).

The cultural landscape of the LWSC Project was a testing ground for new plants that English wanted to study and determine how the plants adapted to Seattle's mild climate (English 1972). English propagated most of the plants he introduced to the Garden himself in the greenhouse at the LWSC Project. Although the budget to purchase plants was tight, he was given a freehand to introduce plants that were more suitable to the site and were more significant botanically.

English obtained the seeds and vegetative cuttings for his endeavors at the LWSC Project while on personal time. He would always plan his leave when he knew seeds were ripening at his favorite locales for seed collection (Lyon 1978). English collected seeds throughout the Pacific Northwest and made several forays into the inter-mountains, and beyond to the west and southwest of Washington State. English used the rare seeds he collected as valuable barter with other botanical gardens and individuals (The Seattle Daily Times 1938).

Figure 4. Carl S. English Jr. pictured outside of his home in Seattle (Cornell University 1931).

We know about English's various trips to collect seeds through two important indirect sources. English traded seeds, plants, and vegetative cuttings with his friend and peer Brian Mulligan, Director of the Washington Park Arboretum at the University of Washington, from 1936 to 1974. Mulligans records show the date and location of the collected seeds and vegetative cuttings (plants that English had grown in pots) that English had given to Mulligan and the Washington Park Arboretum. Mulligan's records collection revealed that English kept accurate records and that the geographic breadth of English's collection was profound. Precise locations of English's collections from Australia to New Zealand to the Siskiyou Mountains of Oregon to Arizona are found in Mulligan's records (Munro 2019). English also owned and operated a nursery and seed business between 1931 and 1959. English sent copies of his nursery seed catalogs to the Bailey Hortorium at Cornell University. The last of the catalogs sent to Mulligan shows a vast collection of seeds and plants for sale from all over the globe. The plants in the catalog also mirror the many and varied plants that English had introduced into the LWSC Project's cultural landscape.

2.5.2 The Design Philosophy and Style of Carl S. English Jr.

English wrote an article in 1972 for American Horticulturalist titled t*he Gardens at the Hiram M. Chittenden Locks in Seattle*. This is the only example of English's natural approach to his design philosophy and style. Various plant species were blended that all had different attributes related to size, leaf shape, autumn color, and flowering times (Figure 5).

Figure 5. Visitors relax adjacent bed 210 note the flowering Japanese crabapple *Malus floribunda* and the accompanying broadleaf evergreen oaks, conifers, and shrubs that characterize the design style of English (USACE 1980).

2.6 The English Landscape Style

The English Landscape style, separate from the design style at the LWSC Project, first became popular on country estates in 18th century England. In the 19th century, this landscape design style was reintroduced in public park design.

Naturalistic in style and a diversion from the highly structured, geometric landscape styles, the English Landscape consisted of heavily clipped topiary shrubs that were popular in England during the 18th century. The English style mimicked the landscapes found in natural settings with swathes

of lawn reminiscent of meadows, with curving, lush shrubbery bordering shaded trees, and scenic view sheds.

In the 19th century, reintroduction of the English Landscape style was popularized and implemented chiefly by landscape architect Frederick Law Olmstead, who designed New York City's Central Park. His sons, Frederick Law Olmstead Jr. and Charles Olmstead, brought this design style to the city of Seattle. The Olmstead brothers designed the Washington Park Arboretum at the University of Washington, Volunteer Park in Seattle's Capitol Hill neighborhood, and the Alaska-Yukon Pacific Exposition, which later evolved into the University of Washington's campus.

2.7 Cultural Landscape Site Description and Context

The Locks and the cultural landscape of the Garden lie in the densely developed northwest part of Seattle between the Ballard and Magnolia neighborhoods (Figure 6). The City of Seattle operates parking area north of the project with a Burlington Northern Railroad spur running through it. The city leases this parking lot from Burlington Northern Railroad. The arterial NW 54th street lies east to west parallel to the parking lot and is the access point to the project.

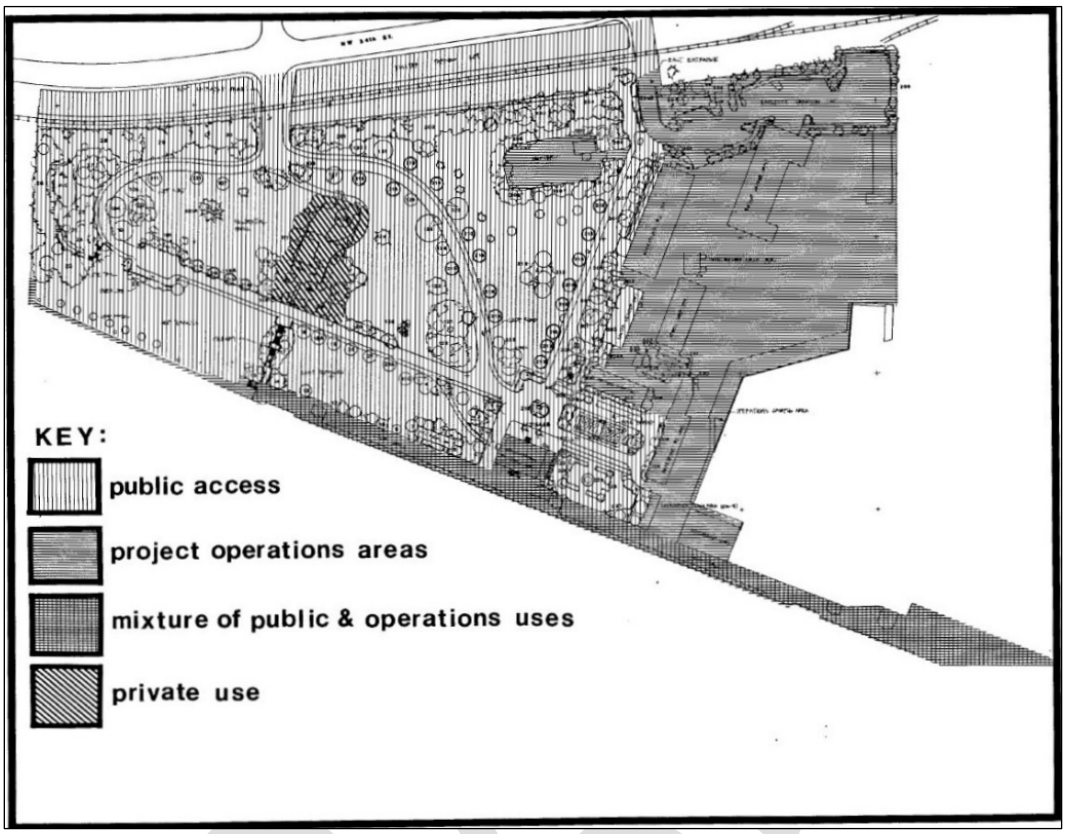
On the south side of the Locks is the spillway dam and fish ladder with associated fish ladder viewing room and plaza. Adjacent the plaza is the City of Seattle's Commodore Park.

Figure 6. Aerial photograph looking east with the Hiram M. Chittenden Locks and Cultural Landscape of the Carl S. English Jr. Botanical Garden bounded by the neighborhoods of Ballard to the north and Magnolia to the south (USACE 1980).

2.7.1 Areas of Operations: Public, Operations, and Private areas

The original division and intent of the organization spaces in and around the cultural landscape is still in use (Figure 7).

Figure 7. HGR organization of spaces (Freier 1989).

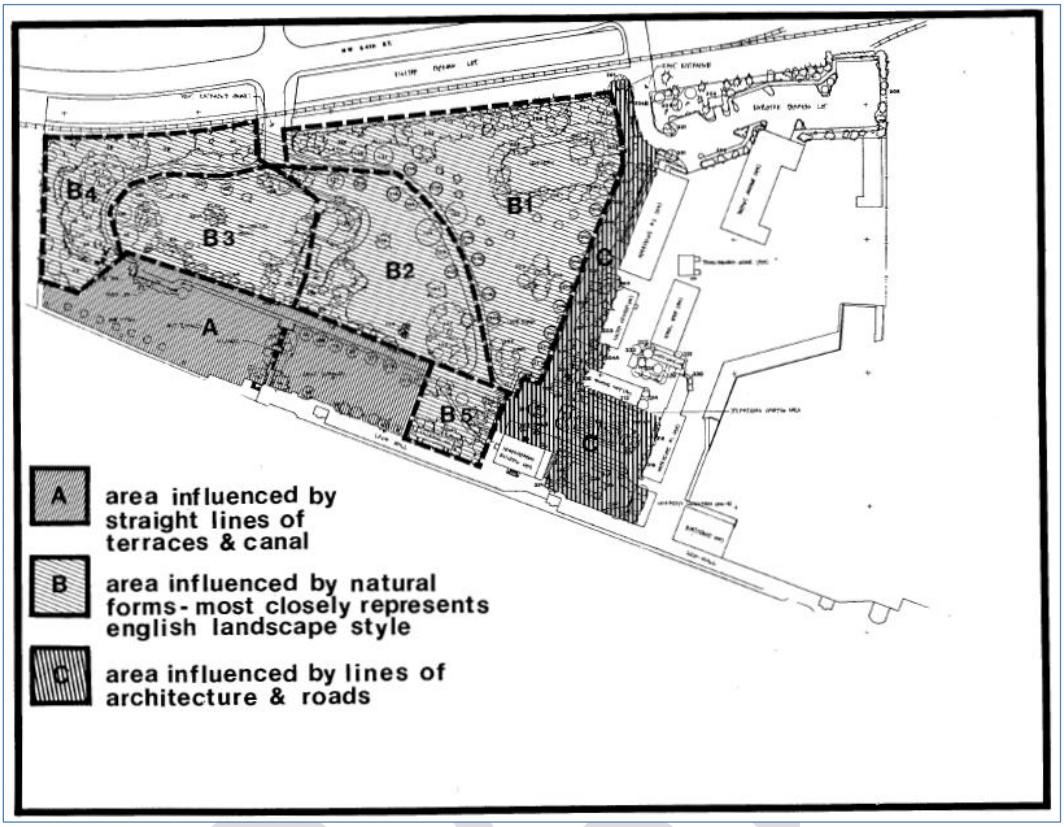


2.7.2 Organization of Spaces: The Landscape Architecture Styles

There are three landscape styles that are found in the cultural landscape. While the predominant style is the English Landscape style, implemented in its unique way by English, other styles are present in the landscape (Figure 8). The straight lines of Area A, located north of the lock wall, is characterized by the large lock canal and by the two terraced lawns put in place. The grading during original construction created a gentle slope.

Dividing the two terraced lawns is a five-landing concrete stairway that runs from the lock wall to the Cavanaugh House. The stairway is flanked by two planting beds, 16 and 17, that are from the earliest landscape design phase of the cultural landscape. These beds consist of a mix of evergreen and deciduous broadleaf trees and evergreen and deciduous conifers. A massive Coast Live oak *Quercus agrifolia* defines the vegetation of this area.

Figure 8. Organization of Landscape Styles (Freier 1989).



At the bottom of the largest of the two terraces is a series of seven crabapple trees placed in a line (Figure 9). These trees were planted by English's successor, Walter Lyon, to mitigate erosion in the area.

West of the two terraces is a concrete overlook that used to function as a parking area for visitor vehicle traffic. North and south of this parking lot are two more beds that date to the oldest design phase of the project, planting beds 22 and 101.

Area B is the typified by the English Landscape style and features expanses of lawn, winding paths and roads, and naturalistic planting beds densely planted. This area encompasses most of the cultural landscape and is split into five subareas.

Subarea B1 is west of the promenade. This area is composed of the largest expanse of lawn on in the cultural landscape with a series of planting beds at its north that is densely planted (Figure 10). In the middle of this area is bed 212/213 where English planted hydrophilic plants due to the collection

of water in this area. Before English installed this planting bed, the lawn was unable to survive there.

Figure 9. Looking east from B2. Note crab apple trees at the bottom of the terrace circa (USACE 1980).

Figure 10. Area B1 looking southeast with beds 212/213 at center left with the Administration Building in the background (USACE 1980).

Subarea B2 is to the west of B1 and composes the east half of the knoll where the Cavanaugh House is located (Figure 11). Trees line the curvilinear roadway here and a large planting bed 121/122, part of the earliest design period, anchors the south end of this area. At the western edge of the subarea are the beds that border the east side of the Cavanaugh House. From this point, there is an open view down into area B1**.** South of this area a small area of lawn is an enclosed area of lawn with planting bed 128 one edge surrounded by the eastern Cavanaugh House planting beds and beds 120, 121/122, 123 (Figure 12).

Figure 11. Looking east into area B1 and B2 beyond from the main promenade (USACE 1983).

Figure 12. Looking north into the enclosed area of lawn in B2 with planting bed 120 in the foreground (USACE 1980).

Subarea B3 lies at the top of the knoll with Cavanaugh House at its center. Planting beds 101 and 118A lie at the western and southern end of this area partially enclosing it while trees line the north edge to bed 108. Bed 108 is from some of the earlier design phases. The lawn in this area has a far more open feel and is bordered in the east by planting beds 110, 111, and 112 which cloak the Cavanaugh House (Figure 13).

Figure 13. Subarea B3 looking east to the Cavanaugh House in Spring (USACE 1983).

Subarea B4 is composed of the wooded area at the northwest of the cultural landscape known as the "Cove" (Figure 14). Adjacent, running at the north of this area is a series of planting beds composed of trees and shrubs. This is forested area used to include lawn, but the lawn died because the trees matured and shaded the grass. In its place, paths were installed to continue to allow access into these areas. Circa 1983 a wooden stairway was installed to allow for access and views of the water to the south. This stairway is inconsistent with the design style, but its obscurity in this wooded area does not have an effect on the overall landscape.

Figure 14. The views looking southeast by the path and stairway in the 'Cove' note the use of concrete slabs and concrete bollards (USACE 1981).

Subarea B5 is located west of the Administration Building and is close to the smallest terrace of Area A (Figure 15). The curvilinear planting beds place this subarea firmly in the English Landscape design style. The lawn of this subarea flows into the small terrace area opening views to south to the Locks.

Figure 15. Visitors feeding geese at the top of the small terrace with subarea B5 to behind and to their right (USACE 1984).

Subarea C begins at the north with the main entrance and main promenade leading to the Administration Building and "campus" area to the east and northeast. The buildings and roadways create a more formal appearance, and this is accentuated by the line of trees to the west of the promenade and the formal and rose gardens to the east and northeast of the Administration Building.

Beds adjacent to this area are of the English Landscape style especially in beds 313 and 327. These beds reduce the overall formal feeling of the subarea. The beds that are formal, particularly the geometric shaped formal beds designed by Otto Holmdahl in 1927 also now too, have a more informal appearance with small trees and herbaceous perennials occupying them (Figure 16).

Figure 16. Looking northeast gardener Walter Lyon in working beds 325 designed by Otto Holmdahl in 1927 located east of the administration building note the formal plantings of these formal style beds (USACE 1978).

2.7.3 Views

Views used to be more extensive in the cultural landscape. The growth and maturation of the plants and trees have changed the location view sheds into the Locks. The lock sides afford the best views of the canal. Area A at the top of the terraced lawns offer good views to the Locks and water below.

Secondary views, most notably the view that open up for visitors entering the project from the north into subarea B1 looking southwest gives an immediate impression of the vastness of the Garden area, although the area is relatively small in acreage (Figure 17). These, and other expanses of views afforded by the openness of the lawn contribute to the cultural landscape.

Figure 17. After entering from the north and looking south note the curbed sidewalk along roadway (USACE 1984).

2.7.4 Visitor Uses of the Cultural Landscape

The visitor use of the grounds has always been in the form of passive recreation. In the past, visitors were able to drive into the grounds with their cars and park. Today, only pedestrians may visit the ground and it is closed to vehicle traffic. Visitors tend to use the landscape to picnic, sunbathe, or strolling ever since the project first opened to the public (Figures 18 and 19).

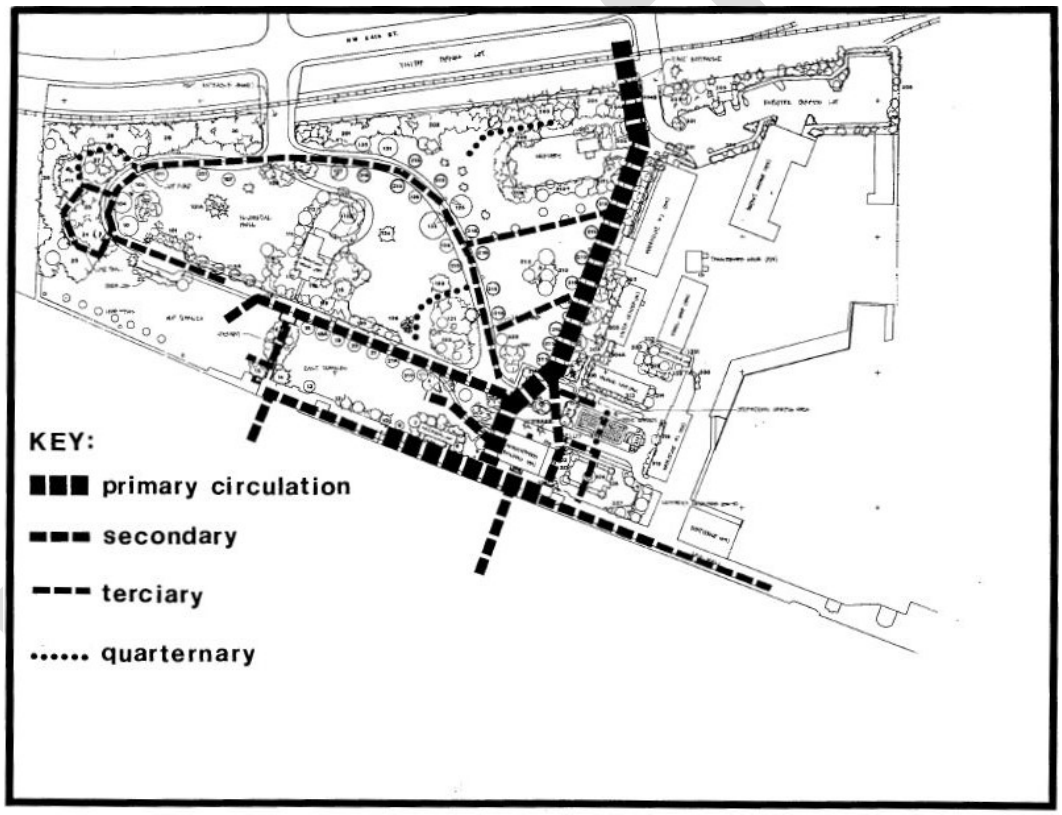
Figure 18. Visitors on the large terrace (USACE 1917),

Figure 19. Visitors picnic on the small terrace fall (USACE 1980),

2.7.5 Circulation Patterns

Thee Locks and Garden are popular attractions for tourists and Seattle residents. Visitation has remained fairly constant over the decades and is estimated at about 800,000 visitors per year. Visitors entering from the north entryway tend to head straight down the promenade to the Locks and fish ladder viewing areas. About ten percent that visit the LWSC Project make their way to the Garden by several different routes as shown in Figure 20. Visitors can enter the Garden from either the north or south entryways and then follow the loop road.

Figure 20. Circulation patterns (Freier 1989).



2.7.6 Materials in the Cultural Landscape

Concrete, rock, and wood are the predominant material found in the environs of the landscape. Concrete is the building material used for the buildings and structures of the project. Rocks are consistently used in the landscape as retaining walls or placed in the landscape. Wood has been used for fencing and logs are placed in landscape. Trails do not have a design precedent as of yet, and have been installed where small grass strips can no longer survive.

2.7.7 Design Trends 1915-Present

Individual deciduous trees evenly spaced along roadways with some trees, mostly conifers, planted in lawns. Most lawns are open, and the terraced lawns are open with only trees at the tops and bottoms.

Prior to 1941, the design trend was to have plants adjacent to buildings. Lone coniferous tree species were planted at the corners of buildings. Post -1941, a vast array of different broadleaf evergreen and deciduous trees and shrubs with coniferous trees were planted near buildings. Thus, conifers and maple trees predominated the cultural landscape prior to English's arrival.

Also, before 1941, plants had a symmetrical appearance while post-1941, asymmetrical plantings typified the appearance of the cultural landscape. Beginning after English's arrival in 1931, the plant composition pivots to a cosmopolitan and very diverse selection of rare, uncommon, and new plants particularly oaks, rhododendrons, and magnolias.

2.7.8 Planting Beds

The planting bed design pre-1941 can best be described as regular shaped round, oval, and sometimes serpentine beds composed mostly of flowers. The planting bed design post-1941 changed to irregular shaped beds with a rich diversity of broadleaf and evergreen and deciduous species and coniferous trees and shrubs.

It is recommended that the planting beds, like lawns, retain their current extent and shape. No new planting beds are to be added nor should planting beds be taken out. A detailed description of the present-day planting beds is found in Appendix A.

New plant introductions can be added to the planting beds, such as trees, shrubs, or smaller plants (i.e., perennials, biennials, grasses, and bulbs); however, care must be taken to make sure the new plantings match the design style of the particular bed (Appendix A). Plants, with the exception of groundcovers, are not recommended to be planted en masse. Planting beds should maintain a diversity of species and visual attributes.

The planting beds surrounding the Cavanaugh House are unique in that special care should be taken to ensure the privacy of the residence by

providing adequate screening with the vegetation while also staying true to the design style and historic integrity of the Garden.

The rose garden was established in 1988 (Freier 1989). The roses that comprise this garden are not part of the HPI. The removal or substitution of roses is a routine action. It is recommended that older varieties of roses or experimental varieties of roses be planted here to follow the design style, philosophy, and precedent of the surrounding Garden.

The formal beds to the east of the Administration Building should retain their present shape. These beds date from the Original Era and are a contributing element to the cultural and historic designed landscape. These beds were most recently restored in 2013. The plant composition of these beds is subject to change and except for the trees, there removal or replacement is considered a routine action. The plant composition of these beds formally consisted of rows of evenly spaced bulbs and flowers. Shortly after 1989, Fleming transitioned the plantings of these beds to groupings of various perennials.

Whatever the style of these beds their position close adjacent to the lock wall, Administration Building, and rose garden require that these beds be more intensely managed and be of interest, particularly in floral display.

2.8 Treatment recommendations to preserve the cultural landscape

- Lawns preserved in their current state as much as possible and maintain open grass areas.
- Maintain a diversity of plant species that vary in height, texture, color, flower form, and layers; avoid en masse plantings of a single species.
- Allow vegetation to take as natural a form as possible with required maintenance of plants mimicking this form.
- New trails should not be added.
- Overused areas should be protected with cable and concrete post barriers on an as need and temporary basis.

3 USACE Undertakings in the Cultural Landscape 1989-2020

This Chapter is dedicated to documenting the USACE undertakings since 1989. There have been many undertakings to the LWSC Project and LHND either in or around the Garden and cultural landscape since 1989. Yet, these undertakings are not equal in scope. The largest undertaking, Entryway Phase II, is given its own section. The other, lesser undertakings, as well as two materials actions, will be covered in a separate section. Many figures showing plans and before and after photographs are provided to illustrate, to the best extent possible, these undertakings.

3.1 Entryway Phase II

Entryway Phase II redesigned the roads and walkways of the Locks and Garden. From the main promenade to the campus area east of the Administration Building original design elements were changed. It is the most significant undertaking by USACE in the cultural landscape since 1989. Entryway Phase II changed the function of the roads and walkways to expressly pedestrian. The project did this in three ways. First, the promenade was changed to just a large pedestrian walkway that could also accommodate emergency vehicles, project equipment and vehicles. Second, sidewalks and other walkways adjacent to the promenade were eliminated and the roadways were expanded. Third, planting beds were expanded in the space of the removed walkways and in the altered entryway footprints to buildings adjacent to the project footprint.

3.1.1 Entryway Phase II: Changes to the Promenade

The original promenade consisted of a curbed sidewalk to the west and curbs to the east. These are design features from when the project was open to public vehicle traffic (Figures 21, 22, and 23). Entryway Phase II functionally changed the promenade to meet new rules and would be able to accommodate vehicles where needed, but the public could only walk onto the project. The changes to the promenade were three-fold. First, the sidewalk to the west of the promenade would be eliminated and pads for pedestrian benches would be poured. Second, the entryways to buildings to the east of the promenade were changed. Third, planting beds adjacent this redesign expanded in footprint and number to fill in the vacant space (Figure 24).

Figure 21 Looking north visitors on the main promenade note the curbed sidewalk and entryways (USACE 1979).

Figure 22. Helen Cassidy with staff officers of Chief of Engineers GEN William F. Cassidy party walking south on the promenade note the curbs and sidewalks (USACE 1967).

Figure 23. Walkway removed after project and bed expanded compare in Figure 26 (USACE 1984).

Figure 24. Promenade after completion of Entryway Phase II note the expansion of planting beds (USACE 1992).

3.1.2 Entryway Phase II: Removal of Walkways

Entryway Phase II also changed the footprint of the roads and walkways adjacent the Administration Building (Figures 25 – 28). The existing walkways were removed, and the roadway was expanded, primarily for public pedestrian use, but also wide enough to accommodate emergency or project vehicle and equipment traffic.

After completion of this work plantings beds expanded to fill the space of the walkways. This changed the footprint of the planting beds and also necessitated the use of more plants in this area (Figures 29 and 30).

Figure 25. Detail of walkways in campus area prepared in the HGR (Freier 1989).

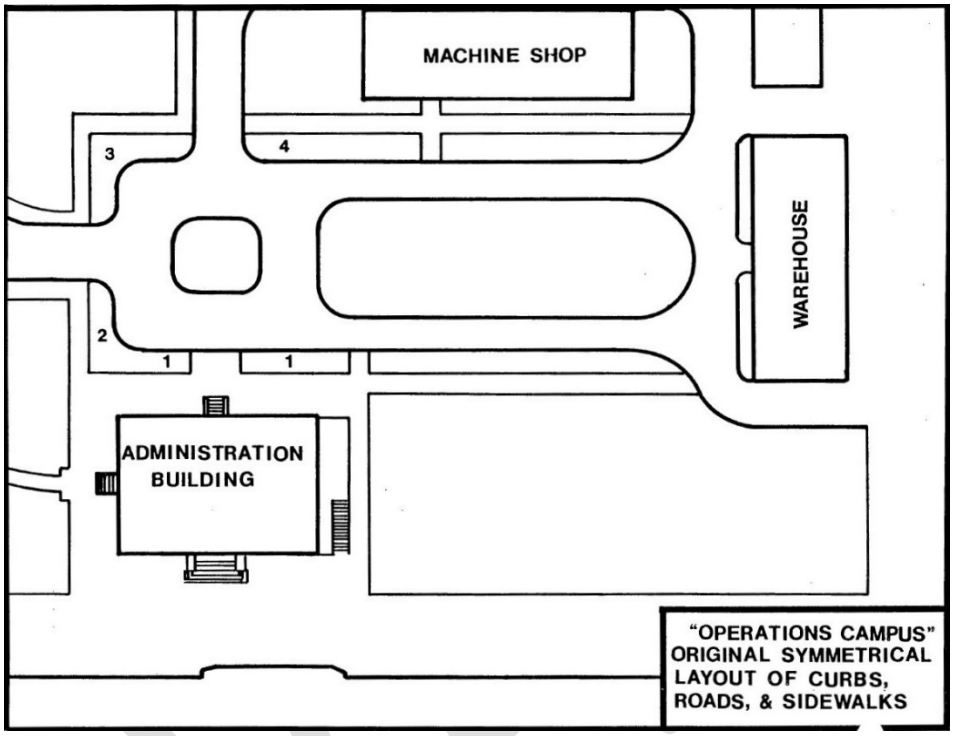


Figure 26. Compare with Figure 27 (USACE 1967).

Figure 27. Looking northwest into the campus plaza from the Administration building (USACE 1971).

Figure 28. A visitor jogging at the project 1984 (USACE 1984).

Figure 29. Entryway Phase II 1990 As Built drawings for grading and drainage with corresponding garden beds and and trees (USACE

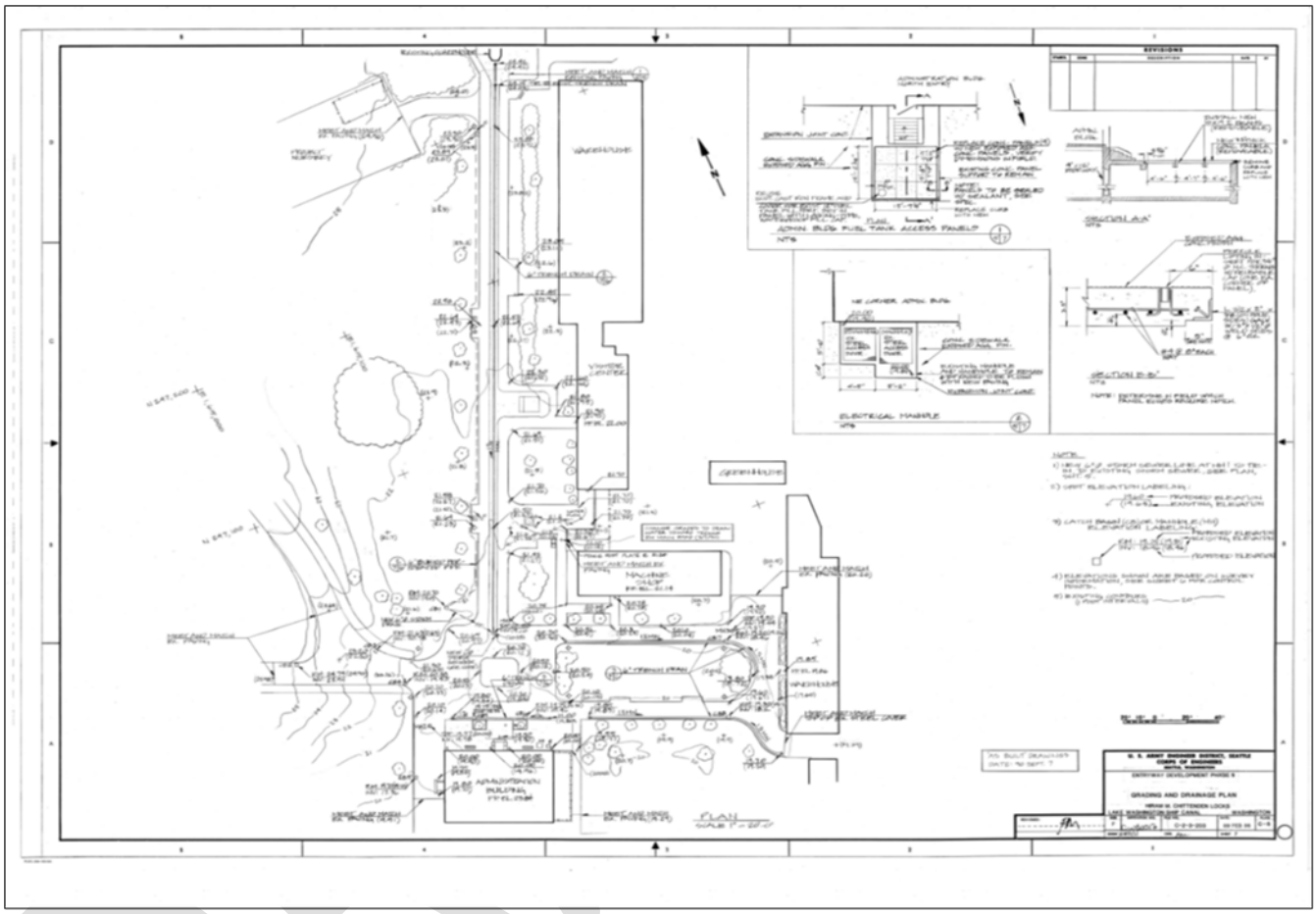


Figure 30. Compare with Figure 28, this area has had a bed expansion and noticeable growth of trees and shrubs (USACE 2020).

3.2 Minor Undertakings In and Around the Cultural Landscape Since 1989

3.2.1 1998 Band Stage Plaza

Starting in 1989, intensive use of the lawn north of beds 215 during the *Locks Summer Concert Series* led to some deterioration of the grass in this area (Figure 31). The summer concert program remains one of the LWSC Project's most popular activities. Due to the increased visitation to the lawn areas, a semi-permanent structure called a band stage plaza (Figure 32) was installed to support the LWSC Project's visitor program and to preserve the lawns. The band stage plaza is still in use and the surrounding lawn appears healthier (Figure 33).

Figure 31. Seattle High School All-Star Band performing note the poor condition of lawn underneath band members and heavy use of lawn (USACE 1992).

Figure 32. A semi-permanent band stage plaza plan inset (USACE 1998).

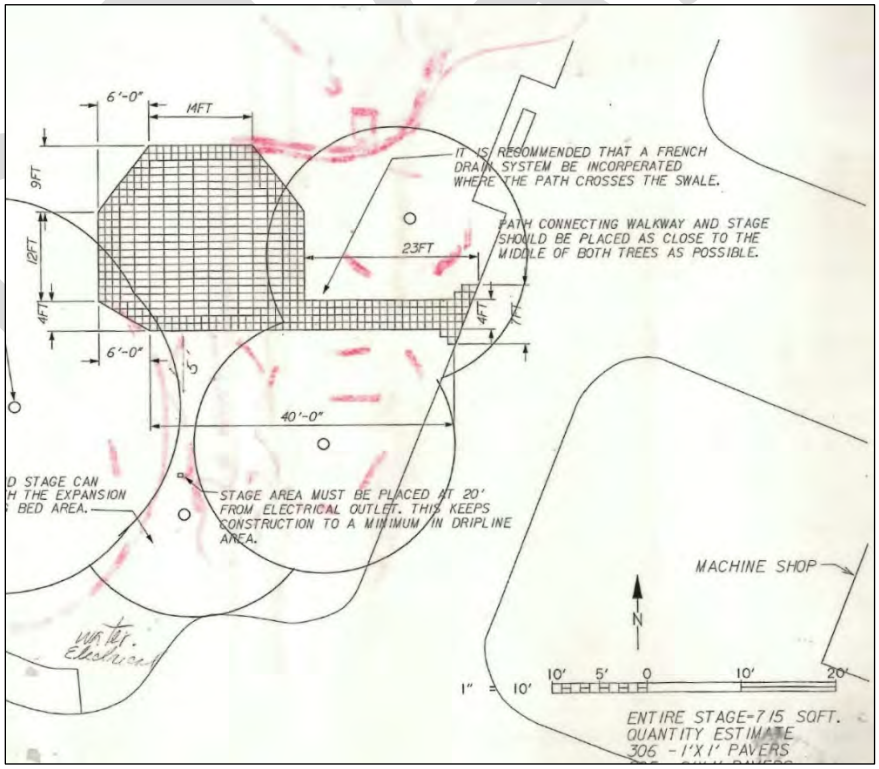


Figure 33. Band stage plaza lawn area (USACE 2020).

3.2.2 1998 Garden Nursery Trellises and Wrought Iron Fence

Prior to 1982, the Garden's nursery was an employee parking lot. When Entryway Phase I project was completed in 1982, the construction resulted in the creation of a new employee parking lot. The old employee parking lot was then renovated into a nursery area for garden plants (Freier 1989).

In 1998, plans were drawn to install wooden trellis, wooden planting boxes, and wooden bins in the Garden nursery area (Figures 34 and 35).

Figure 34. Nursery design plan (USACE 1998).

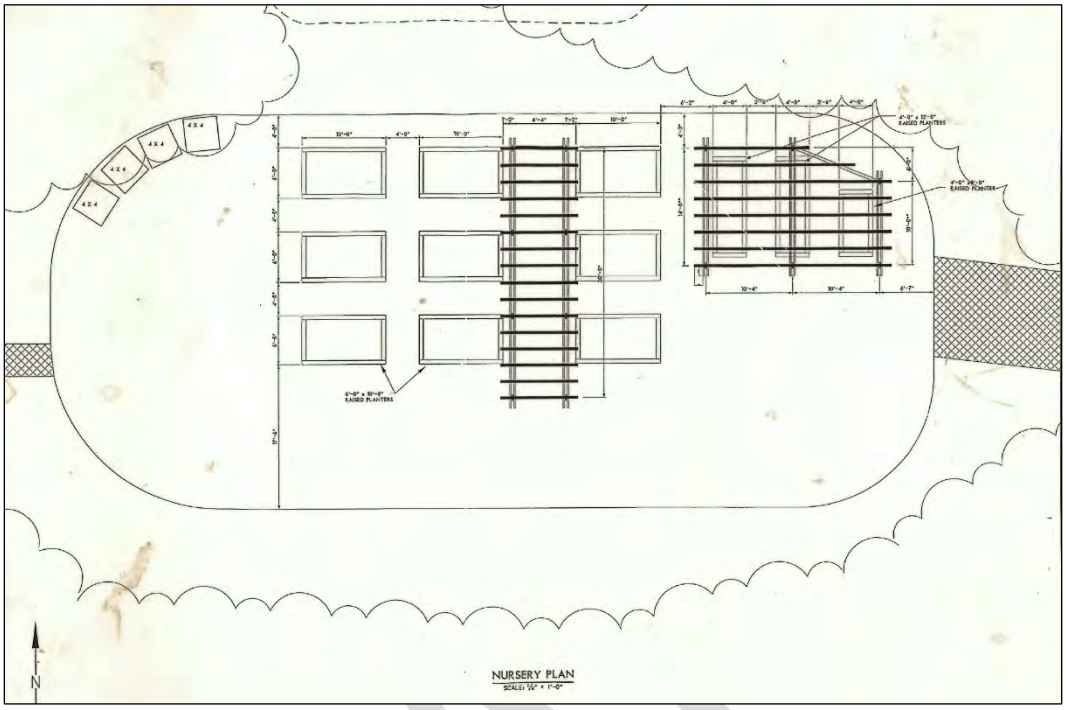
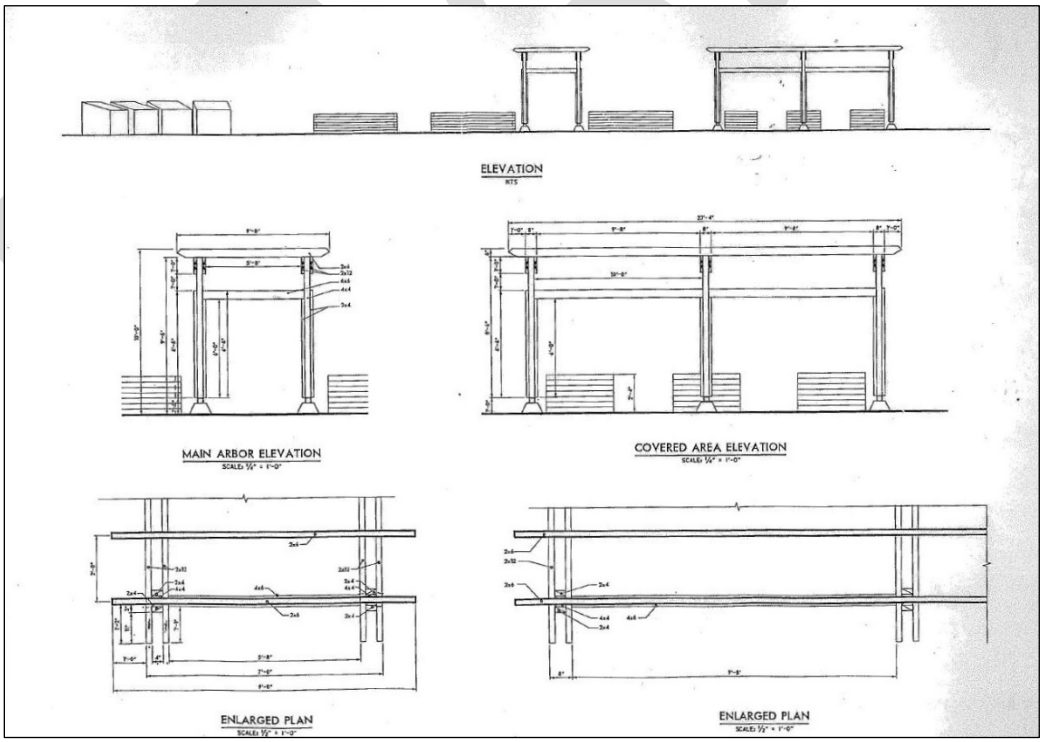


Figure 35. Trellis plans for the Garden nursery (USACE 1998).



Now in 2020, the Garden nursery needs major repairs. Some areas that could use improvements include the nursery planting boxes, the trellises, and the concrete. The nursery planting boxes have significantly deteriorated and, while three of the smallest boxes have been restored, the rest require removal. The trellises are still extant but require maintenance and staining. Last, the concrete in the nursery has deteriorated (Figure 36). The first two proposed improvements have no current action plans, but a contracting action to repave the nursery area is planned for 2021.

Figure 36. Nursery trellises note the poor condition of pavement (USACE 2020).

3.2.3 1999 Garden Pond

Entryway Phase II caused changes to the Garden bed patterns, which in turn caused Fleming to install a garden pond water feature. Fleming's logic for installing the pond was to preserve the historic integrity of a previously installed water feature from the 1930s to 1940s (Munro 2019). The pond Fleming installed lies in bed 215 and is directly behind the band stage plaza area. It is relatively obscured from public view today (Figure 38) and is most notable for its trickling water sounds generated by an installed water pump.

Figure 37. The pond water feature before Entryway Phase II is approximately located at the apex of the sidewalk (USACE 2021).

3.2.4 2000 Cavanaugh House Stone Patio

Similar to reasons for constructing the semi-permanent band stage plaza, the Cavanaugh House stone patio was installed in 2000, to mitigate for the deterioration in the lawn in this area. Poor drainage and increased shade from maturing shrubbery made cultivation of the grass challenging. The stone patio is still extant today (Figure 38).

Figure 38. Cavanaugh House stone patio (USACE 2020).

3.2.5 2000 Circular Drive

In 2000, eleven years after the completion of Entryway Phase II, the circular drive of the LWSC Project was also repaved in the same design style. Like Entryway Phase II the curbed sidewalk was removed to conform to the actual function of a pedestrian-only access project, while also allowing vehicle access when required (Figures 39 and 40). Also, like Entryway Phase II the repaving expanded planting beds adjacent to the project and the plants filled in these areas (Figure 41).

Figure 39. The circular drive prior to redesign note the sidewalk (USACE 1992).

Figure 40. 2001 as built of the circular drive project (USACE 2000).

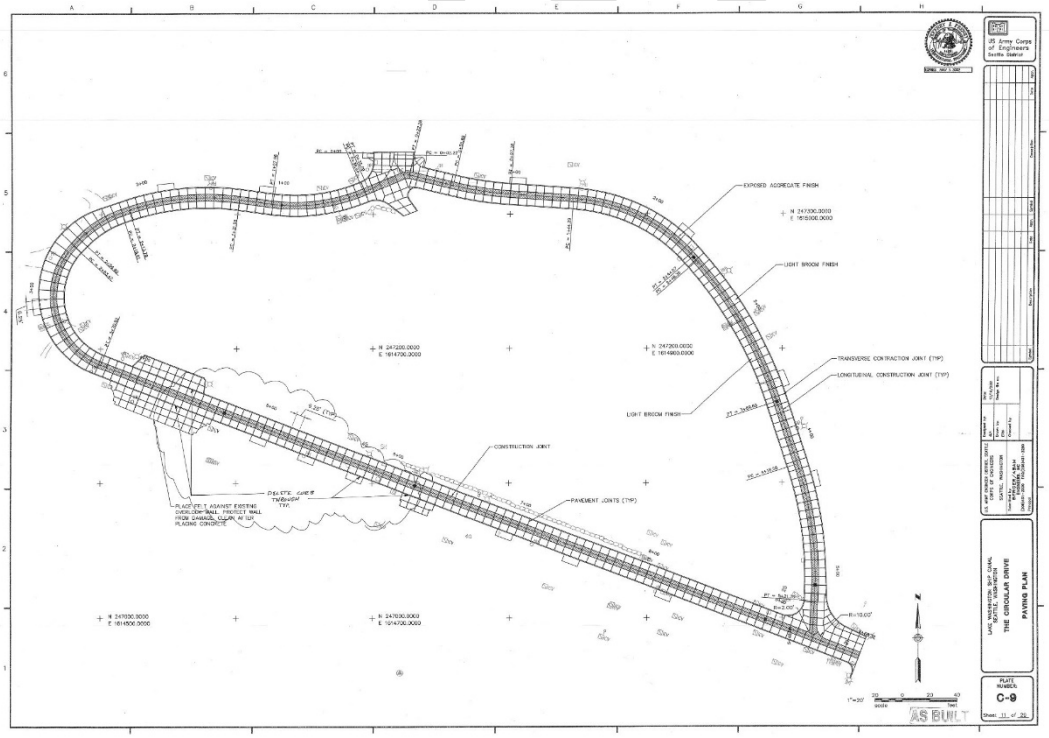


Figure 41. A similar perspective to Figure 43 (USACE 2020).

3.2.6 2010 American Reinvestment and Recovery Act Cavanaugh House Driveway Widening and Sidewalk Repair

This project was part of the 2009 American Reinvestment and Recovery Act that included a suite of concrete work at the LWSC Project. At the Cavanaugh House the driveway was widened, and a curb added. Figure 42 shows the driveway as it appeared in 1967, and Figure 43 shows the same driveway in 2020. There was also minor work completed adjacent to Cavanaugh House walkways.

Figure 42. Chief of Engineers General Cassidy tour party at Cavanaugh House driveway note the strip of lawn and lack of curb at right (USACE 1967).

Figure 43. Cavanaugh House Driveway note the visible addition to the left of original driveway and the edition of a curb on the right (USACE 2020).

3.2.7 2011 Cavanaugh House Security Fence

A security fence was installed around the Cavanaugh House at the direction of the 48th Seattle District Engineer Colonel Anthony O. Wright to enhance the security of the residents (Figure 44). The security fence was to follow the outline of the beds that surrounded the residence.

Figure 44. Cavanaugh House planting beds and security fence looking east (USACE 2019).

3.3 Materials Updates Since 1989

3.3.1 Benches in the Cultural Landscape Since 1989

The original benches at the Locks were concrete backless benches. Subsequent benches made of wood with steel legs and armrests were constructed and placed around the Locks and Garden; however, these were determined to be inconsistent with the design style of the project (Freier 1989).

LWSC Project personnel replaced the wood benches with the replicas of the original design in 2000. There were original benches still located on the project in 2000 (Figure 45). This afforded a near exact replica to be

created by measuring the existing benches (Figure 46). A comparison of the replica and original benches shows the success of this materials replication effort (Figure 47).

Figure 45. An original bench in the Garden note the exposed rebar (USACE 2020).

Figure 46. Drawing of bench replica for contractor (USACE 2020).

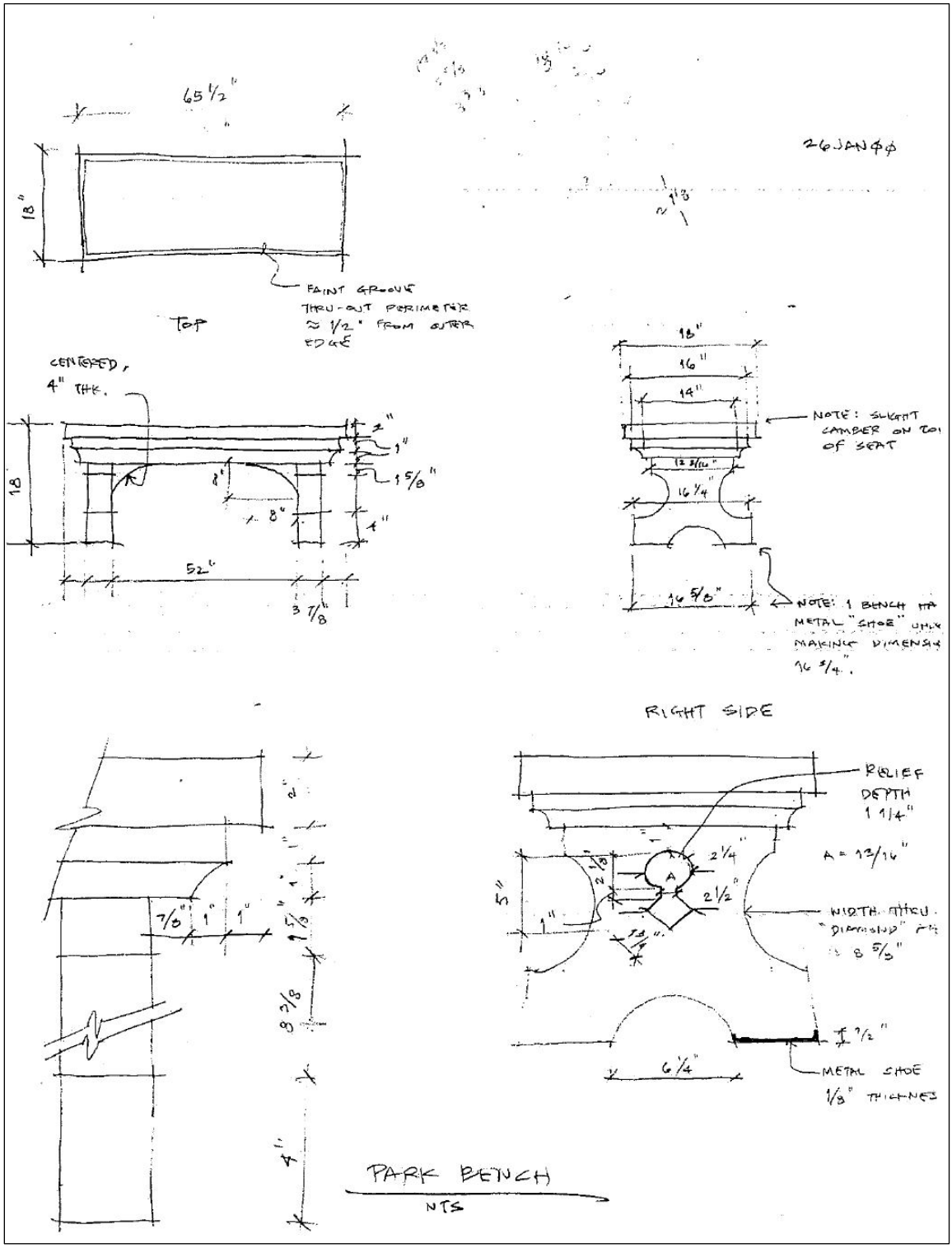


Figure 47. The replica bench on left and original bench on right (USACE 2020).

3.3.2 Planters Consistent with Materials Recommendations

English would fashion planters out of leftover concrete from other LWSC Project operations. These original concrete planters have been relocated to the nursery (Figure 48). LWSC Project gardener Brian S. Carter worked with a contractor to develop new planters in 1998. While these planters were for display, the planters were also designed to help with restricting public access to certain These new planters feature aggregate concrete to match the aggregate of Entryway Phase II repaving. Carter also improved on the original design by asking that spaces for forklifts to move the planters be created. This greatly aided the functionality and versatility of these new planters, as they could be moved with relative ease compared to the planters English had built (Figures 49 and 50).

Figure 48. English's original planter boxes in the nursery (USACE 2020).

Figure 49. New planter boxes (USACE 2020).

Figure 50. Replica planters note the aggregate concrete the space for forklift forks (USACE 2020).

4 Historic Plant Inventory, Plant Collection Records and Plant Significance Hierarchy

Cultural and historic designed landscapes contain plants that have historic and botanical significance. Many plants at the Carl S. English Jr. Botanical Garden have both historic and botanical significance. If these plants are lost, then their loss can diminish the historic integrity of the cultural and historic designed landscape. Therefore, it is recommended that these plants be identified and cataloged in a Historic Plant Inventory (HPI) to preserve the historic integrity of the landscape. Once the plants are cataloged in the HPI, then preservation and restoration treatments can be initiated to mitigate for the loss of plants in the HPI (Birnbaum 2000).

The HGR identified that the landscape styles from three eras of influence are important elements of the cultural and historic designed landscape (Freier 1989). The Original Era (1917 to 1931) represents the original series of plantings between 1917 and 1922. Many of the species planted in the Garden during this era originated from east of the Mississippi River (English 1972). The landscape during the Original Era was heavily maintained in a formal garden style. Plants were placed at intervals in the lawns, at the corners of buildings, and at edges of planting beds, and the plants were pruned and sheared often. The second era is known as the Nascent Era (1932 to 1940) and is marked by English's contributions to the Garden. The landscape style did not change dramatically during this period. The planting of vegetation in straight lines and at corners with the heavily managed and clipped was still the dominant style. The third era is known as the English Era (1941 to 1978). In 1941, English took full charge of the grounds. English expanded existing beds on the grounds by altering many of the plantings, he added beds of his own garden design, and he left some beds, like formal ones designed by Otto Holmdahl east of the Administration Building, alone (Freier 1989). English replaced approximately 80 percent of the plants from the original plantings with rare and experimental plants (English 1972). English introduced a large number of plants grown from seeds that were collected during his vacations in the western United States or obtained via international seed exchange (Lyon 1978). During this era the cultural and historic designed landscape as it is known today was formed. The plants of these three eras form the HPI of the Garden.

Most of the plants that are still extant in the Garden from the Original, Nascent, and English eras are the trees and some shrubs. This is mostly due to the longer natural lives of these plants. Also, because of their size, trees have the most immediate effect on the historic landscape if they are lost. Shrubs that date from these eras are also found in the Garden and are part of the HPI as well. The loss of these plants would not have as a dramatic effect on the landscape as trees; however, over time, the cumulative loss of shrubs to the landscape would begin to affect its historic integrity. So, the identification and preservation of shrubs of the HPI is also important. Interestingly, there are several species of venerable vines that also date from these eras that are still part of the landscape. These plants are generally known, but further investigation was required to identify them all.

4.1.1 Previous Plant Inventories and Identification of Historic Plant Inventory

Two full plant inventories have been completed on the Garden. The first plant inventory was completed by English in 1969, and subsequently republished in 1976. This is the most useful guide to determine plants of the HPI as the inventory of the plant collection was completed just after English retired.

In 1982, a full plant inventory of the Garden was completed by Kathy K. Mendelson (University of Washington). Located in the appendix of the HGR, this inventory provides window into the changes to Garden between 1974 and 1982.

Fleming completed a partial plant inventory before his retirement and while trying to complete a new method for the tagging of trees (Munro 2019). In 2004, Arthur Lee Jacobson published the second edition of "Trees of Seattle" and included a chapter on the trees of the Carl S. English Jr. Botanical Garden. Jacobson identified all of the trees and a few significantly sized shrubs, and in some cases corrected some trees that had been misidentified.

Using all of these inventories it is possible to identify the HPI plants related to the Original, Nascent, and English eras and construct a fuller, more accurate picture of the development eras and associated plants of the Garden.

4.1.2 The Collection Records

Collection records are important to determine the origin of plants in botanical gardens. However, records documenting the provenance of plants in the Carl S. English Jr. Botanical Garden is incomplete because English did not record the plants that he added to the Garden, but records where English had collected seeds still exist at the University of Washington (UW) Arboretum. English traded plants and seeds for years with Brian Mulligan, Director of the UW Arboretum. Mulligan documented where English collected seeds, as English tended to donate the seeds to the arboretum. Mulligan's records are still stored by arboretum staff today. These records are helpful in determining the origin of plants and if the plants fit into the HPI.

In one example, the University of Washington Master Plan (UWMP) inferred that the swamp peppermint gum *Eu-calyptus rodwayi* from Tasmania in planting bed 23 had to have been at least propagated by English. The size of the tree and its rarity in cultivation made it unlikely that English did not introduce the plant, yet, evidence was lacking. The collection records from the UW Arboretum show that English had procured seeds from Tasmania of this species, which is sufficient enough evidence to assign the plant to English.

4.1.3 The Plant Significance Hierarchy

The Plant Significance Hierarchy (PSH) has been adopted and revised over the years to more closely align with NPS standards, guidance, and treatments for cultural and historic designed landscapes. The PSH guides preservation and restoration treatments for non-routine actions. The PSH uses these treatments for managing the HPI and the greater plant collection for non-routine actions in two ways.

1) By applying recommendations from the HGR, the PSH identifies plants that were planted in the Original, Nascent, and English Eras to be part of the historic plant inventory.
2) The PSH infers that many plants introduced after 1974, are consistent with English's design style, philosophy, and precedent. Therefore, these plants have botanic and horticultural significance and are consistent with NPS standards for a cultural landscape

Plants are ranked in the PSH to determine those of the HPI and provide a system of decision making and criteria for plant preservation, removal, and replacement. The plants of Ranks 1 and 3 are part of the HPI, but these plants have different replacement criteria. Plants of Rank 2 are those that are not part of the HPI, but have botanic and horticultural merit. Rank 4 plants have no management criteria and are included to help identify plants that could be removed. Appendix A provides a plant inventory for the Garden and includes their plant bed location and rank.

Individual plants in the Garden, most noticeably trees, effect the historic integrity of the Garden. Decisions made regarding the preservation, removal, and replacement of trees associated with non-routine actions in the Garden have noticeably acute or cumulative effects on the historic and botanical and horticultural integrity. A list of all the plants and their associated rank and HPI are found in Appendix B.

4.1.3.1 Rank 1 Plants

These are plants that were introduced by English (Table 1). They are predominantly trees with some shrubs and several vines. These plants are to be preserved and not removed. Their removal effects the historic integrity of the cultural landscape. These plants are only to be removed if they are dead or, in the case of trees, are deemed to pose an imminent safety risk to USACE employees and/or the visiting public. It is recommended that the determination of whether a tree is dead, or a safety risk be made by a certified arborist. Rank 1 plants are to be replaced in-place and in kind. If biotic or abiotic factors and propagation difficulties prevent their replacement, then two criteria are to be considered before planting an alternative species. These two criteria are: (1) the replaced plant should be of the same genus or family; and, (2) the replaced plant should have a similar growth habit and resemblance and be of botanical or horticultural merit.

4.1.3.2 Rank 2 Plants

Rank 2 plants are ones planted in the Garden after 1974, and possess botanical and horticultural merit (Table 1). This ranking is the most subjective of the PSH. It is recommended that replacement of Rank 2 plants follow the NPS's standards, guidelines, and treatments as these best embrace English's design, philosophy, and precedent. Plants meet these former by possessing certain qualities like out-standing, aesthetics, rarity in cultivation and or in the wild, restricted native range, threatened or endangered status.

Table 1. Criteria for preserving, removing and replacing ranked plants in the Carl S. English Jr. Botanical Garden.

Plant Criteria	Rank 1 Plants	Rank 2 Plants	Rank 3 Plants	Rank 4 Plants
Plant Preservation Criteria	Preserve always; these plants are to be preserved and not removed. Their removal effects the historic integrity of the cultural landscape.	Preserve always; plants are to be preserved even though they are not part of the HPI as they still contribute to the botanic and horticultural significance of the plant collection.	Preservation desired; these plants are to be preserved as their removal will affect the historic integrity of the landscape, yet this is not as stringent as for Rank 1 plants.	Preservation unnecessary or not required. Rank 4 plants are annuals or biennials, recruits, recruits that are weeds, and plants added to the Garden that lack historical botanical or horticultural merit.
Plant Removal Criteria	Removal prohibited; these plants are only to be removed if they are dead or, in the case of trees, are deemed to pose an imminent safety risk to employees and/or the visiting public. Determination of whether a tree is dead, or a safety risk is to be made by a certified arborist.	Removal prohibited; justification needed for removal. If these plants are dead or, in the case of trees, are deemed to pose an imminent safety risk to employees and/or the visiting public. Determination of this should be made by a certified arborist.	Removal not recommended. If trees begin to take on an unsightly appearance even if still alive, they should be removed. Plants are also to be removed if they pose an imminent safety risk to employees and/or the visiting public. Determination of should be made by a certified arborist.	No constraints on removal; remove.
Plant Replacement Criteria	Plants are to be replaced in-place and in kind. If not possible, then two criteria are to be considered in choosing an alternative replacement: (1) the plant should be of the same genus or family; (2) the plant should have a similar growth habit and resemblance and be of botanical or horticultural merit.	Replace with plant of similar characteristics. The Rank 2 plants can be replaced if the following two criteria are met: (1) the replacement plant does not necessarily need to resemble the original plant; (2) the replacement plant should have significant botanical and horticultural merit.	Replace with plants of similar characteristics. Three criteria for replacement of these plants: (1) the Western red cedar *Thuja plicata* "Zebrina" can only be replaced in-place and in-kind; (2) the remaining Rank 3 plants are to be replaced with plants of similar features for example conifers should replace conifers and deciduous broadleaves should replace deciduous broadleaves; (3) the replacement tree though similar in appearance should have historical botanical and horticultural merit.	No criteria for replacement; do not replace.

Rank 2 plants are to be preserved even though they are not part of the HPI they still contribute to the botanic and horticultural significance of the plant collection. This ranking is to protect worthy plant introductions from the Fleming and Present Eras. Removal of these plants is not recommended without sufficient justification. Garden staff may remove these plants only with careful consideration of their botanical and horticultural significance. If these plants are dead or, in the case of trees, are deemed to pose an imminent safety risk to LWSC Project employees and/or the visiting public Garden staff. Determination of this should be made by a certified arborist. The Rank 2 plants can be replaced if the following two criteria are met:

1. The replacement plant does not necessarily need to resemble the original plant. Careful consideration is required to judge if the replacement plant fits the design and landscape style of its area; and,
2. The replacement plant should have significant botanical and horticultural merit.

4.1.3.3 Rank 3 Plants

Rank 3 plants refer only to trees. Rank 3 plants are to be as much as possible as the HGR determined their associated eras of landscape develop contribute to the historic integrity of the landscape (Table 1). As such, Rank 3 individuals, overall, do not possess significant horticultural or botanical merit. With one exception, the Western red cedar *Thuja plicata* 'Zebrina' is one Rank 3 plant that also meets the Rank 1 replacement criteria. These plants are to be preserved as their removal will affect the historic integrity of the landscape, yet this is not as stringent as for Rank 1 plants.

Some of the Rank 3 trees are ailing due to their old age and several biotic and abiotic factors are hastening their decline. If these trees begin to take on unsightly appearances even if still alive, they should be removed. They should also be removed if they pose an imminent safety risk to USACE employees and/or the visiting public. Determination of this should be made by a certified arborist. There are three associated replacement criteria for these plants as follows:

1. The Western red cedar *Thuja plicata* 'Zebrina' can only be replaced in-place and in-kind;
2. The remaining Rank 3 plants are to be replaced with plants of similar features for example conifers should replace conifers and deciduous broadleaves should replace deciduous broadleaves; and,

3. The replacement tree though similar in appearance should have significant botanical and horticultural merit.

4.1.3.4 Rank 4 Plants

Rank 4 plants are annuals or biennials, recruits, recruits that are weeds, and plants added to the Garden that lack botanical or horticultural merit (Table 1). These plants are assigned no preservation, removal, or replacement criteria. As such these plants can be removed at will.

5 Summary

Since 1989, the most significant undertaking to the cultural landscape was Entryway Phase II. Other, minor undertakings occurred including the installation of two stone footprints, one patio and one semi-permanent band stage, a garden pond, the repaving of the circular drive, and a fence around the Cavanaugh House. Lastly, two material changes were instituted, the reintroduction of the original concrete benches and the addition of garden planters that were of poured concrete, fitting into the design style of the project.

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Appendix A: Historic Integrity and Context of the Carl S. English Jr. Botanical Garden Planting Beds

The following provides a primer for historical context of the planting beds and notes on some of these plant species therein as of August 2020. These descriptions have been adapted from the UWMP and edited and amended. Figure 1 shows the most current map of the garden and location of the planting beds.

1, 2, 2A-These beds are an amalgamation of beds previously distinct forming A triangle with a separate island of a lone canyon live oak *Quercus chrysolpsis* just west of the main bed. Its location also makes it a notable interpretive feature of the garden. A specimen of dawn redwood *Metasequoia glytostroboides*. The beds also are home to a display garden of daylilies, a partnership between the LWSC Project and the Puget Sound Daylily Society.

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

4-The Rank 1 holly oak *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-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). 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 flannel bush *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 Mr. Fleming from 315A after 1978.

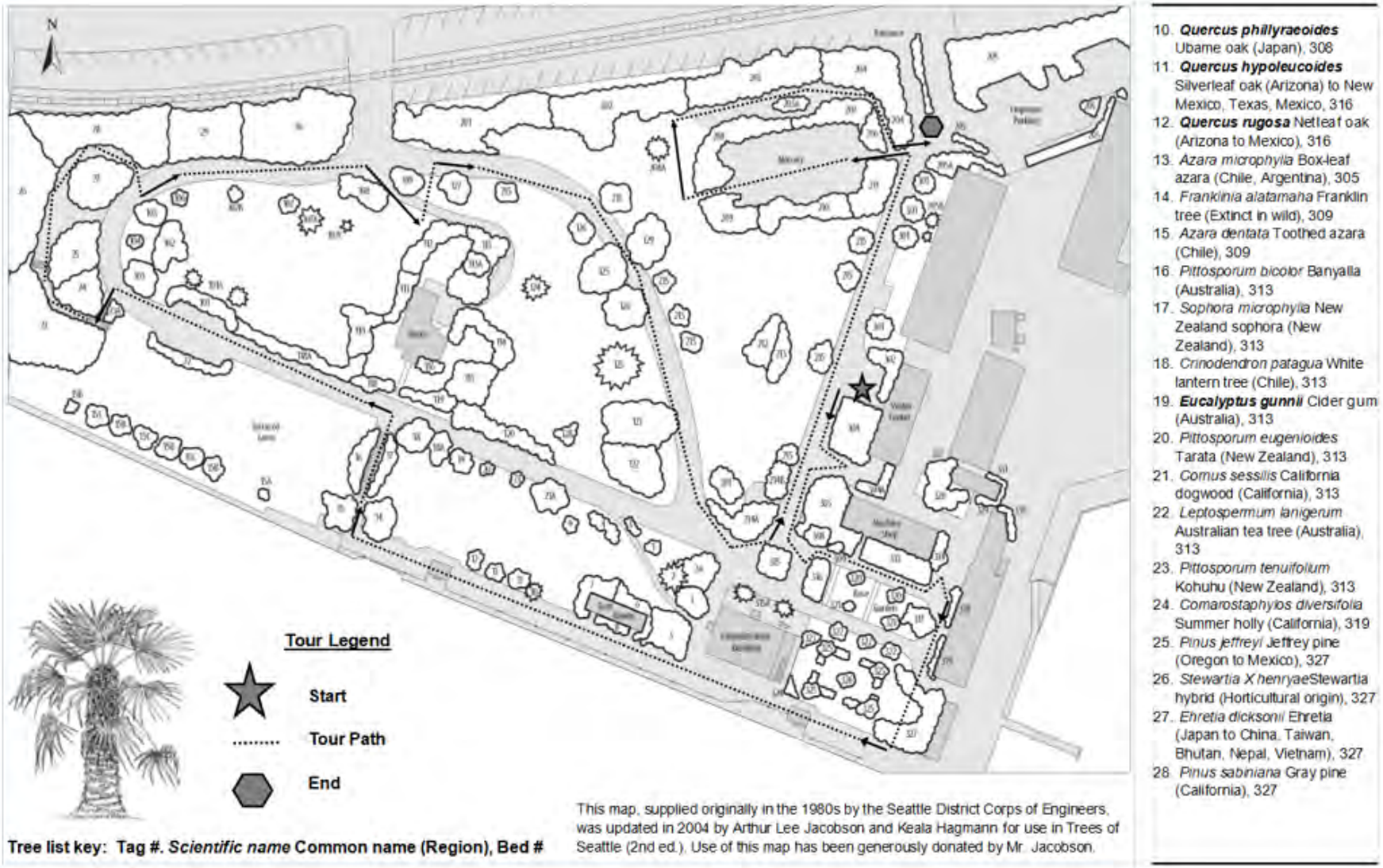

Figure 1. Carl S. English Jr. Botanical Garden.

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 *Rhododedron houlstonii*.

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 *Sequiodendron giganteum* is also populated with yucca.

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 possible cultivar registration status.

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* has grown rapidly and has attained a statuesque form. Care should be taken to prune the tree to reduce weight on the branches. Two significant members of *Fagaceae* also are found here Japanese chinquapin*Castanopsis cuspidat*a from the National Arboretum 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 lawn below and the surrounding beds by reducing shading.

22-Conifers here planted by Fleming in 1986 were removed in the fall of 2019. These trees were inconsistent with how English had left the bed in 1974. In 2020 this bed was replanted with xeric plants particularly several species of manzanaita *Arctostaphylos*. Two rare treesnew to the garden chinquapin *Chrysoplepis chrysophylla* (with genetics from the disjunct Hood Canal population) and Catalina ironwood *Lyonothamnus*

floribundus ssp. *asplenifolius* and one a reintroduction Brewer's spruce *Picea breweri* have been added.

23-"The Cove" applies to beds 23,24,25,26,27 and 28 but each bed will be treated in a different section. This sloping bed is covered in purposefully planted English ivy *Hedera helix* and other Rank 4 plants in the understory. In the over story a mix of large oaks and pines. A leaning Italian alder *Alnus cordata* is a unique inhabitant.

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.

Several interesting shrubs have been added to the understory particularly *Camellia grisjii, Pseudotaxus chienii* and *Rhododendron sinofalconeri* the latter grown from wild collected seed from northern Vietnamese population. In 2019 several highly significant rhododendrons were added to this bed from Olympic peninsula nursery, Chimamacum Woods. Of particular note is the magnolia flowered rhododendron *Rhododendron magniflorum* a tree like rhododendron.

26-This composed mostly of Rank 2 conifers and several Western red cedar *Thuja plicata* that apparently recruited here. Several large rhododendrons populate the bed which appear to be *Rhododendron* x *ponticum* hybrids. Several interesting maple *Acer* species have been added to the bed in recent years as well as the 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 fortunei* 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 Rank 4 plants.

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 road.

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 *Rhododendrons* are now found here including *Rhododendron edgeworthii, Rhododendron insigne,* and *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 to plant Rank 2 plants.

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 plants significant to horticulture 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 the foxtail

pine *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. While not historically planting beds, these trees are threatened in their native range of Oregon and California, as well as in cultivation, by phytophoroa. These trees are healthy and should be retained here.

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-Is the Rank 3 the linder *Tilia platyphyllos* is still there.

104-This weeping cherry is struggling physiologically here due to shade and should be removed.

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 original Rank 1 and Rank 3 plants are mostly represented here. Care should be taken to preserve the Rank 3 Japanese red pine *Pinus densiflora* in both beds. Mendelson comments that bed 109 contains three varieties of *Rhododendon* '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 grounds after this renovation particularly of family *Orchidaceae* from plants obtained from Keeping It Green Nursery, an adept propagator of terrestrial orchids.

Growing in bed 114, the mutant tan-oak, *Notholithocarpus densiflorus f. attenuato-dentatus* mutant), is one of most significant and sensitive plants in garden. 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 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 Dr. Arthur Kruckeberg, were among these recipients 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 (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 and various scientific disciplines.

118A-Fleming planted this bed in 1981 with four scarlet horse chestnuts scarlet horse chestnut *Aesculus carnea* var. *Briottii*.

The HGR makes clear that this bed is inconsistent with the landscape style of the rest of the garden. The many shrubs planted underneath the trees are evergreen and are a permanent screen.

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. 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-These beds contain the highest concentration of Rank 3 trees. The confier . Many Rank 1 plants still remain with the notable exception of the Chilean fire tree *Embothrium coccinuem* which has been reintroduced to bed 214A. In 2019, a large Eastern red oak *Quercus rubra* from bed 301 partially failed, sending a large section of the tree crashing into these beds. A large *Rhododendron decorum* was affected. Yet, this damage allowed for several significant young rhododendrons to be added.

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 its structural integrity.

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.

125,126,127,129-The trees that line this part of the loop road consist of maples in 125 and 127 that were spared by Mr. Fleming and Mr. Lyon in the late 1970s. 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 in decline and when funding is available a contract for removal should be funded.

201,202,203,204-These beds contain Rank 1 plants. English removed the Rank 3 poplar planted by McCarty circa 1920 replanted the north part of the with giant sequoia*Sequioadendron giganteum* (Freier 1989). Notable inhabitants of beds 202 and 203 include the Rank 1 yellowwood, *Cladrastis kentukea*, and a grove of paw-paw *Asimina triloba*.

205-The parking lot bed, installed after Entryway Phase I, was initially landscaped by a contracted firm. The HGR found these landscape additions to be inconsistent with the character of the garden and did not include this area as part of the botanical garden at all. Significant plant species were added to this bed after 1989. Notably species of *Callistemon* are thriving in the bed and a serpentine endemic oak, leather oak *Quercus durata* flourishes on the southeast corner. Many large conifers were removed in 2009 for power line clearance. Dwarf conifer species were later planted as replacements at the east end of the parking lot.

205B-These conifers planted by Fleming were removed in 2019 to allow contractor access to the adjacent warehouse. This contractor is to remove lead and asbestos from the warehouse.

Garden Nursery-Envisaged as an area to showcase the propagation of significant plants in the garden. The nursery is now in need of repair of the trellises and planting boxes and repaving.

206,207,208,209,210,211: The Nursery Beds-These beds surround what is now the garden nursery have many Rank 1 plants still in good health. The shrubbery consists mostly of rhododendrons.

These beds in conjunction with nursery renovation could be markedly improved. Of note is a newly identified Montezuma pine *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.

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 riverbed of cobbles. The Chilean fire tree *Embothrium coccinuem* was added here for visitor enjoyment due to its proximity to the Visitor Center and as a suitable alternative to replacement in beds 121/122.

214A-This bed was added after Entryway Phase II and consists of Rank 2 shrubs.

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 three Eastern red oaks *Quercus rubra* were planted after 1974 by Lyon. The northern most partially failed in 2019 and did significant damage to shrubs in beds 121/122.

302-This bed the combination of Austrain black 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 severely 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 to enhance it.

304-"Visitor Center" discussed in **9.5.4**. 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.

In the 2000s a castle hedge, the USACE emblem, was added in form of a *Ilex crenata* hedge.

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 Iigiri tree, *Idesia polycarpa, Mallotus japonicas, Parrotiopsis jaquemontiana*, Rehder tree *Rehderodendron macrocarpum*, and the endangered Florida torreya *Torreya taxifolia*.

In the island bed adjacent is a Chinese paper bush *Edgeworthia chryantha*, two *Lilium hansonii* and two rare and notable rhododendron species *Rhododendron platypodum* and *zaleucum* as well as, Chinese mayapple *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 southern hemisphere species of significant horticultural and botanical significance have been added to this.

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* keeled over due to heavy snow. The tree was resurrected by crane yet late was coppiced at breast height due to employee safety concerns. Of note is tree roots near the building turned fibrous and did not degrade the foundation. The tree is currently sprouting from the stump. The Campbell magnolia *Magnolia campbelli* var. *mollicomata* is putting on new growth in the extra light now provided.

315-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.

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- Silve and netlear oaks *Querucs hypoleucoides* and *rugosa*.

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 Rank 3 *Chamaecyparis obtus*a. *Prunus* x *yedodensis* 'Akebono'is found in this bedas well as several rhododendrons.

318,319-These beds are fairly intact in Rank 1 plants. *Trachycarpus fortunei* a Rank 1 tree in bed 318 was in for several years before removal in 2016. 319 had two notable Rank 2 plants *Comarostaphylis diversifolia* and *Exbucklandia populnea*.

320,321,322-These beds are *Prunus* 'Kwanzan' and Yoshino or *P.* x yedodensis.

323,324 - Bed 323 contains the possible dwarf canyon live oak found on serpentine, canyon live oak *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 Dutch grown 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 Watson's magnolia *Magnolia* x *watsonii* and the neighboring netleaf oak, a Rank 2 plant has been heavily pruned to afford this magnolia better growing conditions. The herbaceous layer consists of notably *Fritillaria imperialis, Nerine bowdenii,* and *Scilla peruviana*.

325 These beds were installed by Otto Holmdahl circa 1927 (Koykka 1969). Currently the corners of these beds have cherry trees, two locally raised 'Whitcomb" on the east two beds and a Yoshino and 'Shirofugen' on the west beds. The beds mostly contain commonly found showy perennials.

326-This bed contains the reintroduced Rank 2 plant to replace the lost Rank 1 star magnolia *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 significant Rank 2 plant is the hybrid *Stewartia* x *Henryae*.

328,329,**330,331,332,333** These beds are not visited by the public as they now lie behind the security fence. The majority of Rank 1 plants remain in these beds.

Notable feature of these beds includes rampant male and female kiwis *Actinidia deliciosa*, California Dutchman's pipe *Aristolochia californica*, a venerable hedge of *Callistemon subulatus* and the Jack pine *Pinus banksiana*.

Appendix B: Carl S. English Jr. Botanical Garden Plant Inventory with Historic Plant Inventory imbedded

The following contains the most up to date complete plant inventory. These records are reproduced from the LWSC Project's plant accession database as discussed in **Section 4.1.3.**

The Historic Plant Inventory is embedded in this larger inventory and the plants are in bold. Plants in bold are Rank 1 and plants in bold italics Rank 3. The plants in this inventory are listed by bed number.

The following table lists the acronyms for the rose garden and special display planters.

Acronym for bed number	Name or description
CEG	Ubiquitous in Carl S. English Jr. Botanical Garden
CP1	Carnivorous planter one
CP2	Carnivorous planter two
RG	Rose garden
RGN	Rose garden bed north
RGP1	Rock garden planter one
RGP2	Rock garden planter two
RGP3	Rock garden planter three
RGP5	Rock garden planter five
RGS	Rose garden south

Accession Number	Family	Genus	Species	Bed Number	Rank
P19.03.00.l	Ericaceae	*Pieris*	*japonica*	001	2
Q01.04.00c	Fagaceae	*Quercus*	*chrysolepsis*	001	1
R02.061.00	Ericaceae	*Rhododendron*	*macrosepalum*	001	2
A29.01.00	Ranunculaceae	*Anemone*	*hupehensis*	002	2
A34.00.00	Ranunculaceae	*Aquilegia*	*x*	002	2
A13.01.00.e	Araliaceae	*Aralia*	*californica*	002	2
B01.05.01	Berberidaceae	*Berberis*	*thunbergii*	002	2
C04.01.00.b	Calycanthaceae	*Calycanthus*	*occidentalis*	002	2
C04.01.00.c	Calycanthaceae	*Calycanthus*	*occidentalis*	002	2
C14.03.00.a	Pinaceae	*Cedrus*	*libani*	002	1
C36.05.00.c	Cornaceae	*Cornus*	*stolonifera*	002	2
D14.00.00	Plantaginaceae	*Digitalis*	*x*	002	2
F12.02.01.d	Onagraceae	*Fuchsia*	*magellicaica*	002	2
F12.02.01.e	Onagraceae	*Fuchsia*	*magellicaica*	002	2
F12.02.01.f	Onagraceae	*Fuchsia*	*magellicaica*	002	2
H04.04.00.b	Plantagianceae	*Hebe*	*hulkeana*	002	2
H06.00.00	Ranunculaceae	*Helleborus*	*x*	002	2
H06.01.00.d	Ranunculaceae	*Helleborus*	*argutifolius*	002	2
H07.00.01	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.03	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.04	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.05	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.06	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.07	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.08	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.09	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.10	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.11	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.12	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.13	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.14	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.15	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.16	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.17	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.18	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.19	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.20	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.21	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.22	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.23	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.24	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.25	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.26	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.27	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.28	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.29	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.30	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.31	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.32	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.33	Liliaceae	*Hemerocallis*	*x*	002	2

Accession Number	Family	Genus	Species	Bed Number	Rank
H07.00.34	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.35	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.36	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.37	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.38	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.39	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.40	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.41	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.42	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.43	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.44	Liliaceae	*Hemerocallis*	*x*	002	2
H07.00.45	Liliaceae	*Hemerocallis*	*x*	002	2
H14.01.00.c	Hydrangeaceae	*Hydrangea*	*macrophylla*	002	2
H14.01.00e	Hydrangeaceae	*Hydrangea*	*macrophylla*	002	2
I03.00.00.a	Iridaceae	*Iris*	*x*	002	2
I03.00.00.b	Iridaceae	*Iris*	*x*	002	2
I03.10.01.c	Iridaceae	*Iris*	*hollandica*	002	2
I03.10.02.c	Iridaceae	*Iris*	*hollandica*	002	2
L09.01.00.b	Caprifoliaceae	*Leycesteria*	*formosa*	002	2
M02.01.00.a	Berberidaceae	*Mahonia*	*aquifolium*	002	2
M05.01.00.a	Taxodiaceae	*Metasequoia*	*glyptostroboides*	002	2
P17.01.00.g	Poaceae	*Phyllostachys*	*aurea*	002	2
P19.03.00.m	Ericaceae	*Pieris*	*japonica*	002	2
P41.01.00	Poaceae	*Pseudosasa*	*japonica*	002	2
Q01.12.00.a	Fagaceae	*Quercus*	*palustris*	002	2
S27.01.00	Iridaceae	*Sisyrinchium*	*striatum*	002	2
S17.02.00.a	Stachyuraceae	*Stachyurus*	*praecox*	002	2
V04.01.00.b	Apocynaceae	*Vinca*	*minor*	002	2
B01.01.00.g	Berberidaceae	*Berberis*	*darwinii*	003	1
B07.01.00.a	Apiaceae	*Bupleurum*	*fruticosa*	003	2
C07.02.00.a	Theaceae	*Camellia*	*japonica*	003	2
P55.01.00	Rutaceae	*Poncirus*	*trifoliata*	003	2
Q01.06.00.b	Fagaceae	*Quercus*	*glauca*	003	1
Q01.06.00.c	Fagaceae	*Quercus*	*glauca*	003	1
R02.000.21s	Ericaceae	*Rhododendron*	*x*	003	2
S34.03.00b	Lamiaceae	*Stachys*	*cooleyae*	003	2
C24.01.00.a	Calycanthaceae	*Chimonanthus*	*praecox*	004	2
C42.01.00.a	Iridaceae	*Crocosmia*	*x crocosmiiflora*	004	2
E24.01.01	Orchidaceae	*Epipactis*	*gigantea*	004	2
E24.02.02	Orchidaceae	*Epipactis*	*royleana*	004	2
E06.03.00	Apiaceae	*Eryngium*	*yuccifolium*	004	2
G07.01.00.d	Gunneraceae	*Gunnera*	*manicata*	004	2
G07.01.00.e	Gunneraceae	*Gunnera*	*manicata*	004	2
G07.02.00	Gunneraceae	*Gunnera*	*monoica*	004	2
H15.04.00.a	Clusiaceae	*Hypericum*	*patulum*	004	2
Q01.08.00.a	Fagaceae	*Quercus*	*ilex*	004	1
Q01.08.00.d	Fagaceae	*Quercus*	*ilex*	004	1
T11.01.00	Liliaceae	*Tricyrtis*	*x*	004	2
B01.01.00.e	Berberidaceae	*Berberis*	*darwinii*	005	2
C26.01.00.a	Rutaceae	*Choisya*	*ternata*	005	2
C42.01.00.b	Iridaceae	*Crocosmia*	*x crocosmiiflora*	005	2
C43.01.00.a	Cupressaceae	*Cryptomeria*	*japonica*	005	2

Accession Number	Family	Genus	Species	Bed Number	Rank
C43.01.00.d	Cupressaceae	*Cryptomeria*	*japonica*	005	2
C43.01.00.e	Cupressaceae	*Cryptomeria*	*japonica*	005	2
C43.01.00.f	Cupressaceae	*Cryptomeria*	*japonica*	005	2
E03.01.00.a	Ericaceae	*Enkianthus*	*campanulatus*	005	1
F07.01.00.a	Oleaceae	*Forsythia*	*suspensa*	005	2
F12.01.00.a	Onagraceae	*Fuchsia*	*x*	005	2
H15.04.00.b	Clusiaceae	*Hypericum*	*patulum*	005	2
I03.10.01.b	Iridaceae	*Iris*	*hollandica*	005	2
I03.10.02.b	Iridaceae	*Iris*	*hollandica*	005	2
M02.01.02	Berberidaceae	*Mahonia*	*aquifolium*	005	2
M02.03.00	Berberidaceae	*Mahonia*	*haematocarpa*	005	2
N04.00.04.b	Amaryllidaceae	*Narcissus*	*x*	005	2
R02.038.00.c	Ericaceae	*Rhododendron*	*racemosum*	005	2
R02.107.00	Ericaceae	*Rhododendron*	*keysii*	005	2
S28.03.01.b	Lamiaceae	*Salvia*	*nemorosa*	005	2
V03.07.02.a	Caprifoliaceae	*Viburnum*	*plicatum*	005	2
B01.01.00.f	Berberidaceae	*Berberis*	*darwinii*	006	2
C03.01.00.a	Cupressaceae	*Calocedrus*	*decurrens*	006	2
C07.02.13.a	Theaceae	*Camellia*	*japonica*	006	2
C24.01.00.b	Calycanthaceae	*Chimonanthus*	*praecox*	006	1
R02.000.04	Ericaceae	*Rhododendron*	*x*	006	2
R02.016.01	Ericaceae	*Rhododendron*	*x catawbiense*	006	1
R02.038.00.a	Ericaceae	*Rhododendron*	*racemosum*	006	1
R02.064.01.a	Ericaceae	*Rhododendron*	*oreodoxa*	006	2
R04.01.00.a	Grossulariaceae	*Ribes*	*sanguineum*	006	2
S30.01.00	Asparagaceae	*Scilla*	*tubergeniana*	006	2
A05.07.00.a	Sapindaceae	*Aesculus*	*parviflora*	007	1
C07.02.13.b	Theaceae	*Camellia*	*japonica*	007	2
H03.02.00.a	Hamamelidaceae	*Hamamelis*	*mollis*	007	2
I03.02.00.a	Iridaceae	*Iris*	*douglasiana*	007	2
L11.01.00.a	Cupressaceae	*Libocedrus*	*decurrens*	007	2
M01.11.00.a	Magnoliaceae	*Magnolia*	*sargentiana*	007	1
M01.13.01	Magnoliaceae	*Magnolia*	*x soulangiana*	007	1
N05.02.00.a	Fagaceae	*Notholithocarpus*	*densiflorus*	007	1
P19.04.00.a	Ericaceae	*Pieris*	*taiwanensis*	007	2
R02.000.06	Ericaceae	*Rhododendron*	*x*	007	2
R02.000.15	Ericaceae	*Rhododendron*	*x*	007	2
R02.013.02	Ericaceae	*Rhododendron*	*fortunei*	007	1
R02.062.00.b	Ericaceae	*Rhododendron*	*micranthum*	007	1
R07.01.00	Liliaceae	*Ruscus*	*aculeatus*	007	2
C23.01.00.c	Arecaceae	*Chamaerops*	*humilis*	008	2
C35.01.00	Agavaceae	*Cordyline*	*banksii*	008	2
H09.02.00	Saxifragaceae	*Heuchera*	*micrantha*	008	2
H09.03.00	Saxifragaceae	*Heuchera*	*glabra*	008	2
L20.01.00	Rosaceae	*Leucosideum*	*sericea*	008	2
P19.02.00.e	Ericaceae	*Pieris*	*formosa*	008	2
Q01.07.00.c	Fagaceae	*Quercus*	*hypoleucoides*	008	1
M04.06.00	Rosaceae	*Malus*	*yunnanensis*	009	2
C21.03.00.f	Cupressaceae	*Chamaecyparis*	*pisifera*	*010*	*3*
A05.04.00.a	Sapindaceae	*Aesculus*	*indica*	011	1
A05.04.00.b	Sapindaceae	*Aesculus*	*indica*	011	1
M05.01.00.b	Taxodiaceae	*Metasequoia*	*glyptostroboides*	012	1

Accession Number	Family	Genus	Species	Bed Number	Rank
Q01.27.00	Fagaceae	*Quercus*	*garryana*	013	2
S08.01.00.r	Taxodiaceae	*Sequoiadendron*	*giganteum*	014	1
Y01.03.00.g	Agavaceae	*Yucca*	*gloriosa*	014	2
D20.01.00.f	Saxifragaceae	*Darmera*	*peltata*	015	2
E12.03.00	Celastraceae	*Euonymus*	*fortunei*	015	2
F10.01.00.c	Oleaceae	*Fraxinus*	*ornus*	015	2
M01.01.00.a	Magnoliaceae	*Magnolia*	*obovata*	015	2
M01.06.00	Magnoliaceae	*Magnolia*	*x kewensis*	015	1
M06.01.00.a	Myricaceae	*Myrica*	*californica*	015	2
R02.000.21h	Ericaceae	*Rhododendron*	*x*	015	1
R02.000.21i	Ericaceae	*Rhododendron*	*x*	015	1
R06.02.00.b	Rosaceae	*Rubus*	*deliciosus*	015	1
M04.04.01.a	Rosaceae	*Malus*	*x purpurea*	015A	2
M04.04.01.b	Rosaceae	*Malus*	*x purpurea*	015A	2
M04.04.01.c	Rosaceae	*Malus*	*x purpurea*	015A	2
M04.04.01.d	Rosaceae	*Malus*	*x purpurea*	015A	2
M04.01.01.a	Rosaceae	*Malus*	*zumi*	015B	2
M04.01.01.b	Rosaceae	*Malus*	*zumi*	015B	2
M04.01.01.c	Rosaceae	*Malus*	*zumi*	015B	2
P11.01.00	Hamamelidaceae	*Parrotia*	*persica*	015C	2
A03.08.00.a	Sapindaceae	*Acer*	*maximowiczianum*	016	2
C04.01.00.a	Calycanthaceae	*Calycanthus*	*occidentalis*	016	2
C36.03.00.a	Cornaceae	*Cornus*	*mas*	016	2
G03.03.00.a	Ericaceae	*Gaultheria*	*shallon*	016	2
M01.03.01.b	Magnoliaceae	*Magnolia*	*grandiflora*	016	1
M01.09.00	Magnoliaceae	*Magnolia*	*salicifolia*	016	2
P21.03.00.a	Pinaceae	*Pinus*	*bungeana*	016	2
P21.21.00	Pinaceae	*Pinus*	*koraiensis*	016	2
P34.01.00	Pinaceae	*Pseudolarix*	*amabilis*	016	1
R02.012.00.b	Ericaceae	*Rhododendron*	*decorum*	016	2
R02.013.01.a	Ericaceae	*Rhododendron*	*fortunei*	016	2
R02.059.00.c	Ericaceae	*Rhododendron*	*maddenii*	016	2
S14.01.00.f	Rosaceae	*Sorbus*	*aucuparia*	016	2
S17.02.00.c	Stachyuraceae	*Stachyurus*	*praecox*	016	2
A03.01.00	Sapindaceae	*Acer*	*buergerianum*	017	2
C11.01.00.a	Fagaceae	*Castanopsis*	*sieboldii*	017	2
I03.02.00.b	Iridaceae	*Iris*	*douglasiana*	017	2
L19.01.00.a	Fagaceae	*Lithocarpus*	*edulis*	017	1
M01.01.00	Magnoliaceae	*Magnolia*	*acuminata*	017	1
M01.17.00.a	Magnoliaceae	*Magnolia*	*x veitchii*	017	2
P21.03.00.b	Pinaceae	*Pinus*	*bungeana*	017	1
Q01.01.00.b	Fagaceae	*Quercus*	*agrifolia*	017	1
Q01.11.00.a	Fagaceae	*Quercus*	*myrsinifolia*	017	2
Q01.19.00.c	Fagaceae	*Quercus*	*vaccinifolia*	017	1
R02.017.00.d	Ericaceae	*Rhododendron*	*polylepis*	017	2
U01.01.00.a	Lauraceae	*Umbellularia*	*californica*	017	2
Q01.03.00.a	Fagaceae	*Quercus*	*cerris*	018	1
Q01 02.01	Fagaceae	*Quercus*	*robur*	018A	1
Q01.02.00	Fagaceae	*Quercus*	*robur*	019	1
Q01.10.00	Fagaceae	*Quercus*	*mongolica*	020	1
F01.01.00	Fagaceae	*Fagus*	*grandifolia*	021	1
Q01.23.00	Fagaceae	*Quercus*	*gambelii*	021A	1

Accession Number	Family	Genus	Species	Bed Number	Rank
A03.11.00.b	Sapindaceae	*Acer*	*palmatum*	022	2
A34.01.01	Ranunculaceae	*Aquilegia*	*chrysantha*	022	2
A15.03.00.b	Ericaceae	*Arbutus*	*xalapensis*	022	2
A16.04.00.b	Ericaceae	*Arctostaphylos*	*nummularia*	022	2
A16.07.00.b	Ericaceae	*Arctostaphylos*	*viscida*	022	2
A16.12.02a	Ericaceae	*Arctostaphylos*	*edmundsii*	022	2
A16.13.01	Ericaceae	*Arctostaphylos*	*x*	022	2
A16.14.01	Ericaceae	*Arctostaphylos*	*columbiana*	022	2
A16.15.01	Ericaceae	*Arctostaphylos*	*x*	022	2
A16.16.00	Ericaceae	*Arctostaphylos*	*mendocinoesnsis*	022	2
A16.17.01	Ericaceae	*Arctostaphylos*	*glandulosa*	022	2
A16.18.01	Ericaceae	*Arctostaphylos*	*hookeri*	022	2
C02.06.01	Myrtaceae	*Callistemon*	*x*	022	2
C13.07.00	Rhamnaceae	*Ceanothus*	*dentatus*	022	2
C13.11.01	Rhamnaceae	*Ceanothus*	*maritimus*	022	2
C19.02.00.d	Rosaceae	*Cercocarpus*	*ledifolius*	022	2
E08.06.00	Myrtaceae	*Eucalyptus*	*bridgesiana*	022	2
F13.06.00.a	Liliaceae	*Fritillaria*	*lanceolata*	022	2
L24.09.00.b	Montiaceae	*Lewisia*	*x*	022	2
M02.02.00	Berberidaceae	*Mahonia*	*druckerei*	022	2
M02.12.00	Berberidaceae	*Mahonia*	*fremontii*	022	2
M02.13.01	Berberidaceae	*Mahonia*	*piperiana*	022	2
M02.14.01	Berberidaceae	*Mahonia*	*haematocarpus*	022	2
N04.06.01	Amaryllidaceae	*Nerine*	*sarniensis*	022	2
N04.07.01	Amaryllidaceae	*Nerine*	*x*	022	2
N05.02.01.d	Fagaceae	*Notholithocarpus*	*densiflorus*	022	2
O04.01.00.c	Rosaceae	*Oemleria*	*cerasiformis*	022	2
O10.01.00	Cactaceae	*Opuntia*	*basilaris*	022	2
O10.01.01	Cactaceae	*Opuntia*	*basilaris*	022	2
O10.02.00	Cactaceae	*Opuntia*	*fragilis*	022	2
O10.03.01	Cactaceae	*Opuntia*	*imbricata*	022	2
O10.04.01	Cactaceae	*Opuntia*	*phaeacantha*	022	2
O10.05.01	Cactaceae	*Opuntia*	*polyacantha*	022	2
P06.07.00.c	Plantaginaceae	*Penstemon*	*barrettiae*	022	2
Q01.24.00	Fagaceae	*Quercus*	*berberidifolia*	022	2
Q01.25.01	Fagaceae	*Quercus*	*douglasii*	022	2
Q01.26.00	Fagaceae	*Quercus*	*dumosa*	022	2
Q01.27.01.a	Fagaceae	*Quercus*	*garryana*	022	2
R13.01.01	Rhamnaceae	*Rhamnus*	*californica*	022	2
S29.06.00.a	Crassulaceae	*Sedum*	*laxum*	022	2
S16.01.01	Rosaceae	*Spirea*	*x vanhouttei*	*022*	3
T22.01.00	Asparagaceae	*Triteleia*	*hyacinthina*	022	2
Z02.01.01	Onagraceae	*Zauschneria*	*californica*	022	2
Z02.02.01	Onagraceae	*Zauschneria*	*septentrionalis*	022	2
A03.11.00.d	Sapindaceae	*Acer*	*palmatum*	023	2
A10.01.00	Betulaceae	*Alnus*	*cordata*	023	2
A15.02.00.a	Ericaceae	*Arbutus*	*unedo*	023	2
B03.02.00.b	Betulaceae	*Betula*	*pubescens*	023	2
B03.02.00.c	Betulaceae	*Betula*	*pubescens*	023	2
B03.03.00.a	Betulaceae	*Betula*	*pendula*	023	2
B03.03.00.b	Betulaceae	*Betula*	*pendula*	023	2
B03.03.00.c	Betulaceae	*Betula*	*pendula*	023	2

Accession Number	Family	Genus	Species	Bed Number	Rank
C14.03.00.b	Pinaceae	*Cedrus*	*libani*	023	2
E08.03.00	Myrtaceae	*Eucalyptus*	*rodwayi*	023	1
H12.01.00.a	Rosaceae	*Holodiscus*	*discolor*	023	2
L01.01.00.a	Fabaceae	*Laburnum*	*anagyroide*	023	2
L39.01.00	Pinaceae	*Larix*	*decidua*	023	2
N05.02.00.b	Fagaceae	*Notholithocarpus*	*densiflorus*	023	2
N05.02.00.c	Fagaceae	*Notholithocarpus*	*densiflorus*	023	2
P17.01.00.a	Poaceae	*Phyllostachys*	*aurea*	023	2
P21.12.00.c	Pinaceae	*Pinus*	*nigra*	023	2
P21.16.00.a	Pinaceae	*Pinus*	*pinea*	023	2
P21.22.00.b	Pinaceae	*Pinus*	*sylvestris*	023	2
P21.22.00.c	Pinaceae	*Pinus*	*sylvestris*	023	2
P21.22.00.d	Pinaceae	*Pinus*	*sylvestris*	023	2
P21.22.00.e	Pinaceae	*Pinus*	*sylvestris*	023	2
Q01.04.00.e	Fagaceae	*Quercus*	*chrysolepsis*	023	2
Q01.04.00.f	Fagaceae	*Quercus*	*chrysolepsis*	023	2
Q01.05.00.c	Fagaceae	*Quercus*	*coccinea*	023	2
Q01.06.00.d	Fagaceae	*Quercus*	*glauca*	023	2
R02.000.03.b	Ericaceae	*Rhododendron*	*x*	023	2
T06.02.00.a	Cupressaceae	*Thuja*	*plicata*	023	2
A02.02.00.f	Pinaceae	*Abies*	*holophylla*	024	1
A15.02.00.i	Ericaceae	*Arbutus*	*unedo*	024	2
C36.02.01.a	Cornaceae	*Cornus*	*kousa*	024	2
C46.03.00	Betulaceae	*Corylus*	*colurna*	024	2
C40.01.00	Rosaceae	*Crataegus*	*submollis*	024	2
D07.01.00	Saxifragaceae	*Deutzia*	*gracilis*	024	2
L14.01.00.b	Liliaceae	*Lilium*	*hybrid*	024	2
M01.05.00.b	Magnoliaceae	*Magnolia*	*kobus*	024	2
N05.02.00.d	Fagaceae	*Notholithocarpus*	*densiflorus*	024	1
N05.02.00.e	Fagaceae	*Notholithocarpus*	*densiflorus*	024	1
N05.02.00.f	Fagaceae	*Notholithocarpus*	*densiflorus*	024	1
P05.01.01.a	Paulawiacea	*Paulownia*	*tomentosa*	024	2
Q01.20.00.a	Fagaceae	*Quercus*	*wislizenii*	024	1
R02.050.00a	Ericaceae	*Rhododendron*	*magniflorum*	024	2
R02.050.00b	Ericaceae	*Rhododendron*	*magniflorum*	024	2
R02.052.00.b	Ericaceae	*Rhododendron*	*coeloneurum*	024	2
R02.093.00	Ericaceae	*Rhododendron*	*sinofalconori*	024	2
R02.113.00	Ericaceae	*Rhododendron*	*bureavioides*	024	2
T06.02.00.b	Cupressaceae	*Thuja*	*plicata*	024	2
T10.03.00.a	Pinaceae	*Tsuga*	*mertensiana*	024	2
A02.02.00.g	Pinaceae	*Abies*	*holophylla*	025	1
C07.06.00	Theaceae	*Camellia*	*grijsii*	025	2
K01.02.00.a	Ericaceae	*Kalmia*	*latifolia*	025	1
L08.03.00.b	Ericaceae	*Leucothoe*	*keiskei*	025	2
L14.01.00.c	Liliaceae	*Lilium*	*hybrid*	025	2
N05.02.00.g	Fagaceae	*Notholithocarpus*	*densiflorus*	025	2
N05.02.00.h	Fagaceae	*Notholithocarpus*	*densiflorus*	025	2
O04.01.00.f	Rosaceae	*Oemleria*	*cerasiformis*	025	2
P42.01.00	Pinaceae	*Pseudotaxus*	*chienni*	025	2
R02.009.00.a	Ericaceae	*Rhododendron*	*cerasinum*	025	2
R02.009.00.b	Ericaceae	*Rhododendron*	*cerasinum*	025	2
R02.024.00.k	Ericaceae	*Rhododendron*	*x kosteranum*	025	2

Accession Number	Family	Genus	Species	Bed Number	Rank
R02.028.02b	Ericaceae	*Rhododendron*	*rex*	025	2
R02.094.00.	Ericaceae	*Rhododendron*	*x minus*	025	2
R02.114.00	Ericaceae	*Rhododendron*	*rothschildii*	025	2
R02.115.00	Ericaceae	*Rhododendron*	*hodgsonii*	025	2
T06.02.00.c	Cupressaceae	*Thuja*	*plicata*	025	2
T06.02.00.d	Cupressaceae	*Thuja*	*plicata*	025	2
T10.02.00	Pinaceae	*Tsuga*	*heterophylla*	025	2
V01.02.00.a	Ericaceae	*Vaccinium*	*ovatum*	025	2
A02.02.00.a	Pinaceae	*Abies*	*holophylla*	026	2
A02.02.00.b	Pinaceae	*Abies*	*holophylla*	026	2
A03.03.01.a	Sapindaceae	*Acer*	*davidii*	026	2
A03.08.00.b	Sapindaceae	*Acer*	*maximowiczianum*	026	2
A03.10.00	Sapindaceae	*Acer*	*rufinerve*	026	2
C14.02.00.f	Pinaceae	*Cedrus*	*deodara*	026	2
C26.01.00.c	Rutaceae	*Choisya*	*ternata*	026	2
H10.01.00.b	Malvaceae	*Hibiscus*	*syriacus*	026	2
M04.05.00	Rosaceae	*Malus*	*sargentii*	026	2
P16.02.00.a	Rosaceae	*Photinia*	*serratifolia*	026	2
P17.01.00.c	Poaceae	*Phyllostachys*	*aurea*	026	2
R02.000.21u	Ericaceae	*Rhododendron*	*x*	026	2
R02.028.01b	Ericaceae	*Rhododendron*	*rex*	026	2
R02.116.00	Ericaceae	*Rhododendron*	*praestans*	026	2
R02.117.00	Ericaceae	*Rhododendron*	*basilicum*	026	2
R02.118.00	Ericaceae	*Rhododendron*	*uvarifolium*	026	2
S26.01.00.b	Lauraceae	*Sassafras*	*albidum*	026	2
S26.01.00.c	Lauraceae	*Sassafras*	*albidum*	026	2
T03.01.00a	Trochodendraceae	*Tetracentron*	*sinense*	026	2
T06.02.00.e	Cupressaceae	*Thuja*	*plicata*	026	2
T06.02.00.f	Cupressaceae	*Thuja*	*plicata*	026	2
T06.02.00.g	Cupressaceae	*Thuja*	*plicata*	026	2
T06.02.00.h	Cupressaceae	*Thuja*	*plicata*	026	2
T06.02.00.i	Cupressaceae	*Thuja*	*plicata*	026	2
A02.04.00	Pinaceae	*Abies*	*sachalinensis*	027	2
L08.02.00a	Ericaceae	*Leucothoe*	*fontanesiana*	027	1
P19.01.00.a	Ericaceae	*Pieris*	*floribunda*	027	1
P21.05.00.a	Pinaceae	*Pinus*	*densiflora*	*027*	*3*
P21.05.00.b	Pinaceae	*Pinus*	*densiflora*	*027*	*3*
P21.05.00.c	Pinaceae	*Pinus*	*densiflora*	*027*	*3*
P32.06.06.a	Rosaceae	*Prunus*	*serrulata*	027	2
R02.000.21f	Ericaceae	*Rhododendron*	*x*	027	1
R02.000.21g	Ericaceae	*Rhododendron*	*x*	027	1
R02.003.00.b	Ericaceae	*Rhododendron*	*arboreum*	027	2
R02.007.02	Ericaceae	*Rhododendron*	*x griffithianum*	027	1
R02.012.00.f	Ericaceae	*Rhododendron*	*decorum*	027	2
R02.013.01.b	Ericaceae	*Rhododendron*	*fortunei*	027	2
S10.01.00.b	Rutaceae	*Skimmia*	*japonica*	027	2
T06.02.00.j	Cupressaceae	*Thuja*	*plicata*	027	1
T06.02.00.k	Cupressaceae	*Thuja*	*plicata*	027	1
T06.02.00.l	Cupressaceae	*Thuja*	*plicata*	027	1
A02.02.00.c	Pinaceae	*Abies*	*holophylla*	028	2
A02.02.00.d	Pinaceae	*Abies*	*holophylla*	028	2
A02.02.00.e	Pinaceae	*Abies*	*holophylla*	028	2

Accession Number	Family	Genus	Species	Bed Number	Rank
A02.06.00	Pinaceae	*Abies*	*cephalonica*	028	2
B08.01.00.a	Buxaceae	*Buxus*	*sempervirens*	028	2
C07.04.00.a	Theaceae	*Camellia*	*sasanqua*	028	2
C14.02.00.g	Pinaceae	*Cedrus*	*deodara*	028	2
C14.02.00.h	Pinaceae	*Cedrus*	*deodara*	028	2
C39.02.00.b	Rosaceae	*Cotoneaster*	*lacteus*	028	2
E12.02.00.b	Celastraceae	*Euonymus*	*europaeus*	028	2
L01.01.00.b	Fabaceae	*Laburnum*	*anagyroide*	028	2
L36.01.00	Primulaceae	*Lysimachia*	*latifolia*	028	2
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	028	2
P16.01.00.a	Rosaceae	*Photinia*	*x fraseri*	028	2
P21.05.00.j	Pinaceae	*Pinus*	*densiflora*	*028*	*3*
P21.08.00.a	Pinaceae	*Pinus*	*jeffreyi*	028	1
P21.08.00.b	Pinaceae	*Pinus*	*jeffreyi*	028	1
R02.000.21c	Ericaceae	*Rhododendron*	*x*	028	1
R02.000.21t	Ericaceae	*Rhododendron*	*x*	028	1
R02.000.25a	Ericaceae	*Rhododendron*	*x*	028	1
R02.008.00.a	Ericaceae	*Rhododendron*	*orbiculare*	028	2
T06.02.00.m	Cupressaceae	*Thuja*	*plicata*	028	2
A26.01.00.b	Rosaceae	*Amelanchier*	*alnifolia*	029	2
B08.01.00.b	Buxaceae	*Buxus*	*sempervirens*	029	2
C03.01.00.b	Cupressaceae	*Calocedrus*	*decurrens*	029	2
C07.02.00.b	Theaceae	*Camellia*	*japonica*	029	2
C07.04.00.b	Theaceae	*Camellia*	*sasanqua*	029	2
C39.06.00.b	Rosaceae	*Cotoneaster*	*henryanus*	029	2
C39.08.00	Rosaceae	*Cotoneaster*	*x watereri*	029	2
I03.09.03	Iridaceae	*Iris*	*germanica*	029	2
I03.09.03	Iridaceae	*Iris*	*germanica*	029	2
I03.10.01.d	Iridaceae	*Iris*	*hollandica*	029	2
I03.10.02.c	Iridaceae	*Iris*	*hollandica*	029	2
L01.01.00.c	Fabaceae	*Laburnum*	*anagyroide*	029	2
L11.01.00.b	Cupressaceae	*Libocedrus*	*decurrens*	029	2
L25.01.00.b	Caryophyllaceae	*Lychnis*	*coronaria*	029	2
M01.02.00.b	Magnoliaceae	*Magnolia*	*cylindrica*	029	2
M01.07.01.b	Magnoliaceae	*Magnolia*	*liliflora*	029	2
M01.16.00.c	Magnoliaceae	*Magnolia*	*tripetala*	029	2
M02.01.00.c	Berberidaceae	*Mahonia*	*aquifolium*	029	2
P19.03.01.a	Ericaceae	*Pieris*	*japonica*	029	1
R02.000.21b	Ericaceae	*Rhododendron*	*x*	029	2
R02.046.00.d	Ericaceae	*Rhododendron*	*yunnanense*	029	2
T06.02.00.r	Cupressaceae	*Thuja*	*plicata*	029	2
T06.02.00.s	Cupressaceae	*Thuja*	*plicata*	029	2
T06.02.00.t	Cupressaceae	*Thuja*	*plicata*	029	2
T06.02.00.u	Cupressaceae	*Thuja*	*plicata*	029	2
A52.01.00	Fabaceae	*Acacia*	*pravissima*	030	2
A40.02.01.b	Ranunculaceae	*Actaea*	*simplex*	030	2
A15.02.00.b	Ericaceae	*Arbutus*	*unedo*	030	1
B01.01.00.d	Berberidaceae	*Berberis*	*darwinii*	030	2
B01.03.00.c	Berberidaceae	*Berberis*	*verruculosa*	030	2
B01.04.00.c	Berberidaceae	*Berberis*	*x stenophylla*	030	2
B18.00.01	Asparagaceae	*Beschorneria*	*x*	030	2
C01.02.01	Verbenaceae	*Callicarpa*	*bodinieri*	030	2

Accession Number	Family	Genus	Species	Bed Number	Rank
C07.02.00.c	Theaceae	*Camellia*	*japonica*	030	2
C18.02.01	Fabaceae	*Cercis*	*canadensis*	030	2
C51.01.01	Plantaginaceae	*Chelone*	*lyonii*	030	2
C26.01.00.f	Rutaceae	*Choisya*	*ternata*	030	2
C27.09.00.d	Cistaceae	*Cistus*	*salvifolius*	030	2
C38.01.00.a	Hamamelidaceae	*Corylopsis*	*sinensis*	030	2
C38.01.00.b	Hamamelidaceae	*Corylopsis*	*sinensis*	030	2
D04.01.00	Agavaceae	*Dasylirion*	*wheeleri*	030	2
D11.01.00.b	Rosaceae	*Dryas*	*drummondii*	030	2
E14.00.01	Asteraceae	*Echinacea*	*x*	030	2
E14.00.02	Asteraceae	*Echinacea*	*purpurea*	030	2
E14.10.01	Asteraceae	*Echinacea*	*purpurea*	030	2
F10.01.00.a	Oleaceae	*Fraxinus*	*ornus*	030	2
G14.01.01	Rubiaceae	*Gardenia*	*jasminoides*	030	2
G02.01.00.b	Garryaceae	*Garrya*	*elliptica*	030	2
G09.00.01.b	Rosaceae	*Geum*	*x*	030	2
H21.00.00	Asparagaceae	*Helianthus*	*tuberosus*	030	2
H16.01.01	Asparagaceae	*Hesperaloe*	*parviflora*	030	2
H12.01.00.b	Rosaceae	*Holodiscus*	*discolor*	030	2
I03.07.01.b	Iridaceae	*Iris*	*sibirica*	030	2
I03.07.02	Iridaceae	*Iris*	*sibirica*	030	2
I03.08.01	Iridaceae	*Iris*	*pallida*	030	2
I03.09.02	Iridaceae	*Iris*	*germanica*	030	2
I03.09.03	Iridaceae	*Iris*	*germanica*	030	2
J04.05.00	Cupressaceae	*Juniperus*	*cedrus*	030	2
L29.02.01	Lamiaceae	*Lavandula*	*x chaytoriae*	030	2
L24.06.01	Montiaceae	*Lewisia*	*longipetala*	030	2
M01.02.00.c	Magnoliaceae	*Magnolia*	*cylindrica*	030	2
M01.11.00.b	Magnoliaceae	*Magnolia*	*sargentiana*	030	2
M02.01.00.e	Berberidaceae	*Mahonia*	*aquifolium*	030	2
M02.01.03	Berberidaceae	*Mahonia*	*aquifolium*	030	2
M11.01.01.a	Polygonaceae	*Muehlenbeckia*	*x*	030	2
P02.03.00.a	Paeoniaceae	*Paeonia*	*pacifica*	030	2
P06.04.01	Plantaginaceae	*Penstemon*	*barbatus*	030	2
P44.01.01	Polemoniaceae	*Phlox*	*subulata*	030	2
P19.01.00.b	Ericaceae	*Pieris*	*floribunda*	030	2
P28.02.01	Dryopteridaceae	*Polystichum*	*setiferum*	030	2
P28.04.00	Dryopteridaceae	*Polystichum*	*munitum*	030	2
P30.00.01	Rosaceae	*Potentilla*	*x*	030	2
P32.01.00	Rosaceae	*Prunus*	*x blireana*	030	2
P45.01.02	Ranunculaceae	*Pulsatilla*	*vulgaris*	030	2
R02.047.00.b	Ericaceae	*Rhododendron*	*thomsonii*	030	2
R02.054.00	Ericaceae	*Rhododendron*	*edgeworthii*	030	2
R02.101.00	Ericaceae	*Rhododendron*	*insigne*	030	2
R08.02.00	Rosaceae	*Rosa*	*canina*	030	2
S01.05.01	Salicaceae	*Salix*	*gracilistyla*	030	2
S28.02.01.b	Lamiaceae	*Salvia*	*greggii*	030	2
S32.01.01.b	Adoxaceae	*Sambucus*	*nigra*	030	2
S29.00.00	Crassulaceae	*Sedum*	*telephinum*	030	2
S29.01.01	Crassulaceae	*Sedum*	*acre*	030	2
S29.02.00	Crassulaceae	*Sedum*	*sediforme*	030	2
S29.03.01	Crassulaceae	*Sedum*	*spathifolium*	030	2

Accession Number	Family	Genus	Species	Bed Number	Rank
S29.04.01	Crassulaceae	*Sedum*	*spurium*	030	2
S24.02.01	Caryophyllaceae	*Silene*	*caroliniana*	030	2
S33.00.00	Poaceae	*Stipa*	*x*	030	2
V08.00.01.a	Plantaginaceae	*Veronica*	*x*	030	2
V03.03.00.d	Caprifoliaceae	*Viburnum*	*davidii*	030	2
X01.01.00.a	Melanthiaceae	*Xerophyllum*	*tenax*	030	2
Y01.00.01	Agavaceae	*Yucca*	*x*	030	2
Y01.01.00.b	Agavaceae	*Yucca*	*filamentosa*	030	2
Y01.06.00	Agavaceae	*Yucca*	*rostrata*	030	2
A16.11.02.a	Ericaceae	*Arctostaphylos*	*densiflora*	101	2
A16.11.02.b	Ericaceae	*Arctostaphylos*	*densiflora*	101	2
A16.14.00.a	Ericaceae	*Arctostaphylos*	*columbiana*	101	2
A16.14.00.b	Ericaceae	*Arctostaphylos*	*columbiana*	101	2
A16.14.00.c	Ericaceae	*Arctostaphylos*	*columbiana*	101	2
C39.05.00.b	Rosaceae	*Cotoneaster*	*horizontalis*	101	2
C39.05.00.k	Rosaceae	*Cotoneaster*	*horizontalis*	101	2
M02.01.00.b	Berberidaceae	*Mahonia*	*aquifolium*	101	2
N05.02.01.e	Fagaceae	*Notholithocarpus*	*densiflorus*	101	2
P18.04.00.b	Pinaceae	*Picea*	*breweriana*	101	2
P21.01.00.b	Pinaceae	*Pinus*	*aristrata*	101	1
P21.01.00.c	Pinaceae	*Pinus*	*aristrata*	101	1
P21.16.00.b	Pinaceae	*Pinus*	*pinea*	101	2
P21.22.01	Pinaceae	*Pinus*	*sylvestris*	101	1
Q01.27.01.b	Fagaceae	*Quercus*	*garryana*	101	2
S45.01.00	Elaeagnaceae	*Shepherdia*	*argentea*	101	2
V03.07.02.c	Caprifoliaceae	*Viburnum*	*plicatum*	101	2
Y01.03.00.e	Agavaceae	*Yucca*	*gloriosa*	101	2
C21.04.00.a	Cupressaceae	*Chamaecyparis*	*lawsoniana*	101A	2
C21.04.00.b	Cupressaceae	*Chamaecyparis*	*lawsoniana*	101A	2
E03.01.00.c	Ericaceae	*Enkianthus*	*campanulatus*	102	2
E11.01.01	Berberidaceae	*Epimedium*	*x perralchicum*	102	2
K01.02.00.b	Ericaceae	*Kalmia*	*latifolia*	102	2
P18.05.00	Pinaceae	*Picea*	*orientalis*	102	2
Q01.05.00.e	Fagaceae	*Quercus*	*coccinea*	102	2
R02.010.00	Ericaceae	*Rhododendron*	*concinnum*	102	2
R02.024.00.f	Ericaceae	*Rhododendron*	*x kosteranum*	102	2
R02.065.00.b	Ericaceae	*Rhododendron*	*catawbience*	102	2
S14.01.00.b	Rosaceae	*Sorbus*	*aucuparia*	102	2
T10.03.00.b	Pinaceae	*Tsuga*	*mertensiana*	102	2
T07.01.00.a	Tiliaceae	*Tilia*	*platyphyllos*	103	1
P32.12.03.a	Rosaceae	*Prunus*	*pendula*	104	2
M01.05.00.a	Magnoliaceae	*Magnolia*	*kobus*	105	1
P32.09.01	Rosaceae	*Prunus*	*x subhirtella*	106	2
N03.01.00.c	Nyssaceae	*Nyssa*	*sylvatica*	107	2
P32.06.02.f	Rosaceae	*Prunus*	*serrulata*	107B	2
A26.01.00.e	Rosaceae	*Amelanchier*	*alnifolia*	108	2
E20.03.00.b	Liliaceae	*Erythronium*	*revolutum*	108	2
L13.01.00.b	Oleaceae	*Ligustrum*	*japonicum*	108	2
L13.02.00	Oleaceae	*Ligustrum*	*vulgare*	108	2
M01.13.02	Magnoliaceae	*Magnolia*	*x soulangiana*	108	1
P19.02.00.a	Ericaceae	*Pieris*	*formosa*	108	2
P19.03.00.a	Ericaceae	*Pieris*	*japonica*	108	2

Accession Number	Family	Genus	Species	Bed Number	Rank
P21.05.00.d	Pinaceae	*Pinus*	*densiflora*	*108*	*3*
P21.05.00.e	Pinaceae	*Pinus*	*densiflora*	*108*	*3*
P21.05.00.f	Pinaceae	*Pinus*	*densiflora*	*108*	*3*
P28.02.02	Dryopteridaceae	*Polystichum*	*setiferum*	108	2
P32.02.00	Rosaceae	*Prunus*	*cerasifera*	108	2
Q01.13.00.b	Fagaceae	*Quercus*	*phillyraeoides*	108	2
R02.000.03.a	Ericaceae	*Rhododendron*	*x*	108	2
R02.031.01b	Ericaceae	*Rhododendron*	*x obtusum*	108	2
R02.034.02	Ericaceae	*Rhododendron*	*ponticum*	108	2
R02.039.00	Ericaceae	*Rhododendron*	*x ponticum*	108	2
R02.041.00	Ericaceae	*Rhododendron*	*smirnowii*	108	1
S32.02.00	Adoxaceae	*Sambucus*	*racemosa*	108	2
V01.01.00	Ericaceae	*Vaccinium*	*corymbosum*	108	2
V02.02.00.c	Berberidaceae	*Vancouveria*	*planipetala*	108	1
V03.06.00.a	Caprifoliaceae	*Viburnum*	*opulus*	108	2
P19.02.00.b	Ericaceae	*Pieris*	*formosa*	109	2
P21.05.00.g	Pinaceae	*Pinus*	*densiflora*	*109*	*3*
P21.05.00.h	Pinaceae	*Pinus*	*densiflora*	*109*	*3*
P21.05.00.i	Pinaceae	*Pinus*	*densiflora*	*109*	*3*
R02.000.19	Ericaceae	*Rhododendron*	*x*	109	2
R02.000.20	Ericaceae	*Rhododendron*	*x*	109	2
R02.012.00.c	Ericaceae	*Rhododendron*	*decorum*	109	2
S10.01.00.d	Rutaceae	*Skimmia*	*japonica*	109	2
T04.01.00	Pentaphylaceae	*Ternstroemia*	*gymnanthera*	109	2
A03.02.00.b	Sapindaceae	*Acer*	*circinatum*	110	2
A03.16.00.c	Sapindaceae	*Acer*	*capillipes*	110	2
A09.00.00	Amaryllidaceae	*Allium*	*x*	110	2
A15.02.00.k	Ericaceae	*Arbutus*	*unedo*	110	2
A21.01.00.c	Dryopteridaceae	*Athryrium*	*filix-femina*	110	2
B02.01.00.i	Saxifragaceae	*Bergenia*	*cordifolia*	110	2
C04.01.00.e	Calycanthaceae	*Calycanthus*	*occidentalis*	110	2
C07.02.03	Theaceae	*Camellia*	*japonica*	110	2
C13.00.00.a	Rhamnaceae	*Ceanothus*	*x*	110	2
H18.00.00	Asparagaceae	*Hosta*	*x*	110	2
H14.01.00f	Hydrangeaceae	*Hydrangea*	*macrophylla*	110	2
K02.01.02	Rosaceae	*Kerria*	*japonica*	110	2
L19.04.00	Fagaceae	*Lithocarpus*	*henryi*	110	2
O03.02.00.b	Oleaceae	*Osmanthus*	*delavayi*	110	2
P19.03.00.b	Ericaceae	*Pieris*	*japonica*	110	2
P32.08.00.b	Rosaceae	*Prunus*	*lusitanica*	110	2
R02.059.00.b	Ericaceae	*Rhododendron*	*maddenii*	110	2
S20.00.00.a	Styracaceae	*Styrax*	*japonicus*	110	2
S21.01.00	Caprifoliaceae	*Symphoricarpos*	*albus*	110	2
V03.03.00.c	Caprifoliaceae	*Viburnum*	*davidii*	110	2
C26.01.00.l	Rutaceae	*Choisya*	*ternata*	111	1
C53.01.00	Anacardiaceae	*Cotinus*	*coggygria*	111	2
E02.01.00.b	Proteaceae	*Embothrium*	*coccineum*	111	2
H15.00.00	Clusiaceae	*Hypericum*	*x*	111	2
M01.16.00.b	Magnoliaceae	*Magnolia*	*tripetala*	111	2
M01.22.00	Magnoliaceae	*Magnolia*	*sapaensis*	111	2
M04.00.02	Rosaceae	*Malus*	*domestica*	111	2
O02.01.01.d	Liliaceae	*Ophiopogon*	*planiscapus*	111	2

Accession Number	Family	Genus	Species	Bed Number	Rank
P32.06.05.a	Rosaceae	*Prunus*	*serrulata*	111	2
P32.06.08.b	Rosaceae	*Prunus*	*serrulata*	111	2
R02.000.21a	Ericaceae	*Rhododendron*	*x*	111	2
R02.000.21j	Ericaceae	*Rhododendron*	*x*	111	2
R02.000.21o	Ericaceae	*Rhododendron*	*x*	111	2
R02.003.00.c	Ericaceae	*Rhododendron*	*arboreum*	111	2
R08.00.00	Rosaceae	*Rosa*	*x*	111	2
S33.01.00	Poaceae	*Stipa*	*tenuissima*	111	2
S20.00.00.b	Styracaceae	*Styrax*	*japonicus*	111	1
A15.02.00.c	Ericaceae	*Arbutus*	*unedo*	112	2
C01.01.00.a	Verbenaceae	*Callicarpa*	*mollis*	112	2
C07.02.00.e	Theaceae	*Camellia*	*japonica*	112	2
C07.04.01	Theaceae	*Camellia*	*sasanqua*	112	2
C36.03.00.c	Cornaceae	*Cornus*	*mas*	112	2
L08.01.00.b	Ericaceae	*Leucothoe*	*davisiae*	112	2
L08.02.00b	Ericaceae	*Leucothoe*	*fontanesiana*	112	2
M01.07.00	Magnoliaceae	*Magnolia*	*liliflora*	112	1
M04.03.01.a	Rosaceae	*Malus*	*halliana*	112	2
P19.01.00.c	Ericaceae	*Pieris*	*floribunda*	112	2
P32.06.06.b	Rosaceae	*Prunus*	*serrulata*	112	2
P32.10.00.a	Rosaceae	*Prunus*	*x yedoensis*	112	1
P32.10.01.a	Rosaceae	*Prunus*	*x yedoensis*	112	1
P32.12.03.a	Rosaceae	*Prunus*	*pendula*	112	2
P32.12.03.b	Rosaceae	*Prunus*	*pendula*	112	2
Q01.12.00.b	Fagaceae	*Quercus*	*palustris*	112	2
Q01.20.00.b	Fagaceae	*Quercus*	*wislizenii*	112	1
R02.000.21q	Ericaceae	*Rhododendron*	*x*	112	2
R02.005.00.d	Ericaceae	*Rhododendron*	*augustinii*	112	1
R02.018.00.a	Ericaceae	*Rhododendron*	*x gandavense*	112	2
R02.024.00.i	Ericaceae	*Rhododendron*	*x kosteranum*	112	2
R02.024.00.j	Ericaceae	*Rhododendron*	*x kosteranum*	112	2
V03.08.00.a	Caprifoliaceae	*Viburnum*	*rhytidophllum*	112	2
V03.08.00.b	Caprifoliaceae	*Viburnum*	*rhytidophllum*	112	2
A21.01.00.a	Dryopteridaceae	*Athryrium*	*filix-femina*	113	2
B01.04.00.b	Berberidaceae	*Berberis*	*x stenophylla*	113	2
B02.01.00g	Saxifragaceae	*Bergenia*	*cordifolia*	113	2
C25.01.00	Oleaceae	*Chionanthus*	*virginicus*	113	1
C36.01.00.a	Cornaceae	*Cornus*	*florida*	113	1
C36.03.00.b	Cornaceae	*Cornus*	*mas*	113	2
D17.00.00	Caryophyllaceae	*Dianthus*	*x*	113	2
F15.01.00.b	Hamamelidaceae	*Fothergilla*	*gardenii*	113	2
G09.00.02	Rosaceae	*Geum*	*x*	113	2
H06.05.01.b	Ranunculaceae	*Helleborus*	*x hybridus*	113	2
P56.01.01	Pinaceae	*Picea*	*glauca*	113	2
P28.02.00b	Dryopteridaceae	*Polystichum*	*setiferum*	113	2
R02.000.21n	Ericaceae	*Rhododendron*	*x*	113	2
R02.005.00.e	Ericaceae	*Rhododendron*	*augustinii*	113	2
R02.040.00.a	Ericaceae	*Rhododendron*	*schlippenbachii*	113	2
R02.046.00.f	Ericaceae	*Rhododendron*	*yunnanense*	113	2
R02.062.00.a	Ericaceae	*Rhododendron*	*micranthum*	113	2
W02.01.00a	Polypodiaceae	*Woodwardia*	*fimbriata*	113	2
Z02.01.00	Onagraceae	*Zauschneria*	*californica*	113	2

Accession Number	Family	Genus	Species	Bed Number	Rank
B03.02.00.a	Betulaceae	*Betula*	*pubescens*	*113A*	*3*
A03.16.00.a	Sapindaceae	*Acer*	*capillipes*	114	2
A03.17.00	Sapindaceae	*Acer*	*sieboldianum*	114	2
C07.02.01.b	Theaceae	*Camellia*	*japonica*	114	2
C38.02.00	Hamamelidaceae	*Corylopsis*	*pauciflora*	114	2
G02.04.01	Garryaceae	*Garrya*	*issaquahensis*	114	2
I06.00.00	Amaryllidaceae	*Ipheion*	*x*	114	2
L19.03.01	Fagaceae	*Notholithocarpus*	*densiflorus*	114	2
O02.02.00	Liliaceae	*Ophiopogon*	*japonicus*	114	2
P02.02.01.b	Paeoniaceae	*Paeonia*	*lutea*	114	2
P32.10.00.d	Rosaceae	*Prunus*	*x yedoensis*	114	2
R02.000.21k	Ericaceae	*Rhododendron*	*x*	114	2
R02.030.00.a	Ericaceae	*Rhododendron*	*mucronulatum*	114	2
R02.038.00.d	Ericaceae	*Rhododendron*	*racemosum*	114	2
R02.074.00	Ericaceae	*Rhododendron*	*periclymenoides*	114	2
R02.100.00.b	Ericaceae	*Rhododendron*	*macrophyllum x occidentale*	114	2
R02.103.00	Ericaceae	*Rhododendron*	*species nova*	114	2
A03.03.01.d	Sapindaceae	*Acer*	*davidii*	115	2
A13.02.00.b	Araliaceae	*Aralia*	*elata*	115	2
C14.02.00.c	Pinaceae	*Cedrus*	*deodara*	115	1
M04.03.01.b	Rosaceae	*Malus*	*halliana*	115	1
A28.02.00	Pteridaceae	*Adiantum*	*shastense*	116	2
B03.01.00.b	Betulaceae	*Betula*	*nana*	116	2
C13.04.02	Rhamnaceae	*Ceanothus*	*thyrsiflorus*	116	2
C26.02.01	Rutaceae	*Choisya*	*arizonica*	116	2
C66.00.01	Orchidaceae	*Cypripedium*	*x*	116	2
C66.00.02	Orchidaceae	*Cypripedium*	*x*	116	2
C66.00.03	Orchidaceae	*Cypripedium*	*x*	116	2
F13.09.00.b	Liliaceae	*Fritillaria*	*camschatcensis*	116	2
H25.02.01	Helwingiaceae	*Helwingia*	*chinensis*	116	2
H25.02.02	Helwingiaceae	*Helwingia*	*chinensis*	116	2
M01.12.00	Magnoliaceae	*Magnolia*	*sieboldii*	116	2
P19.03.00.c	Ericaceae	*Pieris*	*japonica*	116	1
P21.10.01.a	Pinaceae	*Pinus*	*mugo*	116	2
P21.10.02	Pinaceae	*Pinus*	*mugo*	116	2
P38.01.00b	Polypodiaceae	*Polypodium*	*guttatum*	116	2
P28.02.00.d	Dryopteridaceae	*Polystichum*	*setiferum*	116	2
R02.023.00.c	Ericaceae	*Rhododendron*	*indicum*	116	2
R02.033.00.a	Ericaceae	*Rhododendron*	*rubiginosum*	116	2
S04.01.00.b	Saxifragaceae	*Saxifraga*	*umbosa*	116	2
S38.01.00b	Berberidaceae	*Sinopodophyllum*	*hexandrum*	116	2
V01.05.01	Ericaceae	*Vaccinium*	*nova*	116	2
C07.02.00.k	Theaceae	*Camellia*	*japonica*	117	1
L14.08.00	Liliaceae	*Lilium*	*macklinlae*	117	2
P19.03.00.d	Ericaceae	*Pieris*	*japonica*	117	2
P38.01.00a	Polypodiaceae	*Polypodium*	*guttatum*	117	2
R02.019.00.b	Ericaceae	*Rhododendron*	*liliflorum*	117	2
C13.04.04	Rhamnaceae	*Ceanothus*	*thyrsiflorus*	118	2
C27.01.00.a	Cistaceae	*Cistus*	*creticus*	118	2
H03.04.00.a	Hamamelidaceae	*Hamamelis*	*virginiana*	118	2
H14.01.00.c	Hydrangeaceae	*Hydrangea*	*macrophylla*	118	2

Accession Number	Family	Genus	Species	Bed Number	Rank
H14.01.00.d	Hydrangeaceae	*Hydrangea*	*macrophylla*	118	2
L23.00.00	Fabaceae	*Lupinus*	*latifolius*	118	2
M02.01.00.d	Berberidaceae	*Mahonia*	*aquifolium*	118	2
O01.03.00	Asteraceae	*Olearia*	*macrodonta*	118	2
P06.07.00.b	Plantaginaceae	*Penstemon*	*barrettiae*	118	2
P19.02.00.c	Ericaceae	*Pieris*	*formosa*	118	2
P19.03.00.e	Ericaceae	*Pieris*	*japonica*	118	1
P21.10.00.a	Pinaceae	*Pinus*	*mugo*	118	1
P22.01.00.b	Anacardiaceae	*Pistacia*	*chinensis*	118	2
L02.01.00	Ericaceae	*Rhododendron*	*neoglandulosum*	118	2
T10.03.00.d	Pinaceae	*Tsuga*	*mertensiana*	118	1
T18.01.01.a	Liliaceae	*Tulipa*	*bakeri*	118	2
V03.03.00.b	Caprifoliaceae	*Viburnum*	*davidii*	118	2
A05.02.01.n	Sapindaceae	*Aesculus*	*x carnea*	118A	2
A05.02.01.o	Sapindaceae	*Aesculus*	*x carnea*	118A	2
A05.02.01.p	Sapindaceae	*Aesculus*	*x carnea*	118A	2
A05.02.01.q	Sapindaceae	*Aesculus*	*x carnea*	118A	2
C36.02.00.b	Cornaceae	*Cornus*	*kousa*	118A	2
C46.01.01	Betulaceae	*Corylus*	*heterophylla*	118A	2
C39.05.00.g	Rosaceae	*Cotoneaster*	*horizontalis*	118A	2
E03.01.00.e	Ericaceae	*Enkianthus*	*campanulatus*	118A	2
E03.03.00	Ericaceae	*Enkianthus*	*chinensis*	118A	2
V03.01.00.b	Caprifoliaceae	*Viburnum*	*x bodnantense*	118A	2
V03.05.00.	Caprifoliaceae	*Viburnum*	*x burkwoodii*	118A	2
A03.03.00.b	Sapindaceae	*Acer*	*davidii*	119	2
A03.16.00.b	Sapindaceae	*Acer*	*capillipes*	119	2
B01.00.00	Berberidaceae	*Berberis*	*x*	119	2
D08.01.01.b	Papaveraceae	*Dicentra*	*spectabilis*	119	2
E01.02.00.d	Elaeagnaceae	*Elaeagnus*	*pungens*	119	2
H06.01.00	Ranunculaceae	*Helleborus*	*argutifolius*	119	2
H06.03.00.a	Ranunculaceae	*Helleborus*	*niger*	119	2
H14.01.01.a	Hydrangeaceae	*Hydrangea*	*macrophylla*	119	2
I01.03.01.a	Aquifoliaceae	*Ilex*	*crenata*	119	2
I01.05.00.a	Aquifoliaceae	*Ilex*	*pedunculosa*	119	2
M01.15.00.a	Magnoliaceae	*Magnolia*	*stellata*	119	2
M01.16.00.a	Magnoliaceae	*Magnolia*	*tripetala*	119	2
M02.06.00	Berberidaceae	*Mahonia*	*nervosa*	119	2
M02.06.00.b	Berberidaceae	*Mahonia*	*nervosa*	119	2
O03.03.00	Oleaceae	*Osmanthus*	*heterophyllus*	119	2
O03.04.00.b	Oleaceae	*Osmanthus*	*x burkwoodii*	119	2
P10.01.00.a	Ericaceae	*Pernettya*	*mucronata*	119	2
P16.01.00.b	Rosaceae	*Photinia*	*x fraseri*	119	2
P19.03.00.f	Ericaceae	*Pieris*	*japonica*	119	2
R02.031.00	Ericaceae	*Rhododendron*	*x obtusum*	119	2
R02.031.01a	Ericaceae	*Rhododendron*	*x obtusum*	119	2
R02.031.02	Ericaceae	*Rhododendron*	*x obtusum*	119	2
S15.01.00.c	Fabaceae	*Spartium*	*junceum*	119	2
T10.03.00.c	Pinaceae	*Tsuga*	*mertensiana*	119	1
V02.01.00.a	Berberidaceae	*Vancouveria*	*hexandra*	119	2
A03.11.01	Sapindaceae	*Acer*	*palmatum*	120	1
A03.11.03	Sapindaceae	*Acer*	*palmatum*	120	1
A26.01.00.d	Rosaceae	*Amelanchier*	*alnifolia*	120	2

Accession Number	Family	Genus	Species	Bed Number	Rank
A19.01.00.c	Annonaceae	*Asimina*	*triloba*	120	2
B01.01.00.c	Berberidaceae	*Berberis*	*darwinii*	120	2
B04.01.00.a	Blechnaceae	*Blechnum*	*spicant*	120	2
C22.01.00.b	Ericaceae	*Chamaedaphne*	*calyculata*	120	2
C36.02.00.a	Cornaceae	*Cornus*	*kousa*	120	1
D07.02.00b	Saxifragaceae	*Deutzia*	*x kalmiiflora*	120	2
E20.01.00	Liliaceae	*Erythronium*	*dens-canis*	120	2
F08.00.00	Rosaceae	*Fragaria*	*x*	120	2
G02.01.00.c	Garryaceae	*Garrya*	*elliptica*	120	2
G04.03.00	Fabaceae	*Genista*	*tinctoria*	120	2
H09.01.00	Saxifragaceae	*Heuchera*	*sanguinea*	120	2
H14.01.00.b	Hydrangeaceae	*Hydrangea*	*macrophylla*	120	2
I03.02.00.c	Iridaceae	*Iris*	*douglasiana*	120	2
I03.02.00.g	Iridaceae	*Iris*	*douglasiana*	120	2
K01.01.00	Ericaceae	*Kalmia*	*angustifolia*	120	2
L06.01.00.a	Myrtaceae	*Letpospermum*	*lanigerum*	120	2
M01.01.00.c	Magnoliaceae	*Magnolia*	*obovata*	120	2
M02.07.00.b	Berberidaceae	*Mahonia*	*pumila*	120	2
M14.01.01	Saxifragaceae	*Mukdenia*	*rossii*	120	2
M06.01.00.b	Myricaceae	*Myrica*	*californica*	120	2
P14.01.00	Lamiaceae	*Phlomis*	*fruticosa*	120	2
P16.04.00.b	Rosaceae	*Photinia*	*davidiana*	120	2
P19.01.00.e	Ericaceae	*Pieris*	*floribunda*	120	2
P19.03.02	Ericaceae	*Pieris*	*japonica*	120	2
P21.10.00.b	Pinaceae	*Pinus*	*mugo*	120	2
P21.14.01.a	Pinaceae	*Pinus*	*parviflora*	120	2
P32.06.05.c	Rosaceae	*Prunus*	*serrulata*	120	2
Q01.03.00.c	Fagaceae	*Quercus*	*cerris*	120	2
Q01.08.00.c	Fagaceae	*Quercus*	*ilex*	120	2
R02.011.00.b	Ericaceae	*Rhododendron*	*davidsonianum*	120	2
R02.032.00.b	Ericaceae	*Rhododendron*	*occidentale*	120	2
R02.038.00.b	Ericaceae	*Rhododendron*	*racemosum*	120	2
R02.054.00	Ericaceae	*Rhododendron*	*macrophyllum*	120	2
R02.064.01.b	Ericaceae	*Rhododendron*	*oreodoxa*	120	2
R02.099.02	Ericaceae	*Rhododendron*	*nitidulum*	120	2
R08.01.00	Rosaceae	*Rosa*	*moyesii*	120	2
S14.01.00.d	Rosaceae	*Sorbus*	*aucuparia*	120	2
T19.01.00	Cephalotaxaceae	*Torreya*	*californica*	120	2
T08.01.00.e	Arecaceae	*Trachycarpus*	*fortunei*	120	2
V01.02.00.c	Ericaceae	*Vaccinium*	*ovatum*	120	2
A03.03.01.b	Sapindaceae	*Acer*	*davidii*	121	2
C07.02.00.g	Theaceae	*Camellia*	*japonica*	121	2
C07.02.00.h	Theaceae	*Camellia*	*japonica*	121	2
C21.03.00.a	*Cupressaceae*	*Chamaecyparis*	*pisifera*	*121*	*3*
C21.03.00.b	*Cupressaceae*	*Chamaecyparis*	*pisifera*	*121*	*3*
C21.03.01.a	*Cupressaceae*	*Chamaecyparis*	*pisifera*	*121*	*3*
M01.01.00.b	Magnoliaceae	*Magnolia*	*obovata*	121	2
M08.01.00.a	Asparagaceae	*Maianthemum*	*bifolium*	121	2
M04.07.01.a	Rosaceae	*Malus*	*baccata*	121	1
R02.000.21d	Ericaceae	*Rhododendron*	*x*	121	2
R02.015.01.b	Ericaceae	*Rhododendron*	*x caucasicum*	121	2
S10.01.00.e	Rutaceae	*Skimmia*	*japonica*	121	2

Accession Number	Family	Genus	Species	Bed Number	Rank
S14.05.00	Rosaceae	*Sorbus*	*rehderiana*	121	2
C07.02.00.i	Theaceae	*Camellia*	*japonica*	122	2
C07.02.00.j	Theaceae	*Camellia*	*japonica*	122	2
C21.03.00.c	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C21.03.00.d	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C21.03.00.d	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C21.03.00.e	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C21.03.00.e	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C21.03.00.f	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C21.03.01.b	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C21.03.01.c	Cupressaceae	*Chamaecyparis*	*pisifera*	122	2
C34.01.00	Liliaceae	*Convallaria*	*majalis*	122	2
G05.01.00.a	Ginkoaceae	*Ginkgo*	*biloba*	122	1
H03.02.00.b	Hamamelidaceae	*Hamamelis*	*mollis*	122	2
K04.01.00.b	Sapindaceae	*Koelreuteria*	*paniculata*	122	1
M08.01.00.b	Asparagaceae	*Maianthemum*	*bifolium*	122	2
P05.01.01.b	Paulawiacea	*Paulownia*	*tomentosa*	122	2
P19.01.00.f	Ericaceae	*Pieris*	*floribunda*	122	2
P19.03.00.g	Ericaceae	*Pieris*	*japonica*	122	2
Q01.21.00.a	Fagaceae	*Quercus*	*prinus*	122	2
R02.000.09.b	Ericaceae	*Rhododendron*	*x*	122	1
R02.012.00.a	Ericaceae	*Rhododendron*	*decorum*	122	2
R02.034.00	Ericaceae	*Rhododendron*	*ponticum*	122	2
R02.069.00	Ericaceae	*Rhododendron*	*x arbutifolium*	122	2
R02.081.00b	Ericaceae	*Rhododendron*	*canadense*	122	2
R02.081.00c	Ericaceae	*Rhododendron*	*canadense*	122	2
R02.081.00d	Ericaceae	*Rhododendron*	*canadense*	122	2
R02.089.00b	Ericaceae	*Rhododendron*	*calophytum*	122	2
R02.089.00c	Ericaceae	*Rhododendron*	*calophytum*	122	2
R02.108.00	Ericaceae	*Rhododendron*	*kesangiae*	122	2
R02.109.00	Ericaceae	*Rhododendron*	*fulvum*	122	2
R02.112.00	Ericaceae	*Rhododendron*	*suoilenhense*	122	2
S31.01.00	Hydrangeaceae	*Schizophragma*	*corylieum*	122	2
S31.02.00	Hydrangeaceae	*Schizophragma*	*integrifolia*	122	2
S07.01.00.a	Taxodiaceae	*Sequoia*	*sempervirens*	122	2
S10.01.00.f	Rutaceae	*Skimmia*	*japonica*	122	2
T06.01.00.a	*Cupressaceae*	*Thuja*	*plicata*	*122*	*3*
T06.01.00.b	*Cupressaceae*	*Thuja*	*plicata*	*123*	*3*
F16.01.00	Cupressaceae	*Fokienia*	*hodgsinii*	124	2
A03.13.00.b	*Sapindaceae*	*Acer*	*platanoides*	*125*	*3*
A05.01.00.a	Sapindaceae	*Aesculus*	*californica*	126	1
A05.01.00.b	Sapindaceae	*Aesculus*	*californica*	126	1
A03.14.00	*Sapindaceae*	*Acer*	*pseudoplatanus*	*127*	*3*
H15.02.00	Clusiaceae	*Hypericum*	*subsessil*	128	2
H15.04.00.c	Clusiaceae	*Hypericum*	*patulum*	128	2
H15.07.00	Clusiaceae	*Hypericum*	*lancasteri*	128	2
H15.08.00	Clusiaceae	*Hypericum*	*pseudohenryi*	128	2
H15.10.00	Clusiaceae	*Hypericum*	*bellum*	128	2
T08.01.00.j	Arecaceae	*Trachycarpus*	*fortunei*	128	1
T08.01.00.k	Arecaceae	*Trachycarpus*	*fortunei*	128	1
T08.01.00.l	Arecaceae	*Trachycarpus*	*fortunei*	128	1
T08.01.00.m	Arecaceae	*Trachycarpus*	*fortunei*	128	1

Accession Number	Family	Genus	Species	Bed Number	Rank
T08.01.00.n	Arecaceae	*Trachycarpus*	*fortunei*	128	1
A03.13.00.a	*Sapindaceae*	*Acer*	*platanoides*	*129*	*3*
A51.01.00	Berberidaceae	*Achlys*	*triphylla*	201	2
A40.02.01.a	Ranunculaceae	*Actaea*	*simplex*	201	2
A30.01.01	Lamiaceae	*Ajuga*	*reptans*	201	2
A30.01.02	Lamiaceae	*Ajuga*	*reptans*	201	2
A30.01.03	Lamiaceae	*Ajuga*	*reptans*	201	2
A09.04.01	Amaryllidaceae	*Allium*	*stipitatum*	201	2
A29.02.01	Ranunculaceae	*Anemone*	*x hybrida*	201	2
A29.04.01	Ranunculaceae	*Anemone*	*nemorosa*	201	2
A31.01.00.a	Aspleniaceae	*Asplenium*	*scolopendrium*	201	2
B14.01.00.a	Berberidaceae	*Berberidopsis*	*corallina*	201	2
B02.01.01	Saxifragaceae	*Bergenia*	*aff. Purpurascens*	201	2
B03.04.01	Betulaceae	*Betula*	*plettkei*	201	2
C06.00.01	Asparagaceae	*Camassia*	*x*	201	2
C07.05.00	Theaceae	*Camellia*	*sinensis*	201	2
C09.04.01	Cyperaceae	*Carex*	*oshimensis*	201	2
C13.06.01	Rhamnaceae	*Ceanothus*	*pallidus*	201	2
C19.03.00.b	Rosaceae	*Cercocarpus*	*betuloides*	201	2
C24.01.00.e	Calycanthaceae	*Chimonanthus*	*praecox*	201	2
C27.00.01.	Cistaceae	*Cistus*	*x*	201	2
C27.06.00.c	Cistaceae	*Cistus*	*ladanifer*	201	2
C32.02.00.a	Clethraceae	*Clethra*	*alnifolia*	201	1
C34.01.01	Asparagaceae	*Convallaria*	*majalis*	201	2
C34.01.02	Asparagaceae	*Convallaria*	*majalis*	201	2
C36.01.00.b	Cornaceae	*Cornus*	*florida*	201	2
C39.05.00.c	Rosaceae	*Cotoneaster*	*horizontalis*	201	2
C39.07.00	Rosaceae	*Cotoneaster*	*integrifolius*	201	2
C69.01.01	Cupressaceae	*Cupressus*	*macrocarpa*	201	2
C69.01.01.a	Cupressaceae	*Cupressus*	*macrocarpa*	201	2
C69.01.01.b	Cupressaceae	*Cupressus*	*macrocarpa*	201	2
C50.01.00.a	Dryopteridaceae	*Cyrtomium*	*macrophyllum*	201	2
D04.02.00.a	Nyssaceae	*Davidia*	*involucrata*	201	2
D07.02.00a	Saxifragaceae	*Deutzia*	*x kalmiiflora*	201	2
D07.03.01	Saxifragaceae	*Deutzia*	*gracilis*	201	2
D23.01.01	Colchicaceae	*Disporum*	*cantoniense*	201	2
D12.02.01.a	Dryopteridaceae	*Dryopteris*	*filix-mas*	201	2
E16.01.00.b	Thymelaeaceae	*Edgeworthia*	*chysantha*	201	2
E07.01.00.b	Escalloniacea	*Escallonia*	*rubra*	201	2
E10.02.00.b	Cunoniaceae	*Eucryphia*	*x intermedia*	201	2
F07.01.00.	Oleaceae	*Forsythia*	*suspensa*	201	2
F10.01.00.b	Oleaceae	*Fraxinus*	*ornus*	201	2
G01.01.00.b	Amaryllidaceae	*Galanthus*	*nivalis*	201	2
G10.00.00	Rubiaceae	*Galium*	*odoratum*	201	1
G02.01.00.d	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.e	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.f	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.g	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.h	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.i	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.j	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.k	Garryaceae	*Garrya*	*elliptica*	201	1

Accession Number	Family	Genus	Species	Bed Number	Rank
G02.01.00.l	Garryaceae	*Garrya*	*elliptica*	201	1
G02.01.00.m	Garryaceae	*Garrya*	*elliptica*	201	1
G03.02.01	Ericaceae	*Gaultheria*	*procumbems*	201	2
G04.02.00.b	Fabaceae	*Genista*	*pilosa*	201	2
H06.05.01.a	Ranunculaceae	*Helleborus*	*x hybridus*	201	2
H06.05.02	Ranunculaceae	*Helleborus*	*x hybridus*	201	2
H06.05.03	Ranunculaceae	*Helleborus*	*x hybridus*	201	2
H09.02.02.a	Saxifragaceae	*Heuchera*	*micrantha*	201	2
H09.02.03.a	Saxifragaceae	*Heuchera*	*micrantha*	201	2
H20.01.00.b	Fabaceae	*Hippocrepis*	*emerus*	201	2
H14.01.01.c	Hydrangeaceae	*Hydrangea*	*macrophylla*	201	2
H14.01.01.d	Hydrangeaceae	*Hydrangea*	*macrophylla*	201	2
H14.03.00.b	Hydrangeaceae	*Hydrangea*	*quercifolia*	201	2
I01.01.00.a	Aquifoliaceae	*Ilex*	*aquifolium*	201	2
I02.01.00	Schisandraceae	*Illicium*	*anisatum*	201	2
I03.03.00	Iridaceae	*Iris*	*foetidissima*	201	2
I03.07.01	Iridaceae	*Iris*	*sibirica*	201	2
I03.09.01	Iridaceae	*Iris*	*germanica*	201	2
I03.10.01.a	Iridaceae	*Iris*	*hollandica*	201	2
I03.10.02.a	Iridaceae	*Iris*	*hollandica*	201	2
K05.01.00.a	Caprifoliaceae	*Kolkwitzia*	*amabilis*	201	1
L21.03.01	Caprifoliaceae	*Lonicera*	*nitida*	201	2
N02.01.00	Nothofagaceae	*Lophonzonia*	*obliqua*	201	1
L37.00.01	Hamamelidaceae	*Loropetalum*	*x*	201	2
M08.02.00	Asparagaceae	*Maianthemum*	*oleraceum*	201	2
M13.01.00	Lamiaceae	*Mentha*	*requienii*	201	2
M11.01.01.b	Polygonaceae	*Muehlenbeckia*	*x*	201	2
O02.01.01.a	Liliaceae	*Ophiopogon*	*planiscapus*	201	2
O06.01.00	Oxalidaceae	*Oxalis*	*oregana*	201	2
O05.01.00.c	Ericaceae	*Oxydendrum*	*arboreum*	201	2
P02.02.01.c	Paeoniaceae	*Paeonia*	*lutea*	201	2
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	201	2
P13.01.01	Rosaceae	*Physocarpus*	*opuifolius*	201	2
P19.03.01.b	Ericaceae	*Pieris*	*japonica*	201	2
P21.09.00.a	Pinaceae	*Pinus*	*lambertiana*	201	2
P21.20.00.a	Pinaceae	*Pinus*	*wallichiana*	201	1
P25.02.01.b	Campanulaceae	*Platycodon*	*astra*	201	2
P28.03.00.a	Dryopteridaceae	*Polystichum*	*polyblepharum*	201	2
P32.06.04.a	Rosaceae	*Prunus*	*serrulata*	201	2
P32.06.06.d	Rosaceae	*Prunus*	*serrulata*	201	2
P32.10.00.e	Rosaceae	*Prunus*	*x yedoensis*	201	2
P40.02.00	Pinaceae	*Pseudotsuga*	*wilsoniana*	201	2
R02.017.00.b	Ericaceae	*Rhododendron*	*polylepis*	201	2
R02.057.00.a	Ericaceae	*Rhododendron*	*leucaspis*	201	2
R02.057.00.b	Ericaceae	*Rhododendron*	*leucaspis*	201	2
R02.076.01	Ericaceae	*Rhododendron*	*wardii*	201	2
R02.105.00	Ericaceae	*Rhododendron*	*nipponicum*	201	2
R02.106.00	Ericaceae	*Rhododendron*	*dentatum*	201	2
R03.01.00.a	Anacardiaceae	*Rhus*	*typhina*	201	2
R03.03.01	Anacardiaceae	*Rhus*	*aromatica*	201	2
S01.01.00.b	Salicaceae	*Salix*	*purpurea*	201	2
S28.02.01	Lamiaceae	*Salvia*	*greggii*	201	2

Accession Number	Family	Genus	Species	Bed Number	Rank
S07.01.00.b	Taxodiaceae	*Sequoia*	*sempervirens*	201	1
S08.01.00.a	Taxodiaceae	*Sequoiadendron*	*giganteum*	201	1
S08.01.00.b	Taxodiaceae	*Sequoiadendron*	*giganteum*	201	1
S08.01.00.c	Taxodiaceae	*Sequoiadendron*	*giganteum*	201	1
S08.01.00.d	Taxodiaceae	*Sequoiadendron*	*giganteum*	201	1
S08.01.00.e	Taxodiaceae	*Sequoiadendron*	*giganteum*	201	1
S17.01.00	Stachyuraceae	*Stachyurus*	*himalaicus*	201	2
S20.05.01	Styraxaceae	*Stryax*	*officinale*	201	2
S20.01.00.h	Styracaceae	*Styrax*	*japonicus*	201	2
S22.02.00	Oleaceae	*Syringa*	*x laciniata*	201	2
T12.01.00d	Melanthiaceae	*Trillium*	*ovatum*	201	2
V02.02.00	Berberidaceae	*Vancouveria*	*planipetala*	201	2
V02.02.00.b	Berberidaceae	*Vancouveria*	*planipetala*	201	2
V03.08.00.c	Caprifoliaceae	*Viburnum*	*rhytidophllum*	201	2
Y01.03.00.d	Agavaceae	*Yucca*	*gloriosa*	201	2
A22.01.00.a	Cornaceae	*Aucuba*	*japonica*	202	2
C28.01.00.a	Fabaceae	*Cladrastis*	*kentukea*	202	2
C42.01.00.c	Iridaceae	*Crocosmia*	*x crocosmiiflora*	202	2
E01.01.00.c	Elaeagnaceae	*Elaeagnus*	*multiflora*	202	2
F07.01.00.	Oleaceae	*Forsythia*	*suspensa*	202	2
G02.01.00.n	Garryaceae	*Garrya*	*elliptica*	202	2
G02.01.00.o	Garryaceae	*Garrya*	*elliptica*	202	2
G02.01.00.p	Garryaceae	*Garrya*	*elliptica*	202	2
G05.01.00.d	Ginkoaceae	*Ginkgo*	*biloba*	202	2
M05.01.00.c	Taxodiaceae	*Metasequoia*	*glyptostroboides*	202	1
M05.01.00.d	Taxodiaceae	*Metasequoia*	*glyptostroboides*	202	1
M05.01.00.e	Taxodiaceae	*Metasequoia*	*glyptostroboides*	202	1
O03.02.00.a	Oleaceae	*Osmanthus*	*delavayi*	202	2
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	202	2
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	202	2
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	202	2
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	202	2
P21.10.03.a	Pinaceae	*Pinus*	*mugo*	202	2
P40.01.00.b	Pinaceae	*Pseudotsuga*	*menziesii*	202	2
Q01.13.00.c	Fagaceae	*Quercus*	*phillyraeoides*	202	2
Q01.22.00	Fagaceae	*Quercus*	*arizonica*	202	2
R02.000.21e	Ericaceae	*Rhododendron*	*x*	202	2
R02.000.21p	Ericaceae	*Rhododendron*	*x*	202	2
S08.01.00.f	Taxodiaceae	*Sequoiadendron*	*giganteum*	202	2
S08.01.00.g	Taxodiaceae	*Sequoiadendron*	*giganteum*	202	2
T06.02.00.v	Cupressaceae	*Thuja*	*plicata*	202	2
T06.02.00.w	Cupressaceae	*Thuja*	*plicata*	202	2
T06.02.00.x	Cupressaceae	*Thuja*	*plicata*	202	2
A19.01.00.b	Annonaceae	*Asimina*	*triloba*	203	1
B01.02.00.a	Berberidaceae	*Berberis*	*julianae*	203	2
C21.03.01.d	Cupressaceae	*Chamaecyparis*	*pisifera*	203	2
C21.03.01.e	Cupressaceae	*Chamaecyparis*	*pisifera*	203	2
C26.01.00.g	Rutaceae	*Choisya*	*ternata*	203	2
C31.01.00.b	Clethraceae	*Clethra*	*barbinervis*	203	2
D09.03.00	Ebenaceae	*Diospyros*	*lotus*	203	2
F07.01.00.	Oleaceae	*Forsythia*	*suspensa*	203	2
G02.01.00.q	Garryaceae	*Garrya*	*elliptica*	203	1

Accession Number	Family	Genus	Species	Bed Number	Rank
G02.01.00.r	Garryaceae	*Garrya*	*elliptica*	203	1
G02.01.00.s	Garryaceae	*Garrya*	*elliptica*	203	1
G02.01.00.t	Garryaceae	*Garrya*	*elliptica*	203	1
G02.01.00.u	Garryaceae	*Garrya*	*elliptica*	203	1
G02.01.00.v	Garryaceae	*Garrya*	*elliptica*	203	1
G02.01.00.w	Garryaceae	*Garrya*	*elliptica*	203	1
G02.01.00.x	Garryaceae	*Garrya*	*elliptica*	203	1
L16.01.00.a	Hamamelidaceae	*Liquidambar*	*styraciflua*	203	2
M02.04.00	Berberidaceae	*Mahonia*	*japonica*	203	2
O04.01.00.g	Rosaceae	*Oemleria*	*cerasiformis*	203	2
O03.05.00.b	Oleaceae	*Osmanthus*	*decorus*	203	2
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	203	2
P12.01.00.b	Hydrangeaceae	*Philadelphus*	*lewisii*	203	2
P12.01.00.c	Hydrangeaceae	*Philadelphus*	*lewisii*	203	2
P40.01.00.c	Pinaceae	*Pseudotsuga*	*menziesii*	203	2
R02.066.00	Ericaceae	*Rhododendron*	*mollicomum*	203	2
S07.01.00.c	Taxodiaceae	*Sequoia*	*sempervirens*	203	1
S08.01.00.h	Taxodiaceae	*Sequoiadendron*	*giganteum*	203	1
S08.01.00.i	Taxodiaceae	*Sequoiadendron*	*giganteum*	203	1
S08.01.00.j	Taxodiaceae	*Sequoiadendron*	*giganteum*	203	1
S08.01.00.k	Taxodiaceae	*Sequoiadendron*	*giganteum*	203	1
S08.01.00.l	Taxodiaceae	*Sequoiadendron*	*giganteum*	203	1
S08.01.00.m	Taxodiaceae	*Sequoiadendron*	*giganteum*	203	1
S08.01.00.n	Taxodiaceae	*Sequoiadendron*	*giganteum*	203	1
S18.01.00.a	Lardizabalaceae	*Stauntonia*	*hexaphylla*	203	2
T11.01.00.a	Taxaceae	*Taxus*	*baccata*	203	2
T06.02.00.n	Cupressaceae	*Thuja*	*plicata*	203	2
T06.02.00.o	Cupressaceae	*Thuja*	*plicata*	203	2
T06.02.00.p	Cupressaceae	*Thuja*	*plicata*	203	2
T06.02.00.q	Cupressaceae	*Thuja*	*plicata*	203	2
T06.02.00.y	Cupressaceae	*Thuja*	*plicata*	203	2
T08.01.00.d	Arecaceae	*Trachycarpus*	*fortunei*	203	2
T08.01.00.f	Arecaceae	*Trachycarpus*	*fortunei*	203	2
A03.02.00.a	Sapindaceae	*Acer*	*circinatum*	204	2
A05.07.00.c	Sapindaceae	*Aesculus*	*parviflora*	204	2
C07.02.00.	Theaceae	*Camellia*	*japonica*	204	2
C17.01.00.d	Cercidiphyllaceae	*Cercidiphyllum*	*japonicum*	204	2
C26.01.00.h	Rutaceae	*Choisya*	*ternata*	204	2
C46.04.02	Betulaceae	*Corylus*	*avellana*	204	2
C39.05.00.d	Rosaceae	*Cotoneaster*	*horizontalis*	204	2
D12.03.00.a	Dryopteridaceae	*Dryopteris*	*tokyoensis*	204	2
E12.01.00	Celastraceae	*Euonymus*	*alatus*	204	2
G02.01.00.aa	Garryaceae	*Garrya*	*elliptica*	204	2
G02.01.00.bb	Garryaceae	*Garrya*	*elliptica*	204	2
G02.01.00.cc	Garryaceae	*Garrya*	*elliptica*	204	2
G02.01.00.dd	Garryaceae	*Garrya*	*elliptica*	204	2
G02.01.00.ee	Garryaceae	*Garrya*	*elliptica*	204	2
G02.01.00.y	Garryaceae	*Garrya*	*elliptica*	204	2
G02.01.00.z	Garryaceae	*Garrya*	*elliptica*	204	2
H13.01.00.b	Liliaceae	*Hyacinthoides*	*hispanica*	204	2
J01.01.00.a	Oleaceae	*Jasminum*	*humile*	204	2
L31.01.00.a	Amaryllidaceae	*Leucojum*	*aestivum*	204	2

Accession Number	Family	Genus	Species	Bed Number	Rank
P12.01.00.	Hydrangeaceae	*Philadelphus*	*lewisii*	204	2
P19.03.00.h	Ericaceae	*Pieris*	*japonica*	204	2
P32.06.04.b	Rosaceae	*Prunus*	*serrulata*	204	2
P32.06.05.e	Rosaceae	*Prunus*	*serrulata*	204	2
P40.01.00.e	Pinaceae	*Pseudotsuga*	*menziesii*	204	1
R02.039.01.b	Ericaceae	*Rhododendron*	*x ponticum*	204	2
R02.046.00.e	Ericaceae	*Rhododendron*	*yunnanense*	204	2
R02.097.01a	Ericaceae	*Rhododendron*	*falconeri*	204	2
S02.01.01.b	Buxaceae	*Sarcococca*	*hookeriana*	204	2
S02.02.01.c	Buxaceae	*Sarcococca*	*ruscifolia*	204	2
S08.01.00.o	Taxodiaceae	*Sequoiadendron*	*giganteum*	204	1
S08.01.00.p	Taxodiaceae	*Sequoiadendron*	*giganteum*	204	1
S13.01.00	Fabaceae	*Sophora*	*japonica*	204	1
S16.02.01	Rosaceae	*Spirea*	*japonica*	204	2
S44.01.00	Fabaceae	*Styphnolobium*	*japonicum*	204	2
T06.02.00.z	Cupressaceae	*Thuja*	*plicata*	204	2
V03.08.00.d	Caprifoliaceae	*Viburnum*	*rhytidophllum*	204	2
C14.03.01	Pinaceae	*Cedrus*	*libani*	204A	2
P21.06.01.b	Pinaceae	*Pinus*	*cembroides*	204A	2
A02.06.01	Pinaceae	*Abies*	*cephalonica*	205	2
A03.03.01.c	Sapindaceae	*Acer*	*davidii*	205	2
A03.04.00.b	Sapindaceae	*Acer*	*tataricum*	205	2
A06.01.00.b	Lardizabalaceae	*Akebia*	*quinata*	205	2
A26.01.00.a	Rosaceae	*Amelanchier*	*alnifolia*	205	2
A15.02.00.d	Ericaceae	*Arbutus*	*unedo*	205	2
A15.02.00.e	Ericaceae	*Arbutus*	*unedo*	205	2
A15.02.00.f	Ericaceae	*Arbutus*	*unedo*	205	2
A15.02.00.g	Ericaceae	*Arbutus*	*unedo*	205	2
A16.02.00	Ericaceae	*Arctostaphylos*	*x media*	205	2
A16.06.00.a	Ericaceae	*Arctostaphylos*	*uva-ursi*	205	2
A49.00.01	Asteraceae	*Aster*	*x*	205	2
B01.01.00.a	Berberidaceae	*Berberis*	*darwinii*	205	2
B01.02.00.d	Berberidaceae	*Berberis*	*julianae*	205	2
B01.03.00.a	Berberidaceae	*Berberis*	*verruculosa*	205	2
B01.04.00.a	Berberidaceae	*Berberis*	*x stenophylla*	205	2
B07.01.00.b	Apiaceae	*Bupleurum*	*fruticosa*	205	2
C02.01.00a	Myrtaceae	*Callistemon*	*citrinus*	205	2
C02.01.00b	Myrtaceae	*Callistemon*	*citrinus*	205	2
C02.02.00.b	Myrtaceae	*Callistemon*	*pallidus*	205	2
C02.02.00.c	Myrtaceae	*Callistemon*	*pallidus*	205	2
C03.01.00.d	Cupressaceae	*Calocedrus*	*decurrens*	205	2
C04.01.00.d	Calycanthaceae	*Calycanthus*	*occidentalis*	205	2
C13.01.00.b	Rhamnaceae	*Ceanothus*	*arboreus*	205	2
C14.02.01	Pinaceae	*Cedrus*	*deodara*	205	2
C26.01.00.i	Rutaceae	*Choisya*	*ternata*	205	2
C27.02.00	Cistaceae	*Cistus*	*albidus*	205	2
C27.09.00.b	Cistaceae	*Cistus*	*salvifolius*	205	2
C36.02.00.d	Cornaceae	*Cornus*	*kousa*	205	2
C36.02.00.e	Cornaceae	*Cornus*	*kousa*	205	2
C38.03.00.b	Hamamelidaceae	*Corylopsis*	*spicata*	205	2
C38.03.00.c	Hamamelidaceae	*Corylopsis*	*spicata*	205	2
C39.02.00.c	Rosaceae	*Cotoneaster*	*lacteus*	205	2

Accession Number	Family	Genus	Species	Bed Number	Rank
C39.02.00.d	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.e	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.f	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.g	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.h	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.i	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.j	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.k	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.02.00.l	Rosaceae	*Cotoneaster*	*lacteus*	205	2
C39.04.00.a	Rosaceae	*Cotoneaster*	*wardii*	205	2
C39.05.00.h	Rosaceae	*Cotoneaster*	*horizontalis*	205	2
C43.01.01	Cupressaceae	*Cryptomeria*	*japonica*	205	2
D19.00.00	Ranunculaceae	*Delphinium*	*x*	205	2
E12.02.00.a	Celastraceae	*Euonymus*	*europaeus*	205	2
G05.01.02	Ginkoaceae	*Ginko*	*biloba*	205	2
H06.04.00.c	Ranunculaceae	*Helleborus*	*orientalis*	205	2
I01.03.02	Aquifoliaceae	*Ilex*	*crenata*	205	2
J01.01.00.b	Oleaceae	*Jasminum*	*humile*	205	2
L03.01.01	Lythraceae	*Lagerstromemia*	*indica*	205	2
L11.01.00.c	Cupressaceae	*Libocedrus*	*decurrens*	205	1
L19.01.00.b	Fagaceae	*Lithocarpus*	*edulis*	205	2
O03.01.00	Oleaceae	*Osmanthus*	*armantus*	205	2
P44.00.01	Polemoniaceae	*Phlox*	*x*	205	2
P16.01.00.c	Rosaceae	*Photinia*	*x fraseri*	205	2
P16.04.00.a	Rosaceae	*Photinia*	*davidiana*	205	2
P18.01.00.a	Pinaceae	*Picea*	*abies*	205	2
P21.02.01	Pinaceae	*Pinus*	*banksiana*	205	2
P21.03.01	Pinaceae	*Pinus*	*bungeana*	205	2
P21.04.02	Pinaceae	*Pinus*	*contorta*	205	2
P21.14.01.b	Pinaceae	*Pinus*	*parviflora*	205	2
P21.20.00.b	Pinaceae	*Pinus*	*wallichiana*	205	2
P21.22.02	Pinaceae	*Pinus*	*sylvestris*	205	2
P21.31.00	Pinaceae	*Pinus*	*greggii*	205	2
P22.01.00.a	Anacardiaceae	*Pistacia*	*chinensis*	205	1
P32.06.08.d	Rosaceae	*Prunus*	*serrulata*	205	2
P32.06.08.e	Rosaceae	*Prunus*	*serrulata*	205	2
P32.07.01.c	Rosaceae	*Prunus*	*x*	205	2
P32.08.00.c	Rosaceae	*Prunus*	*lusitanica*	205	2
P32.08.00.d	Rosaceae	*Prunus*	*lusitanica*	205	2
P32.12.00	Rosaceae	*Prunus*	*armeniaca*	205	2
P35.01.00.b	Styraxaceae	*Pterostyrax*	*corymbosus*	205	2
P36.01.00.a	Rosaceae	*Pyracantha*	*coccinea*	205	2
Q01.11.00.b	Fagaceae	*Quercus*	*myrsinifolia*	205	2
Q01.19.00.d	Fagaceae	*Quercus*	*vaccinifolia*	205	2
Q01.28.00	Fagaceae	*Quercus*	*durata*	205	2
R02.000.12	Ericaceae	*Rhododendron*	*x*	205	2
R02.039.01.a	Ericaceae	*Rhododendron*	*x ponticum*	205	2
R06.03.00.b	Rosaceae	*Rubus*	*hispidus*	205	2
S02.00.00	Buxaceae	*Sarcococca*	*x*	205	2
S07.01.00.d	Taxodiaceae	*Sequoia*	*sempervirens*	205	2
S41.01.00	Poaceae	*Seseria*	*autumnalis*	205	2
S14.06.00	Rosaceae	*Sorbus*	*hupehensis*	205	2

Accession Number	Family	Genus	Species	Bed Number	Rank
S19.03.00.b	Theaceae	*Stewartia*	*rostrata*	205	2
S33.01.01	Poaceae	*Stipa*	*tenuissima*	205	2
T08.01.00.o	Arecaceae	*Trachycarpus*	*fortunei*	205	2
V03.03.00.a	Caprifoliaceae	*Viburnum*	*davidii*	205	2
V03.09.00.b	Caprifoliaceae	*Viburnum*	*tinus*	205	2
V03.09.00.c	Caprifoliaceae	*Viburnum*	*tinus*	205	2
V03.09.00.d	Caprifoliaceae	*Viburnum*	*tinus*	205	2
O01.02.01.c	Asteraceae	*Olearia*	*x*	205A	2
C21.04.00.c	Cupressaceae	*Chamaecyparis*	*lawsoniana*	205B	2
G02.01.00.ff	Garryaceae	*Garrya*	*elliptica*	206	2
G02.01.00.gg	Garryaceae	*Garrya*	*elliptica*	206	2
H03.04.00.c	Hamamelidaceae	*Hamamelis*	*virginiana*	206	2
M01.05.00	Magnoliaceae	*Magnolia*	*kobus*	206	1
O03.05.00.c	Oleaceae	*Osmanthus*	*decorus*	206	2
P32.06.05.d	Rosaceae	*Prunus*	*serrulata*	206	1
P32.06.06.e	Rosaceae	*Prunus*	*serrulata*	206	2
P32.06.08.f	Rosaceae	*Prunus*	*serrulata*	206	2
R02.095.00	Ericaceae	*Rhododendron*	*sanctum*	206	2
R02.097.01b	Ericaceae	*Rhododendron*	*falconeri*	206	2
S19.02.00.d	Theaceae	*Stewartia*	*pseudocamellia*	206	2
V03.05.00.a	Caprifoliaceae	*Viburnum*	*x burkwoodii*	206	2
C14.02.00.e	Pinaceae	*Cedrus*	*deodara*	207	2
C36.02.00.c	Cornaceae	*Cornus*	*kousa*	207	2
G02.01.00.hh	Garryaceae	*Garrya*	*elliptica*	207	2
H14.01.00.a	Hydrangeaceae	*Hydrangea*	*macrophylla*	207	2
L03.01.02	Lythraceae	*Lagerstromemia*	*indica*	207	2
P19.01.00.g	Ericaceae	*Pieris*	*floribunda*	207	2
P19.03.00.i	Ericaceae	*Pieris*	*japonica*	207	2
P32.06.06.c	Rosaceae	*Prunus*	*serrulata*	207	2
P32.06.08.a	Rosaceae	*Prunus*	*serrulata*	207	2
R02.110.00	Ericaceae	*Rhododendron*	*pachysanthum*	207	2
R02.111.00	Ericaceae	*Rhododendron*	*souliei*	207	2
A01.01.00.d	Acanthaceae	*Acanthus*	*mollis*	208	2
A03.18.00	Sapindaceae	*Acer*	*carpinifolium*	208	2
A15.02.00.h	Ericaceae	*Arbutus*	*unedo*	208	2
C07.04.00.e	Theaceae	*Camellia*	*sasanqua*	208	2
C14.02.00.a	Pinaceae	*Cedrus*	*deodara*	208	2
C14.02.00.b	Pinaceae	*Cedrus*	*deodara*	208	2
G02.01.00.ii	Garryaceae	*Garrya*	*elliptica*	208	2
I03.03.00.a	Iridaceae	*Iris*	*foetidissima*	208	2
L13.01.00.a	Oleaceae	*Ligustrum*	*japonicum*	208	2
M04.00.01	Rosaceae	*Malus*	*x*	208	2
P16.03.00	Rosaceae	*Photinia*	*villosa*	208	2
P21.12.00.a	Pinaceae	*Pinus*	*nigra*	208	2
Q01.04.00.b	Fagaceae	*Quercus*	*chrysolepsis*	208	2
R02.008.00.b	Ericaceae	*Rhododendron*	*orbiculare*	208	2
T08.01.00.c	Arecaceae	*Trachycarpus*	*fortunei*	208	2
C21.04.00.d	Cupressaceae	*Chamaecyparis*	*lawsoniana*	208A	2
A05.06.00	Sapindaceae	*Aesculus*	*pavia*	209	2
B01.01.00.b	Berberidaceae	*Berberis*	*darwinii*	209	2
C26.01.00.k	Rutaceae	*Choisya*	*ternata*	209	2
I03.03.00.b	Iridaceae	*Iris*	*foetidissima*	209	2

Accession Number	Family	Genus	Species	Bed Number	Rank
P32.06.06.f	Rosaceae	*Prunus*	*serrulata*	209	2
R02.000.21l	Ericaceae	*Rhododendron*	*x*	209	2
R02.000.21m	Ericaceae	*Rhododendron*	*x*	209	2
R02.007.01	Ericaceae	*Rhododendron*	*x griffithianum*	209	2
R02.012.00.e	Ericaceae	*Rhododendron*	*decorum*	209	2
S20.01.00.d	Styracaceae	*Styrax*	*japonicus*	209	2
T11.01.00.b	Taxaceae	*Taxus*	*baccata*	209	2
V03.11.00	Caprifoliaceae	*Viburnum*	*odoratissimum*	209	2
A01.01.00.c	Acanthaceae	*Acanthus*	*mollis*	210	2
A13.01.00.d	Araliaceae	*Aralia*	*californica*	210	2
B01.02.00.b	Berberidaceae	*Berberis*	*julianae*	210	2
B04.01.00.e	Blechnaceae	*Blechnum*	*spicant*	210	2
G02.01.00.jj	Garryaceae	*Garrya*	*elliptica*	210	2
M04.02.00.a	Rosaceae	*Malus*	*floribunda*	210	2
P16.02.00.b	Rosaceae	*Photinia*	*serratifolia*	210	2
P48.01.01	Scrophulariaceae	*Phygelius*	*x rectus*	210	2
P36.01.00.b	Rosaceae	*Pyracantha*	*coccinea*	210	2
P36.02.00.c	Rosaceae	*Pyracantha*	*fortuneana*	210	2
Q01.04.00.a	Fagaceae	*Quercus*	*chrysolepsis*	210	2
Q01.18.00.a	Fagaceae	*Quercus*	*suber*	210	2
R02.000.10.a	Ericaceae	*Rhododendron*	*x*	210	2
R02.000.22a	Ericaceae	*Rhododendron*	*x*	210	2
R02.000.24	Ericaceae	*Rhododendron*	*x*	210	2
R02.003.01	Ericaceae	*Rhododendron*	*arboreum*	210	2
R02.079.00	Ericaceae	*Rhododendron*	*metternichii*	210	2
S19.04.00	Theaceae	*Stewartia*	*serrata*	210	2
S20.01.00.e	Styracaceae	*Styrax*	*japonicus*	210	2
V03.06.00.b	Caprifoliaceae	*Viburnum*	*opulus*	210	2
A03.04.00.a	Sapindaceae	*Acer*	*tataricum*	211	2
A03.11.04	Sapindaceae	*Acer*	*palmatum*	211	1
A33.01.01	Brassicaceae	*Arabis*	*caucasica*	211	2
A19.01.00.a	Annonaceae	*Asimina*	*triloba*	211	2
A31.01.00.c	Aspleniaceae	*Asplenium*	*scolopendrium*	211	2
B01.02.00.c	Berberidaceae	*Berberis*	*julianae*	211	2
C73.01.00.a	Cupressaceae	*Callitropsis*	*nootkatensis*	211	1
C73.01.00.c	Cupressaceae	*Callitropsis*	*nootkatensis*	211	1
C73.01.0b0.c	Cupressaceae	*Callitropsis*	*nootkatensis*	211	1
C07.02.00.	Theaceae	*Camellia*	*japonica*	211	2
C17.01.00.b	Cercidiphyllaceae	*Cercidiphyllum*	*japonicum*	211	2
C26.01.00.j	Rutaceae	*Choisya*	*ternata*	211	2
C30.02.00	Verbenaceae	*Clerodendrum*	*trichotmum*	211	2
C50.01.00.c	Dryopteridaceae	*Cyrtomium*	*macrophyllum*	211	2
D12.02.01.c	Dryopteridaceae	*Dryopteris*	*filix-mas*	211	2
E11.02.01	Berberidaceae	*Epimedium*	*× youngianum*	211	2
E11.03.01	Berberidaceae	*Epimedium*	*x versicolor*	211	2
F15.01.00.a	Hamamelidaceae	*Fothergilla*	*gardenii*	211	2
F15.01.01	Hamamelidaceae	*Fothergilla*	*gardenii*	211	2
H06.01.02	Ranunculaceae	*Helleborus*	*argutifolius*	211	2
H06.02.00	Ranunculaceae	*Helleborus*	*x sternii*	211	2
H09.02.03.b	Saxifragaceae	*Heuchera*	*micrantha*	211	2
H18.00.02	Asparagaceae	*Hosta*	*x*	211	2
H18.01.01	Asparagaceae	*Hosta*	*fortunei*	211	2

Accession Number	Family	Genus	Species	Bed Number	Rank
H14.03.00.a	Hydrangeaceae	*Hydrangea*	*quercifolia*	211	2
N04.05.00	Amaryllidaceae	*Narcissus*	*x*	211	2
O03.04.00.a	Oleaceae	*Osmanthus*	*x burkwoodii*	211	2
P09.01.00	Fabaceae	*Petteria*	*ramentacea*	211	1
P19.03.00.j	Ericaceae	*Pieris*	*japonica*	211	2
P11.00.00	Pinaceae	*Pinus*	*montezumae*	211	2
P28.03.00.b	Dryopteridaceae	*Polystichum*	*polyblepharum*	211	2
P39.03.00.b	Primuaceae	*Primula*	*elatior*	211	2
Q01.11.00.c	Fagaceae	*Quercus*	*myrsinifolia*	211	2
R01.01.01	Rosaceae	*Raphiolepis*	*indica*	211	2
R02.000.10.b	Ericaceae	*Rhododendron*	*x*	211	2
R02.000.22b	Ericaceae	*Rhododendron*	*x*	211	2
R02.005.00.c	Ericaceae	*Rhododendron*	*augustinii*	211	2
R02.026.00.	Ericaceae	*Rhododendron*	*minus*	211	2
R02.046.00.a	Ericaceae	*Rhododendron*	*yunnanense*	211	2
R02.100.00.a	Ericaceae	*Rhododendron*	*macrophyllum x occidentale*	211	1
S19.01.00.a	Theaceae	*Stewartia*	*monadelpha*	211	2
S19.02.00.b	Theaceae	*Stewartia*	*pseudocamellia*	211	2
S19.03.00.a	Theaceae	*Stewartia*	*rostrata*	211	2
S20.02.00.b	Styracaceae	*Styrax*	*obassia*	211	1
U01.01.00.b	Lauraceae	*Umbellularia*	*californica*	211	1
V04.01.01	Apocynaceae	*Vinca*	*minor*	211	2
A05.03.00	Sapindaceae	*Aesculus*	*hippocastanum*	212	2
I03.02.00.f	Iridaceae	*Iris*	*douglasiana*	212	2
M04.07.01.c	Rosaceae	*Malus*	*baccata*	212	2
M05.01.00.f	Taxodiaceae	*Metasequoia*	*glyptostroboides*	212	1
M05.01.00.g	Taxodiaceae	*Metasequoia*	*glyptostroboides*	212	1
N03.01.00.d	Nyssaceae	*Nyssa*	*sylvatica*	212	1
N03.01.00.e	Nyssaceae	*Nyssa*	*sylvatica*	212	1
T01.01.00.a	Taxodiaceae	*Taxodium*	*distichum*	212	1
T01.01.00.b	Taxodiaceae	*Taxodium*	*distichum*	212	1
T01.01.00.c	Taxodiaceae	*Taxodium*	*distichum*	212	1
D20.01.00.a	Saxifragaceae	*Darmera*	*peltata*	213	
L16.01.00.b	Hamamelidaceae	*Liquidambar*	*styraciflua*	213	1
L17.01.00	Magnoliaceae	*Liriodendron*	*tulipifera*	213	1
M06.01.00.d	Myricaceae	*Myrica*	*californica*	213	1
N03.01.00.a	Nyssaceae	*Nyssa*	*sylvatica*	213	1
N03.01.00.f	Nyssaceae	*Nyssa*	*sylvatica*	213	1
N03.01.00.g	Nyssaceae	*Nyssa*	*sylvatica*	213	1
N03.01.00.h	Nyssaceae	*Nyssa*	*sylvatica*	213	1
T01.01.00.d	Taxodiaceae	*Taxodium*	*distichum*	213	1
T01.01.00.e	Taxodiaceae	*Taxodium*	*distichum*	213	1
C16.02.00.a	Plumbaginaceae	*Ceratostigma*	*willmottianum*	214	2
D05.01.00.d	Lardizabalaceae	*Decaisnea*	*fargesii*	214	2
P21.10.01.b	Pinaceae	*Pinus*	*mugo*	214	2
P35.01.00.a	Styraxaceae	*Pterostyrax*	*corymbosus*	214	1
R02.119.00a	Ericaceae	*Rhododendron*	*cinnabarinum*	214	2
A01.01.00.b	Acanthaceae	*Acanthus*	*mollis*	214A	2
A03.11.02.a	Sapindaceae	*Acer*	*palmatum*	214A	2
C13.02.00	Rhamnaceae	*Ceanothus*	*griseus*	214A	2
C17.01.00.c	Cercidiphyllaceae	*Cercidiphyllum*	*japonicum*	214A	2

Accession Number	Family	Genus	Species	Bed Number	Rank
D03.03.00.b	Thymelaeaceae	*Daphne*	*mezereum*	214A	2
E12.02.00.c	Celastraceae	*Euonymus*	*europaeus*	214A	2
F08.01.01	Rosaceae	*Fragaria*	*x ananassa*	214A	2
H04.07.00.b	Plantagianceae	*Hebe*	*brachysiphon*	214A	2
H07.00.00.a	Liliaceae	*Hemerocallis*	*x*	214A	2
J04.01.02	Cupressaceae	*Juniperus*	*chinensis*	214A	2
J04.03.01	Cupressaceae	*Juniperus*	*horizontalis*	214A	2
L18.01.01	Liliaceae	*Liriope*	*muscari*	214A	2
L18.02.01	Liliaceae	*Liriope*	*spicata*	214A	2
M02.07.00.a	Berberidaceae	*Mahonia*	*pumila*	214A	2
N01.01.00.a	Berberidaceae	*Nandina*	*domestica*	214A	2
O01.00.01	Asteraceae	*Olearia*	*x*	214A	2
P21.06.01.c	Pinaceae	*Pinus*	*cembroides*	214A	2
P32.04.01	Rosaceae	*Prunus*	*mume*	214A	2
R02.032.00.d	Ericaceae	*Rhododendron*	*occidentale*	214A	2
V09.02.00	Scrophulariaceae	*Verbascum*	*thapsus*	214A	2
E02.01.00.a	Proteaceae	*Embothrium*	*coccineum*	214B	2
H02.01.01	Styracaceae	*Halesia*	*carolina*	214B	2
L23.02.02	Lamiaceae	*Lamium*	*maculatum*	214B	2
P01.01.01	Buxaceae	*Pachysandra*	*terminalis*	214B	2
R02.096.00	Ericaceae	*Rhododendron*	*reticulatum*	214B	2
S34.03.00a	Lamiaceae	*Stachys*	*cooleyae*	214B	2
S19.06.00	Theaceae	*Stewartia*	*koreana*	214B	2
A05.02.01.c	Sapindaceae	*Aesculus*	*x carnea*	215	1
A05.02.01.e	Sapindaceae	*Aesculus*	*x carnea*	215	1
A05.02.01.f	Sapindaceae	*Aesculus*	*x carnea*	215	1
A05.02.01.g	Sapindaceae	*Aesculus*	*x carnea*	215	1
A05.02.01.h	Sapindaceae	*Aesculus*	*x carnea*	215	1
A05.02.01.r	Sapindaceae	*Aesculus*	*x carnea*	215	1
L14.05.00.a	Liliaceae	*Lilium*	*pardalinum*	215	2
Q01.29.00	Fagaceae	*Quercus*	*texana*	215	2
R02.025.00b	Ericaceae	*Rhododendron*	*calendulaceum*	215	2
R02.025.00c	Ericaceae	*Rhododendron*	*calendulaceum*	215	2
R02.025.00d	Ericaceae	*Rhododendron*	*calendulaceum*	215	2
R02.119.00b	Ericaceae	*Rhododendron*	*cinnabarinum*	215	2
T20.01.00a	Saxifragaceae	*Tellima*	*grandiflora*	215	2
G03.04.00	Ericaceae	*Gaultheria*	*wardii*	23A	2
Q01.14.00.a	Fagaceae	*Quercus*	*rubra*	301	1
Q01.14.00.b	Fagaceae	*Quercus*	*rubra*	301	1
Q01.14.00.c	Fagaceae	*Quercus*	*rubra*	301	1
Q01.14.00.d	Fagaceae	*Quercus*	*rubra*	301	1
Q01.14.00.e	Fagaceae	*Quercus*	*rubra*	301	1
Q01.14.00.f	Fagaceae	*Quercus*	*rubra*	301	1
C07.02.00.	Theaceae	*Camellia*	*japonica*	302	2
C07.02.07	Theaceae	*Camellia*	*japonica*	302	2
C36.02.00.f	Cornaceae	*Cornus*	*kousa*	302	2
C49.02.00	Iridaceae	*Crocus*	*minimus*	302	2
F12.01.00.b	Onagraceae	*Fuchsia*	*x*	302	2
H13.01.00.c	Liliaceae	*Hyacinthoides*	*hispanica*	302	2
H18.01.01	Asparagaceae	*Hyacinthus*	*orientalis*	302	2
H18.01.02	Asparagaceae	*Hyacinthus*	*orientalis*	302	2
M02.06.00.a	Berberidaceae	*Mahonia*	*nervosa*	302	2

Accession Number	Family	Genus	Species	Bed Number	Rank
P19.02.00.d	Ericaceae	*Pieris*	*formosa*	302	2
P21.12.00.b	Pinaceae	*Pinus*	*nigra*	302	1
P54.01.00	Theaceae	*Polyspora*	*longicarpa*	302	2
R02.000.07	Ericaceae	*Rhododendron*	*x*	302	2
R02.000.11.a	Ericaceae	*Rhododendron*	*x*	302	2
R02.000.18b	Ericaceae	*Rhododendron*	*x*	302	2
R02.005.00.b	Ericaceae	*Rhododendron*	*augustinii*	302	2
R02.005.01	Ericaceae	*Rhododendron*	*augustinii*	302	2
R02.005.02	Ericaceae	*Rhododendron*	*augustinii*	302	2
R02.005.03	Ericaceae	*Rhododendron*	*augustinii*	302	2
R02.018.01	Ericaceae	*Rhododendron*	*x gandavense*	302	2
R02.046.00.b	Ericaceae	*Rhododendron*	*yunnanense*	302	2
R02.102.00	Ericaceae	*Rhododendron*	*macabeanum*	302	2
S02.01.01.a	Buxaceae	*Sarcococca*	*hookeriana*	302	2
S06.01.00	Sciadopityaceae	*Sciadopitys*	*verticillata*	302	1
V06.01.00.a	Vitaceae	*Vitis*	*coignetiae*	302	1
A01.02.00.a	Acanthaceae	*Acanthus*	*spinosus*	303	2
A24.01.00.a	Flacourtiaceae	*Azara*	*lanceolata*	303	2
B09.01.00.a	Asteraceae	*Brachyglottis*	*laxifolia*	303	2
F08.01.02	Rosaceae	*Fragaria*	*indica*	303	2
H04.02.00.a	Plantagianceae	*Hebe*	*cupressoides*	303	2
H04.05.00	Plantagianceae	*Hebe*	*ochracea*	303	2
H08.01.00	Ranunculaceae	*Hepatica*	*americana*	303	2
H10.01.01	Malvaceae	*Hibiscus*	*syriacus*	303	2
P21.15.00.a	Pinaceae	*Pinus*	*patula*	303	1
P28.02.00.e	Dryopteridaceae	*Polystichum*	*setiferum*	303	2
R02.022.00	Ericaceae	*Rhododendron*	*impeditum*	303	2
S02.02.01.a	Buxaceae	*Sarcococca*	*ruscifolia*	303	2
A50.01.00	Theaceae	*Adinandra*	*glischrolma*	304	2
A29.03.00	Ranunculaceae	*Anemone*	*rivularis*	304	2
A34.03.00	Ranunculaceae	*Aquilegia*	*barnebyi*	304	2
A34.04.00	Ranunculaceae	*Aquilegia*	*x micrantha*	304	2
A16.07.00.a	Ericaceae	*Arctostaphylos*	*viscida*	304	2
A16.12.01a	Ericaceae	*Arctostaphylos*	*edmundsii*	304	2
A16.12.02b	Ericaceae	*Arctostaphylos*	*edmundsii*	304	2
A43.01.00.a	Saxifragaceae	*Astilbe*	*species*	304	2
A43.01.00.b	Saxifragaceae	*Astilbe*	*species*	304	2
C07.01.00	Theaceae	*Camellia*	*x*	304	1
C07.02.00.	Theaceae	*Camellia*	*japonica*	304	1
C07.02.00.	Theaceae	*Camellia*	*japonica*	304	1
C07.02.01.a	Theaceae	*Camellia*	*japonica*	304	1
C07.02.04	Theaceae	*Camellia*	*japonica*	304	1
C07.02.08	Theaceae	*Camellia*	*japonica*	304	1
C07.03.00.a	Theaceae	*Camellia*	*reticulata*	304	1
C07.04.00.d	Theaceae	*Camellia*	*sasanqua*	304	2
C13.10.01	Rhamnaceae	*Ceanothus*	*gloriosus*	304	2
C67.01.00	Caryophyllaceae	*Cerastium*	*arvense*	304	2
C19.02.00.c	Rosaceae	*Cercocarpus*	*ledifolius*	304	2
C63.00.00	Asparagaceae	*Chloroglaum*	*pomeridianum*	304	2
D08.02.01	Papaveraceae	*Dicentra*	*formosa*	304	2
D21.01.00	Iridaceae	*Dierama*	*floriferum*	304	2
E20.02.00.a	Liliaceae	*Erythronium*	*oreganum*	304	2

Accession Number	Family	Genus	Species	Bed Number	Rank
E20.03.00.a	Liliaceae	*Erythronium*	*revolutum*	304	2
E10.02.00.a	Cunoniaceae	*Eucryphia*	*x intermedia*	304	2
F13.06.00.c	Liliaceae	*Fritillaria*	*lanceolata*	304	2
F13.09.00.c	Liliaceae	*Fritillaria*	*camschatcensis*	304	2
G02.05.00.a	Garryaceae	*Garrya*	*buxifolia*	304	2
G02.05.00.b	Garryaceae	*Garrya*	*buxifolia*	304	2
G05.01.00.b	Ginkoaceae	*Ginkgo*	*biloba*	304	2
H26.01.00	Asparagaceae	*Hastingsia*	*bracteosa*	304	2
I08.01.00	Balsaminaceae	*Impatiens*	*tinctoria*	304	2
I03.13.00.a	Iridaceae	*Iris*	*bracteata*	304	2
I03.13.00.b	Iridaceae	*Iris*	*bracteata*	304	2
I03.14.00	Iridaceae	*Iris*	*innominata*	304	2
J04.04.00	Cupressaceae	*Juniperus*	*pingii*	304	2
L31.01.00.b	Amaryllidaceae	*Leucojum*	*aestivum*	304	2
L14.04.01	Liliaceae	*Lilium*	*x martagon*	304	2
L14.05.00.b	Liliaceae	*Lilium*	*pardalinum*	304	2
M17.01.00	Phrymaceae	*Mimulus*	*lewisii x cardinalis*	304	2
M17.01.00	Phrymaceae	*Mimulus*	*ringens*	304	2
M18.01.00	Lamiaceae	*Monarda*	*austroappalachiana*	304	2
P06.07.00.a	Plantaginaceae	*Penstemon*	*barrettiae*	304	2
P21.20.00.c	Pinaceae	*Pinus*	*wallichiana*	304	2
P32.06.03	Rosaceae	*Prunus*	*jamasakura*	304	2
Q01.16.00	Fagaceae	*Quercus*	*sadleriana*	304	2
R02.032.00.a	Ericaceae	*Rhododendron*	*occidentale*	304	2
S28.04.00	Lamiaceae	*Salvia*	*involucrata*	304	2
S04.02.01	Saxifragaceae	*Saxifraga*	*paniculata*	304	2
S30.02.00	Asparagaceae	*Scilla*	*hyacinthoides*	304	2
S37.01.00	Liliaceae	*Scoliopus*	*bigelovii*	304	2
T19.01.00	Saxifragaceae	*Tolmiea*	*menziesii*	304	2
T12.01.00b	Melanthiaceae	*Trillium*	*ovatum*	304	2
A13.01.00.a	Araliaceae	*Aralia*	*californica*	304A	2
C17.01.00.a	Cercidiphyllaceae	*Cercidiphyllum*	*japonicum*	304A	2
D08.00.00	Papaveraceae	*Dicentra*	*x*	304A	2
H06.01.00.a	Ranunculaceae	*Helleborus*	*argutifolius*	304A	2
L31.01.00.b	Amaryllidaceae	*Leucojum*	*aestivum*	304A	2
O03.05.00.a	Oleaceae	*Osmanthus*	*decorus*	304A	2
P33.01.00	Rosaceae	*Pseudocydonia*	*sinensis*	304A	2
S19.01.00.c	Theaceae	*Stewartia*	*monadelpha*	304A	2
S19.02.00.a	Theaceae	*Stewartia*	*pseudocamellia*	304A	2
A01.02.00.c	Acanthaceae	*Acanthus*	*spinosus*	305	2
A03.19.00	Sapindaceae	*Acer*	*sikkimense*	305	2
A03.20.00	Sapindaceae	*Acer*	*sempervirens*	305	1
A09.00.01	Amaryllidaceae	*Allium*	*x*	305	2
A09.01.00.a	Amaryllidaceae	*Allium*	*moly*	305	2
A13.01.00.b	Araliaceae	*Aralia*	*californica*	305	2
C07.03.00.b	Theaceae	*Camellia*	*reticulata*	305	2
C45.00.00.a	Primulaceae	*Cyclamen*	*x*	305	2
C45.01.00	Primulaceae	*Cyclamen*	*coum*	305	2
C45.02.00	Primulaceae	*Cyclamen*	*hederifolium*	305	2
E16.01.00.a	Thymelaeaceae	*Edgeworthia*	*chysantha*	305	2
F13.01.00.a	Liliaceae	*Fritillaria*	*meleagris*	305	2
F13.10.00	Liliaceae	*Fritillaria*	*acmopetala*	305	2

Accession Number	Family	Genus	Species	Bed Number	Rank
H06.01.00.b	Ranunculaceae	*Helleborus*	*argutifolius*	305	2
I05.01.00	Salicaceae	*Idesia*	*polycarpa*	305	2
J02.01.00	Calcolariaceae	*Jovellana*	*violacea*	305	2
M01.04.00	Magnoliaceae	*Magnolia*	*heptapeta*	305	1
M09.01.00	Euphorbiaceae	*Mallotus*	*japonicus*	305	2
O04.01.00.d	Rosaceae	*Oemleria*	*cerasiformis*	305	2
P01.01.00	Buxaceae	*Pachysandra*	*terminalis*	305	2
P03.01.00	Hamamelidaceae	*Parrotiopsis*	*jacquemontiana*	305	1
P19.04.00.d	Ericaceae	*Pieris*	*taiwanensis*	305	2
P21.05.00.k	Pinaceae	*Pinus*	*densiflora*	305	1
P21.05.00.l	Pinaceae	*Pinus*	*densiflora*	305	1
P27.01.00	Asparagaceae	*Polygonatum*	*hirtum*	305	2
P39.01.00	Primulaceae	*Primula*	*auricula*	305	2
Q01.08.00.b	Fagaceae	*Quercus*	*ilex*	305	1
R14.01.00	Styracaceae	*Rehderodendron*	*macrocarpum*	305	2
R02.082.00	Ericaceae	*Rhododendron*	*zaleucum*	305	2
R02.091.00	Ericaceae	*Rhododendron*	*platypodum*	305	2
S02.02.01.b	Buxaceae	*Sarcococca*	*ruscifolia*	305	2
S38.01.00	Berberidaceae	*Sinopodophyllum*	*hexandrum*	305	2
S10.01.00.i	Rutaceae	*Skimmia*	*japonica*	305	2
T19.02.00	Cephalotaxaceae	*Torreya*	*taxifolia*	305	2
T08.01.00.h	Arecaceae	*Trachycarpus*	*fortunei*	305	1
T08.01.00.i	Arecaceae	*Trachycarpus*	*fortunei*	305	1
T12.03.00	Melanthiaceae	*Trillium*	*kurabayashii*	305	2
T09.01.00.c	Trochodendraceae	*Trochodendron*	*aralioides*	305	2
V07.01.00	Verbenaceae	*Verbena*	*bonariensis*	305	2
V05.01.00	Verbenaceae	*Vitex*	*agnus-castus*	305	2
A13.02.00.a	Araliaceae	*Aralia*	*elata*	306	2
A24.03.00	Flacourtiaceae	*Azara*	*dentata*	306	2
A24.02.00	Flacourtiaceae	*Azara*	*microphylla*	308	2
Q01.13.00.a	Fagaceae	*Quercus*	*phillyraeoides*	308	1
A11.01.00.a	Amaryllidaceae	*Amaryllis*	*belladonna*	309	2
C72.02.00	Liliaceae	*Calochortus*	*venustus*	309	2
R02.035.00	Ericaceae	*Rhododendron*	*lutescens*	309	2
P32.06.02.e	Rosaceae	*Prunus*	*serrulata*	310	2
P24.03.00	Pittosporaceae	*Pittosporum*	*tenuifolium*	312	2
A42.01.00.b	Apiaceae	*Aciphylla*	*aurea*	313	2
A44.01.00	Asparagaceae	*Albuca*	*shawaii*	313	2
A09.02.00	Amaryllidaceae	*Allium*	*sphaerocephalum*	313	2
A38.00.01	Alstroemeriaceae	*Alstroemeria*	*x*	313	2
A38.01.00	Alstroemeriaceae	*Alstroemeria*	*aurea*	313	2
A38.01.01	Alstroemeriaceae	*Alstroemeria*	*ligtu*	313	2
A27.01.00	Iridaceae	*Aristea*	*ecklonii*	313	2
A27.02.00	Iridaceae	*Aristea*	*africana*	313	2
A32.01.00.a	Elaeocarpaceae	*Aristotelia*	*chilensis*	313	2
A32.01.00.b	Elaeocarpaceae	*Aristotelia*	*chilensis*	313	2
B14.01.00.c	Berberidaceae	*Berberidopsis*	*corallina*	313	2
B04.02.00	Blechnaceae	*Blechnum*	*chilense*	313	2
B10.01.00	Pittosporaceae	*Bursaria*	*spinosa*	313	2
C02.02.00.a	Myrtaceae	*Callistemon*	*pallidus*	313	2
C18.01.00.a	Fabaceae	*Cercis*	*occidentalis*	313	2
C41.01.00	Elaeocarpaceae	*Crinodendron*	*patagua*	313	2

Accession Number	Family	Genus	Species	Bed Number	Rank
C42.00.01	Iridaceae	*Crocosmia*	*x crocosmiiflora*	313	2
C42.00.02	Iridaceae	*Crocosmia*	*x crocosmiiflora*	313	2
D26.01.00.a	Columelliaceae	*Desfontainia*	*spinosa*	313	2
D22.01.00	Iridaceae	*Diplarrena*	*moraea*	313	2
D17.01.00	Winteraceae	*Drimys*	*winteri*	313	2
E08.01.00	Myrtaceae	*Eucalyptus*	*gunni*	313	2
E08.05.00	Myrtaceae	*Eucalyptus*	*archeri*	313	2
E10.01.00.b	Cunoniaceae	*Eucryphia*	*glutinosa*	313	2
E10.04.00	Cunoniaceae	*Eucryphia*	*moorei*	313	2
G06.01.00.c	Proteaceae	*Grevillea*	*victoriae*	313	2
G06.01.00c	Proteaceae	*Grevillea*	*victoriae*	313	2
L05.01.00	Lauraceae	*Laurus*	*nobilis*	313	2
L06.01.00.c	Myrtaceae	*Letpospermum*	*lanigerum*	313	2
L10.01.00.c	Iridaceae	*Libertia*	*formosa*	313	2
L14.00.01	Liliaceae	*Lilium*	*x*	313	2
L14.07.00	Liliaceae	*Lilium*	*tigrinum*	313	2
L23.01.00	Campanulaceae	*Lobelia*	*tupa*	313	2
L33.01.00.a	Myrtaceae	*Luma*	*apiculata*	313	2
L33.01.00.b	Myrtaceae	*Luma*	*apiculata*	313	2
P15.01.01.a	Agavaceae	*Phormium*	*tenax*	313	2
P47.01.00	Podocarpaceae	*Phyllocladus*	*alpinus*	313	2
P24.02.00	Pittosporaceae	*Pittosporum*	*bicolor*	313	2
P24.04.00	Pittosporaceae	*Pittosporum*	*eugenioides*	313	2
P50.02.00	Rosaceae	*Polylepis*	*tomentella*	313	2
P32.05.00	Rosaceae	*Prunus*	*sargentii*	313	2
P32.06.02.a	Rosaceae	*Prunus*	*serrulata*	313	2
P52.01.01	Bromeliaceae	*Puya*	*aff. humilis*	313	2
S39.01.00	Colchicaceae	*Sandersonia*	*aurantica*	313	2
S13.02.00	Fabaceae	*Sophora*	*microphylla*	313	2
T08.01.00.p	Arecaceae	*Trachycarpus*	*fortunei*	313	2
T21.01.00	Ericaceae	*Trochocarpa*	*thymifolia*	313	2
F10.01.00.d	Oleaceae	*Fraxinus*	*ornus*	314	2
M01.08.01	Magnoliaceae	*Magnolia*	*campbellii*	314	1
Q01.19.00.b	Fagaceae	*Quercus*	*vaccinifolia*	314	1
A01.02.00.b	Acanthaceae	*Acanthus*	*spinosus*	315	2
A09.01.00.b	Amaryllidaceae	*Allium*	*moly*	315	2
E03.01.00.f	Ericaceae	*Enkianthus*	*campanulatus*	315	1
F12.01.00.c	Onagraceae	*Fuchsia*	*x*	315	2
H06.03.00.c	Ranunculaceae	*Helleborus*	*niger*	315	2
H06.04.00.a	Ranunculaceae	*Helleborus*	*orientalis*	315	2
S04.01.00.a	Saxifragaceae	*Saxifraga*	*umbosa*	315	2
C21.01.01.b	Cupressaceae	*Callitropsis*	*nootkatensis*	315A	2
C73.01.01.a	Cupressaceae	*Callitropsis*	*nootkatensis*	315A	2
M02.03.00	Berberidaceae	*Mahonia*	*haematocarpa*	315A	1
M02.09.00	Berberidaceae	*Mahonia*	*fortunei*	315A	2
V01.04.01.a	Ericaceae	*Vaccinium*	*vitis-idaea*	315A	2
V01.04.01.b	Ericaceae	*Vaccinium*	*vitis-idaea*	315A	2
A09.05.00	Amaryllidaceae	*Allium*	*cyaneum*	316	2
A45.01.00	Asphodelaceae	*Aloe*	*aristata*	316	2
A16.01.00	Ericaceae	*Arctostaphylos*	*canescens*	316	2
C10.01.00.c	Hydrangeaceae	*Carpenteria*	*californica*	316	2
C10.01.01.a	Hydrangeaceae	*Carpenteria*	*californica*	316	2

Accession Number	Family	Genus	Species	Bed Number	Rank
C10.01.01.b	Hydrangeaceae	*Carpenteria*	*californica*	316	2
G04.01.00.a	Fabaceae	*Genista*	*lydia*	316	2
G04.02.00.c	Fabaceae	*Genista*	*pilosa*	316	2
H04.04.00.a	Plantagianceae	*Hebe*	*hulkeana*	316	2
H24.01.00	Rosaceae	*Heteromeles*	*arbutifolia*	316	2
H12.01.00.c	Rosaceae	*Holodiscus*	*discolor*	316	2
M02.08.01.b	Berberidaceae	*Mahonia*	*x wagneri*	316	2
M02.13.00	Berberidaceae	*Mahonia*	*piperiana*	316	2
P12.02.01	Hydrangeaceae	*Philadelphus*	*microphyllus*	316	2
P21.01.00.d	Pinaceae	*Pinus*	*aristrata*	316	2
P26.01.00.a	Podocarpaceae	*Podocarpus*	*alpinus*	316	2
P26.02.00.a	Podocarpaceae	*Podocarpus*	*nivalis*	316	2
Q01.07.00.a	Fagaceae	*Quercus*	*hypoleucoides*	316	1
Q01.07.00.b	Fagaceae	*Quercus*	*hypoleucoides*	316	1
Q01.15.00.a	Fagaceae	*Quercus*	*rugosa*	316	1
R12.01.01	Hypoxidaceae	*Rhodohypoxis*	*baurii*	316	2
S29.04.02	Crassulaceae	*Sedum*	*spurium*	316	2
S29.04.03	Crassulaceae	*Sedum*	*spurium*	316	2
T05.01.01.a	Lamiaceae	*Teucrium*	*fruiticans*	316	2
T05.02.01	Lamiaceae	*Teucrium*	*chamaedrys*	316	2
Y01.01.00.a	Agavaceae	*Yucca*	*filamentosa*	316	2
Y01.04.00	Agavaceae	*Yucca*	*harrimaniae*	316	2
Y01.05.00	Agavaceae	*Yucca*	*aloifolia*	316	2
A05.07.00.b	Sapindaceae	*Aesculus*	*parviflora*	317	2
A29.05.01	Ranunculaceae	*Anemone*	*blanda*	317	2
B14.01.00.b	Berberidaceae	*Berberidopsis*	*corallina*	317	2
C65.01.00	Brassicaceae	*Cardamine*	*trifolia*	317	2
C21.02.00	Cupressaceae	*Chamaecyparis*	*obtusa*	317	1
C42.01.01.b	Iridaceae	*Crocosmia*	*x crocosmiiflora*	317	2
E11.01.00.b	Berberidaceae	*Epimedium*	*grandiflorum*	317	2
F03.01.00	Araliaceae	*Fatshedera*	*lizei*	317	2
F04.01.00.a	Araliaceae	*Fatsia*	*japonica*	317	1
H06.03.00.d	Ranunculaceae	*Helleborus*	*niger*	317	2
H23.01.00	Melanthiaceae	*Helonias*	*bullata*	317	2
H14.01.01.b	Hydrangeaceae	*Hydrangea*	*macrophylla*	317	2
K02.01.01	Rosaceae	*Kerria*	*japonica*	317	2
K03.02.00.a	Asphodelaceae	*Kniphofia*	*buchanaii*	317	2
O04.01.00.b	Rosaceae	*Oemleria*	*cerasiformis*	317	2
P38.00.00	Passifloraceae	*Passiflora*		317	2
P32.10.01.c	Rosaceae	*Prunus*	*x yedoensis*	317	2
R02.000.11.b	Ericaceae	*Rhododendron*	*x*	317	2
R02.000.21r	Ericaceae	*Rhododendron*	*x*	317	2
R02.029.01	Ericaceae	*Rhododendron*	*mucronatum*	317	2
R02.031.01c	Ericaceae	*Rhododendron*	*x obtusum*	317	2
R02.033.00.b	Ericaceae	*Rhododendron*	*rubiginosum*	317	2
R02.038.00.e	Ericaceae	*Rhododendron*	*racemosum*	317	2
V03.07.02.b	Caprifoliaceae	*Viburnum*	*plicatum*	317	2
A11.01.00.b	Amaryllidaceae	*Amaryllis*	*belladonna*	318	2
B02.01.00.d	Saxifragaceae	*Bergenia*	*cordifolia*	318	2
C07.03.00.c	Theaceae	*Camellia*	*reticulata*	318	1
C24.01.00.c	Calycanthaceae	*Chimonanthus*	*praecox*	318	1
H03.01.00	Hamamelidaceae	*Hamamelis*	*japonica*	318	1

Accession Number	Family	Genus	Species	Bed Number	Rank
M01.03.01.a	Magnoliaceae	*Magnolia*	*grandiflora*	318	1
P04.01.00.d	Vitaceae	*Parthenocissus*	*tricuspidata*	318	2
R04.01.00.e	Saxifragaceae	*Ribes*	*sanguineum*	318	2
S21.01.01.a	Caprifoliaceae	*Symphoricarpos*	*albus*	318	2
T08.01.00.b	Arecaceae	*Trachycarpus*	*fortunei*	318	2
B02.01.00.e	Saxifragaceae	*Bergenia*	*cordifolia*	319	2
A16.08.00	Ericaceae	*Comarostaphylis*	*diversifolia*	319	2
E22.01.00	Hamamelidaceae	*Exbucklandia*	*populnea*	319	2
L21.01.00	Caprifoliaceae	*Lonicera*	*x heckrottii*	319	2
M01.03.01.c	Magnoliaceae	*Magnolia*	*grandiflora*	319	1
P04.01.00.b	Vitaceae	*Parthenocissus*	*tricuspidata*	319	2
R04.01.00.f	Saxifragaceae	*Ribes*	*sanguineum*	319	2
V03.01.00.a	Caprifoliaceae	*Viburnum*	*x bodnantense*	319	2
P32.06.02.h	Rosaceae	*Prunus*	*serrulata*	320	2
P32.06.02.i	Rosaceae	*Prunus*	*serrulata*	320	2
P32.10.00.f	Rosaceae	*Prunus*	*x yedoensis*	321	2
P32.10.00.g	Rosaceae	*Prunus*	*x yedoensis*	321	2
P32.06.02.k	Rosaceae	*Prunus*	*serrulata*	322	2
P32.06.02.l	Rosaceae	*Prunus*	*serrulata*	322	2
P32.06.02.m	Rosaceae	*Prunus*	*serrulata*	322	2
A28.03.00	Pteridaceae	*Adiantum*	*venustum*	323	2
A47.01.00	Araceae	*Arisaema*	*sikokianum*	323	2
C66.01.00b	Orchidaceae	*Cypripedium*	*formosanum*	323	2
L14.06.00	Liliaceae	*Lilium*	*hansonii*	323	2
P02.04.00	Paeoniaceae	*Paeonia*	*mairei*	323	2
Q01.04.01	Fagaceae	*Quercus*	*chrysolepsis*	323	2
R02.080.00.a	Ericaceae	*Rhododendron*	*tephropeplum*	323	2
R02.080.00.b	Ericaceae	*Rhododendron*	*tephropeplum*	323	2
S19.02.00.e	Theaceae	*Stewartia*	*pseudocamellia*	323	2
T12.01.00c	Melanthiaceae	*Trillium*	*ovatum*	323	2
T12.05.00	Melanthiaceae	*Trillium*	*erectum*	323	2
C45.03.00	Primulaceae	*Cyclamen*	*purpurascens*	324	2
E20.00.01	Liliaceae	*Erythronium*	*x*	324	2
M01.19.00	Magnoliaceae	*Magnolia*	*x watsonii*	324	1
N04.05.00	Amaryllidaceae	*Nerine*	*bowdenii*	324	2
Q01.15.00.b	Fagaceae	*Quercus*	*rugosa*	324	2
B16.01.00	Fabaceae	*Baptisia*	*australis*	325	2
C27.07.00.c	Cistaceae	*Cistus*	*laurifolius*	325	2
D21.02.00	Iridaceae	*Dierama*	*pulcherrimum*	325	2
E06.01.00	Apiaceae	*Eryngium*	*alpinum*	325	2
E06.02.00	Apiaceae	*Eryngium*	*planum*	325	2
F06.01.00.b	Rosaceae	*Filipendula*	*vulgaris*	325	2
H09.00.01	Saxifragaceae	*Heuchera*	*x*	325	2
H09.00.02	Saxifragaceae	*Heuchera*	*x*	325	2
H09.00.03	Saxifragaceae	*Heuchera*	*x*	325	2
L14.07.00b	Liliaceae	*Lilium*	*tigrinum*	325	2
L21.02.00	Caprifoliaceae	*Lonicera*	*involucrata*	325	2
P32.06.05.f	Rosaceae	*Prunus*	*serrulata*	325	2
P32.09.05.b	Rosaceae	*Prunus*	*x subhirtella*	325	2
P32.09.05.c	Rosaceae	*Prunus*	*x subhirtella*	325	2
S30.03.00	Asparagaceae	*Scilla*	*peruviana*	325	2
T20.01.00b	Saxifragaceae	*Tellima*	*grandiflora*	325	2

Accession Number	Family	Genus	Species	Bed Number	Rank
H06.01.00.c	Ranunculaceae	*Helleborus*	*argutifolius*	325D	2
P32.10.00.c	Rosaceae	*Prunus*	*x yedoensis*	325D	2
A35.01.00	Ranunculaceae	*Aconitum*	*carmichaelii*	326	2
C42.01.01.a	Iridaceae	*Crocosmia*	*x crocosmiiflora*	326	2
C42.01.02	Iridaceae	*Crocosmia*	*x crocosmiiflora*	326	2
C42.01.03	Iridaceae	*Crocosmia*	*x crocosmiiflora*	326	2
H01.01.00	Poaceae	*Hakonechloa*	*macra*	326	2
L15.01.00	Limnanthaceae	*Limnanthes*	*douglasii*	326	2
M01.15.00.c	Magnoliaceae	*Magnolia*	*stellata*	326	1
M10.01.01	Poaceae	*Miscanthus*	*sinensis*	326	2
N04.05.00.b	Amaryllidaceae	*Narcissus*	*x*	326	2
A03.09.00.b	Sapindaceae	*Acer*	*negundo*	327	2
A04.01.02.c	Actinidiaceae	*Actinidia*	*deliciosa*	327	1
A05.05.00	Sapindaceae	*Aesculus*	*octandra*	327	1
A06.02.00	Lardizabalaceae	*Akebia*	*trifoliate*	327	2
A13.01.00.c	Araliaceae	*Aralia*	*californica*	327	2
A15.03.00.a	Ericaceae	*Arbutus*	*xalapensis*	327	2
B02.01.00.f	Saxifragaceae	*Bergenia*	*cordifolia*	327	2
C07.02.09.a	Theaceae	*Camellia*	*japonica*	327	2
C10.01.00.b	Hydrangeaceae	*Carpenteria*	*californica*	327	2
C23.01.00.d	Arecaceae	*Chamaerops*	*humilis*	327	2
C24.01.00.d	Calycanthaceae	*Chimonanthus*	*praecox*	327	2
E13.01.00	Boraginaceae	*Ehretia*	*dicksonii*	327	2
E10.01.00.a	Cunoniaceae	*Eucryphia*	*glutinosa*	327	1
F07.01.00.	Oleaceae	*Forsythia*	*suspensa*	327	2
F07.01.00.b	Oleaceae	*Forsythia*	*suspensa*	327	2
H13.01.00.d	Liliaceae	*Hyacinthoides*	*hispanica*	327	2
J03.01.00	Juglandaceae	*Juglans*	*nigra*	327	2
L08.01.00.a	Ericaceae	*Leucothoe*	*davisiae*	327	2
M01.10.00	Magnoliaceae	*Magnolia*	*x loebneri*	327	2
M01.18.00	Magnoliaceae	*Magnolia*	*virginiana*	327	1
O04.01.00.e	Rosaceae	*Oemleria*	*cerasiformis*	327	2
P21.08.00.c	Pinaceae	*Pinus*	*jeffreyi*	327	2
P21.18.00.c	Pinaceae	*Pinus*	*sabiniana*	327	2
R02.043.00.c	Ericaceae	*Rhododendron*	*williamsianum*	327	2
S19.01.00.b	Theaceae	*Stewartia*	*monadelpha*	327	2
S19.02.01	Theaceae	*Stewartia*	*pseudocamellia*	327	2
T08.01.00.g	Arecaceae	*Trachycarpus*	*fortunei*	327	2
T09.01.00.b	Trochodendraceae	*Trochodendron*	*aralioides*	327	2
T09.01.00.c	Trochodendraceae	*Trochodendron*	*aralioides*	327	2
W01.00.01	Caprifoliaceae	*Weigela*	*x*	327	2
A17.01.00	Aristolochiaceae	*Aristolochia*	*californica*	328	1
C02.04.00.a	Myrtaceae	*Callistemon*	*subulatus*	328	2
C15.01.00	Ulmaceae	*Celtis*	*occidentalis*	328	2
G02.01.00.kk	Garryaceae	*Garrya*	*elliptica*	328	2
G02.02.00	Garryaceae	*Garrya*	*flavescens*	328	2
H02.01.00	Styracaceae	*Halesia*	*carolina*	328	1
K04.01.00.a	Sapindaceae	*Koelreuteria*	*paniculata*	328	1
L10.01.00.b	Iridaceae	*Libertia*	*formosa*	328	2
R02.012.00.d	Ericaceae	*Rhododendron*	*decorum*	328	2
C15.02.00.a	Ulmaceae	*Celtis*	*reticulata*	329	2
D09.01.00.d	Ebenaceae	*Diospyros*	*virginiana*	329	2

Accession Number	Family	Genus	Species	Bed Number	Rank
E20.02.00.b	Liliaceae	*Erythronium*	*oreganum*	329	2
F13.06.00.b	Liliaceae	*Fritillaria*	*lanceolata*	329	2
F13.06.00.d	Liliaceae	*Fritillaria*	*lanceolata*	329	2
H11.01.00	Lardizabalaceae	*Holboellia*	*angustifolia*	329	2
L10.01.00.a	Iridaceae	*Libertia*	*formosa*	329	2
P36.01.00.c	Rosaceae	*Pyracantha*	*coccinea*	329	2
A12.01.00.a	Vitaceae	*Ampelopsis*	*brevipedunculata*	330	2
A20.01.00	Liliaceae	*Asparagus*	*officinalis*	330	2
F05.01.00.a	Moraceae	*Ficus*	*carica*	330	2
G02.01.02	Garryaceae	*Garrya*	*elliptica*	330	2
P21.02.00.a	Pinaceae	*Pinus*	*banksiana*	330	1
Q01.19.00.a	Fagaceae	*Quercus*	*vaccinifolia*	330	2
S11.01.01.b	Liliaceae	*Smilax*	*aspera*	330	2
T08.01.00.a	Arecaceae	*Trachycarpus*	*fortunei*	330	2
A04.01.01.	Actinidiaceae	*Actinidia*	*deliciosa*	331	1
C02.04.00.b	Myrtaceae	*Callistemon*	*subulatus*	331	1
C23.01.00.a	Arecaceae	*Chamaerops*	*humilis*	331	1
O04.01.00.a	Rosaceae	*Oemleria*	*cerasiformis*	331	2
P36.02.00.a	Rosaceae	*Pyracantha*	*fortuneana*	331	2
S11.01.01.a	Liliaceae	*Smilax*	*aspera*	331	2
A06.01.00.a	Lardizabalaceae	*Akebia*	*quinata*	332	1
G03.03.00	Ericaceae	*Gaultheria*	*shallon*	CEG	2
M02.01.00	Berberidaceae	*Mahonia*	*aquifolium*	CEG	2
P28.04.00	Dryopteridaceae	*Polystichum*	*munitum*	CEG	2
D28.01.02	Droseraceae	*Dioneae*	*muscipula*	CP1	2
D28.01.03	Droseraceae	*Dioneae*	*muscipula*	CP1	2
D28.01.04	Droseraceae	*Dioneae*	*muscipula*	CP1	2
D29.01.00	Droseraceae	*Drosera*	*intermedia*	CP1	2
D29.02.00	Droseraceae	*Drosera*	*filiformis*	CP1	2
D29.02.00	Droseraceae	*Drosera*	*rotundifolia*	CP1	2
S42.00.02	Sarraceniaceae	*Sarracenia*	*x*	CP1	2
S42.02.00	Sarraceniaceae	*Sarracenia*	*alta*	CP1	2
S42.03.00	Sarraceniaceae	*Sarracenia*	*purpurea*	CP1	2
S43.00.01	Sphagnaceae	*Sphagnum*	*x*	CP1	2
S43.00.01	Sphagnaceae	*Sphagnum*	*x*	CP1	2
D28.01.01	Droseraceae	*Dioneae*	*muscipula*	CP2	2
P54.01.00	Lentibulariaceae	*Pinguicula*	*grandiflora*	CP2	2
S42.00.01	Sarraceniaceae	*Sarracenia*	*x*	CP2	2
S42.00.01	Sarraceniaceae	*Sarracenia*	*x*	CP2	2
S42.01.00	Sarraceniaceae	*Sarracenia*	*leucophylla*	CP2	2
S42.01.01	Sarraceniaceae	*Sarracenia*	*leucophylla*	CP2	2
S42.01.02	Sarraceniaceae	*Sarracenia*	*leucophylla*	CP2	2
J01.0.00.	Oleaceae	*Jasminum*	*x*	RG	2
P44.01.03	Polemoniaceae	*Phlox*	*subulata*	RG	2
P44.01.04	Polemoniaceae	*Phlox*	*subulata*	RG	2
P32.06.02.c	Rosaceae	*Prunus*	*serrulata*	RG	2
R08.00.01	Rosaceae	*Rosa*	*x*	RG	2
R08.00.02	Rosaceae	*Rosa*	*x*	RG	2
R08.00.03	Rosaceae	*Rosa*	*x*	RG	2
R08.00.04	Rosaceae	*Rosa*	*x*	RG	2
R08.00.05	Rosaceae	*Rosa*	*x*	RG	2
R08.00.06	Rosaceae	*Rosa*	*x*	RG	2

Accession Number	Family	Genus	Species	Bed Number	Rank
R08.00.07	Rosaceae	*Rosa*	*x*	RG	2
R08.00.08	Rosaceae	*Rosa*	*x*	RG	2
R08.00.09	Rosaceae	*Rosa*	*x*	RG	2
R08.00.10	Rosaceae	*Rosa*	*x*	RG	2
R08.00.11	Rosaceae	*Rosa*	*x*	RG	2
R08.00.12	Rosaceae	*Rosa*	*x*	RG	2
R08.00.13	Rosaceae	*Rosa*	*x*	RG	2
R08.00.14	Rosaceae	*Rosa*	*x*	RG	2
R08.00.15	Rosaceae	*Rosa*	*x*	RG	2
R08.00.16	Rosaceae	*Rosa*	*x*	RG	2
R08.00.17	Rosaceae	*Rosa*	*x*	RG	2
R08.00.18	Rosaceae	*Rosa*	*x*	RG	2
R08.00.19	Rosaceae	*Rosa*	*x*	RG	2
R08.00.20	Rosaceae	*Rosa*	*x*	RG	2
R08.00.21	Rosaceae	*Rosa*	*x*	RG	2
R08.00.22	Rosaceae	*Rosa*	*x*	RG	2
R08.00.23	Rosaceae	*Rosa*	*x*	RG	2
R08.00.23	Rosaceae	*Rosa*	*x*	RG	2
R08.00.23.b	Rosaceae	*Rosa*	*x*	RG	2
R08.00.24	Rosaceae	*Rosa*	*x*	RG	2
R08.00.25	Rosaceae	*Rosa*	*x*	RG	2
R08.00.26	Rosaceae	*Rosa*	*x*	RG	2
R08.00.27	Rosaceae	*Rosa*	*x*	RG	2
R08.00.28	Rosaceae	*Rosa*	*x*	RG	2
I01.03.02.b	Aquifoliaceae	*Ilex*	*crenata*	RGB	2
I01.06.00	Aquifoliaceae	*Ilex*	*pernyi*	RGB	2
A34.00.01	Ranunculaceae	*Aquilegia*	*x*	RGN	2
A31.01.00.b	Aspleniaceae	*Asplenium*	*scolopendrium*	RGN	2
B05.01.00.b	Orchidaceae	*Bletilla*	*striata*	RGN	2
B05.01.02	Orchidaceae	*Bletilla*	*striata*	RGN	2
B05.02.01.a	Orchidaceae	*Bletilla*	*yokohama*	RGN	2
B05.04.01	Orchidaceae	*Bletilla*	*striata x yokohama*	RGN	2
C08.00.01	Campanulaceae	*Campanula*	*x*	RGN	2
C08.00.02	Campanulaceae	*Campanula*	*x*	RGN	2
C55.01.00	Papaveraceae	*Corydalis*	*solida*	RGN	2
C50.01.00.b	Dryopteridaceae	*Cyrtomium*	*macrophyllum*	RGN	2
D12.02.01.b	Dryopteridaceae	*Dryopteris*	*filix-mas*	RGN	2
G12.00.01.a	Gentianaceae	*Gentiana*	*x*	RGN	2
G08.02.01	Geraniaceae	*Geranium*	*sanguineum*	RGN	2
G09.00.01.a	Rosaceae	*Geum*	*x*	RGN	2
H09.01.02	Saxifragaceae	*Heuchera*	*sanguinea*	RGN	2
H09.02.02.b	Saxifragaceae	*Heuchera*	*micrantha*	RGN	2
H09.02.03.b	Saxifragaceae	*Heuchera*	*micrantha*	RGN	2
I08.02.01.b	Balsaminaceae	*Impatiens*	*omeana*	RGN	2
I04.01.00	Campanulaceae	*Isotoma*	*fluviatilis*	RGN	2
L23.02.01	Lamiaceae	*Lamium*	*maculatum*	RGN	2
N04.01.00	Amaryllidaceae	*Narcissus*	*cantabricus*	RGN	2
P25.02.01.a	Campanulaceae	*Platycodon*	*astra*	RGN	2
P28.03.00.c	Dryopteridaceae	*Polystichum*	*polyblepharum*	RGN	2
P39.03.00.a	Primuaceae	*Primula*	*elatior*	RGN	2
P51.01.00	Papaveraceae	*Pteridophyllum*	*racemosum*	RGN	2
S23.01.01.a	Asteraceae	*Santolina*	*rosmrinifolia*	RGN	2

Accession Number	Family	Genus	Species	Bed Number	Rank
S25.01.00	Caryophyllaceae	*Saponaria*	*ocymoides*	RGN	2
S04.03.01	Saxifragaceae	*Saxifraga*	*stolonifera*	RGN	2
T15.00.01	Ranunculaceae	*Thalictrum*	*nova*	RGN	2
T15.01.01	Ranunculaceae	*Thalictrum*	*x*	RGN	2
T18.00.01	Liliaceae	*Tulipa*	*x*	RGN	2
V02.01.00.c	Berberidaceae	*Vancouveria*	*hexandra*	RGN	2
V08.00.01.b	Plantaginaceae	*Veronica*	*x*	RGN	2
A34.05.00	Ranunculaceae	*Aquilegia*	*flavescens*	RGP1	2
C64.01.01a	Montiaceae	*Claytonia*	*megarhiza*	RGP1	2
L24.01.02	Montiaceae	*Lewisia*	*columbiana*	RGP1	2
L35.01.00	Apiaceae	*Lomatium*	*grayi*	RGP1	2
P06.05.00	Plantaginaceae	*Penstemon*	*procerus*	RGP1	2
P06.06.00	Plantaginaceae	*Penstemon*	*davidsonii*	RGP1	2
S29.03.00	Crassulaceae	*Sedum*	*spathifolium*	RGP1	2
A02.08.00	Pinaceae	*Abies*	*amabilis*	RGP2	2
A46.00.00	Caryophyllaceae	*Arenaria*	*species nova*	RGP2	2
C06.01.00.d	Asparagaceae	*Camassia*	*quamash*	RGP2	2
D19.03.00	Ranunculaceae	*Delphinium*	*menziesii*	RGP2	2
F13.09.00.a	Liliaceae	*Fritillaria*	*camschatcensis*	RGP2	2
L24.01.01.a	Montiaceae	*Lewisia*	*columbiana*	RGP2	2
L24.01.03	Montiaceae	*Lewisia*	*columbiana*	RGP2	2
P06.00.01	Plantaginaceae	*Penstemon*	*x Edithae*	RGP2	2
S29.05.00	Crassulaceae	*Sedum*	*oreganum*	RGP2	2
T12.01.00a	Melanthiaceae	*Trillium*	*ovatum*	RGP2	2
L24.02.00	Montiaceae	*Lewisia*	*cotyledon*	RGP3	2
L24.02.01	Montiaceae	*Lewisia*	*cotyledon*	RGP3	2
L24.07.00	Montiaceae	*Lewisia*	*leeana*	RGP3	2
L24.09.00.c	Montiaceae	*Lewisia*	*x*	RGP3	2
P06.09.00	Plantaginaceae	*Penstemon*	*newberryi*	RGP3	2
S29.06.00.b	Crassulaceae	*Sedum*	*laxum*	RGP3	2
A48.01.01	Ericaceae	*Agapetes*	*serpens*	RGP5	2
A48.02.01	Ericaceae	*Agapetes*	*smithiana*	RGP5	2
B17.01.00	Gesneriaceae	*Briggsia*	*rosthornii*	RGP5	2
C66.01.00a	Orchidaceae	*Cypripedium*	*formosanum*	RGP5	2
D03.04.00b	Thymelaeaceae	*Daphne*	*x hendersonii*	RGP5	2
R02.002.00	Ericaceae	*Rhododendron*	*collettianum*	RGP5	2
R02.019.00.a	Ericaceae	*Rhododendron*	*liliiflorum*	RGP5	2
R02.053.02	Ericaceae	*Rhododendron*	*dalhousiae*	RGP5	2
R02.098.01	Ericaceae	*Rhododendron*	*diversipilosum*	RGP5	2
R02.099.01	Ericaceae	*Rhododendron*	*nitidulum*	RGP5	2
R02.100.00	Ericaceae	*Rhododendron*	*campylogynum*	RGP5	2
R02.104.00	Ericaceae	*Rhododendron*	*nuttallii*	RGP5	2
V01.05.00	Ericaceae	*Vaccinium*	*nova*	RGP5	2
A33.01.03	Brassicaceae	*Arabis*	*caucasica*	RGS	2
B11.01.00	Asteraceae	*Bellium*	*minutum*	RGS	2
C68.01.01	Lamiaceae	*Caryopteris*	*clandonensis*	RGS	2
F13.02.00	Liliaceae	*Fritillaria*	*pallidiflora*	RGS	2
G12.00.01.b	Gentianaceae	*Gentiana*	*x*	RGS	2
H04.01.00.a	Plantagianceae	*Hebe*	*caledonia*	RGS	2
H22.01.01	Asteraceae	*Heliopsis*	*helianthoidies*	RGS	2
I03.11.01	Iridaceae	*Iris*	*juno*	RGS	2
L28.01.01	Asteraceae	*Leucanthemum*	*x superbum*	RGS	2

Accession Number	Family	Genus	Species	Bed Number	Rank
L14.00.00.b	Liliaceae	*Lilium*	*x*	RGS	2
M18.02.01	Lamiaceae	*Monarda*	*didyma*	RGS	2
M07.02.01	Liliaceae	*Muscari*	*aucheri*	RGS	2
N04.02.00	Amaryllidaceae	*Narcissus*	*obvallaris*	RGS	2
O02.01.01.c	Liliaceae	*Ophiopogon*	*planiscapus*	RGS	2
P02.03.00.b	Paeoniaceae	*Paeonia*	*pacifica*	RGS	2
P06.10.01	Plantaginaceae	*Penstemon*	*Misson Bells*	RGS	2
P44.01.02	Polemoniaceae	*Phlox*	*subulata*	RGS	2
P45.01.02.b	Ranunculaceae	*Pulsatilla*	*vulgaris*	RGS	2
S28.01.00	Lamiaceae	*Salvia*	*nana*	RGS	2
S23.01.01.b	Asteraceae	*Santolina*	*rosmrinifolia*	RGS	2
S27.02.00	Iridaceae	*Sisyrinchium*	*x*	RGS	2
T16.01.01	Asteraceae	*Tanacetum*	*coccineum*	RGS	2
T17.01.00	Lamiaceae	*Thymus*	*serpyllum*	RGS	2