SEATTLE-TACOMA INTERNATIONAL AIRPORT

Landscape Vision, Design Guidelines, and Standards

SEA
Seattle-Tacoma International Airport

2025

revision date: 12.20.24

INTRODUCTION

Seattle-Tacoma International Airport (SEA) welcomes you as a vital partner in helping shape our future. This document is comprised of the SEA Landscape Vision, Landscape Guidelines, and Landscape Standards. This document is designed to guide you in conceptualizing and realizing the SEA landscape design.

NATURE AS A REFERENCE

Landscapes in the Pacific Northwest have always responded TO THE NATURAL ENVIRONMENT, developing a unique, 'northwest' sense of place.

This response to nature has created a particular kind of design expression that connects materials, people, and ecology. The region's dramatic and varied geography includes mountains, volcanoes, islands, temperate rain forests, alpine forests, and multiple bodies of water; these form a singular ecological context for design. There is an inherent human need to **connect with nature.** This idea embodies the tenets of designing with nature. The basic underlying tenant being, "the right plant for the right place." This means that the microclimate of a space should determine the types of plants used. This means that the local conditions of sun and wind exposure, moisture regime, temperature, and soils at the fine grain level determines plant success. This bottom-up approach steps out of binary concepts such as native vs nonnative, to focus design based on a systems approach, that responds to a changing and variable climate.

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ORGANIZATION

There are four main sections to this document: Landscape Vision, Landscape Guidelines, Landscape Standards, and Resource Appendix. Project teams should work across these sections to ensure their projects are meeting Airport goals and expectations.

Landscape Vision

The Landscape Vision aims to set the conceptual vision and direction for the airport landscape going forward. As we work to improve and expand our facilities, new projects and decisions should aspire to align with the Landscape Vision. The Landscape Vision sets the long-term direction for the airport landscape and is not intended to change often.

Landscape Guidelines

The Landscape Guidelines provide guidance regarding the physical aspects of the landscape: including planting design, design of irrigation, maintenance of the landscape, and soils.

The Landscape Guidelines also provide guidance on Tree Stewardship and the Tree Replacement Requirements.

Landscape Standards

The Landscape Standards provide specific requirements and standards that a project needs to meet. At other times, they define minimum performance requirements for which project teams should seek equal or better solutions, to be approved by the Landscape Committee

Resource Appendix

The Resource Appendix section provides other documents and tools that impact Airport landscape projects. Project teams are expected to work across documents to ensure their efforts meet all expectations relevant to their project.

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ORGANIZATION

These guidelines supersede the following documents:

- Landscape Design Guidelines (2000)
- Landscape Design Standards (2020)

Additionally, the resources section serves as a reference tool, providing the following:

- Definitions and Acronyms
- Documents and Forms
- Maps and Plant Lists

Where conflicts occur between these Landscape Guidelines and/or Standards and any other Port documents, the following supersede any requirement as it relates to safety and security at SEA:

- The Port of Seattle's Schedule of Rules and Regulations (see page 5-4)
- The Wildlife Hazard Management Plan

Coordination with Other Standards

All new development shall comply with all applicable Port and other city, county, state and federal guidelines, codes, plans and standards in addition to these Landscape Guidelines and Standards.

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PURPOSE

As a general rule, this document covers the planted outdoor spaces of SEA's public-facing properties. It is to provide a flexible framework, allowing for new discoveries, and appropriate responses to each project's unique conditions.

Project teams should reference this document at the start of each project. They may look to their SEA project manager for clarification or additional insight on project requirements.

This is an evolving document and will be updated annually as conditions and criteria change over time to keep up with product availability, and to incorporate new recommendations and best practices. Please check back often for updates to this document.

This document is intended to accomplish the following:

- Outline the design strategies, providing fundamental principles to guide project teams in developing the landscape design of each project.
- Provide a clear basis for design reviews by the Landscape Committee, which has responsibility for reviewing the landscape design of all projects at SEA to assure compliance with the Landscape Vision, Landscape Guidelines, and Landscape Standards.
- Set the tone for unity and consistency in the landscape appearance, drawing a link between existing and new.
- Consolidate relevant information by providing a summary of related documents, resources, authorities, or other entities that are applicable to design work at SEA.

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AUDIENCE

This document is intended for a landscape architecture and design audience (including administrators, project managers, and facilities maintenance personnel), both internal SEA employees, and external consultants and vendors. This includes technical consultants (including engineering, maintenance, environmental) who are being on-boarded.

This document operates in conjunction with other disciplines' design guidelines and standards. Design consultants should review the documents in the Resource Appendix section for further information on requirements for each particular project. Also, all projects must proceed in accordance with the SEA Regulations for Airport Construction (RAC), which is available from the Port of Seattle and the Resource Appendix section of this document.

The users of this document are responsible for:

- Verifying that they have received the latest version of this document to ensure they are following the most recent guidance for their projects.
- Becoming familiar with and meeting the intent of the landscape vision, guidelines, and standards.
- Using good judgment while applying the landscape vision, guidelines, and standards to the project.
- Requesting owner approval of plant materials, products, or buffer requirements that vary from this document (using the Variance Request form - see Resource Appendix), if it is necessary because of specific site conditions.
- Abiding by the requirements of this document without sacrificing creative and innovative solutions.
- Providing feedback to the owner on the use of this document.
- Coordinating work with other applicable SEA standards and regulations.
- Presenting designs for selected projects to the design review committees.
- Applying the tree replacement requirements to offset tree clearing.

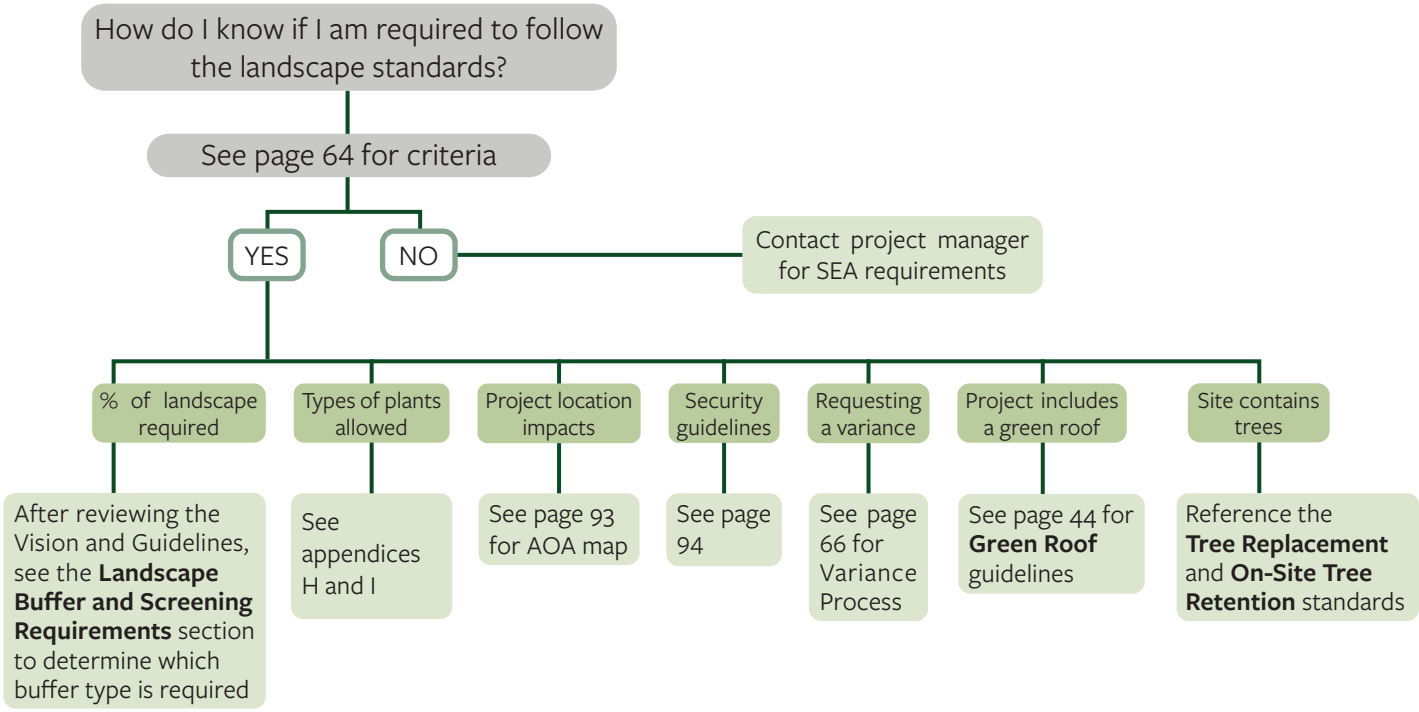
PROCEDURES FOR USE

The following summarizes the procedures for use of this document:

- The requirement to comply with the guidelines is part of the required project information identified in the Request for Qualifications advertising work as part of the design consultant selection process.
- This document is part of the required project information transmitted to landscape architecture consultants at the beginning of a project.
- The Port of Seattle project manager is responsible for providing the landscape architecture consultant with the latest version of this document.
- The landscape architecture consultant will meet with the Port of Seattle project manager during negotiation to review the landscape design scope and ensure that all aspects of this document are followed and applied well. This meeting will take place once the landscape architecture consultants have familiarized themselves with the latest version of this document.
- The Professional Services Agreement and landscape architecture consultant scope of services requires that the consultant be familiar with and conform to this document.
- The Port of Seattle project manager is responsible for seeing that the landscape architecture consultant's design is in conformance with and consistent with this document.
- Reviews by the Port of Seattle Landscape Committee include verification of conformance with this document.
- The Port of Seattle project manager requires a Variance Request from the landscape architecture consultant for any requested variance from this document.
- The Port of Seattle project manager forwards Variance Requests to the Landscape Committee, which is the reviewing and approving/disapproving body for variances and conformance with this document.

PROCEDURES FOR USE

QUICK GUIDE FOR NAVIGATING THE LANDSCAPE STANDARDS



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ADMINISTRATION

The owner of this document is the Aviation Facilities and Infrastructure Department. They are responsible for the development, implementation, long-term application, and enforcement of this document.

Their responsibilities include:

- Obtaining the latest information from the field concerning the adequacy of this document.
- Obtaining input from and identifying needs of the airport environment from the public, tenants, and employees.
- Establishing the level of quality and appearance of the landscape that meet the expectations of the public, tenants, and employees.
- Providing information for updating and revising this document to reflect changing needs of the airport terminal environment.
- Providing feedback to the public, tenants, and employees on issues that affect this document.
- Keeping this document up-to-date with the latest revisions.
- Updating the Change Log with changes to this document.

As this document evolves over time, changes will be noted with the icons below:

New

The “new” icon represents that an item has recently changed or is newly listed.

Sustainable

The “sustainable” icon represents that there may be opportunities for an item to align with SEA’s sustainability goals.

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LANDSCAPE VISION

DESIGNING THE FUTURE

Welcome to SEA.

As a premier destination for domestic and international air travel, SEA is committed to an unparalleled experience, one that is truly reflective of the grandeur of the Pacific Northwest. The purpose of the Landscape Vision is to capture a Pacific Northwest viewpoint, guiding the design of unique landscapes that engage the public and personnel passing through the open spaces.

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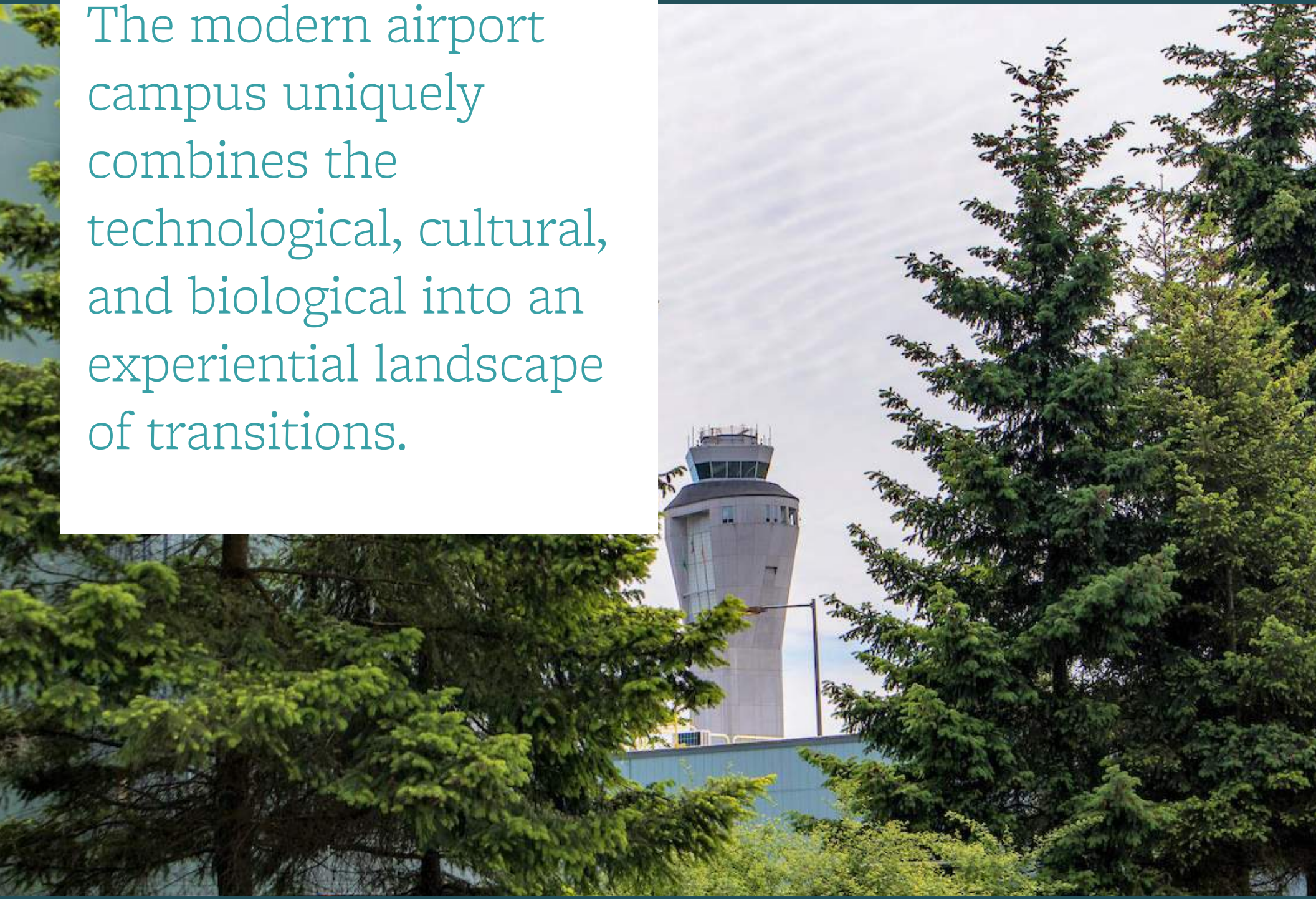
1

INTRODUCTION

The modern airport campus uniquely combines the technological, cultural, and biological into an experiential landscape of transitions.



INTRODUCTION

When applied to the design of the landscape, this vision solidifies the airport's role as the primary gateway to the Pacific Northwest-through which millions of visitors pass each year. This vision addresses various themes and applications.

PRINCIPAL THEME

The singular, enduring image of the Pacific Northwest is the lush green forest that covers our mountains, spills into the foothills, through the cities, and down to the shores of Puget Sound and the Pacific Ocean. To capture this image, the Northwest Evergreen Forest was selected as the principal theme to guide the development of the landscape.

What makes the Northwest Evergreen Forest a particularly appropriate theme is the role it plays in defining the three geographic landscapes that lie between the Cascade Mountains and Puget Sound: mountains and foothills, forests and clearings, sound and ocean. Each of these landscapes allow us to experience the forest environment in a different way.

The distinct physical characteristics of the Northwest Evergreen Forest can be used to project a strong regional image throughout the airport. These include immense vertical scale, richly textured floor, glimpses and vistas, and drizzle and mists.

SUPPORTING THEMES

Two supporting themes provide a repository of evocative elements of the Pacific Northwest. 1) The Natural Environment includes land, water, plants, and wildlife. 2) The Cultural Environment includes Northwest faces, arts, trade and technology, landmarks, and outdoor recreation.

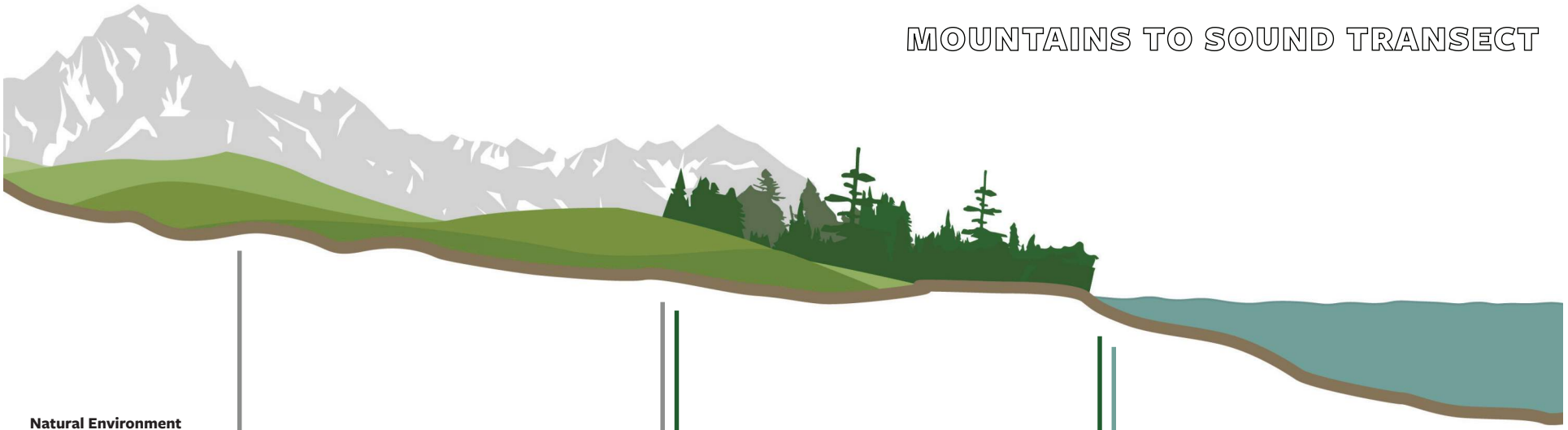
EMOTIONAL CHOREOGRAPHY

Travelers often approach a trip with a blend of excitement, concern, and anxiety. As a result, this document suggests locations, forms and intensities of thematic emphasis that are based on the various states of mind travelers experience in an airport.

THE VOCABULARY OF SPACES

To exemplify how themes and images can be applied to specific areas within the landscape, a vocabulary of spaces has been developed. Unifying elements are continuous applications of consistently designed elements that help unify the overall sense of the place. Gateways and portals offer sensory experiences using visual, aural or other elements to heighten the traveler's awareness of important transition points and entries. Focal points are highly designed elements that create interior or exterior landmarks.

MOUNTAINS TO SOUND TRANSECT



	MOUNTAINS & FOOTHILLS		FOREST & CLEARING		SOUND & OCEAN	
Natural Environment						
Land	The Cascade Range	The Olympic Range	Skagit Valley	Kitsap Peninsula	Cape Flattery	San Juan Islands
Water	Nisqually Glacier	Skykomish River	Nisqually Delta	Lake Washington	Pacific Beaches	Salish Sea
Plants	Hurricane Ridge	Wildflower Meadows	Hoh Rain Forest	Mt Vernon Tulip Fields	Kelp Farms	Oysters & Shrimping
Animals	Mountain Goats	Cougars	Bald Eagles	River Otter	Salmon	Orca
Cultural Environment						
Historical Faces	Chinese Builders	'The Klondikers'	Swedish Loggers	Immigrant Farmsteads	Coast Salish Tribes	Norwegian Fisherman
The Arts	Pilchuk School	Seattle Opera	Seattle Symphony	"On the Boards"	Buster Simpson	George Tsutakawa
Trade & Technology	BNSF Railroad	Weyerhauser	Boeing	Microsoft	Washington Ferries	Container Ships
Landmarks	Paradise Lodge	Mt. Rainier	Space Needle	Pike Place Market	Floating Bridges	Ballard Locks
Outdoor Recreation	Crystal Mt. Skiing	Rainier Summit Assent	Canoe River Trails	Burke Gilman Trail	Sea Kayaking	Sailing

APPLYING THE THEMES AND THE DESIGN VOCABULARY

The landscape vision found in this document provides guidance to aviation staff and design consultants as they plan the further development of the airport. The photographic images, plans, sketches, and narrative text in this section provide inspiration as to how the thematic approach could work as applied to landscape design.

Along with design exploration, future teams must also address maintenance, sustainability, and operational constraints through life cycle cost analyses, conservation, maintenance practices, public arts program, and an understanding of FAA and Port of Seattle safety concerns. This includes an understanding of how planting types and water features may attract wildlife or create vertical intrusions into runway areas and impact airline/passenger safety.

Designers should apply the principal theme and supporting themes using the design vocabulary to create a convenient and pleasant experience for travelers at the airport. However, the airport is a very transitory environment. As such, designers will need to coordinate their efforts with other planning and design projects, current guidelines and standards, current regulations and codes at the airport to create a coherent and consistent lasting image of Seattle-Tacoma International Airport.

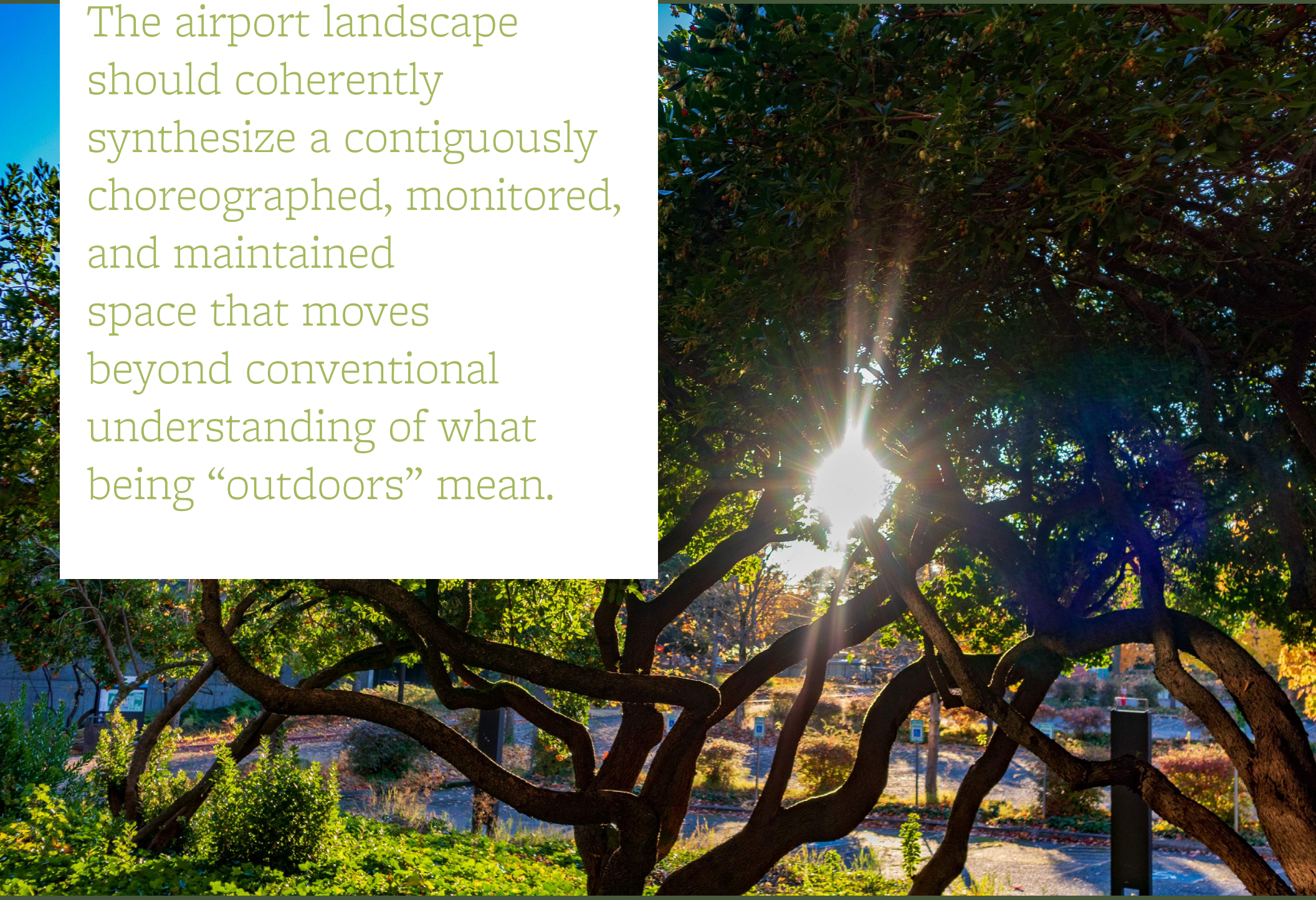
This we know. All things are connected.

— Chief Seattle

2

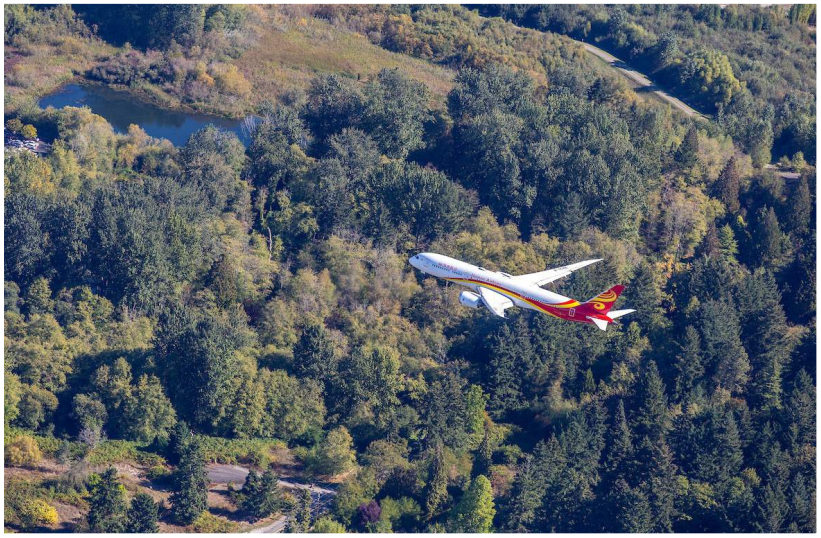
THE MODERN AIRPORT

The airport landscape should coherently synthesize a contiguously choreographed, monitored, and maintained space that moves beyond conventional understanding of what being “outdoors” mean.



The idea is not to copy nature, but to give a feeling of nature.

— Piet Oudolf



DESIGN PHILOSOPHY

As we enter the 21st century, a transition is underway in the relationship between urban airports and the communities they serve. The airport's role as a highly specialized exchange between air and ground transportation is changing rapidly. Business meetings and transactions, specialty shopping and restaurants, recreation and exhibitions are entwining airports into the daily life of communities and regions.

As a gateway to the Pacific Northwest, the airport needs a comprehensive vision and set of design directions to give it new energy and unite the many elements of the capital improvement program being implemented during the next decades into a coherent whole.

A renewed airport will be more than a premier, world class facility. It will be an integral part of the community and a vivid symbol of the region. As a gateway to the Pacific Northwest, it could also be a visually exciting and memorable place for the millions of travelers who will pass through each year.
To create this vision, the planning team explored all aspects of the visitor experience at Seattle-Tacoma International Airport- from the moment of arrival, through the terminal, along roadways, and out into the cityscape beyond.

This vision also explores ways for the airport to be a good neighbor to the communities it adjoins. As each continues to grow and mature, better pedestrian and vehicular connections are recommended to enhance the access between the airport and its neighbors.

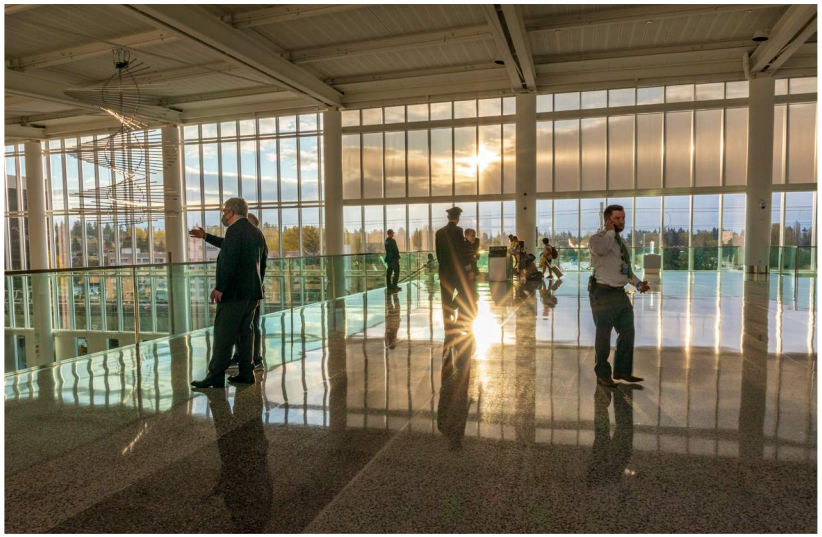
CREATING A MEMORABLE PLACE

Like a memorable individual or a vivid natural landscape, Seattle-Tacoma International Airport should emanate a strong, confident sense of itself and the region it serves.

By having a dynamic physical presence-combined with high quality service, courteous communications, and ease of movement, the airport can provide a satisfying and memorable experience for visitors.

The vision expresses key Northwest values that will provide a foundation for the thematic organization of the airport. In brief, these values include the important role of the environment, the rich diversity of cultures, an independent and entrepreneurial work ethic, and a fervor for active outdoor recreation.

The region's natural and built environments contain a rich source of thematic symbols that capture Northwest values. The distinctive Northwest culture – derived from its diversity and energy of people – can be expressed in faces, art, and symbols of resource-based industries, high technology, and trade around the Pacific Rim and the world. As the principal theme and supporting themes are developed, they form a sequence of memorable experiences for airport users.



The key to successful implementation of the vision lies with how future design teams use it to develop design concepts and details specific to each project.

PLANNING PROCESS

The goal of the vision was to develop an overall theme and supporting images for the facility, and describe how these could be applied to locations within the airport to achieve a cohesive and classical Northwest design.

Key planning and design criteria included environmental enhancement, customer satisfaction, safety, and the creation of a truly memorable Northwest experience- sustainable over time.

Public involvement during the planning process of this vision included airport users, neighbors, adjacent city governments, and other related public agencies.

This work is both visionary and practical. Future designers will be responsible for addressing maintainability, sustainability, and operational constraints for their projects. These issues should be addressed through life cycle cost analyses, conservation, maintenance guidelines and the development of an arts infrastructure.

An understanding of FAA and Port of Seattle safety concerns including plant palettes, wildlife attractants and vertical intrusions into runway safety areas and airline operations, as well as close coordination with the FAA and other governing agencies and departments, such as adjacent city governments and airport operations, will be critical to the successful implementation of this plan.

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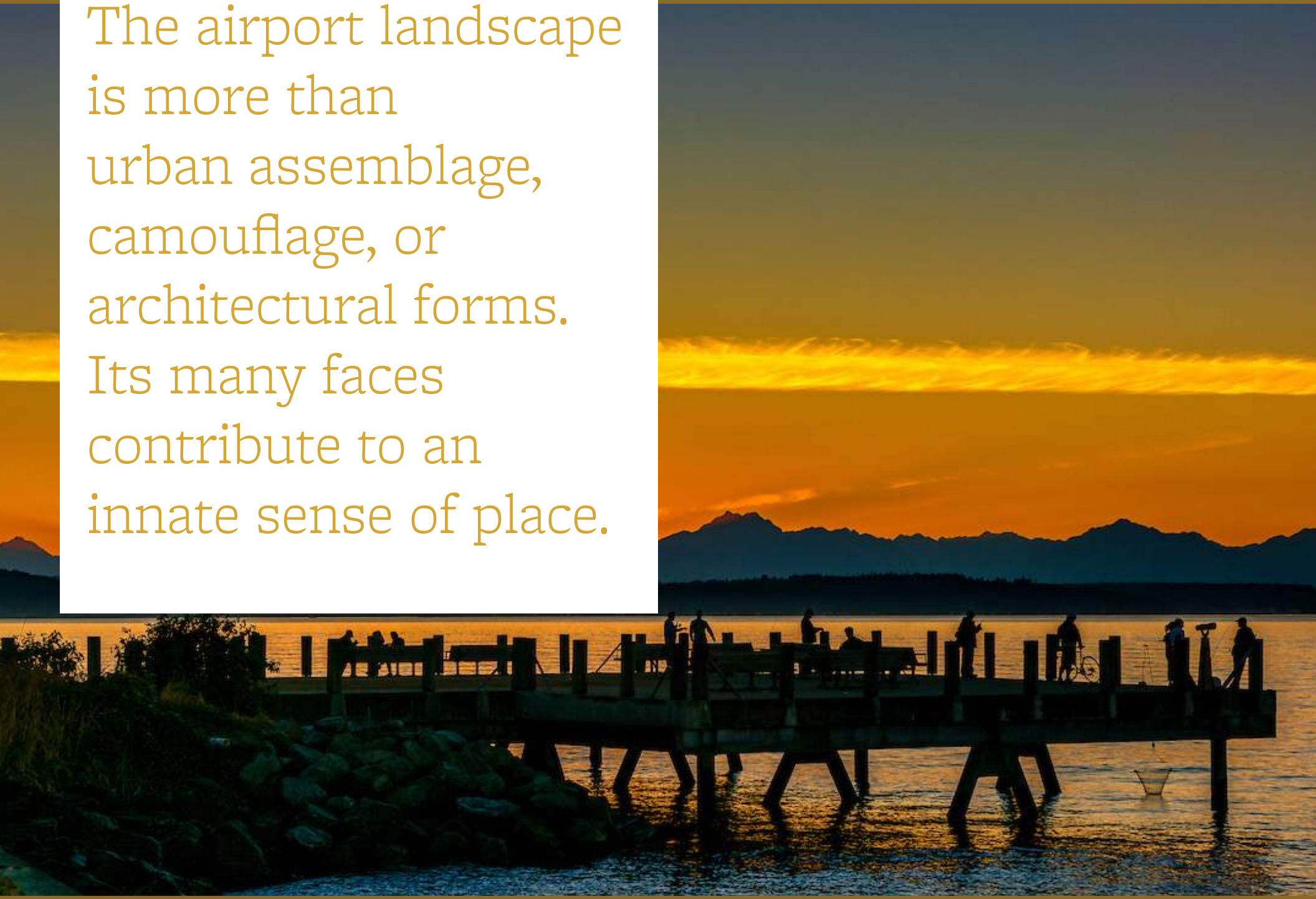
THEMATIC DEVELOPMENT

The airport landscape is more than urban assemblage, camouflage, or architectural forms. Its many faces contribute to an innate sense of place.



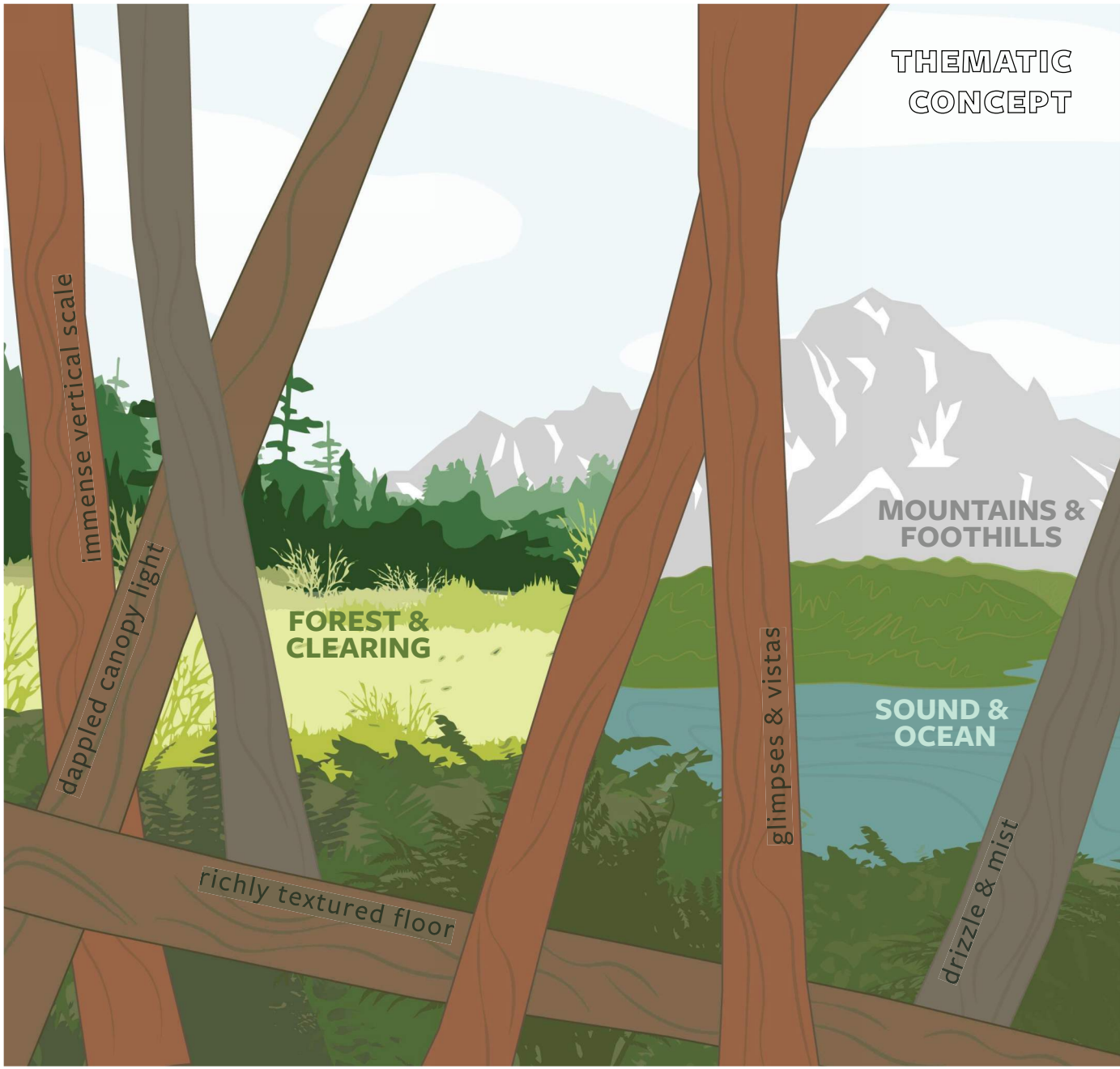
PRINCIPAL THEME:
NORTHWEST EVERGREEN FOREST

One of Seattle-Tacoma International Airport's primary roles is as a gateway to the Pacific Northwest. As such, it can introduce people to the unique physical characteristics found in this part of the world. For this purpose, the concepts and themes presented in this report were selected to symbolize, explain, and reinforce the physical qualities that set us apart from other places.

The widely varied natural landscapes of the Pacific Northwest offer windows to our past, present, and future. The singular, enduring image of western Washington- known throughout the world-is the rich, green, seemingly continuous forest of tall evergreen trees covering our mountains, spilling down into the foothills, extending into our cities, and down to the shores of Puget Sound and the Pacific Ocean (Exhibit 2).

To capture this image, the Northwest Evergreen Forest was selected as the principal theme to guide the design development of the airport's landscapes.

What makes the Northwest Evergreen Forest a particularly appropriate theme is the role it plays in defining the three geographic landscapes that lie between the Cascade Mountains and Puget Sound (Exhibit 3). In less than a hundred miles, the land descends from a height of 14,000 feet to depths of several thousand feet below sea level. Within this unique geographic setting, three archetypal landscapes support the Northwest Evergreen Forest theme. Designers can use the components found in each landscape to convey this principal guiding theme in different ways.



MOUNTAINS AND FOOTHILLS

The wall of the Cascade Mountains, with its two volcanic sentinels, Mount Rainier and Mount Baker, and the wilderness of the Olympic Mountains, are among the Northwest's most striking icons.

FORESTS AND CLEARINGS

A walk through a Northwest Forest is marked by the distinct contrast between the intimate, mystical enclosure of dark green trees, punctuated by the sunlit openings and vistas of clearings.

SOUND AND OCEAN

A source of food, transport, and recreation, the region's saltwater surroundings and islands provide a refreshing addition to the mountain peaks and dark green veils of evergreen forest.

The principal theme of the Northwest Evergreen Forest leads to two supporting themes. These two themes are used broadly to encompass geography, people, technology, commerce, and the arts. Each is described below by a selection of representative and evocative elements.

SUPPORTING THEME #1:
ELEMENTS OF THE NATURAL ENVIRONMENT

LAND

The landforms of the Northwest encompass the majestic heights of Mount Rainier and the Olympic Mountains to the fertile Skagit Valley lowlands. The San Juan Islands and the islands of Puget Sound flow into the rocky headlands of Cape Flattery and the beaches of Gray's Harbor and Long Beach.

WATER

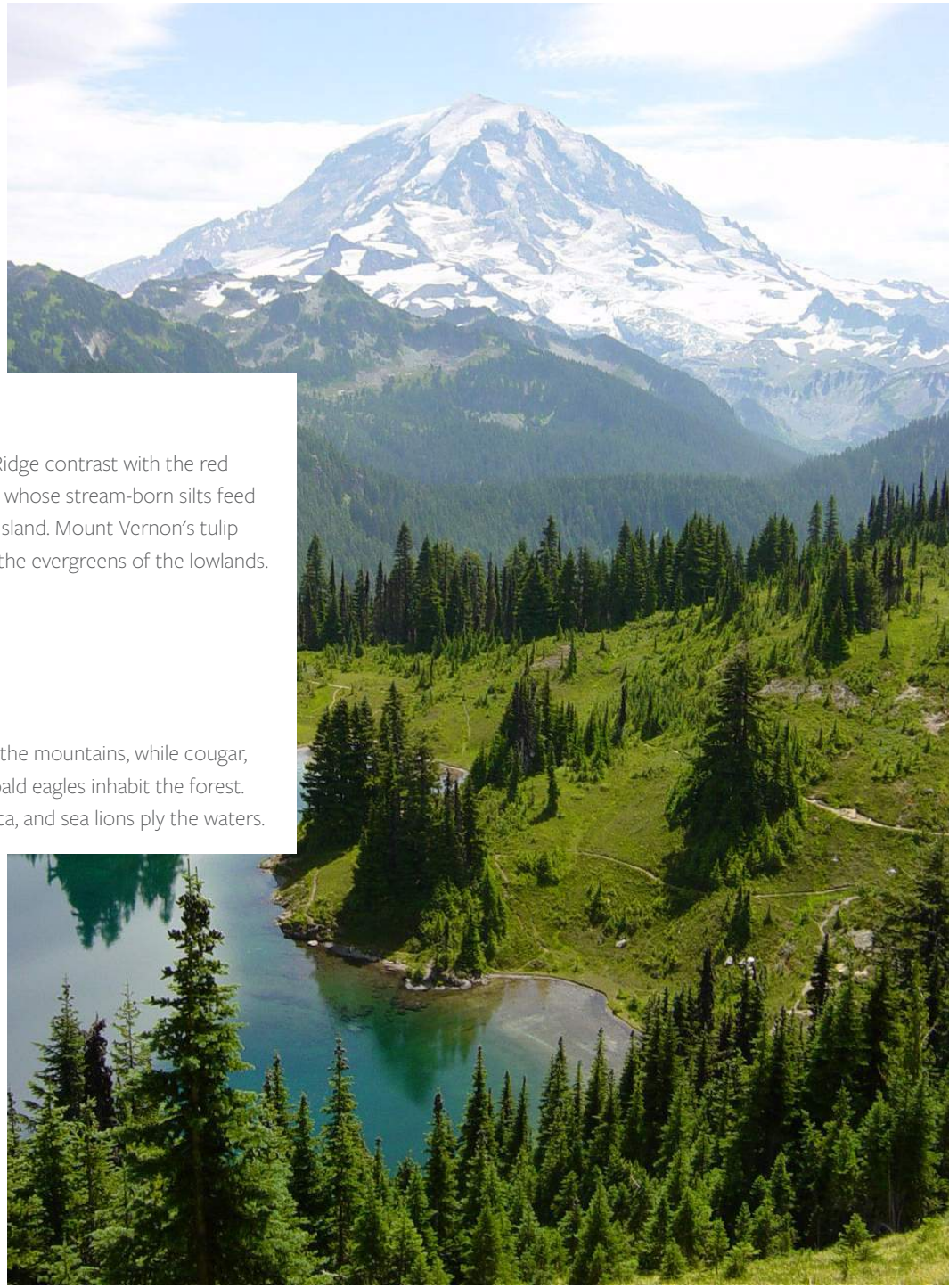
Northwest waters begin at the snows that feed the Nisqually glacier and the rains which fill the North Fork Skykomish River. They descend in streams, feeding the rich Nisqually delta and Lake Washington, before reaching Puget Sound and the Pacific Ocean.

PLANTS

The wildflowers of Hurricane Ridge contrast with the red cedars of the Hoh Rain Forest, whose stream-born silts feed the kelp forests of Desolation Island. Mount Vernon's tulip fields bring flashes of color to the evergreens of the lowlands.

WILDLIFE

Mountain goat and pika live in the mountains, while cougar, black bear, blacktail deer, and bald eagles inhabit the forest. Schools of salmon, pods of orca, and sea lions ply the waters.



SUPPORTING THEME #2:
ELEMENTS OF THE CULTURAL ENVIRONMENT

HISTORIC FACES

The Puget Sound's first inhabitants-the Coast Salish tribes-now share this temperate region with descendants of Swedish loggers, Norwegian fishermen, Chinese, Japanese and African American immigrants, and more recent immigrants from Southeast Asia. As Seattle's reputation as a special and livable place spreads, the next century will bring more newcomers with different customs, ideas, and talents.

LANDMARKS

The rugged, complex landscape has produced many unique landmarks. Perhaps the two most famous symbols, the Space Needle and the Washington State Ferries are instantly recognizable. Others include City Light dams along the upper Skagit River, floating bridges across Hood Canal and Lake Washington, and the Hiram Chittenden Locks in Ballard. Mount Rainier hosts Paradise Lodge, and the quirky Pike Place Market attracts people from all over the world.

THE ARTS

Mark Toby, Morris Graves, Jacob Lawrence and George Tsutakawa brought early national attention to Northwest art. In the 1970s and 1980s Dale Chihuly and the Pilchuck Glass School, and author Tom Robbins made their mark. The Seattle Opera and several dozen live theater and dance companies join Nirvana, Dave Matthews, and other pop bands to create a uniquely Northwest arts scene.

RECREATION

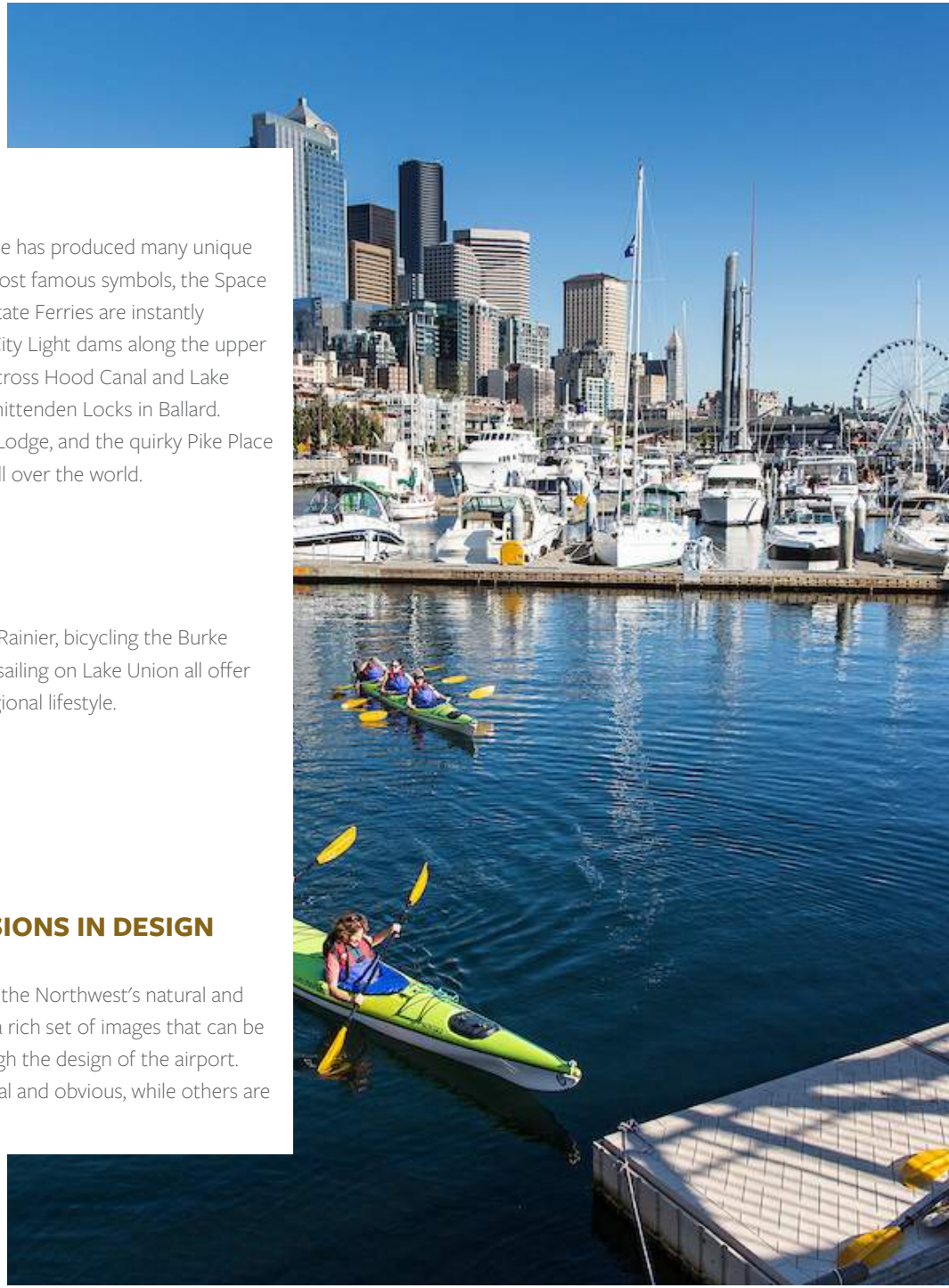
Hiking, skiing, climbing Mount Rainier, bicycling the Burke Gilman trail, sea kayaking, and sailing on Lake Union all offer strong, enduring images of regional lifestyle.

TRADE AND TECHNOLOGY

With its vast natural resources, this region supports companies such as Weyerhaeuser and Burlington Northern Santa Fe Railroad, as well as Alaska fishing fleets and shipbuilders. More recently, by changing the way people travel and communicate, Boeing and Microsoft have become household words. Our location in the Pacific Rim makes this region a key port for container ships and airplanes delivering and receiving products from Asia and other parts of the world.

THEMATIC EXPRESSIONS IN DESIGN

These descriptive examples of the Northwest's natural and cultural environment provide a rich set of images that can be expressed in many ways through the design of the airport. Some expressions may be literal and obvious, while others are subtle and referential.



4

BUILDING A DESIGN VOCABULARY

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The transitional and temporal essence of the airport's public landscape physically manifests the poetry of flow as people pass through the space.

FOREST STRUCTURE

This section suggests images that could be used to visualize the principal theme of the Northwest Evergreen Forest. The physical structure of the forest includes characteristics that can evoke a place that visually conveys a sense of the Pacific Northwest. Those characteristics that can help guide design include:

VERTICAL SCALE

The towering heights of old growth forests engender awe and respect in all who see them.

RICHLY TEXTURED GROUNDPLANE

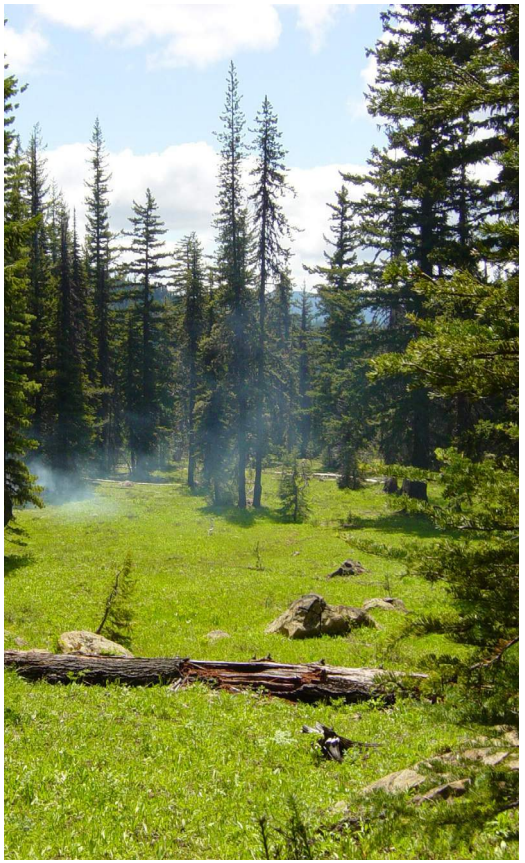
From nurse logs to drifts of ferns, and the white glimmer of trilliums, the deep woody patterns and primeval feeling of the forest floor leave an indelible impression.

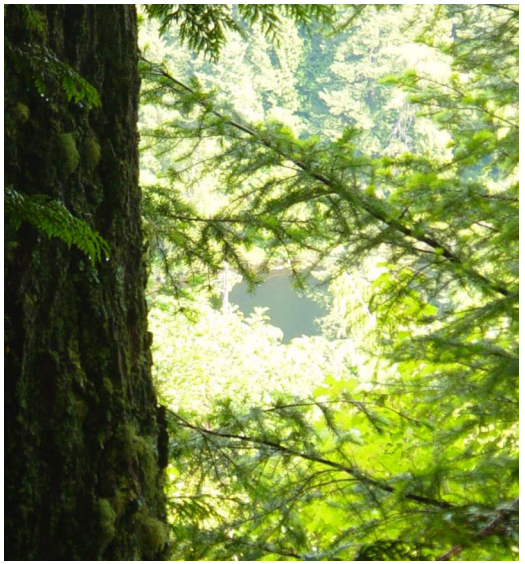
GLIMPSES AND VISTAS

The contrast of forests and clearing — along with the dramatic topography of hills, mountains, lakes, and sea — combine to create classic Northwest views.

DRIZZLE AND MIST

Countless shades of gray and variations of rain often veil the region, punctuated with periods of clear blue sky during months of summer sunshine and heat.





EMOTIONAL CHOREOGRAPHY

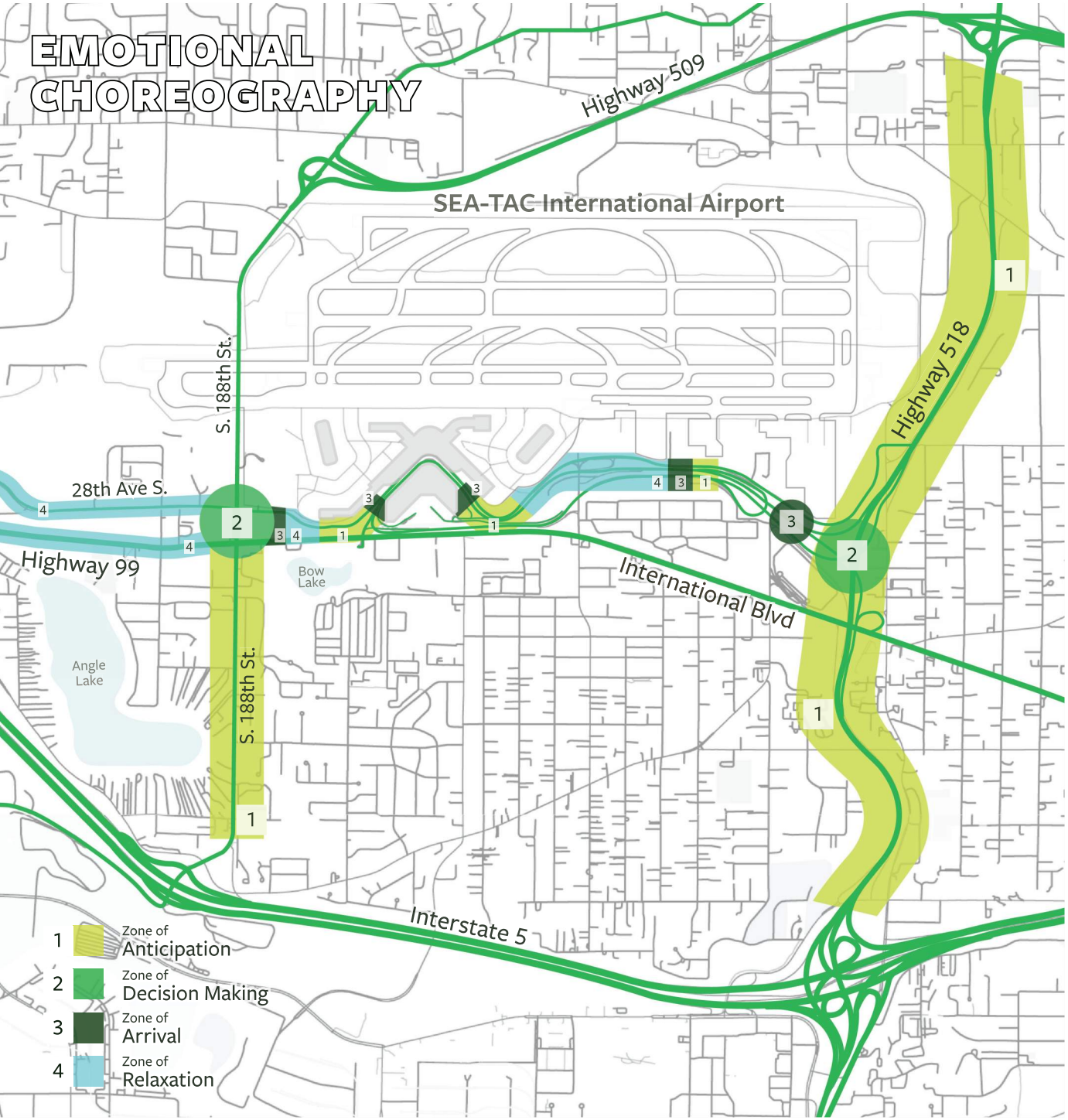
One way to organize the airport's landscape thematically is by acknowledging the traveler's state of mind, and ability to absorb information during the stressful processes of arrival and departure.

Travelers often approach a trip with a blend of excitement, concern, and anxiety. The design of an airport can actually make the experience of a traveler smooth, predictable and supportive.

A traveler experiences a sequence of emotional states while moving through the airport: anticipation, decision, arrival, and relaxation. Each of these states suggests a different location, form, and intensity of thematic emphasis (Exhibits 5 and 6).

ANTICIPATION

This emotional state occurs when traveling to the airport. The traveler is preoccupied with searching for clues about the approaching destination and contemplating the next major decision point. The long stretches of highway leading to the airport are suitable locations for presenting scenery, art, or large-scale interpretive elements that frame views and offer mild distraction, but do not demand attention.



DECISION

This emotional state occurs at points that require attention in order to determine the next direction or course of action. Examples are finding a route through the garage, searching for an airline ticket counter, and approaching security. Thematic presentation can assist decisions by making choices and pathways memorable. Thematic communication, however, must not confuse or obstruct the decision-making process.

ARRIVAL

Turning from the freeway onto the airport entry road, crossing the sky bridges to enter the main terminal, or emerging from a jetway for a first glimpse of the real Northwest, are places that should include a celebration of having arrived. Here is an opportunity to apply major statements which present our principal and supporting themes, and leave a lasting impression on the traveler.

RELAXATION

Much of one's time in an airport is spent waiting—in lines and in seats. The traveler's attention turns to resting, reading, thinking, or conversing to fill the time. Thematic presentations in areas of the airport where travelers congregate and wait can help make this period of time memorable. Often the amount of time involved in waiting allows for shopping, which also presents entrepreneurial opportunities for the airport and its tenants.

The region is culturally represented in visual media as diverse as film, paintings, and photography, revealing its form as a blend of technology, human agency, and ecology.

VOCABULARY OF SPACES

This section presents a simple vocabulary of spaces and treatment examples as tools to implement the principal and supporting themes at Seattle-Tacoma International Airport.

UNIFYING ELEMENT:

A continuous application of consistently designed elements that unifies the overall sense of the place.

Examples:

- Specifically designed lighting and distinctive color within the planting.
- Visually prominent pattern that suggests the region.
- Consistent textures (fine, coarse, narrow, or broad).

GATEWAY AND PORTAL

Use of visual elements to heighten the visitor's awareness of important transition points and entryways.

Examples:

- Passing under the 160th Street overpass.
- Pedestrian overpasses between Garage and Terminal.
- Vertical elements that frame a roadway or view.

FOCAL POINT

A concentrated use of art, architecture, landscape, and/or engineering to create a landmark. It may frame a view, draw special attention to a particular location, or create an identifiable juncture.

Examples:

- Sculptures placed at intersections, exits, or entrances.
- Landform features such as detention ponds, mounds, or sloped groundplanes.
- Tree grove or an isolated tree in an open space.

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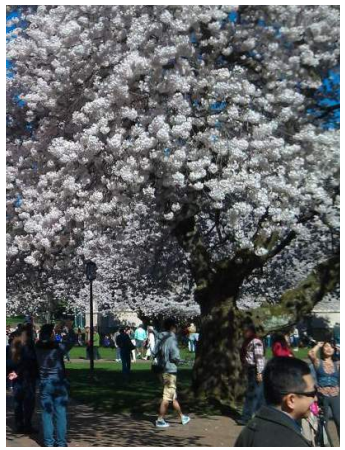
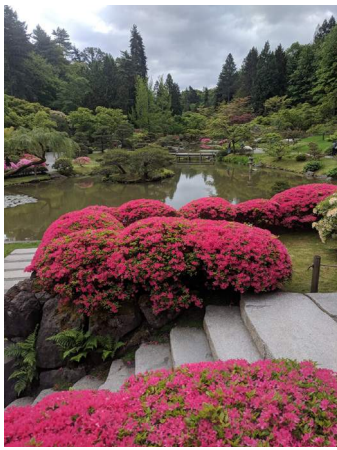
UNIFYING ELEMENT			
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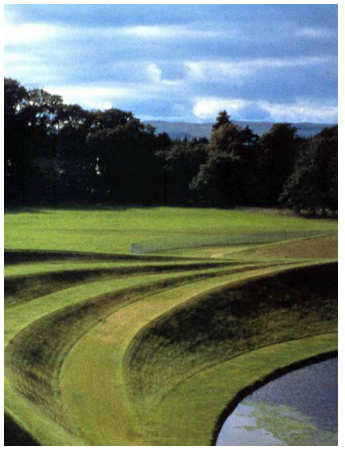
FOCAL POINTS			

2

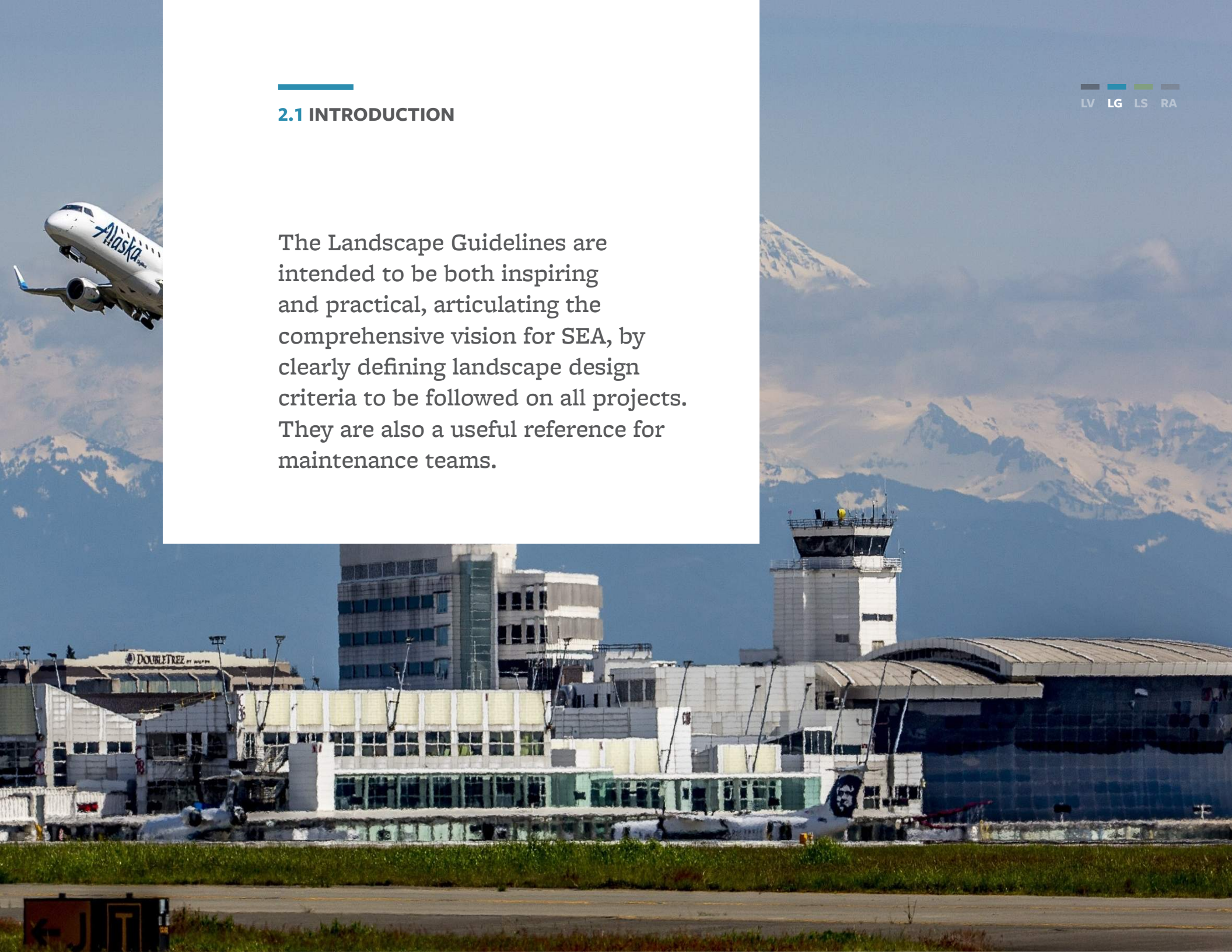
LANDSCAPE GUIDELINES

2

LANDSCAPE GUIDELINES

2.1 INTRODUCTION

The Landscape Guidelines are intended to be both inspiring and practical, articulating the comprehensive vision for SEA, by clearly defining landscape design criteria to be followed on all projects. They are also a useful reference for maintenance teams.



GENERAL DESIGN

The Northwest Evergreen Forest, as the principal guiding theme for SEA landscape, is envisioned as the overall structure to the landscape surrounding the airport. In places, it will be the dominant landscape theme. At the pedestrian scale or as an area of special emphasis, the forest will serve as a backdrop and frame for plants that are selected for their ornamental value (i.e., color, foliage, form, and massing). The Tree Stewardship Standards recommends incorporating trees into designs to offset the loss of trees due to development and other impacts. The plan requires that as planting designs are developed for each area, the structure of the planting design should be reflective of the multi-layered structure of the forest. At the forest floor level, this begins with groundcovers and herbaceous plants; at eye level, it includes shrubs and small trees, and at the canopy level the towering trunks of evergreen trees are found.

Parking Lots

Whenever and wherever parking lots are proposed within the airport complex, the following design criteria should be considered to integrate them within the Northwest Evergreen Forest theme:

- Provide perimeter and interior planting for screening and shade.
- Consider providing planting between rows of stalls to break up the expanse of paving where possible, particularly where visible from adjacent land uses or transportation corridors.
- Consider providing bio-filtration swales between rows of cars for removal of pollutants from storm water runoff, but do not allow standing water to form.
- Discuss porous paving solutions (geogrid and other successors to grasscrete) with Port stakeholders as alternatives to asphaltic concrete and concrete paving.
- Select plants suitable for harsh environments, and draw on the expertise of community resource agencies, such as the University of Washington's Center for Urban Horticulture, in defining emerging species and varieties.
- Refer to the Landscape Standards for more detailed requirements regarding landscape development at SEA.

Commercial Development

Where commercial development is proposed, it should be integrated within the Northwest Evergreen Forest theme. Recommendations include the following:

- Integrate regional aesthetic with open space development.
- Provide usable exterior spaces adjacent to the buildings for use by airport staff.
- Provide planting along public streets and exterior property lines to integrate the development with adjacent land uses and the surrounding communities.
- Refer to the Landscape Standards for more detailed requirements for landscape development at SEA.

Operational (Non-Public) Buildings

Where operational buildings, such as cargo hangers and maintenance facilities are proposed, their perimeters and edges along public streets and exterior property lines should be integrated within the Northwest Evergreen Forest theme and help integrate the facilities with adjacent land uses and the surrounding communities.

Open Space

Where development is proposed, open space should be considered for planting. Open space is defined as pervious areas, excluding areas with existing healthy tree canopy, with the potential to enhance landscape aesthetics and/or habitat areas.

There are two types of open space:

- On-site Open Space, hereby referred to as “Open Space” is an area within the project boundary or development footprint not proposed for hardscape or operational buildings. On-site Open Space is outside of landscape buffers, critical areas, or stormwater features.
- Off-site/Adjacent Open Space, hereby referred to as “Off-Site Open Space” are areas outside of and not directly associated with a project boundary or development footprint.

Refer to the **Landscape Standards** section for more detailed requirements regarding Open Space at SEA.

Green Roofs

The Port is currently evaluating the conditions and challenges associated with including green roof systems in projects. A pilot project is currently in development as part of this evaluation. The outcome of the pilot will inform further guidance on goals, constraints and general feasibility related to green roof applications.

Assessment of green roof feasibility for a project shall be reviewed on a project-by-project basis. The following considerations should be discussed with the SEA project manager in order to evaluate the possible inclusion of a green roof relative to project goals, opportunities, and constraints.

Possible benefits of a green roof include:

- Stormwater mitigation
- Beneficial wildlife habitat (pollinators)
- Aesthetic enhancement to visible roof areas
- Demonstration of ecological project goals
- Reduction of roof heat island effects
- Credits toward third-party certification frameworks, such as LEED

Refer to **General Landscape Considerations** for additional green roof considerations.

Vegetated Stormwater BMPs

Vegetated stormwater BMPs, such as bioretention swales and detention ponds, require close coordination with the civil engineering team members and review by Port Environmental staff.

Landscaping must comply with the Port of Seattle Stormwater Management Manual for Port Aviation Division Property (SWMM), current version. The SWMM includes requirements for low impact development (LID) BMPs, as further described in the STIA LID Guidelines (current edition). This LID guidance should be followed for specific requirements for landscape treatment and planting all vegetated stormwater facilities.

Refer to Environmental Landscape Features in the Landscape Standards section for additional requirements.

TREE REPLACEMENT

As per Commission Resolution 3821 (2024), tree replacement requirements were developed to further SEA land stewardship by mitigating operational and development impacts to trees and forests. If a regulated tree is cleared from a property within the Airport Activity Area ("AAA"), that regulated tree must be replaced at a 4:1 ratio. Credits toward the replacement requirement can include a combination of the following:

- Planting one tree in an on-site or off-site location
- Removing 200 square feet of invasive vegetation from an off-site location and replanting the area with native vegetation
- Retaining one regulated tree in an on-site location through project design and construction methods or protecting on a regulated tree in an off-site location through invasive removal (for example removing English ivy from a high-value tree)

Mitigation should be prioritized and maximized first on-site, then adjacent to the site before identifying additional off-site locations. Tree planting shall not be less than 50% of the credit allocation.

For tree replacement that occurs on-site or at adjacent locations, projects shall consider the potential for employee access to tree replacement areas to improve project equity and employee wellness benefits.

All trees removed from Port-owned property outside the AAA shall be replaced at time of removal according to applicable City standards or at least a 1:1 ratio; if they cannot be replaced on-site, then an off-site location should be used. Replacement trees shall meet all applicable requirements of these Landscape Standards (size, spacing, type, etc.). Replacement trees will be provided within the project area of removal; if this is not possible, alternate replacement tree locations may be determined in consultation with the appropriate municipality.

TREE REPLACEMENT

Tree Replacement Process

The following steps outline the process to follow if a tree is proposed to be removed. This process is also laid out in the **Tree Replacement Tool** found on Port of Seattle Website.

1. Inventory On-site Trees. This includes collecting the total count of regulated trees within the project boundary or development footprint, including those that will be cleared and those that will be protected. Document inventory using Regulated Tree Inventory Form which is included with the Tree Replacement Tool.

2. Calculate Tree Replacement Requirements. Use the Tree Replacement Tool to determine the number of credits that are required to offset tree clearing.

3. Plan Mitigation Actions. If on-site mitigation is feasible, identify actions to implement. This can include a combination of tree planting and high-value tree retention. If on-site mitigation is not feasible or does not off-set tree clearing, engage the Landscape Committee to determine off-site locations where mitigation can be implemented. Off-site mitigation includes tree planting, invasive species removal, and high-value tree protection. If mitigation will be implemented off-site, complete an inventory of existing conditions including invasive cover, count of regulated trees, and threats to regulated trees. Document inventory using Off-site Inventory Form which is included with the Tree Replacement Tool.

4. Confirm Tree Replacement Requirement is Met. Use the Tree Replacement Tool to confirm that the proposed mitigation credits will adequately offset tree clearing debits.

5. Complete mitigation. Actions shall be implemented concurrent with project construction. Refer **General Landscape Provisions** for implementation standards such as plant species, plant size, plant spacing, and soil and irrigation requirements.

HORTICULTURAL REQUIREMENTS AND SURVIVABILITY

Site Analysis

Select plants that will thrive with a minimum of maintenance requirements. The most important first step is a careful analysis of the intended sites. It should be noted that site conditions around the airport are extremely diverse. in terms of microclimate, exposure, and soil characteristics.

Therefore, designers and implementers of each landscape project should sample growing conditions on their site thoroughly. Newly created planting sites with fresh fill dirt are especially prone to exhibit differences in conditions over a small geographic area.

Microclimate

Above-ground site characteristics that should be evaluated include the following:

- Timing and intensity of sunlight, both throughout the day and the year.
- Presence of artificial sources of heat, usually human generated.
- Presence of topographic hollows and low points, where cold air will drain and create a local frost pocket.
- Local wind conditions, including any tunneling or eddying effects.
- Local sources of airborne pollution that could affect plant health and survival.
- In areas where plants already exist, those plants should be examined even if they will be removed-for clues to stressful conditions that may affect new plantings.

HORTICULTURAL REQUIREMENTS AND SURVIVABILITY

Soil Conditions

Soil conditions, often more critical to plant success than microclimate, deserve assessment. Specific soil conditions include the following:

- pH (or soil reactivity)
- Pollutants (including metals from previous sites of transported fill)
- Micro-nutrient presence and availability to plants
- Texture
- Structure
- Bulk density
- Drainage (tested directly, as opposed to educated guesses based on texture and bulk density)
- Presence and depth of surface organic layer
- Differentiation of soil horizons below the surface
- Sources of below-ground temperature anomaly (e.g., in soil over an underground building or parking garage).
- Salvaged or imported soil shall meet the following specifications within reasonable variations and shall be free of phyto-toxic materials and viable seeds, rhizomes, or roots of state-listed noxious weeds.

A careful consideration of the soil conditions will help landscape professionals select plants with stress tolerances and physiological ranges which are appropriate for the site. Other site conditions require modification before planting. For instance, sites that have well drained soils lacking in organic matter can be supplemented with compost mixes applied as a top dressing and incorporated into the top foot or so. Organic matter leaches to underlying soil fairly readily, so overly deep (and expensive) incorporation is usually not necessary.
Sites with poorly drained soils, which usually also lack sufficient organic matter, should be amended with a mix of sandy soil and compost. As discussed above, amendments should be incorporated into the ambient soil to a 12” depth in order to reduce any drastic discontinuity of soil texture, which can alter water drainage, and ultimately root growth.

If slope stability is an issue, which can be the case with slopes over 30 degrees from horizontal, landscape architects and installation contractors should consult soils and geotechnical engineers about the advisability of incorporating one or more geosynthetic materials to stabilize the slope until new vegetative cover can do so.

Landscape architects and designers need to be aware that empirical information on the performance of many native species under urban conditions still has room for improvement.

To achieve a successful landscape, it is best to incorporate a diverse plant palette that will simulate natural plant communities within microclimates that mimic pacific northwest forests, but also discourage hazardous wildlife.

HORTICULTURAL REQUIREMENTS AND SURVIVABILITY

Non-Native Plantings

Our maritime climate presents the opportunity for open-air cultivation of a much wider range of woody plants than is possible in many other temperate climate regions of the world. Because of this unique climate, many varieties of non-native plants are available to enhance and augment Pacific Northwest native species especially those non-native plants that thrive in xeriscape and low-water-use environments.

Invasive Species

Competition from unwanted, aggressive plants such as Himalayan blackberry, Scots broom, and English ivy can often ruin a new planting. Therefore, removing unwanted invaders is paramount in the first stages of site preparation.

Manual removal of the Himalayan blackberry should be followed by a plant specific application of herbicide. Follow up mowing should be part of maintenance program.

Scots broom should be completely removed with systemic eradication herbicide when the plant is in bloom. After foliage has died back, remove and dispose plants and roots. If re-growth occurs, a second application of herbicide may be required.

English ivy should be manually removed.

A mixture of overstory trees could be planted to achieve a multi-level canopy that will prevent adequate sunlight for the growth of blackberry and broom.

Refer to **Tree Replacement** section for additional requirements for invasive removal.

Containerized Plant Soils

In the special case of soil planters around the edge of the garage and above-ground, outdoor, plant containers, the most stressful condition is likely to be caused by reflected light and heat. Containerized soils experience much more extreme diurnal fluctuations in temperature than normal soils.

As a result, soil mixes should be light and appropriately drained (fast enough so roots do not drown, but slow enough to reduce over-frequent watering). Rapid establishment of plants also requires a thorough drip or deep root watering irrigation system.

IRRIGATION GUIDELINES

Irrigation is an important system that supports the Port's investment in landscape improvements and maintenance. The approach to irrigation reflects a balance of efficient water use and appropriate water needs for the variety of landscape areas on Port properties. Each system should be designed to meet sustainability goals while also supporting overall landscape goals specific to each project.

One goal of the Port is to provide a low-maintenance landscape that requires minimal and reduced irrigation. The selection of site-appropriate, hardy, and drought-tolerant plants that will survive in the microclimates of the SEAs built environment will minimize the need for ongoing irrigation after plants are established.

Consideration must be made for the changing climate of the region, including the need for periodic irrigation during increasingly frequent and longer-lasting periods of extreme drought. Extended drought conditions, sometimes lasting for months, leads to dry plants and subsequently an increased risk of wildfire hazard. Maintaining an operable irrigation system in place that can be turned on during emergency drought conditions will be necessary to ensure plants do not catch fire and produce hazardous sight-obscuring smoke near flight-paths and runways. The installation of in-ground irrigation systems allows for this reactivation function.

To align with the Airport's sustainability goals, high-flow irrigation methods should not be allowed. Systems should be designed with high-efficiency sprinklers or dripline and include automatic weather monitoring controllers in order to conserve water. The resulting slower water application facilitates deeper water penetration into soils, which promotes deeper root growth and increased drought resistance in the plants. Specific sustainability goals will be identified for each project based on an evaluation within the Sustainable Evaluation Framework (SEF) process.

Early evaluation of project goals and needs should inform choices for irrigation methods such as sprinkler or dripline selection, or in-ground versus above-ground piping. Projects with higher public access would benefit from in-ground piping and dripline to minimize irrigation system visibility and allow for periodic reactivation in times of drought.

Example water-efficient controller (Weathermatic).

IRRIGATION GUIDELINES

Meanwhile, projects with low public visibility or a strictly ecological restoration function may be suitable for temporary above-ground piping and broader sprinkler water application. Consideration should be given to the characteristics of each landscape, such as relative visibility, intended use or function of the landscape area, access by public or Port staff, or risk of vandalism. Additional considerations include higher plant stress conditions such as plantings under overhangs, or containerized plantings, which may require additional watering or year-round watering.

The Port is developing standards for green roof installations. These landscape types have unique irrigation needs and require an approach that considers factors such as low water applications, fire prevention plan requirements, and considerations for water supply and roof drainage. See **Green Roof** section for additional green roof design considerations.

Refer to **Tree Replacement** section for additional requirements for irrigation and watering.

GENERAL LANDSCAPE CONSIDERATIONS

Maintenance effectiveness and long-term maintenance costs of developed landscapes, particularly naturalized, are dependent on following factors which should be considered by both designers and maintenance personnel:

- Maintenance and appearance objectives
- Access for personnel and equipment
- Proper soil preparation and condition
- Establishment of effective drainage
- Following the forest progression
- Irrigation and water delivery systems
- Site topography
- Adequate traffic and pathway planning
- Ground surfacing and groundcover selection
- Use of pesticides and herbicides

These factors are detailed within this section. It is generally recommended that an experienced Certified Landscape Professional (CLP) with a background in maintenance operations be included in design teams for conceptual discussion, as well as to plan review and maintenance specifications. To best facilitate future development and improvement projects at the airport, it is recommended that a full-time landscape supervisor be hired at SEA airport to oversee landscape maintenance and design.

GENERAL LANDSCAPE CONSIDERATIONS

Maintenance and Appearance Objectives

The objective for the majority of airport property will be the maintenance and appearance of a natural landscape. Design teams should consider one of the following two planting options related to initial size of plant materials at installation and consider the associated budget implications:

- Natural forest progression - Landscape development plans that anticipate future maturity at a slower pace should be planted and maintained with densities anticipating natural plant form development and spacing.
- Mature, natural landscapes at installation - Creation of initial environments which attempt to duplicate or suggest mature, natural landscapes will require denser and more mature plantings (i.e., higher initial and ongoing maintenance cost) than those in which natural forest progression is encouraged as an alternative. Initial, high density, mature plantings may also require more attention to pruning, thinning, or transplanting operations. But because of their shade-providing characteristics, they may offer an advantage over the natural forest progression option because shade loving groundcover and lower story canopy materials can be established earlier in the landscape development process.

In perimeter areas, and those which are observed rather than interactive elements, natural development and maintenance practice should be used. However, provision should be made for maintenance operations to prevent or eliminate noxious and invasive species, even in natural areas. For more information, refer to Tree Stewardship Standards

Access for Maintenance Personnel and Equipment

The accessibility of landscape design features can have a large impact on the feasibility and long-range cost of maintenance operations. Designers should consider how each feature would be accessed by personnel, vehicles, and equipment.

For example, it is important to consider access along perimeter roadways to ensure that personnel and vehicles can safely enter and leave these areas. Safe access to planters and elevated interior or exterior plantings along garage parking ramps is recommended, as is access to interior or exterior atrium spaces-which may be glassed or otherwise separated from direct public access-and access for pruning and trimming hanging or cascading vine features.

Proper Soil Conditioning and Preparation

Typically, soils from large-scale construction are highly compacted, poorly draining, and usually deficient in organic material and nutrients needed for adequate plant establishment.

Particular attention should be devoted to soil structure in plantings where native materials are to be established.

Incorporation of composted organic materials is recommended, similar to current procedures used by Washington State Department of Transportation (WSDOT). Decompaction of soil prior to installation is also recommended.

It should be remembered that typical root zones exist in the top few inches of soil where plants retrieve most of their water, air, and nutrients. Adequate soil drainage in planting areas, with the exception of bog and wetland plantings, is essential. During installation procedures, care should be taken to avoid excessive layering and compaction of subsurface soils to assure adequate drainage and air pore space for root systems. There is little chance of compensating for poor soil drainage and aeration through maintenance practices.

Effective Drainage

Adequate surface, as well as subsurface, drainage is critical to the successful establishment of plant communities.

Because of their potential to act as wildlife hazard attractants, it is critical that landscape drainage patterns for planting areas consider collection patterns and destinations for surface water-to prevent the creation of lagoons, wetlands, and open water courses at the airport. Natural drainage should be encouraged where possible and where not, drainage collection should be planned to avoid pooling water. Flotation and flooding of either artificial or naturalized mulches should be avoided.

GENERAL LANDSCAPE CONSIDERATIONS

Following the Forest Progression

When selecting plants, designers should consider natural forest progression.

Here are some examples:

- Shade-loving groundcovers should not be used where the progression of landscape maturity will not establish shade conditions for some years.
- Vine maple (Acer circinatum) thrives best in well lighted, but shady environments. When planted in open sun, it will typically survive but not establish the attractive deep forest character normally intended.

If a mature forest, open clearing, or wetland character is intended, large size plant specimens need to be specified in the initial design. To the maximum extent possible, the presence and preservation of existing, naturalized plants particularly on the north and west sides of the airport facilities-is encouraged and must be considered early on in the grading and development planning process.

Irrigation and Water Delivery Systems

During their initial years of establishment, plant communities are sensitive to the presence of adequate moisture. To the extent that irrigation design can place water at or near the point of use, it is a wise investment to do so during the original design and installation phase.

Plants accustomed to moist woodland environments near water, or deeply shaded environments, may need additional water in a developed environment. In such situations, overhead spray sprinklers or dripline irrigation may be necessary beyond initial establishment periods, particularly where only intermittent or seasonal natural flows will be present.

In situations where natural development and adaptation of species will be encouraged, attention should be given to the fact that rainfall is highly variable throughout the Northwest, and annual rainfall levels at Seattle-Tacoma International Airport do not meet the levels of the western Olympic and Cascade Mountains slopes where many of these plants are native. Supplemental irrigation will be a necessity throughout most areas at the airport. Because irrigation systems are typically turned off during winter months, plantings located beneath overhead projections will not receive normal winter exposure to rainwater and thus, will be vulnerable to stress and in some cases death. In such situations, self-draining irrigation zones should be planned as year-round systems with adequate protection from freeze damage planned into the system.

Irrigation controls are an important part of each system and can provide specific zoning and timing of water application to accommodate the many different microclimates around the airport. Smart controllers, or weather-adjusting controllers, should be included in new or renovated irrigation systems. These types of controllers have access to weather data and can adjust the duration and frequency of zone watering schedules to account for recent rainfall or drought conditions. They can provide long-range savings with increased water use efficiency and in maintenance labor time by better supporting plantings with optimized water application.

Currently, the Port of Seattle does not have an irrigation central control system. However, smart controllers, with capacity to communicate with a central control system, would provide future functionality if a central control system is implemented.

Site Topography

Slope areas, whether elevated or depressed, should be designed with naturalizing plantings requiring minimum access and maintenance. This will have a beneficial impact on maintenance effectiveness and cost. Slopes exceeding 3: I horizontal to vertical should consider terracing and retainage, and should not be planted with grasses or groundcovers that will require mechanical mowing and trimming.

GENERAL LANDSCAPE CONSIDERATIONS

Traffic and Pathway Planning

Traffic patterns for human movement and activity that may affect the nature of plantings, groundcovers and walkways should be anticipated. Areas not intended for pedestrian access should be screened or guarded. Low-hanging tree branches, hanging vines. and plant sizing should consider pedestrian, as well as vehicular sight and visibility requirements, to avoid excessive pruning and trimming. Planting designs should encourage development of natural plant forms to the maximum extent possible.

An additional consideration, important in pedestrian environments is site security. Dense plantings should be avoided near parking lots or poorly lit locations where pedestrian access is required. The use of potentially flammable mulches should be avoided near all traffic paths where smoking materials may be tossed or disposed. This is particularly a concern in smoke-free airports, where entries and exits may be light-up or toss-out areas for smoking travelers.

Ground Surfacing and Groundcover Selection

Selection of groundcovers will affect the degree of maintenance required. Typically, bark mulch has been utilized as the most natural initial mulch product in the Northwest. It is encouraged on this project as an alternative to compost mulches, which tend to dry out, blow away, and encourage early weed and invasive species development. Compost mulches should only be used as an incorporated soil amendment.

In the forest environment of the conceptual plan, many native groundcovers have been recommended for the plant palette. Non-invasive species are to be encouraged, and shade versus sun tolerance levels must be considered. Again, where a deep shade or moisture-loving plant is specified, consideration must be given to forest progression and whether such a groundcover can be established initially, or deferred to a subsequent phase planting.

Subsequent maintenance intensity and cost will be determined largely by the extent to which a naturalized versus a developed appearance is desired, particularly in outlying areas of the conceptual plan. In general, naturalized conditions requiring lower maintenance intensity will be preferred. Leaf and needle drop should be retained, so that a natural duff or forest floor can develop. In developed areas, such as high use pedestrian zones, public entrances to the terminal, along International Boulevard, and portions of South 188th Street, a more maintained and developed appearance is preferred. In these areas the requirements for access, irrigation, nutrition, chemical, periodic mulch replenishment and pruning requirements will likely be higher.

Pesticides and Herbicides

Management and maintenance practices should be incorporated into airport operations to reduce pollutant loading to downstream surface waters. These include choosing (or modifying) landscape maintenance practices to reduce the amounts of nutrients and other pollutants that could enter stormwater runoff. An integrated vegetation management plan should be prepared, detailing management practices that reduce the use of chemicals such as fertilizers, herbicides, and pesticides, as well as irrigation practices that minimize surface runoff. Chemicals should be chosen that have little or no soluble phosphorus content, to avoid loading Miller and Des Moines Creeks. In addition, other methods of pest control should be considered including natural predators, plant selection, and maintenance practices.

Green Roofs

If a green roof is being considered for a project based on the project goals, multiple factors must be evaluated to identify the appropriate technical solution. Green roofs can have varied growth media configurations to suite the proposed function of the system (from thinnest to thickest: extensive, semi-intensive, intensive). The system may also be implemented as a unitized tray system or as a multi-layered system depending on project conditions and depth of growth media.

Green roof systems should be evaluated based on the following important project considerations:

- Installation on an existing or new roof
- Structural capacity (weight) of roof area
- Adjacency to outdoor roof areas
- Function of the green roof, for example: stormwater mitigation or aesthetic enhancement
- Micro-climatic conditions including shade, direct sun, or reflected light from adjacent structures
- Maintenance access, including fall protection
- Access to water and electricity for irrigation
- Wildlife management (refer to Appendix F: Wildlife Issues for further guidance)
- Fire code: fire prevention & irrigation
- Long term maintenance
- Wind uplift resistance
- Roof warranties
- LEED or other third-party certification credits
- Installation and materials costs

The green roofs described in these standards are considered inaccessible roof areas and thus considered unoccupied. Any access would be for maintenance and fire protection requirements, similar to other roof areas. Occupied roof terraces would require separate design considerations, code review, and coordination.

GENERAL LANDSCAPE CONSIDERATIONS

Green Roofs

The added weight of a green roof system can pose significant structural challenges, in particular if one is contemplated for an existing roof area. For new structures, foundation capacity, framing capacity, and seismic lateral force-resisting system capacity must be considered. For existing structures, structural capacity must be evaluated to determine feasibility and costs for retrofits.

The planting palette required for these specialty landscape conditions can vary based on the function of the green roof. Refer to **Plant Selection Standards** for more guidance on green roof plants.

3

LANDSCAPE STANDARDS

3

LANDSCAPE STANDARDS

3.1 INTRODUCTION

The landscape standards provide specific direction to screen undesirable views and visually buffer different land uses. They advance a more sustainable landscape through plant selection and maintenance standards, with an eye towards water conservation and tree management.

OVERVIEW

The following Landscape Standards are to be used to guide the design, implementation and management of exterior landscape areas at SEA. Building interior planting shall refer to the SEA Architectural Standards.

Goals

The goals of these Landscape Standards are:

1. To enhance the aesthetic character of SEA resulting in improved appearance to the surrounding community;
2. To improve the quality of the built environment;
3. To integrate SEA into the surrounding community;
4. To promote the retention and conservation of existing natural vegetation;
5. To promote ecological function and habitat availability impacted by development;
6. To offset impacts resulting from tree clearing;
7. To promote the safety and security of pedestrian, vehicular and aircraft traffic;
8. To promote land use compatibility; and
9. To promote the aesthetic landscape concept presented in the Landsape Vision.

The Landscape Standards will accomplish these goals by:

1. Screening undesirable views from the right-of-way and surrounding properties;
2. Providing a visual and physical buffer between different land uses;
3. Providing increased areas of permeable surfaces which allow infiltration of surface water, reduction in the quantity of storm water discharge, and improvement in the quality of storm water discharge;
4. Creating more sustainable landscapes through the use of drought- tolerant plants, “water-wise” irrigation techniques, and other innovative water management strategies;
5. Prioritizing species native to the Pacific Northwest to improve habitat function
6. Reducing wildlife hazards;
7. Utilizing landscaping adjacent to paved parking areas;
8. Retaining existing mature trees, as feasible;
9. Improving ecological function in open spaces through increasing tree canopy, reducing invasive vegetation, and protecting existing trees; and,
10. Planting trees.

OVERVIEW

Application

These Landscape Standards apply:

1. To all new development on vacant land or vacant property by the Port or its Tenants that requires a permit through either the Port's Airport Building Department or City of SeaTac's Department of Community and Economic Development.
2. When the cost of a building's redevelopment totals one-half (1/2) or more of the appraised value of the existing building, then the current Landscape Design Standards shall be integrated into the redevelopment project.
3. When a renovation/rehabilitation project exceeds $1 million in value.
4. When the Port removes tree obstructions as part of its Flight Corridor Safety Program.

These Landscape Standards shall not apply when a change of use occurs for a building or a site, unless the new use qualifies as a Temporary Use as defined by these Landscape Standards.

All references to the City of SeaTac shall apply only to Port properties within the City of SeaTac city limits.

Remaining on-site vegetated area not devoted to required landscaping by these Landscape Standards should adhere to the following:

- Remove invasive species and plant with shrubs and trees to realize a full canopy at maturity. No more than 20% of the remaining on-site vegetated area shall be tree canopy, as calculated using the "Maximum Spread" value for trees in the Approved Plant List (see Appendix H). Existing trees shall not be removed to meet this requirement. Existing native vegetation in these areas shall be retained to the extent feasible.
- Wildlife hazards or attractants, as determined by the Airport Wildlife Manager, will be managed using appropriate wildlife mitigation techniques, such as, selective tree harvesting (see Tree Stewardship Standards).
- No landscaping will be allowed, other than grass type(s) specified in the Port Guide Specifications, inside the Landscaping Exclusion Zone (See Appendix A).

PROJECT REVIEW AND APPROVAL PROCESS

Landscape Plan Review and Approval

As identified in the ILA (refer to Section 5.2 of the ILA), the Airport Building Department shall administer and enforce the requirements of these Landscape Standards where the Port has authority to issue building permits, and the City of SeaTac Building Department shall administer and enforce the requirements of these Landscape Standards where the City has authority to issue building permits.

Each project on Port property is required to complete the pre-application checklist (refer to Section 5.6 of the ILA). The Port's Airport Building Department reviews all pre-application checklists before they are sent to the City of SeaTac. As part of that review the Airport Building Department will advise the Project Manager if additional requirements from the Landscape Design Guidelines may apply. The Project Manager is then responsible for scheduling a meeting with the Landscape Committee to get additional clarification regarding the potential scope.

Landscape areas located outside the FAA Critical Area, but within five (5) statute miles of SEA aircraft movement areas, loading ramps, or aircraft parking areas, may be reviewed by the FAA as needed to determine if they present potential wildlife hazards to aircraft operations. Any requirements or design changes made by the FAA relating to the safety and security of SEA shall supersede the requirements of these Landscape Standards.

The Landscape Committee (see Appendix C) shall determine whether additional or less landscaping is required as follows:

- to build on the Landscape Guidelines and comply with the Landscape Vision
- to minimize or to mitigate visual impacts of projects developed on "edges" of properties,
- to ensure proposed landscaping meets the highest and best use from a natural resources standpoint, or
- to ensure tree clearing impacts are offset through tree replacement requirements.

Alternative landscaping may be required to mitigate wildlife attractants as determined by the Airport Wildlife Manager and in accordance with FAA Certificate requirements. Less landscaping shall require approval by the Landscape Committee via the variance process.

To request changes, additions or removal of any portion of these Standards, refer to the Landscape Standards Update Request form on the Port of Seattle SharePoint site (see **Appendix B**).

All special or unique conditions not explicitly covered by these Landscape Standards will be addressed on a case-by-case basis through the Landscape Committee. In addition, if regulated trees are being removed from Port-owned property and the Tree Stewardship Standards apply to the project, the Tree Stewardship Standards need to be followed.

PROJECT REVIEW AND APPROVAL PROCESS

Variance Process

A variance from any portion of these Landscape Standards may be approved by the Landscape Committee where:

1. A literal application or enforcement of these Landscape Standards would result in practical difficulty or unnecessary hardship;
2. There are extraordinary circumstances, such as irregular lot shape, size or natural features of a property, or the physical character or configuration of a property is such that the strict implementation of these Landscape Standards will impose unnecessary hardships of the applicant or significantly interfere with reasonable use of the property;
3. The difficult or hardship circumstances described above is not the result of deed restrictions or the applicant's own actions;
4. The design of the project is compatible with other authorized uses within the area and will not cause adverse impacts, such as a lack of visual screening;
5. The variance will not constitute a grant of special privilege not enjoyed by the other properties in the area;
6. The variance requested is the minimum necessary to afford relief;
7. The public interest will not suffer any substantial detrimental effect; and
8. The relief granted will be in accordance with the spirit, or intent, of these Landscape Standards.

PROJECT REVIEW AND APPROVAL PROCESS

The applicant for the Variance Request must clearly state why the variance is requested based on the items above and how the requested variance will still meet the overall intent of these Landscape Standards. Refer to the Variance Request Form on the Port of Seattle SharePoint site (see Appendix B).

Items to be considered in reviewing a Variance Request include, but are not limited to, the following:

- Visual Character: Supports the goals and visual design character and/or level of screening expressed in these Landscape Standards and in the Landscape Design Guidelines. This includes consideration of density, heights, appearance, and types of planting and screening.
- Safety/Security: The design must ensure the safety and security of the traveling public. The design shall not create a condition that would constitute a current or future wildlife hazard attractant.
- Maintainability: The design can be maintained per these Landscape Standards and/or other industry-standard, best management practices. Both short-term and long-term maintenance must be considered.
- Environmental: The design shall meet or exceed all relevant federal, state, and local environmental regulations.
- Interlocal Agreement (ILA): The design must be consistent with ILA commitments.

The Landscape Committee shall either approve or disapprove a Variance Request within ten business days of receipt. If approved, a variance shall be issued in writing within ten business days. Appeals shall follow the process in Resolution #3745, Building Code Adoption, Section 13. If disapproved, the Landscape Committee shall provide a written statement explaining the reasons for disapproval within ten business days. Additional conditions may be imposed by the Landscape Committee upon granting a Variance Request.

An appeal to a decision regarding a Variance Request may be made, in writing, within two weeks of the date the Variance Request was approved or disapproved.

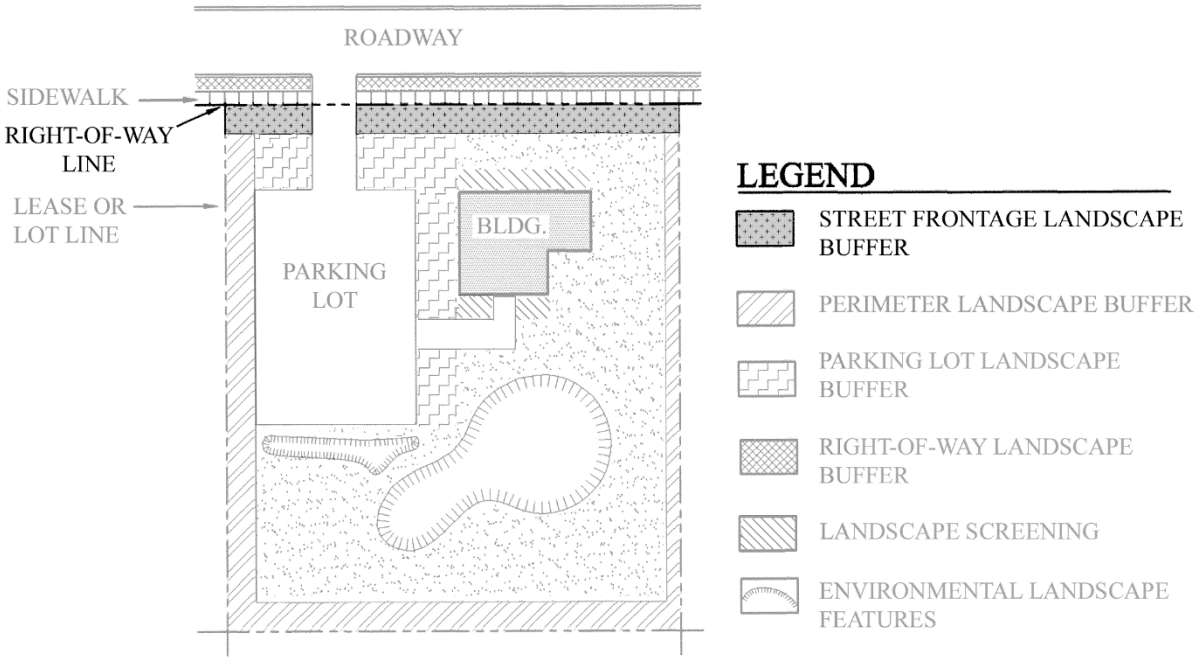
LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PURPOSE

The intent of the following types of landscape treatment is to serve as minimum requirements for quality landscaping at SEA and to meet the goals outlined in the Landscape Standards overview.

All Landscape Buffer and Screening Types shall meet the requirements outlined in the General Landscaping Provisions.

LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: STREET FRONTAGE LANDSCAPE BUFFER

Type 1 Partial Buffer



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: STREET FRONTAGE LANDSCAPE BUFFER

Location

Street Frontage Landscape Buffer shall be located adjacent to a right-of-way line, behind a sidewalk. Where a lease or lot line is set back and not directly adjacent to a right-of-way line, and no other developable Port lot is located between the lease or lot line and the right-of-way line, the Street Frontage Landscape Buffer along that lease or lot line shall be moved so that it is located directly adjacent to the right-of-way, but still within Port property.

Requirements

For on-site Street Frontage Landscape Buffer in all uses, provide Type 1 Partial Buffer.

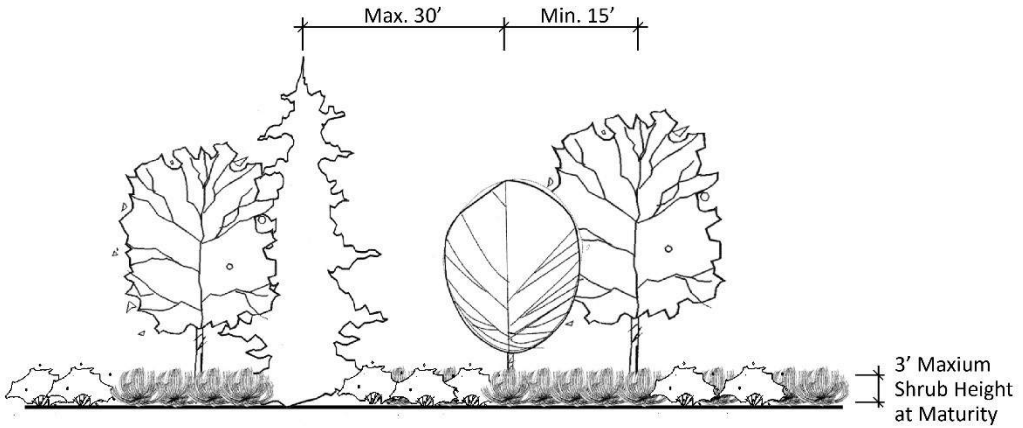
Type 1 Partial Buffer

Type 1 Partial Buffer functions as a partial visual separator and shall be as follows:

1. Landscape areas shall provide shade and visual relief wherever possible and maintain clear sight lines.
2. Landscape buffer areas shall have a narrow dimension of no less than ten (10) feet.
3. Trees:
   a. Canopy-type deciduous and evergreen trees chosen to result in a variety of canopy types and tree heights throughout the buffer.
   b. Trees shall be provided at a rate of one (1) tree for every twenty-five (25) linear feet of landscape buffer.
   c. At least 70% of the trees shall be deciduous.
   d. Tree spacing may be evenly spaced or may vary between fifteen (15) and thirty (30) feet.
4. Shrubs:
   a. Shrubs that do not exceed a height at maturity of three (3) feet.
   b. A variety of shrub species shall be chosen.
   c. Provide a double row of shrubs at on-center, triangular spacing; spaced so that they will have grown together within three (3) years
   d. At least 50% of the shrubs shall be evergreen.
5. Living groundcovers:
   a. Groundcovers shall be a height between one (1) and two (2)feet at maturity.
   b. Groundcovers shall be 100% evergreen.

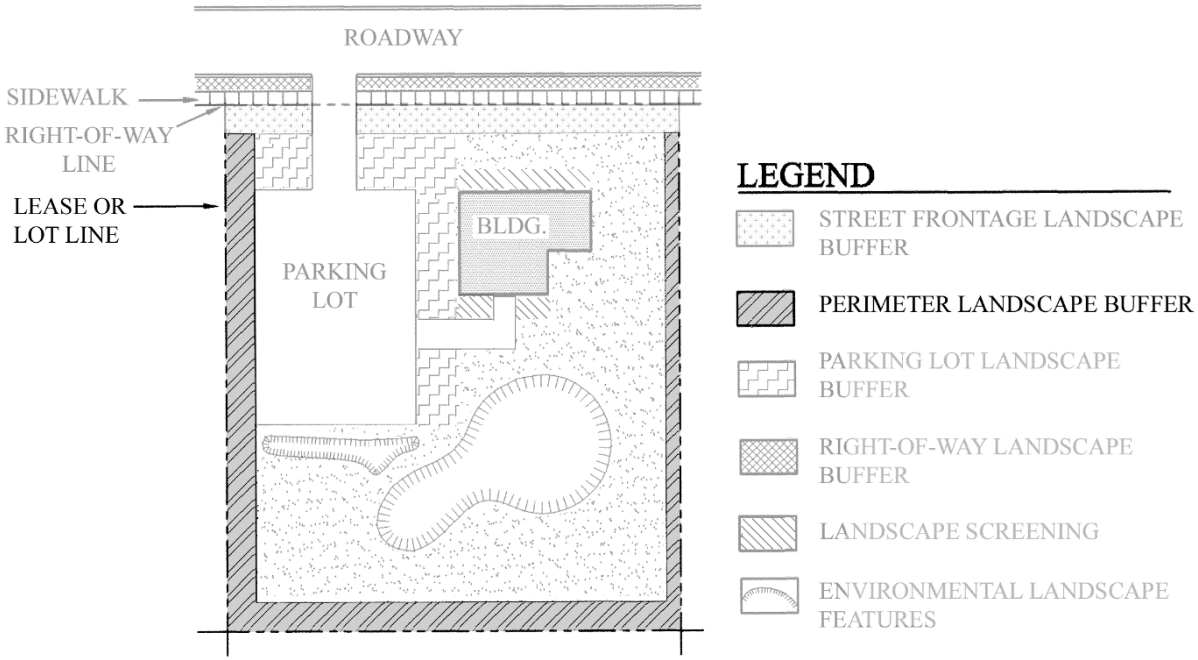
LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: STREET FRONTAGE LANDSCAPE BUFFER

Type 1 Partial Buffer



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PERIMETER LANDSCAPE BUFFER

Type 2 Full Buffer &
Type 3 Filtered Buffer



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PERIMETER LANDSCAPE BUFFER

Location

Perimeter Landscape Buffer shall be located adjacent to a Port lease or lot line.

Requirements

Perimeter Landscape Buffers shall be provided in accordance with the table below. Refer to the following descriptions for requirements specific to each buffer type listed in the table.

ADJACENT USE	REQUIREMENTS ALONG SIDE AND REAR PERIMETERS
Residential	Type 2 Full Buffer
Non-Residential - Port Owned	None
Non-Residential - Not Port Owned	Type 3 Filtered Buffer
Demolished Property	See Demolished Properties Section V.
Temporary Use	See Temporary Use Section VI.

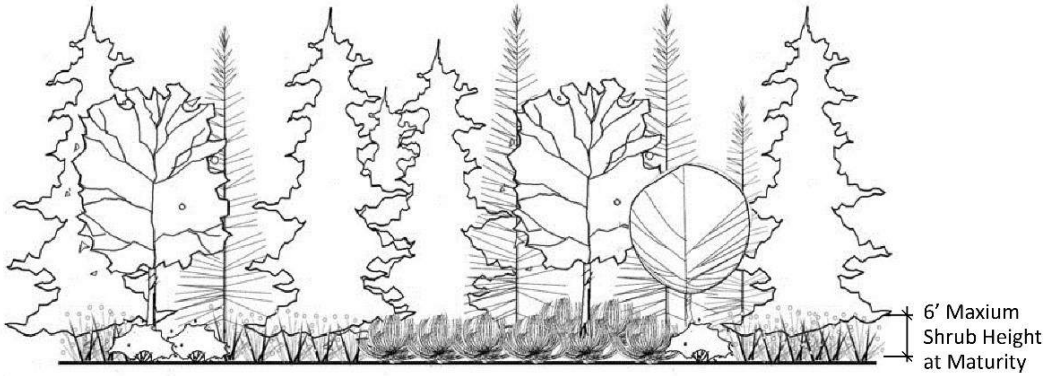
Type 2 Full Buffer

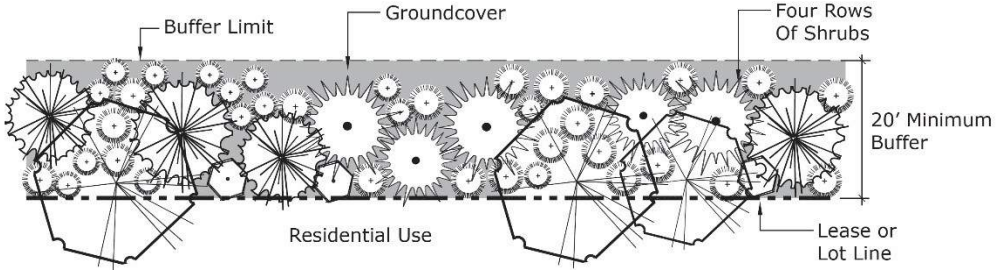
Type 2 Full Buffer planting shall meet all of the following criteria:

1. Minimum 20' wide side and rear perimeter buffers as measured from the edge of the lease or lot line.
2. Trees, shrubs, and groundcovers shall prioritize native and/or xeric plant species, when feasible.
3. Trees:
   a. Deciduous and evergreen trees provided at a rate of one (1) tree for every ten (10) linear feet of landscape buffer.
   b. Trees shall be spaced with triangular spacing (staggered) in a manner sufficient to obscure sight through the buffer.
   c. At least 70% of the trees shall be evergreen.
4. Shrubs:
   a. Shrubs shall be a species that does not exceed a height at maturity of six (6) feet.
   b. A variety of shrub species shall be chosen.
   c. Provide four rows of shrubs at on-center, triangular spacing; spaced so that they will have grown together within three (3) years.
   d. At least 90% of the shrubs shall be evergreen.
5. Living groundcovers:
   a. Groundcovers shall be a height between one (1) and two (2) feet at maturity.
   b. Groundcovers shall be 100% evergreen.

LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PERIMETER LANDSCAPE BUFFER

Type 2 Full Buffer





LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PERIMETER LANDSCAPE BUFFER

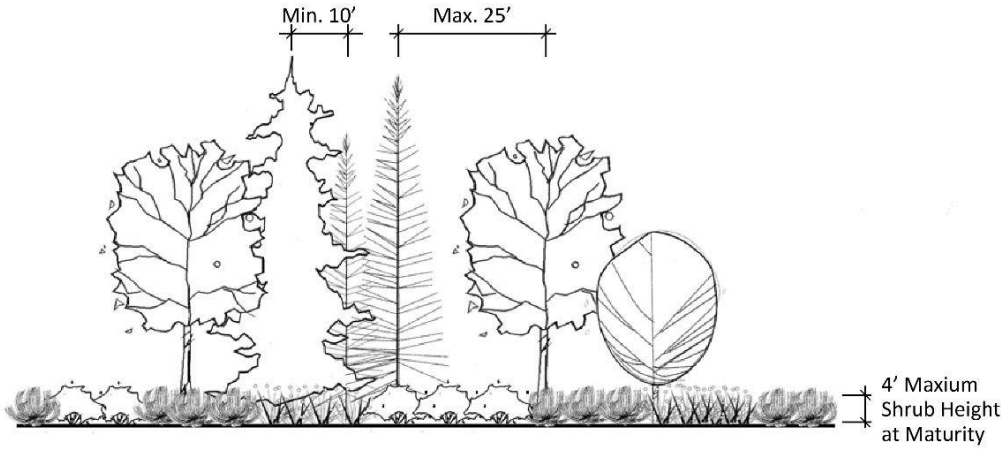
Type 3 Filtered Buffer

Type 3 Filtered Buffer planting shall meet all of the following criteria:

1. Minimum 10' wide buffer as measured from the edge of the lease or lot line.
2. Trees, shrubs, and groundcovers shall prioritize native and/or xeric plant species, when feasible.
3. Trees and shrubs chosen and spaced so as to grow together within three (3) years in a manner sufficient to provide a filtered view through the buffer.
4. Trees:
   a. Deciduous and evergreen trees provided at a rate of one (1) tree for every twenty (20) linear feet of landscape buffer.
   b. Tree spacing may be evenly spaced or may vary between ten (10) and twenty-five (25) feet so as to create a filtered buffer.
   c. At least 30% of the trees shall be evergreen and 50% deciduous.
5. Shrubs:
   a. Shrubs shall be a species that does not exceed a height at maturity of four (4) feet.
   b. A variety of shrub species shall be chosen.
   c. Provide three rows of shrubs at on-center, triangular spacing; spaced so that they will have grown together within three (3) years.
   d. At least 70% of the shrubs shall be evergreen.
6. Living groundcovers:
   a. Groundcovers shall be a height between one (1) and two (2) feet at maturity.
   b. Groundcovers shall be 100% evergreen.

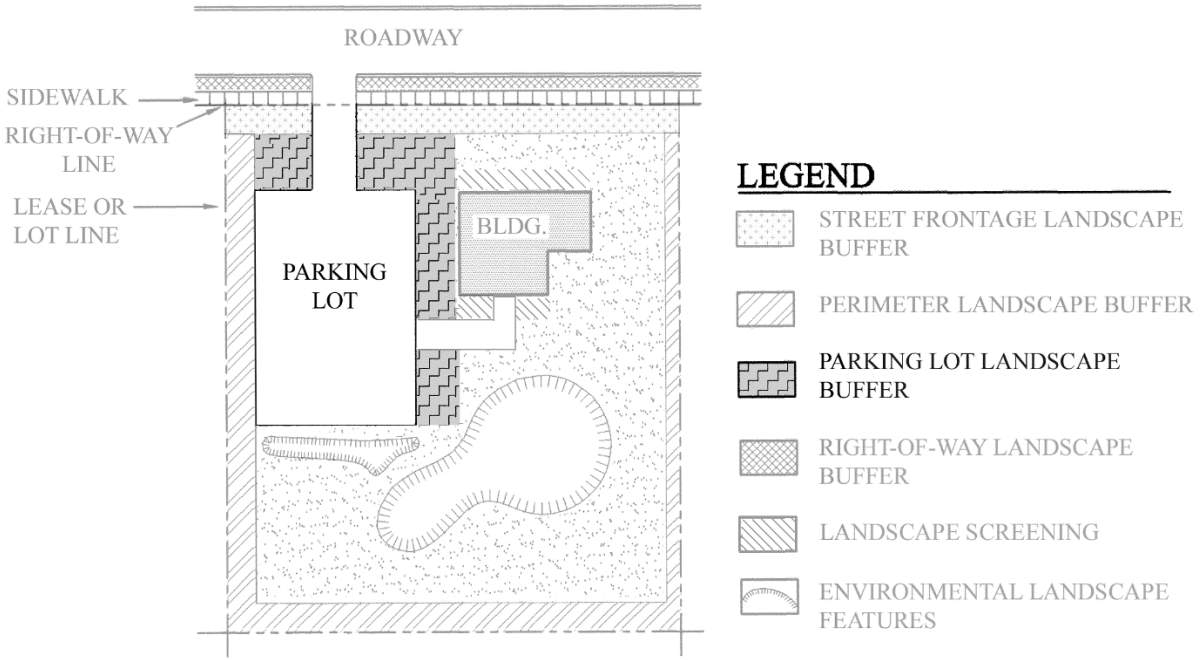
LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PERIMETER LANDSCAPE BUFFER

Type 3 Filtered Buffer



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PARKING LOT LANDSCAPE BUFFER

Type 4 Parking Buffer



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PARKING LOT LANDSCAPE BUFFER

Location

Adjacent to and/or within surface parking areas outside the AOA. Landscaping will not be required in parking areas inside the AOA.

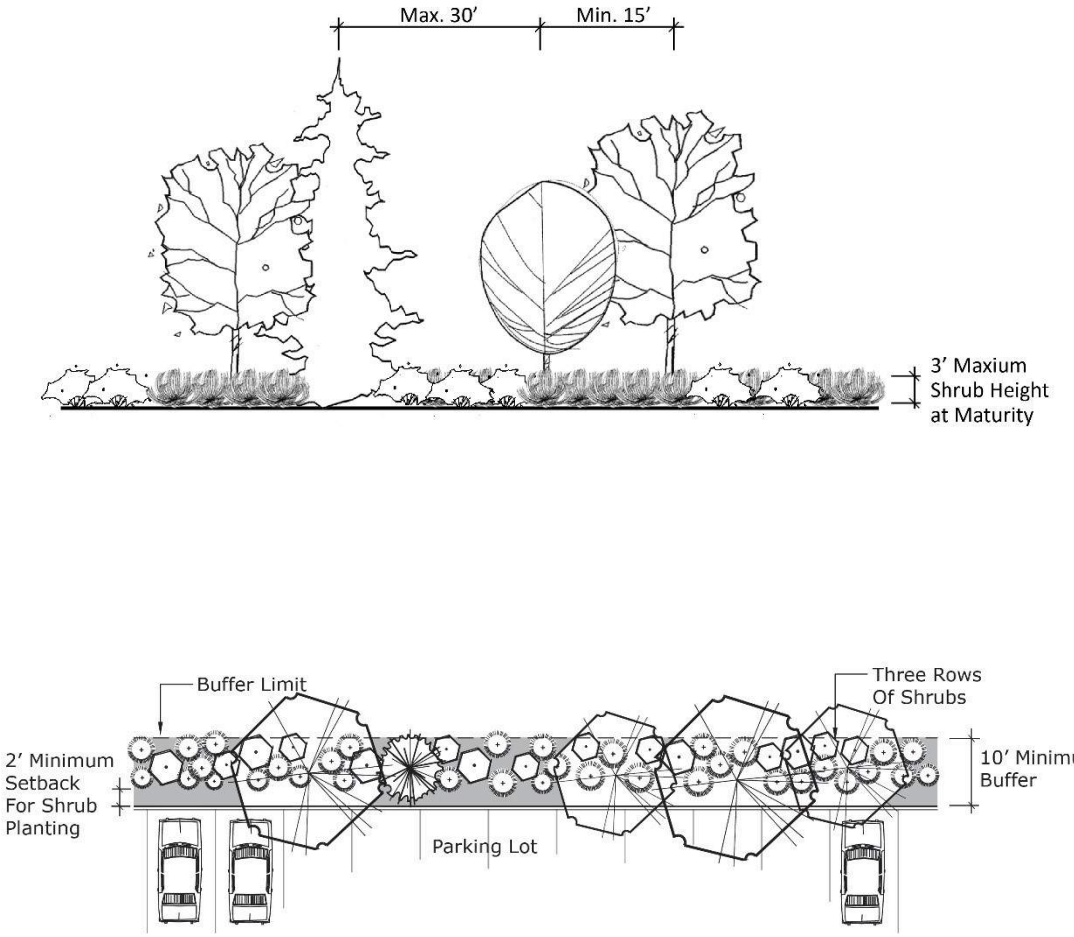
Type 4 Parking Buffer

Type 4 Parking Buffer functions as a partial visual screen. Planting shall be provided per Type 1 Partial Buffer requirements above and as follows:

1. Add one (1) row of shrubs so that there are three (3) total rows of shrubs.
2. Interior planting areas shall be located at the perimeter of the parking lot and/or clustered at the lot entry drives to allow for the greatest flexibility and use of the interior of the parking lot area.
3. The combined, interior planting area and planting buffer area shall be a minimum of 10% of the interior parking lot area, including parking spaces and driving aisles, but not less than the required ten (10) foot wide planting buffer.
4. Planting areas meeting the requirements of a Type 4 Parking Buffer cannot be substituted and shall take precedence to any other required buffer or screening requirements.
5. Permanent curbs or structural barriers shall be provided to protect the plantings from vehicle overhang.
6. Plants within two (2) feet of a permanent curb or structural barrier shall not exceed a height of one (1) foot to allow for car overhangs, unless additional wheel stops are used.

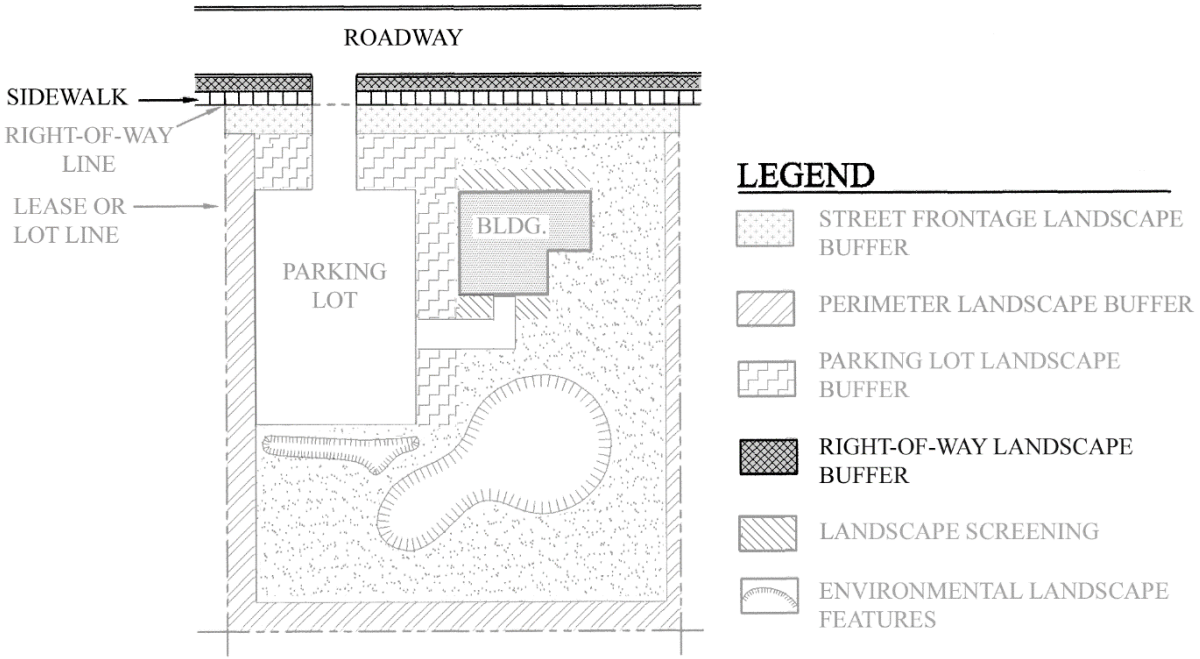
LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: PARKING LOT LANDSCAPE BUFFER

Type 4 Parking Buffer



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: RIGHT-OF-WAY LANDSCAPE BUFFER

Type 5 Right-Of-Way Buffer



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: RIGHT-OF-WAY LANDSCAPE BUFFER

Location

Right-of-way landscape buffer shall be provided along the property frontage, within the street right-of- way by the Port or Tenant, as applicable and as follows:

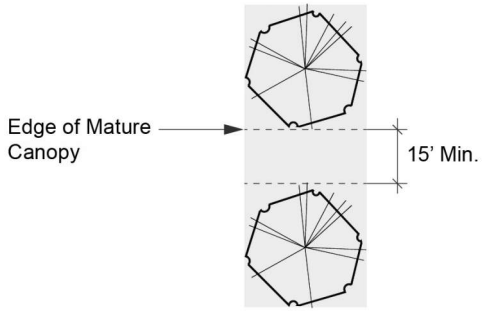
ROADWAY CLASSIFICATION*	APPROXIMATE TREE QUANTITY**
Principal Arterial - Airport Expressway	40’ on center
Principal Arterial - Terminal Roadway System (adjacent to buildings)	Optional - trees not required
Minor Arterial - Air Cargo Rd and portions of S. 160th St and S 170th St	40’ on center
Service Road (open to the public)	40’ on center

* Refer to Appendix E for a map of roadway classifications.
** Spacing identified is intended to be used to calculate the general quantity of trees to be provided and does not include access curb cuts, such as driveway entrances. Actual tree spacing will vary per the requirements outlined below.

Type 5 Right-Of-Way Buffer

Landscaping in this area should generally unify the overall roadway and/or street corridor. Right-of-way buffer functions as a partial visual separator. Type 5 Right-of-way Buffer shall be as follows:

1. Minimum width of five (5) feet shall be provided within the roadway right-of-way adjacent and behind the back of curb or pavement edge.
2. Landscaping may consist of trees that are planted in tree grates adjacent to the roadway edge within the sidewalk area where space is limited and with the approval of the Landscape Standards Committee. Review of this alternative must take into account the provision for adequate soil volumes to ensure health of the street tree species chosen.
3. Street Trees:
   a. Canopy-type deciduous or broadleaf evergreen trees shall be provided.
   b. Tree spacing shall allow for a minimum of 15’ between adjacent tree canopies at maturity, as defined by the Approved Plant List (see Appendix B), and the spacing shall depend on tree type selected, location of underground utilities, location of adjacent light fixtures, required setbacks, and sight-distance requirements.



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: RIGHT-OF-WAY LANDSCAPE BUFFER

c. Where tree canopies extend over the roadway edge, trees shall have a minimum six (6) foot branching height at time of planting.

d. Trees may be planted in formal row(s) or with a more informal spacing to create a park-like setting when space is available.

e. Conifer trees may be allowed in limited quantity provided adequate space is available.

4 Shrubs:

a. Shrubs are not required.

b. Shrubs may be provided and shall be maintained at a height not to exceed twenty-four (24) inches at maturity where planted adjacent to the roadway edge.

5 Living Groundcover:

a. Living groundcover shall be provided, except along Service Roads and Principal Arterial – Terminal Roadway System, unless trees are planted in tree grates and the tree grates completely cover planting area.

b. All groundcover that is used shall be between a height of one (1) foot to two (2) feet at maturity.

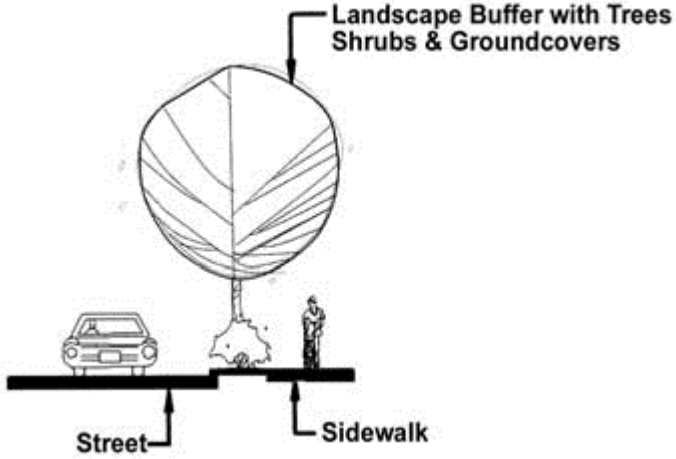
c. Mowed grass lawn may be used to cover 100% of the required groundcover area, except along Minor Arterial roadways where mowed grass lawn is not allowed.

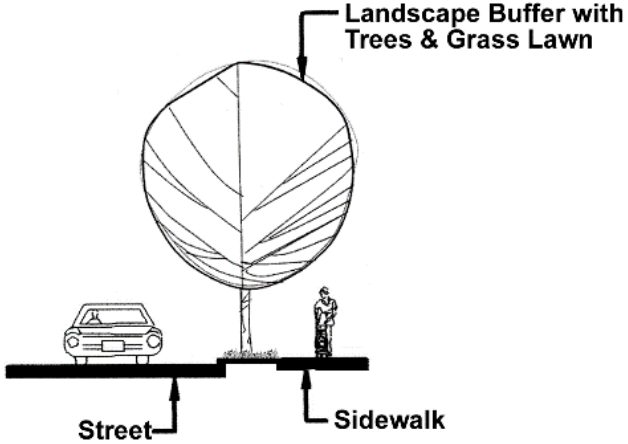
6 Landscaping may be provided outside the roadway right-of-way with approval of the Landscape Standards Committee.

LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: RIGHT-OF-WAY LANDSCAPE BUFFER

Type 5 Right-Of-Way Buffer: Preferred

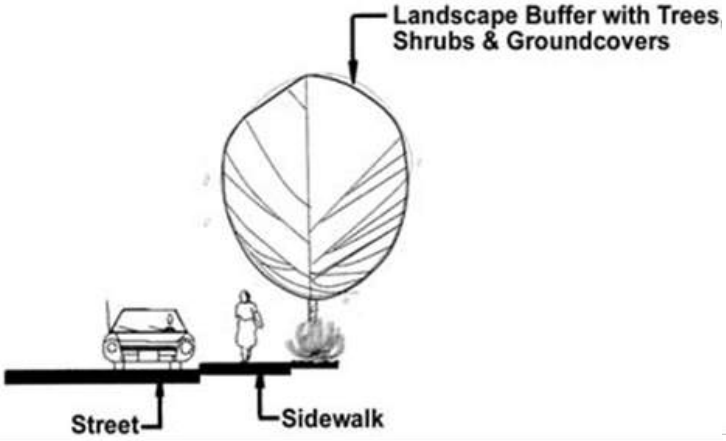
Conceptual Sections - Not To Scale

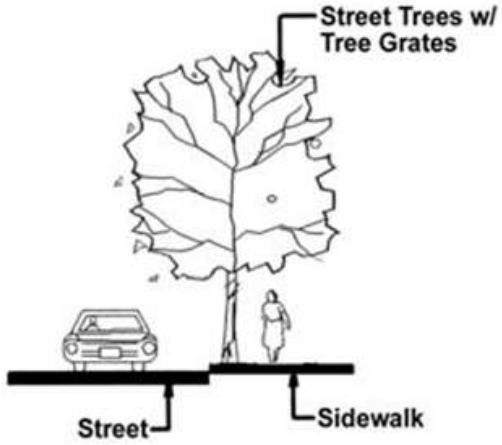




Type 5 Right-Of-Way Buffer: Alternative Options

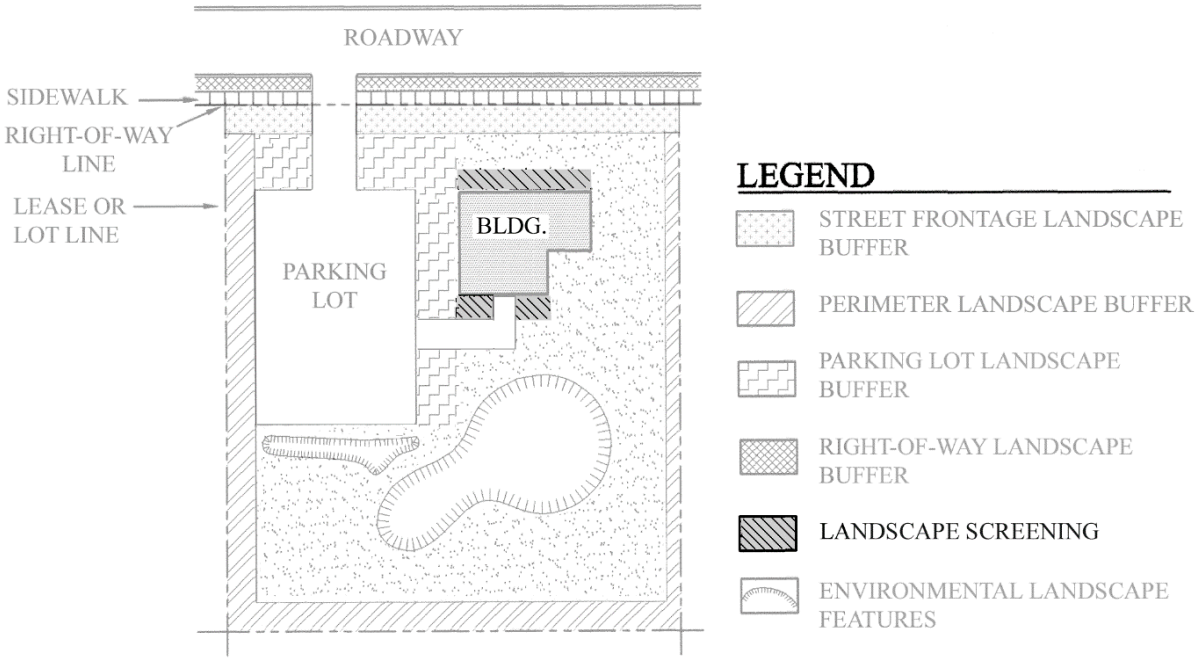
Conceptual Sections - Not To Scale





LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: LANDSCAPE SCREENING

Entry and Gateways
Dumpsters, Service Areas, Loading Docks, and Storage Yards
Uninterrupted, Blank Wall Surfaces



LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: LANDSCAPE SCREENING - ENTRY AND GATEWAYS

Location

Adjacent to major building and/or SEA doorway entrances, pedestrian walkways, and entry/exit driveways.

Requirements

Refer to the Roadways Concept Plan for specific recommendations regarding gateways to SEA. Entry and gateway areas shall be landscaped whenever possible. The landscaping used should provide color, texture and visual interest; and larger plant sizes may be considered to provide immediate interest and effect.

LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: LANDSCAPE SCREENING - DUMPSTERS, SERVICE AREAS, LOADING DOCKS, AND STORAGE YARDS

Location

Adjacent to dumpsters, service areas, loading docks, and storage yards.

Type 6a Visual Screen

Type 6a planting shall meet all of the following criteria:

1. A five (5) foot wide landscape area shall be provided to screen incompatible uses.
2. Fences, walls and/or berms may be used in conjunction with or in place of other landscaping to screen incompatible uses when limited space is available as approved by the Landscape Standards Committee.
3. Landscape areas shall include a combination of trees, shrubs, and/or living groundcovers to result in total coverage of the landscape area within three (3) years and such that a minimum of 75% of the incompatible use is screened.

LANDSCAPE BUFFER AND SCREENING REQUIREMENTS: LANDSCAPE SCREENING - UNINTERRUPTED, BLANK WALL SURFACES

Location

Any uninterrupted, blank wall surface 30' long or greater.

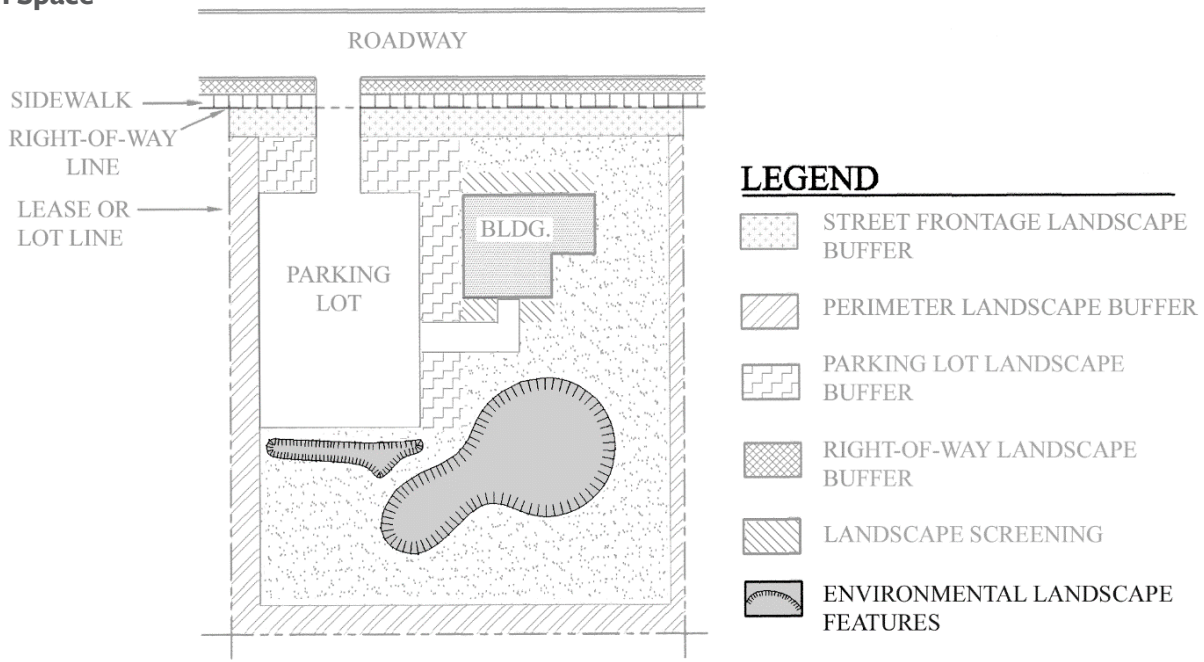
Type 6b Filtered Screen

Type 6b planting shall meet all of the following criteria:

1. A five (5) foot wide landscape area shall be provided to partially screen uninterrupted wall surfaces.
2. Landscape area shall include a combination of trees, shrubs, and/or groundcover to result in total coverage of the landscape area within three (3) years and such that a minimum of 50% of the wall surface is screened.
3. Architectural features, such as building reveals and other detailing, trellis structures and public art may be used in conjunction with other landscaping as approved by the Landscape Standards Committee.
4. Landscape planters or large planting containers may be used to meet this requirement where concrete/asphalt surfaces exist adjacent to building façades that are visible to the public.

ENVIRONMENTAL LANDSCAPE FEATURES

Detention Ponds
Bioswales
Slope Stabilization and Construction Site Management
Geotechnical Exploration
Critical Areas
Open Space
Off-Site Open Space



ENVIRONMENTAL LANDSCAPE FEATURES

All landscaping associated with environmental features (e.g., detention ponds, bioswales, slope stabilization, geotechnical explorations, and other related elements), shall be provided and maintained in accordance with any permit requirements made through the regulatory agency and/or all relevant Port documents (standards, guidelines, plans and/or specification), in addition to the requirements outlined below.

All landscape associated with environmental features shall meet the requirements outlined in the General Landscaping Provisions (see Section VII).

Landscaping must comply with the Port of Seattle Stormwater Management Manual for Port Aviation Division Property (SWMM), current version. This document was developed in compliance with the City of SeaTac and POS Interlocal Agreement, see ILA Section 6.3 Storm Water Management.

Detention Ponds

For projects located within the FAA Critical Area, the following shall apply unless superseded by revisions to the SWMM:

- Eliminate the potential for wetland vegetation growth on the pond bottom and side slopes by lining the pond with heavy-duty liners, riprap or quarry spalls. Alternately, use vegetation that provides no food or habitat for wildlife. For example, closely mowed grass, which is preferred by waterfowl, should be avoided.
- Break up possible bird flight lines by planting trees, setting up poles and/or fences which do not allow most waterfowl clear landing or takeoff room on the pond surface.

Landscape must comply with the SWMM and Stormwater Pollution Prevention Plan (SWPPP), including controlling growth of unwanted vegetation.

Bioswales

Landscape must comply with the SWMM (current version).

Slope Stabilization and Construction Management

Stabilization of cut or fill slopes shall be accomplished in accordance with permits issued by a regulatory agency and/or shall comply with the Port Master Specification.

ENVIRONMENTAL LANDSCAPE FEATURES

Geotechnical Exploration

Geotechnical explorations shall comply with the Stormwater Pollution Protection Plan (SWPPP), including requiring disturbed soil areas to match original condition: in grass areas soil is to be raked and reseeded, and in planted areas soil is to be covered with Arborist Wood Chip mulch and planted with in-kind vegetation that was disturbed by exploration activities. Restoration to occur after site exploration, hydrogeologic testing, and soil cutting collection have been completed.

Critical Areas

Critical Areas are regulated by the jurisdiction in which they are located.

Port regulation of Critical Areas within the AAA is authorized in Section 6.2 of the ILA. SEA will administer SeaTac Critical Areas regulations within its jurisdiction flexibly and on a case-by-case basis to harmonize state and federal regulations, advisory circulars or similar provisions affecting airports and/or the special circumstances presented by SEA operations.

Open Space

Open Space within each development footprint will vary and may be limited. Open Space area may offer additional space for tree and understory planting, area for access, or a combination. For example, open space could accommodate employee break areas with access to respite areas. Criteria for Open Space shall include the following:

- There shall be no impervious area except for footings to support user amenities such as benches and tables.
- Any paving, if applicable, shall be pervious. Pervious paving could include crushed rock, pervious concrete, or pervious asphalt.
- Access routes and user amenity areas shall meet Americans for Disabilities Act (ADA) requirements.
- No more than 20% of vegetated area within open space shall be tree canopy and shall be consistent with Wildlife Hazard Management Plan (see appendix H).

Off-Site Open Space

Off-Site Open Space provides additional area to meet tree replacement requirements, including invasive removal and tree protection. Areas designated as Off-site Open Space must be coordinated with the Landscape Committee. Full canopy is possible in Off-site Open Space if it is consistent with Wildlife Hazard Management Plan (see appendix H).

PLANT SELECTION STANDARDS

Plant selection shall comply with FAA rules and advisory circulars, including, but not limited to restrictions on vegetation (obstruction) height and wildlife hazard attractants. Only plants on the Approved Plant List shall be allowed for use on STIA property. The Approved Plant List also includes a Rejected Plant list to identify plants considered unacceptable for use at SEA. Requests to add species to the Approved Plant List can be made using the Plant List Update Requests Template (see **Appendix H**). Project-specific plant approvals may also use this template. Plants producing forage (nuts, berries, seeds, etc.) that may attract hazardous wildlife will not be approved.

All plants shall be adapted to the microclimate conditions of their sites (sun exposure, cold hardiness, hydrozones, soil type, soil pH). Plants with differing environmental requirements shall not be used together if desirable circumstances (sun exposure, soil types, water requirements) cannot be provided for both plant types.

Tree Selection

- Trees adjacent to paved surfaces shall not have invasive and aggressive root systems.
- Trees shall not sucker from their root system.
- Trees shall be selected to avoid damage to vehicles from sap, berries, or other undesirable plant characteristics.
- Trees in landscaped areas should not be of types that attract hazardous wildlife. Refer to Wildlife Management Plan.
- Trees with vertical branching and/or vase shaped canopies should be used in narrow planting areas to avoid conflicts with vehicles or pedestrians.

Other Plant Material Selection

- Grass lawn may be provided as a groundcover not to exceed a maximum of 50% of the total required groundcover area, except as noted for the Type 5 Right-of-Way Buffer: Alternate Option.
- Plant materials should consist of at least 50% native species, whenever possible.
- Plant materials should consist of 100% drought-tolerant species that are adapted to the climatic conditions of the Puget Sound region, or species that are on the approved plant list or as otherwise approved by the Landscape Standards Committee.
- No artificial plants will be allowed.
- Recommended additions to the Approved Plant List (see **Appendix H**) must minimize wildlife hazards by meeting the criteria in **Wildlife Hazard Mitigation Requirements**.

PLANT SELECTION STANDARDS

Additional Limited Landscaping Zone (LLZ) Plant Selection

- Landscape within the Limited Landscaping Zone (LLZ) shall not include any trees or other vegetation that would exceed a height of 15' at maturity or grow higher than the elevation of the runway surface,
- Landscape within LLZ shall be planted such that a minimum clear area of 15' is maintained between adjacent tree crowns.
- The use of conifer trees within the LLZ shall be kept to a minimum and shall not exceed a total of 30% of the total required trees.

See map next page for LLZ boundary.

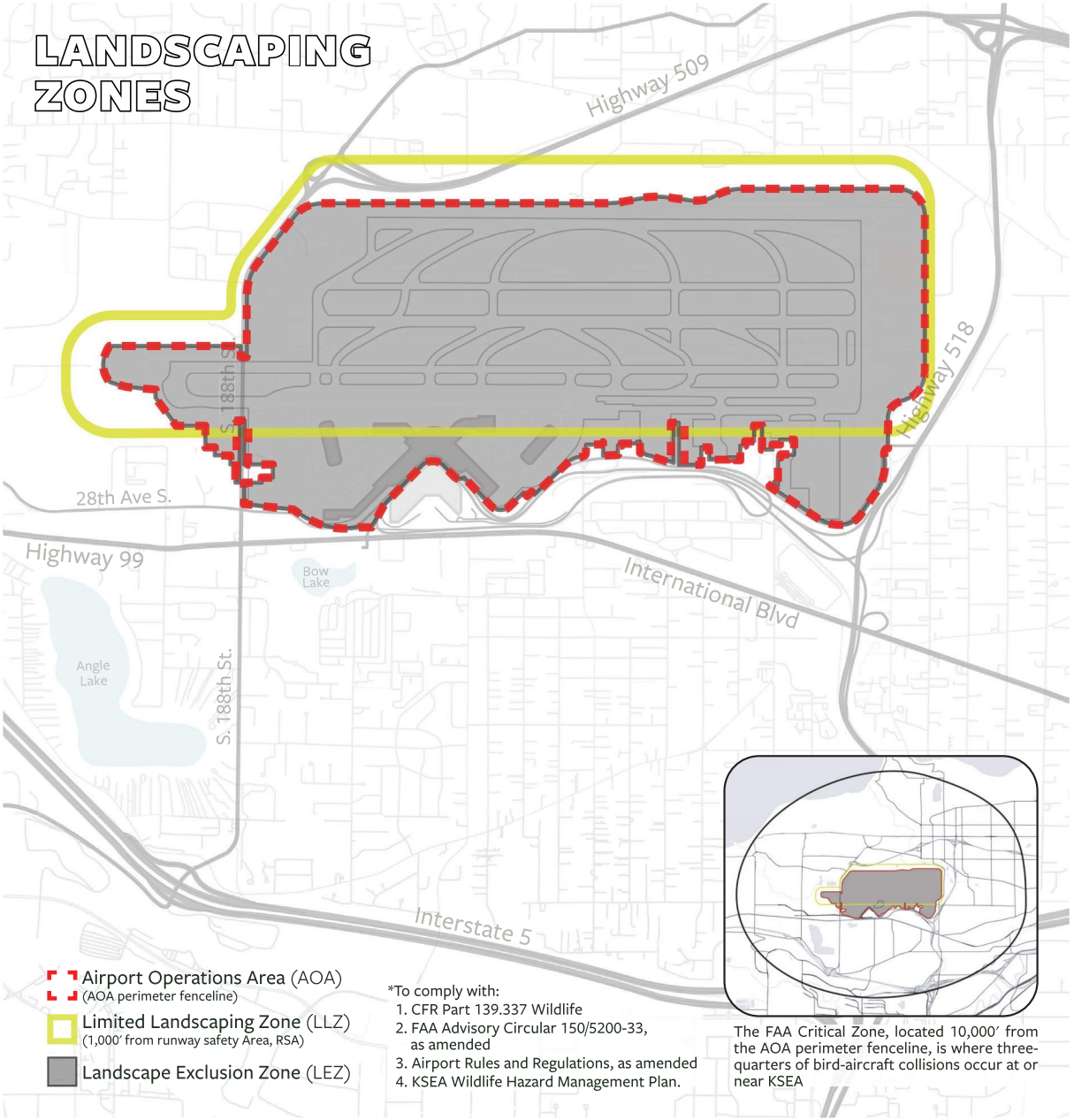
Green Roofs

SEA does not currently have green roof areas, but is developing a pilot project to test functionality, performance, and process for inclusion in future projects. Future plant selection standards for green roofs will be developed based on performance and balanced with other Port planting standards.

The plant selection for green roof areas can vary significantly based on the type of green roof system, growth media depth, micro-climate conditions, and overall design goals for the appearance and function of the green roof. For example, highly drought tolerant sedum monocultures might be appropriate for thin growth media depths intended to mitigate stormwater. Meanwhile, more diverse perennials and grasses in deeper growth media might be appropriate for more visible green roof areas intended to enhance the aesthetic qualities of a roof area.

Green roof planting will be evaluated on a project-by-project basis until additional Plant Selection Standards are developed. Refer to **Appendix H** for the new plant approval process.

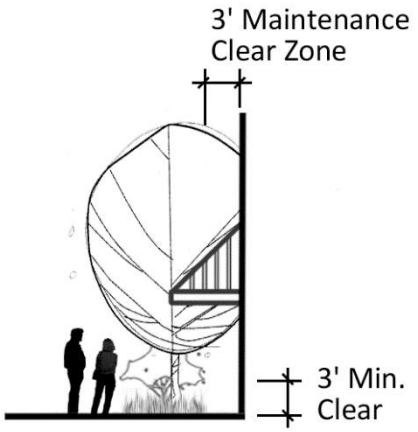
PLANT SELECTION STANDARDS



SITE SECURITY REQUIREMENTS

All landscape areas shall comply with the following safety and security requirements:

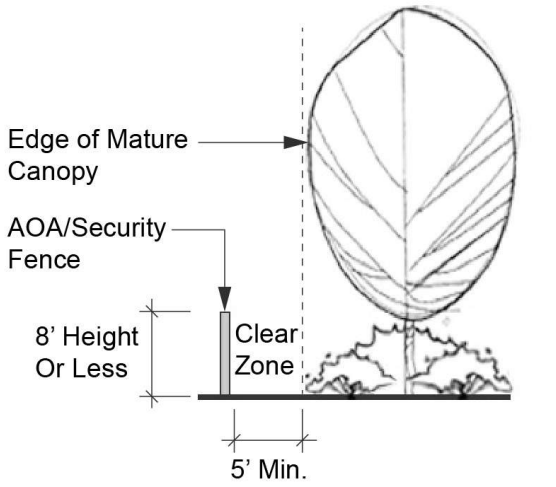
1. Landscape areas adjacent to building facades, where pedestrians have public access shall provide clear visibility from grade to a minimum three (3) foot height. Distance of clear zone will be determined on a case-by-case basis by the Port (Airport Security) or City (Police Department).
2. Planting near doors, stairs, exits, etc. shall not provide concealment for a person in those areas.
3. Maintain an area clear of landscaping (at maturity) within three (3) feet of building façades to minimize pest harborage, building entry, and provide for maintenance access. This clear, maintenance strip may be surfaced in gravel, paved or similar.
4. Plants shall not provide a means to access to second story windows.
5. Planting under and around roadway and bridge overpasses shall provide an unobstructed view of that area from the roadway and shall not provide any place for concealment of a person under or around overpasses or similar structures.
6. All landscape areas located adjacent to an AOA security fence shall:
   a. Not include deciduous or evergreen trees located such that the branches intersect or extend over the fence; and
   b. Maintain an area clear of trees and shrub growth at maturity within five (5) feet of either side of the AOA security fence. If present in clear zone, groundcovers shall be maintained at a maximum six (6) inch height.

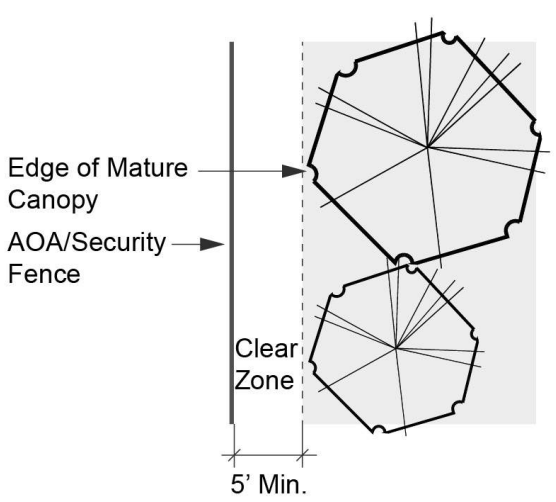


Typical clear zone adjacent to building facade.
Conceptual Section - Not To Scale

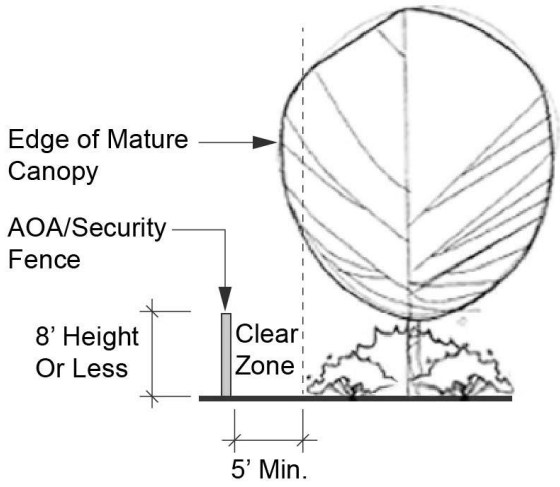
SITE SECURITY REQUIREMENTS

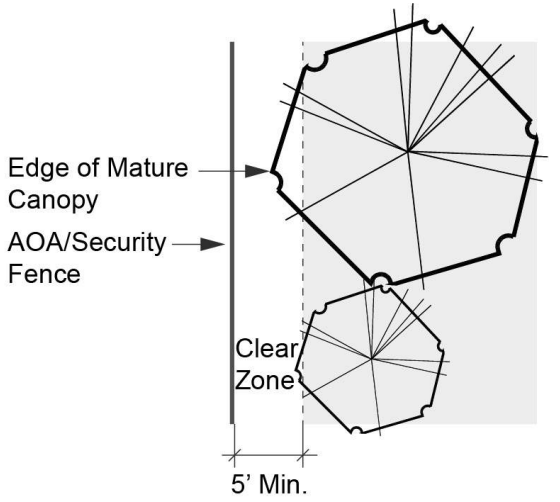
AOA Security Fence Clear Zone (Conceptual Sections and Plans - Not To Scale)





CORRECT





INCORRECT

WILDLIFE HAZARD MITIGATION REQUIREMENTS

Wildlife hazards or attractants, as determined by the Airport Wildlife Manager, will be managed using appropriate wildlife mitigation techniques, such as, selective tree harvesting (see Tree Management section).

If hazardous wildlife is detected, corrective action will be implemented to preserve the safety and security of SEA operations. This includes modifications to the AOA security fence to integrate a wildlife deterrent fence or fence components.

Recommended additions to the Approved Plant List must minimize wildlife hazards by meeting the following criteria:

- Must be consistent with recommendations of the STIA Wildlife Hazard Management Plan
- Select predominantly deciduous tree varieties and that do not propagate with rhizomes;
- Select plant varieties without seeds or berries that attract wildlife;
- Select tree varieties whose branching habits/canopies are open, offering less protection for birds;
- Select sterile varieties of trees, when possible;
- Avoid broadleaf evergreens that provide enhanced protection for wildlife;
- Select tree species or varieties that do not require the use of Plant Growth Regulators to manage their growth, flowering, fruiting, or pruning cycles; and
- Select tree species or varieties that do not require treatment with a sterilant chemical to stop or minimize fruiting.

LANDSCAPE STANDARDS ON DEMOLISHED PROPERTIES

A Demolition Permit is required for any structure that would require a building permit if being built and may be conditioned as necessary to reasonably mitigate adverse impacts associated with demolition activities.

All debris and other material resulting from demolition activities shall be removed from the site.

All disturbed areas resulting from demolition activities shall be graded smooth and hydroseeded, or other approved erosion control method applied, within the disturbed area.

If a fence is required then the fence shall be at a minimum a temporary galvanized chain link fence (i.e., posts at-grade on concrete blocks) used during site construction activities. A permanent vinyl-coated chain link fence shall be provided when the fence is located within paved surfaces that drain directly to catch basins, inlets, or other storm-drainage structure. No permanent galvanized fencing shall be allowed in areas that drain directly to any storm-drainage structure. Fence posts and rails do not need to be vinyl-coated. Vinyl-coating is not required within landscape areas.

For projects on Port-owned land outside the AAA but within the City of SeaTac, refer to City of SeaTac Municipal Code and the 2018 ILA.

TEMPORARY USE LANDSCAPE REQUIREMENT

For the purposes of these Landscape Standards, a temporary use includes the following activities:

1. Carnivals, street fairs, and outdoor holiday celebrations;
2. Seasonal sales of Christmas trees, fireworks, flowers, fruits and vegetables;
3. Temporary construction sheds or trailers, staging area, lay down or other construction related activities only for the duration of the construction activity; provided, that no residential or other use shall be made of such temporary construction sheds or trailers that is unrelated to the construction activity;
4. Temporary parking facilities; and
5. Recreational uses.

No landscape improvements will be required for the duration of a temporary use.

Landscaping as required by these Landscape Standards shall be provided once the property is redeveloped with a permanent use.

A temporary use shall be provided with sanitary facilities if the Building Code or Health Department Code specifically requires it.

A temporary use shall meet all other applicable codes, ordinances and standards as determined by the Port or City of SeaTac based upon building authority.

For projects on Port-owned land outside the AAA but within the City of SeaTac, refer to City of SeaTac Municipal Code and the 2018 ILA.

AIR OPERATIONS AREA AND LANDSCAPE REQUIREMENTS

Within 10,000 feet of the Air Operations Area (AOA) fence line, an area designated by the FAA as the "Critical Area," approval is required from Airport Operations for all Port of Seattle associated projects involving any landscaping.

All landscaping must be done in accordance to the current version of the Airport's Landscape Standards (Standards).

These Standards include an Airport-Approved Plant List and Landscaping Zones for areas inside and outside the AOA. More specifically, no new vegetation other than the grass type(s) specified in the Port of Seattle Construction Standards may be planted inside the general perimeter of the AOA.

Landscaping within 1,000 feet of the runways:

1. No new trees may be planted that exceed a height of 15 feet.
2. No new tree shall grow higher than the elevation of the runway surface.
3. Drip line to drip line spacing between trees shall exceed 15 feet.
4. The use of conifers (Evergreen) trees shall be kept to a minimum and shall not exceed a total of 30 percent of the total landscaping cover or tree number, whichever is less.
5. Shrubs and groundcover shall not be planted in areas where undesirable vegetation cannot be kept reasonably suppressed to ground level on a regular maintenance schedule.

Emergency Maintenance:

Any landscaping feature that has been determined to compromise aviation safety (e.g., becoming a hazardous wildlife attractant) will be altered or immediately removed by the responsible organization in a way that alleviates the hazard.

No replacement landscaping shall be required when an aviation safety issue is the reason for the landscaping feature to be altered or removed.

Exceptions:

- Approval from Airport Operations is required to obtain a variance from these regulations.
- No action in areas identified as wetland, protected by a restrictive covenant or otherwise specified in the Port of Seattle's Natural Resource Mitigation Plan(s) may occur without prior approval from Airport Operations.

GENERAL LANDSCAPE PROVISIONS

All landscaping proposed in the project under permit review, including areas not devoted to specific landscape buffers or screening, shall meet the requirements outlined in this section.

General Requirements

- Linear dimensions used for calculating plant quantities shall be taken along the longest length of the landscape buffer area.
- Where two adjacent or overlapping Landscape Buffer or Screen Types are within the same lease or lot area, they may be combined to provide the more stringent of the two landscape requirements. The exception is where Parking Lot Landscape Buffer applies in which case Type 4 Parking Buffer shall take precedence.
- Plants shall conform to the current edition of the American Nursery & Landscape Association (ANLA) standards.
- Existing vegetation and architectural features (including walls, trellis structures, public art, planters and fences) may be used in conjunction with landscape requirements outlined in these Landscape Standards provided they achieve the intent of the landscape buffer or screen type and as approved by the Landscape Committee.
- Landscaping shall be installed prior to occupancy for the project.
- Landscaping shall clear sight lines for all vehicle sight distance requirements.
- Landscaping around electrical utilities shall comply with the current edition of the National Electric Code (NEC).
- Landscaping shall be located on the exterior side (that side closest to the lease/lot line) of any wall or fence used within landscape buffer areas.
- Landscaping shall be arranged in the best configuration to maximize the buffer or screening function, with minimal use of tree cover, and incorporating any tree or plant clearance requirements for underground and/or above-ground utilities.
- Access for maintenance personnel, equipment, and vehicles shall be provided and integrated into the design of landscape areas.
- Slopes should be terraced whenever possible. Use of plants with fibrous roots on slopes should be considered.

Berms

Berms are encouraged as a screening device provided:

- There is a variation in height and width to provide interest;
- The combined height of the berm and shrub/groundcover planting shall not exceed the height requirements defined for each landscape buffer or screen type; and
- Berms shall not exceed a slope of three (3) horizontal feet to one (1) vertical foot.

Soil Preparation Requirements

Soil preparation and quality is critical to the performance of plants especially in order to minimize watering use. An adequate depth of soil preparation provides the necessary space and nutrients for plants to be successful and for soil to hold on to rainfall for later plant use.

Based on soil fertility tests conducted at the Airport, the existing soils in the planting areas are almost entirely sand or have a large portion of sand, with very low organic matter, low micronutrients, and nutrient imbalances. Organic matter, typically compost, is a primary source of micro-nutrients for plant growth.

While fertilizers can supply macro-nutrients such as nitrogen, phosphorus and potassium, micro-nutrients are generally obtained from a healthy soil that has organic matter. Organic matter also helps to bind soil and builds a healthy soil texture. This helps plant root growth and improves erosion control. Use of the existing sandy soils should be explored and tested for use in the soil mix.

Alternative soil amendments and water-wise mulches that exceed minimum requirements may be used as approved by the Landscape Committee.

Example soil preparation: subgrade preparation

GENERAL LANDSCAPE PROVISIONS

- To remedy low organic content in the subgrade soils, apply a 3" depth of organic compost to the subgrade, prior to scarification.
- Existing subgrade soils shall be scarified to a minimum six (6) inches depth.
- After existing subgrade soils have been scarified, a minimum twenty-four (24) inch layer of planting soil shall be placed.
- Planting soil must be either:
  - A 3-way mix consisting of 25% compost, 25% sand, and 50% sandy loam by volume thoroughly mixed together with the soil amendments as required by the Soil Test Report; or
  - A 2-way mix of soil consisting of 1/3 compost and 2/3 sandy loam by volume thoroughly mixed together with the soil amendments as required by the Soil Test Report.
- Planting Soil Mixes must have pH range of 5.5 to 7.5 and an organic content between 10% and 15% by weight as tested by the Loss on Ignitions method.
- For lawn sod or seeded areas, incorporate 50 pounds of Dolomite Lime per 1,000 square feet in direct broadcast application and rake into top surface of planting soil. Apply seed or sod.
- Fertilizers will not be allowed.

soiltest farm consultants, inc.

SOILTEST FARM CONSULTANTS - 11
2925 DRIGGS DR
Moses Lake , WA 98837
Laboratory #: S18-10587

Date Received: 7/2/201
Grower: RACHEL
Sampled By:
Field: 1
Customer Account #:
Customer Sample ID:

Soil Test Results

Phosphorus	Bray	mg/kg	100
Potassium	NH4OAc	mg/kg	219
Boron	DTPA	mg/kg	0.34
Zinc	DTPA	mg/kg	8.4
Manganese	DTPA	mg/kg	2.5
Copper	DTPA	mg/kg	1.4
Iron	DTPA	mg/kg	87
Calcium	NH4OAc	meq/100g	7.1
Magnesium	NH4OAc	meq/100g	1.3
Sodium	NH4OAc	meq/100g	0.06
Total Bases	NH4OAc	meq/100g	9.0

Other Tests:

pH 1:1		5.9
E.C. 1:1	m.mhos/cm	0.29
Est Sat Paste E.C.	m.mhos/cm	0.75
Effervescence		None
Ammonium - N	mg/kg	1.8
Organic Matter W.B.	%	4.0

Depth inches	Nitrate-N mg/kg	Nitrate-N lbs/acre	Sulfate-S mg/kg
0 - 12	35.0	112	5
Totals	**35.0**	**112**	**5**

Sum of Tested N: 198 lbs/acre N

Example soil test

GENERAL LANDSCAPE PROVISIONS

Mulch

For improved soil moisture retention and weed control, all planting areas and trees shall be maintained with a 4” layer of “arborist wood chip” mulch. Composted or fine mulch should not be used since it breaks down quickly and may actually increase weed growth.

All trees in grass areas should be maintained with a minimum 5 ft diameter mulch ring. Mulch should be checked and reapplied at least twice every year to maintain the 4” depth.

Beauty bark mulches will not be allowed.

Example mulch tree ring.

Example arborist wood chip mulch.

GENERAL LANDSCAPE PROVISIONS

Plant Size and Spacing At Landscaped Areas

Trees:

- Deciduous trees shall have a minimum caliper of two (2) inches as measured per the American Nursery & Landscape Association (ANLA) standards.
- Coniferous and broadleaf evergreen trees shall be at least four (4) feet in height.
- Deciduous trees shall have a canopy-tree form and a minimum branching height of four (4) feet unless otherwise stated.
- Multi-trunk trees shall have a minimum three (3) main trunks and minimum height of six (6) feet.
- Trees should not be less than the minimum tree spacing requirements specified in the Landscape Buffer and Screening Requirements (see Section III).

Shrubs shall be:

- a minimum two (2) gallon container, and
- a minimum eighteen (18) inches high or wide at time of planting.

Groundcovers, except grass lawn, shall be:

- a minimum one (1) gallon container size at time of planting and
- planted at a maximum of twenty-four inches (24") on center, triangular spacing.

Plant Size and Spacing At Open Space

Trees, shrubs and groundcovers planted in Open Space areas shall meet requirements defined in the previous section (Plant Size and Spacing at Landscaped Areas).

Plant Size and Spacing At Off-Site Open Space

Trees - Deciduous and coniferous trees shall be:

- Deciduous and coniferous trees shall be a minimum one (1) gallon container per standards of the latest edition of "American Standard for Nursery Stock.".
- Bare root stock may be allowed if approved by Landscape Committee.
- Trees shall be planted at a minimum spacing of 10 feet on center.

Shrubs shall be:

- Shrubs shall be a minimum one (1) gallon container per standards of the latest edition of "American Standard for Nursery Stock.".
- Bare root stock may be allowed if approved by Landscape Committee.
- Shrubs shall be planted at a maximum spacing of 5 feet on center, triangular spacing.

GENERAL LANDSCAPE PROVISIONS

Plant Size and Spacing

At Off-Site Open Space

Groundcover:

- Groundcovers shall be a minimum one (1) gallon container per standards of the latest edition of "American Standard for Nursery Stock.".
- Bare root stock may be allowed if approved by Landscape Committee.
- Groundcovers shall be planted at a maximum spacing of 3 feet on center, triangular spacing.

Plant Health and Vigor

All plants shall be nursery grown or collected materials that has been held in a nursery for at least 1 year. Nursery climatic conditions must be similar to those in the locality of the project. All plants shall be weed free at the time of planting. Stock furnished shall be at least the minimum size indicated.

Provide plants typical of their species or variety, with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from weeds, defects, disfiguring knots, sunscald injuries, and abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids, open spaces, broken branches, flush cuts or stubs. Container-grown stock shall be grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole. No plants shall be loose in the container or contain roots that are pot bound.

No pruning wounds shall be present with a diameter of more than 1/2 inch and such wounds must show vigorous callous on all edges. Trees shall not be pruned within six months prior to delivery.

Deciduous trees that have solitary leaders shall have only the lateral branches thinned by pruning. All conifer trees shall have only one leader (growing apex) and one terminal bud and shall not be sheared or shaped. Trees having a damaged or missing leader, multiple leaders, or Y-crotches will be rejected.

LANDSCAPE MAINTENANCE

All landscape areas shall be maintained by the Port of Seattle or Port's Tenant (as applicable) as follows:

1. All maintenance practices shall comply with the SWPPP. Landscaping planted in association with detention facilities shall be maintained per the SWMM.
2. All maintenance must meet minimum requirements per the Port's Landscape Maintenance Specification 32 01 90 and 32 92 19.16.
3. Maintain all areas to achieve effective, positive drainage, either through natural means (i.e. infiltration) or through an installed drainage system, to improve plant health and to reduce wildlife hazard associated with the creation of lagoons, wetlands, pooling or standing water, and open watercourses.
4. Hazards to public safety and/or the safety and security of SEA operations, as determined by the Landscape Standards Committee, will be managed or maintained through pruning, transplanting and/or removal as needed to protect the continued safety/security of the SEA environment.
5. Maintenance of natural resource mitigation areas shall be according to associated permits issued for those areas.

TREE MAINTENANCE

Tree management shall be provided, maintained, and/or implemented for all landscape areas accordingly:

1. Tree topping is not an allowable management method because it can damage or kill the tree, potentially creating a hazard and/or attracting hazardous wildlife.
2. No more than twenty (20) percent of the living crown of a tree shall be pruned in one year, or as directed by an Arborist certified by the International Society of Arboriculture;
3. All pruning shall be done in accordance with current International Society of Arboriculture standards, and shall result in a balanced and open form for the height and width of the tree. Pruning cuts shall be made back to living lateral branches, leaving no stubs or torn bark.
4. Trees shall be removed when one of the following applies:
   a. The maximum allowed pruning does not meet the requirements to discourage wildlife hazards.
   b. Trees are too large to transplant.
   c. Trees exceed the maximum allowable height requirements imposed by the FAA (e.g. FAA Critical Area conflicts).
   d. Trees constitute a wildlife hazard or wildlife attractant as determined by the Airport Wildlife Manager.
   e. For police, fire, safety, and/or security purposes.
5. All trees subject to the Tree Removal Requirements which are removed during project implementation shall meet the Tree Removal Requirements defined in **Landscape Guidelines** and in accordance with Landscape Standards (size, spacing, type, etc).
   a. Tree(s) inadvertently removed during construction (that were not planned for removal), shall be replaced in accordance with the **Tree Removal Requirements** and in accordance with Landscape Standards (size, spacing, type, etc).
   b. Replacement tree(s) installed during project implementation that are removed due to mortality or poor health after project implementation and during maintenance activities, shall be replaced at a 1:1 ratio and shall be in accordance with Landscape Standards (size, spacing, type, etc
   c. Trees protected during project implementation that are removed due to mortality or poor health after project implementation and during maintenance activities, shall be replaced in accordance with the **Tree Removal Requirements** and in accordance with Landscape Standards (size, spacing, type, etc).
   d. Trees removed for aviation safety shall be mitigated through the Flight Corridor Safety Plan development in coordination with Port Environmental Staff.

TREE MAINTENANCE

6 Trees shall be selected for harvesting on the basis of their position relative to adjacent trees. Weak, unhealthy trees, and trees being crowded by the greatest number of adjacent trees shall be removed first.

7 Tree harvesting shall generally be performed during dry periods and outside the migratory bird nesting window which is March 1 – July 15, except under emergency conditions.

8 Trees shall be cut and felled such that remaining trees, shrubs and groundcovers are not damaged or cause excessive compaction to surrounding soils.

Harvested trees shall be removed from the area immediately if the downed trees are adjacent to a public roadway or present a safety or security conflict. Trees in other areas may be left in place if they do not attract hazardous wildlife and with the approval of the Airport Wildlife Manager.

ON-SITE TREE RETENTION

Regardless of location, all on-site regulated trees shall be protected to the greatest extent possible (see **Tree Replacement** requirements in previous section, Landscape Guidelines).

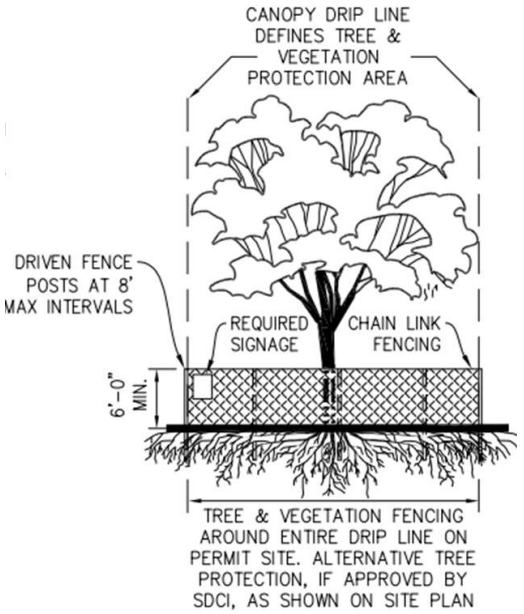
On-site tree retention measures include the following:

- Temporary 6-foot high chain link fencing shall be used where work is occurring near tree dripline. Fencing shall be located at the tree's dripline. Fencing shall be installed prior to any demolition or site clearing activities and shall remain for the duration of construction work.
- No construction activities including excavation, equipment storage, staging, parking, washing, dumping or material stockpiling shall occur within the tree dripline area. No soil disturbance is allowed within the tree dripline area.
- Where existing trees are within the work area, or where existing trees outside the work area have driplines extending into the work area, the Contractor shall employ all methods to minimize adverse impact to these existing trees including limbs and roots including temporary chain link fencing at the dripline.
- If roots larger than 2-inch are found outside the tree dripline area, they shall be protected through construction means such as hand excavation. If roots need to be cut, they shall be kept moist and cut cleanly.

Additional tree retention methods to be employed include:

- Temporary tie-up of low limbs.
- Application of a 4- to 6-inch thick layer of mulch (or wood chips salvaged from clearing and grubbing operations) within the drip-line of trees.
- Timber or steel planking for protection of surface roots from Equipment.
- Tree root pruning or other tree root treatment.

Typical Tree and Vegetation Protection Detail (SDCI 2023)



IRRIGATION SYSTEM REQUIREMENTS

SEA follows two third-party certification frameworks for new and current projects: Leadership in Energy and Environmental Design (LEED) and Salmon Safe. Landscaping shall be designed to meet the LEED Outdoor Water Use Reduction Credit which requires irrigation systems to be temporary and not used beyond a two-year plant establishment period, unless a waiver or variance has been received or during periods of prolonged and/or extreme drought to ensure survival of plant material and to decrease the potential for a wild fire hazard in close proximity to SEA. The current SEA standard is to limit irrigation to a two-year plant establishment period.

Permanent systems with in-ground piping are the preferred approach to irrigation water distribution. Temporary systems may be in-ground, like a permanent system, with easy access to shut down and reactivate when needed. Temporary above-ground piping and sprinkler systems are least preferred unless post-establishment removal is expected. Hand-watering methods for irrigation are discouraged and will be reviewed in the variance request process. All irrigation systems, temporary or otherwise, must include a meter per Port Mechanical Systems Standards (current version).

On a case-by-case basis, some projects may require a waiver or variance of the irrigation requirement. In these cases, the Landscape Standards Committee must approve an alternative irrigation or watering plan. The irrigation designs should also be reviewed with the Airport's environmental staff to ensure compliance with the Airport's sustainability goals. This includes providing a comparison of water budgets and usage between traditional systems and proposed systems.

As a result of the increasing cost of water and frequency of periodic water shortages, a water-conservation irrigation system suitable to maintain all new landscape areas shall be provided, installed, and maintained as follows:

1. Coordinate with the Mechanical Utilities Systems Team (MUST), the Proactive Electrical Systems Team (PEST), and the Water, IWS, Storm & Sanitary Sewer Committee (WISE) for existing water and electrical points of connection and system design review prior to construction. An Application for Connection form must be submitted and approved prior to construction.
2. Use of water recapture/reuse systems for irrigation water supply may be considered, especially if a variance for a longer irrigation period is necessary for the landscaped area.
3. Systems shall be designed to ensure that overspray, runoff or low-head drainage does not occur.

IRRIGATION SYSTEM REQUIREMENTS

4 Systems shall be designed for separate irrigation zones based upon plant hydrozone requirements, soil conditions and maturity of planting.

5 Provide separate zones for trees so that trees requiring a longer establishment period can be watered beyond the standard establishment period.

6 Sprinkler heads with consistent application rates shall be selected for proper area coverage, operating pressure, and adjustment capability.

7 Sprinkler head spacing shall be based upon manufacturer's recommendation to provide the most efficient water application and head-to-head coverage. Sprinklers shall be offset from back of curbs to avoid vehicle damage.

8 All irrigation systems (temporary and permanent) shall use state-of-the-art water conserving features, such as:

a. Weather-based irrigation controller that automatically adjusts watering schedules based upon current weather conditions. This would include: Moisture or precipitation sensors (Rain Sensors) and control devices;

b. Pressure regulator valve(s); and

c. Master control and flow sensing valve(s).

9 Special problems posed by irrigation on slopes, in median strips and in narrow hydrozones shall be addressed.

10 Systems shall include a backflow prevention device per Port Standard Details. Locate within an insulated hot box or provide heat trace for non-insulated boxes.

11 Irrigation meters shall be installed per Port Standard Details.

12 Irrigation systems shall be designed with provisions for winterization by providing a means to blow out irrigation system pipes with pressurized air.

13 Consider the natural drainage patterns of the landscape, the microclimate, and other natural features that may affect water availability and needs of a particular planting area.

14 Irrigation systems shall be regularly monitored and maintained for efficient water-wise irrigation of the landscape. Automatic controllers shall be set for operation at night to optimize water efficiency, minimize evaporation, and assure adequate moisture levels. Maintenance adjustment needs or repairs may be indicated by the following common irrigation performance problems:

a. Dry areas between sprinkler heads;

b. Wet areas due to excessive water coverage;

c. Water applied to areas not requiring water (over-spray);

d. Ponding water at sprinkler heads;

e. Loss of water pressure; and/or

f. Damaged or broken sprinkler heads and/or pipe.

15 If a temporary above-ground system is provided, include

SPECIAL LANDSCAPE FEATURES

Water Features

All proposed water features (not including environmental landscape features such as rain gardens, stormwater control areas, and/or mitigation sites will not be allowed. Any exception to this, must be reviewed by the Airport Wildlife Manager and may only be allowed on SEA property provided:

1. They are located in urban, high traffic (vehicular and pedestrian) areas or in specific locations where the potential for wildlife hazards to aircraft are reduced.
2. They are unvegetated and are not located in a natural environment, such as, wetlands, streams, etc.
3. They do not include standing bodies of water unless covered in a fashion that prevents attracting wildlife.
4. They use a recirculating system to reclaim, treat, and recirculate the water reducing water consumption and loss through evaporation and runoff. Treatment must include UV and Chemical methods in addition to particulate filtering.
5. They are treated to meet local public health department requirements if the public have access to the water and/or can touch it, in order to protect public health and safety.
6. They consider the use of chemicals or other means of deterring wildlife from the water feature(s) but must meet all other regulatory requirements.
7. They meet all FAA regulations and other requirements to avoid any conflicts with SEA operations.
8. They minimize the ability to enhance breeding of mosquitoes capable of spreading vector-borne diseases.

SPECIAL LANDSCAPE FEATURES

Public Art

Refer to the Aviation Art Program procedures for applicability of public art on STIA projects. Where used in the landscape, public art shall be integrated into the overall design approach to maintain a consistent, coherent overall landscape design as determined on a case-by-case basis through the Aviation Art Program and the Landscape Standards Committee, and shall consider:

1. Recommendations outlined in the Port's Landscape Design Guidelines;
2. Sight distance requirements, per Washington State Department of Transportation Design Manual;
3. Safety of the traveling public (i.e., distractions to vehicular drivers, etc.);
4. Access and feasibility for maintenance; and
5. FAA regulations and other limitations as may be required to avoid any conflicts with SEA operations.
6. Lighting should be considered in the overall design of public art.

Landscape planting in and of itself is not considered an art feature by the Port and cannot be counted towards the art program funding requirements.

Lighting

Lighting may be provided to accent or highlight landscape areas or special features in the landscape, or to increase the pedestrian usability of a particular space at night, such as, walkways, streetscapes and/or plazas. Where used in the landscape, lighting shall be integrated into the overall design approach to maintain a consistent, coherent landscape design as determined on a case-by-case basis through the Landscape Standards Committee.

1. All lighting provided shall meet the requirements outlined in the Architectural Standards, Electrical Standards and other relevant SEA guidelines or standards, and shall consider recommendations outlined in the Port's Landscape Design Guidelines.
2. All lighting design shall be reviewed and approved by the Proactive Electrical Systems Team (PEST) prior to installation.
3. All lighting shall consider Recommended Practices for Outdoor Lighting by the Illuminating Engineering Society of North America (IESNA).
4. Lighting that is near and clearly visible from City residential areas and street right-of-way shall be screened in a manner to prevent off-site glare.
5. Exterior lighting should minimize impacts to Critical Areas according to SeaTac Critical Areas Regulations (see SeaTac Municipal Code) as authorized in the ILA.

SPECIAL LANDSCAPE FEATURES

Site Furnishings

Site furnishings may be provided in landscape areas, along roadways, roadway frontages, public transportation areas, walkways and/or in exterior plaza/gathering spaces. Where used, site furniture shall be integrated into the overall design approach to maintain a consistent landscape design, and reflect the overall character of SEA. All site furniture shall meet the requirements outlined in the Architectural Standards. Selection of site furniture shall consider:

- Recommendations outlined in the Landscape Guidelines.
- Universal Access, Human-Centered Design, and ADA Accessibility.
- Security and public safety in locating street furniture elements.
- Access and feasibility of maintenance.

All site furnishings shall be reviewed by the Architectural Design Review Committee.

Signage

In general, sign design (way-finding/directional, informational, etc.) is governed by the sign standards and/or guidelines for SEA. Interpretive signs and other landscape-related signage may be considered provided it meets the overall intent of the sign standards and/or guidelines for SEA.

4

RESOURCE APPENDIX

4

RESOURCE APPENDIX

4.1 RESOURCE APPENDIX

This section provides a list of additional documents or drawings that project teams should reference as appropriate. A glossary of terms is also provided as reference.

Your SEA project manager is the first point of contact for any additional questions or comments.

A. ABBREVIATIONS AND DEFINITIONS

1 **Adjacent.** Directly abutting, contagious to, touching or adjoining.

2 **Airport.** Seattle-Tacoma International Airport.

3 **Airport Activities Area.** The area defined by the 2018 Interlocal Agreement between the City of SeaTac and the Port of Seattle to address land use on Port-owned properties within City boundaries. See ILA Appendix 3A.

4 **Architectural Standards.** An airport-wide set of design guidelines and standards, including architecture, engineering, electrical, etc. developed by the POS.

5 **AOA.** Air Operations Area. Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. The AOA includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron. The AOA is also defined as the Landscape Exclusion Zone. See page 88 for map.

6 **Bioswale.** A grassy, flat-bottomed swale that receives runoff after it is collected and concentrated, and that removes pollutants from stormwater prior to its release to the natural system.

7 **Critical Area(s).** Areas authorized by the state Growth Management Act to be regulated by local municipalities because they are subject to natural hazards and/or support unique, fragile or valuable natural resources including fish, wildlife and other organisms and their habitat, and such resources which carry, hold or purify water in their natural state.

8 **Deciduous.** A plant species with foliage (needle or broadleaf) that is shed annually.

9 **Demolished Property.** Any property where an existing structure has been removed, including property newly created vacant as a result of demolition activities.

10 **Detention Pond.** A constructed facility intended to hold storm water and release or infiltrate it at rates that do not damage downstream areas. Design and maintenance of these areas is defined in the SWMM.

11 **Dripline.** The circumference defined by the outermost canopy branches of an individual tree. The dripline area is the soil and roots within the defined dripline circumference.

12 **Driving Aisle.** That portion of the off-street parking area used exclusively for the maneuvering and circulation of motor vehicles.

A. ABBREVIATIONS AND DEFINITIONS

13 **Drought Tolerant.** Plants that, once established, can survive without rainfall or irrigation for short periods of time. Most plants are drought-tolerant after establishment, when planted in the right conditions; i.e., succulents survive droughts in xeric soils, while wetland plants survive droughts in hydric soils. Although plants can be drought-tolerant, their health and aesthetics during drought may decline due to stress, high maintenance [incorrect maintenance practices], and dormancy (a plant may lose its leaves, stop blooming, and stems may desiccate, but the roots of the plant survive)

14 **"Edge" Properties.** Defined in the ILA as the locations where new development on Port-owned property located within the Airport Activity Area is adjacent to or abuts public right-of-way, or property owned by public agencies other than the Port, or privately-owned Property.

15 **Evergreen.** A plant species with foliage (needle or broadleaf that persists and remains green year-round.

16 **FAA.** Federal Aviation Administration.

17 **FAA Critical Area.** The zone within 10,000 feet of all runway surfaces for airports that are rated to receive aircraft using turboprop or turbofans as a means of propulsion.

18 **Fence.** A barrier for the purpose of enclosing space or separating lots (excluding retaining walls). Fences may consist of masonry walls, posts connected by boards, rails, etc. and shall comply with all applicable guidelines and standards at the POS.

19 **Fence, AOA Security.** Built to FAA/TSA standards and a type of fence line that is at a minimum 12 feet high topped with 3 strand barbed wire outrigger, designed to keep intruders outside of the air operating area. A minimum of 5 feet clearance must be maintained along the inside and outside of this fence. All changes to the AOA security fence must be approved by the TSA.

20 **Fence, Wildlife Deterrent.** A fence designed to deter wildlife, especially coyotes, from digging under the AOA security fence. This includes modifying other areas of potential access such as ensuring the separations between the AOA security fence gates and other access points (culverts) are no wider than 3 inches.

21 **Grass Lawn.** An ornamental, mowed lawn area. Refer to Port Master Specifications for approved lawn seed type(s).

22 **Groundcover.** Living, low evergreen planting installed in masses or drifts.

23 **Hazardous wildlife.** Wildlife species with the potential to strike aircraft during flight, are capable of causing structural damage to aircraft or airport facilities, or act as attractants to other wildlife that pose a wildlife-aircraft strike hazard.

24 **Herbicide.** A chemical weed or plant killer, applied to leaves, foliage, roots or soil. STIA's SWPPP has reference to documents providing restrictions and guidelines for herbicide use.

A. ABBREVIATIONS AND DEFINITIONS

25 **High Value Tree.** A tree providing significant ecological function due to size, maturity, species, or location in a tree grove. In general, trees greater than 30 inches diameter at breast height (30 inches DBH) are considered high-value due to their size. All regulated native conifers occurring within a tree grove that contains at least three trees greater than 30" DBH are considered to be high-value trees.

26 **Hydrozone.** A grouping of plant species that have similar irrigation watering needs.

27 **ILA.** Interlocal Agreement. The most recently revised Interlocal Agreement entered into by the Port of Seattle and City of SeaTac on February 17, 2018.

28 **Invasive Plant Species.** A typically non-native plant adapted to disturbance that when established is highly destructive, competitive, or difficult to control by mechanical or chemical means and requiring control under Washington State's weed control law, RCW Chapter 17.10, and as listed on King County's Noxious Weed List.

29 **Landscaping.** Live vegetation and associated materials required for a development.

30 **LEZ.** Landscaping Exclusion Zone. Area where landscaping is not required. The AOA is also defined as the Landscape Exclusion Zone; see AOA definition.

31 **Landscape Plan.** A plan, drawn to scale and per the Port CAD Standards which clearly delineates existing and proposed landscape features and structures, including irrigation.

32 **Landscape Standards.** The Landscape Design Standards set forth in this document to guide landscape development at SEA.

33 **Landscape Committee.** A Port/ City of SeaTac committee whose basic purpose is to review and approve Plant List Update Requests, Variance Requests, and Landscape Standards Update Requests (see Appendix C).

34 **LLZ.** Limited Landscaping Zone. Area where landscaping is limited due to wildlife hazard management and related safety/ security requirements. See page 88 for map.

35 **Lot.** A distinct parcel of property.

36 **Lot Line.** The geographic boundaries of a lot.

37 **Mulch.** An organic material, such as yard waste or decomposed sawdust manure that is fully composted, used on the soil surface for moisture retention, weed suppression and soil insulation, or rototilled into subgrade as a soil amendment. Mulch must be a weed free material. Refer to the Port Master Specifications for acceptable mulch products.

38 **Native Species.** Vegetation comprised of plant species, other than noxious weeds, which are indigenous to the Pacific Northwest and which reasonably could be expected to naturally occur on the site.

39 **On-Site.** On-site Open Space, hereby referred to as "Open Space" is an area within the project boundary or development footprint not proposed for hardscape or operational buildings. On-site Open Space is outside of landscape buffers, critical areas, or stormwater features.

A. ABBREVIATIONS AND DEFINITIONS

40 **Off-Site.** Off-site/Adjacent Open Space, hereby referred to as "Off-Site Open Space" are areas outside of and not directly associated with a project boundary or development footprint.

41 **Parking Lot.** An area not within a building where motor vehicles may be stored for the purposes of temporary, daily, or overnight off-street parking. Typically paved with asphalt or concrete and landscaped.

42 **Parking Space.** An area accessible to vehicles, improved, maintained and used for the sole purpose of parking a motor vehicle.

43 **Pesticide.** Any substance used for the control of insects, mites, mollusks, nematodes, or rodents.

44 **POS.** Port of Seattle.

45 **Plant Approval Committee.** A Port committee whose basic purpose is to review and approve Approved Plant List Update Requests.

46 **Planting Soil.** Free draining sandy loam soil, containing a minimum five (5) percent organic content by weight and suitable chemistry/fertility elements to support normal plant growth. Refer to Port Master Specifications.

47 **Redevelopment.** Additions or alterations to a building or site, excluding interior-only improvements, which total fifty percent (50%) or more of the gross square footage (GSF) of the existing building(s) or site. This does not include maintenance activities to maintain a building or site for its original design and expected useful life.

48 **Regulated Tree.** An existing healthy tree (excluding cottonwood varieties) which, when measured four (4) feet above finish grade, has a minimum truck diameter of six (6) inches for evergreen and decidious trees. Any tree planted by design as part of landscaping for existing development.

49 **SEA.** Seattle-Tacoma International Airport

50 **Shrubs.** Woody plants often multi-stemmed, generally less than fifteen (15) feet at maximum growth height at maturity.

51 **Sidewalk.** Paved walkway for pedestrians at side of a street.

52 **STIA.** Seattle-Tacoma International Airport.

53 **STIA Roadway Classifications.** (See Appendix E).

54 **SWMM.** Stormwater Management Manual for the Port Aviation Division Property. The POS has adopted and follows the most recent version of the Department of Ecology's Storm Water Management Manual for Western Washington.

55 **SWPPP.** Stormwater Pollution Prevention Plan.

56 **Temporary Use.** Use of a property for a limited period of time. Time limit allowed may vary depending on use as determined by the permitting agency.

57 **Tenant.** Any person, firm, corporation, Governmental Agency or other entity which has entered into a contractual relationship with the Port for lease, rental, or occupancy of a building, land or other facility on Port property

58 **Tree.** Woody perennial plant typically with one dominant trunk and a mature height greater than fifteen (15) feet.

A. ABBREVIATIONS AND DEFINITIONS

59 **Tree Grove.** A group of trees that grow close together, generally without many bushes or other plants underneath, and anchored by at least three high-value trees.

60 **TSA.** Transportation Security Administration.

61 **Vacant Property.** Any property where an existing structure has been removed as a result of Port activities.

62 **Variance.** An adjustment in the application of these standards to a particular property.

63 **Water Feature.** A man-made waterfall, fountain, stream, etc. This does not include environmental mitigation sites.

64 **Water-wise.** Planting and irrigation practices that conserve water usage.

65 **Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof. As used in these Landscape Standards "wildlife" includes feral animals and domestic animals while out of the control of their owners.

66 **Wildlife Attractant.** Any human-made structure, land use practice, or human-made or natural geographic feature, that can attract or sustain hazardous wildlife on or adjacent to airport property, such as, landing or departure airspace, aircraft movement area, loading ramps, or aircraft parking areas of an airport. These attractants can include but are not limited to architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquacultural activities, surface mining, or wetlands.

67 **Wildlife Hazard.** A potential for an aircraft collision or disease transmission problem as a result of direct or potential contact with wildlife within the FAA Critical Area.

B. FORMS LOCATED ON PORT OF SEATTLE SHAREPOINT PORTAL

1. **Landscape Standards Update Request**
2. **Variance Request, Plant List Update Requests**
3. **Approved and Rejected Plant List**
4. **Tree Replacement Tool, Regulated Tree Inventory Form, Off-Site Inventory Form**

Located on Port of Seattle website:

https://www.portseattle.org/page/design-standards-and-guidelines

SharePoint Portal:

https://portseattle.sharepoint.com/sites/LandStandComm/SitePages/Landscape-Standards---Variance---Plant-Requests.aspx

C. LANDSCAPE COMMITTEE

The purpose of the Landscape Committee is:

1. To ensure that the Landscape Standards are current with latest technology available in the industry.
2. To ensure that the Landscape Standards are consistent with generally accepted industry standards and local/regional standards.
3. To review and implement any requested changes to the Landscape Standards.
4. To clarify and interpret language in the Landscape Standards.
5. To provide the opportunity or City of SeaTac staff to review proposed changes, interpretations and variances to the Landscape Standards.

C. LANDSCAPE COMMITTEE

The current Landscape Committee is comprised of:

NAME	DEPARTMENT	TELEPHONE
Heather Karch Regan Greenhill	AV/F&I AV/F&I	206-519-8793 206-495-1602
Steve Osmeck	AV/AIRFLD	206-419-8666
Valerie Johnson Nick Mayr Chris Heimbigner	AV/MT AV/MT AV/MT	206-300-1081 206-787-7542 206-787-5823
Tom Hooper	AV/PL	206-988-5588
Shelie Bumgarner (Alternate)	AV/AIRPORT SECURITY AV/AIRPORT SECURITY	206-787-7360
Josh Feigin Chipper Maney Risa Askerooth	AV/ENV AV/ENV AV/ENV	206-291-4736 206-787-5516 206-787-5921
Dee Garrison	ABD	206-787-6274
Zack Shields **(REVIEW ONLY)**	CITY OF SEATAC	206-973-4844

C. LANDSCAPE COMMITTEE

1. Membership will be comprised of a minimum of 3 Port of Seattle Aviation Division employees. Outside consultants with specific expertise may also be members of the committee, maximum 2.
2. Membership will include a minimum of 1 City of SeaTac employee, to a maximum of 3.
3. New members will be approved by current committee members.
4. Memberships do not have a definitive end date.
5. If committee members request termination from the committee, they will be replaced by a new member upon joint approval from the remaining membership.
6. Members should represent a variety of Aviation Division departments and/or working groups, and the City of SeaTac. Current committee members should have a general knowledge of other departments and /or working groups concerns as it relates to landscaping. If this knowledge is not available, then committee members will seek out their input.
7. The City of SeaTac member's role is to attend meetings related to landscaping on projects that meet PDRC criteria relevant to the City and confirm that the POS is meeting the requirements of the Landscape Standards.

C. LANDSCAPE COMMITTEE

Decision Making

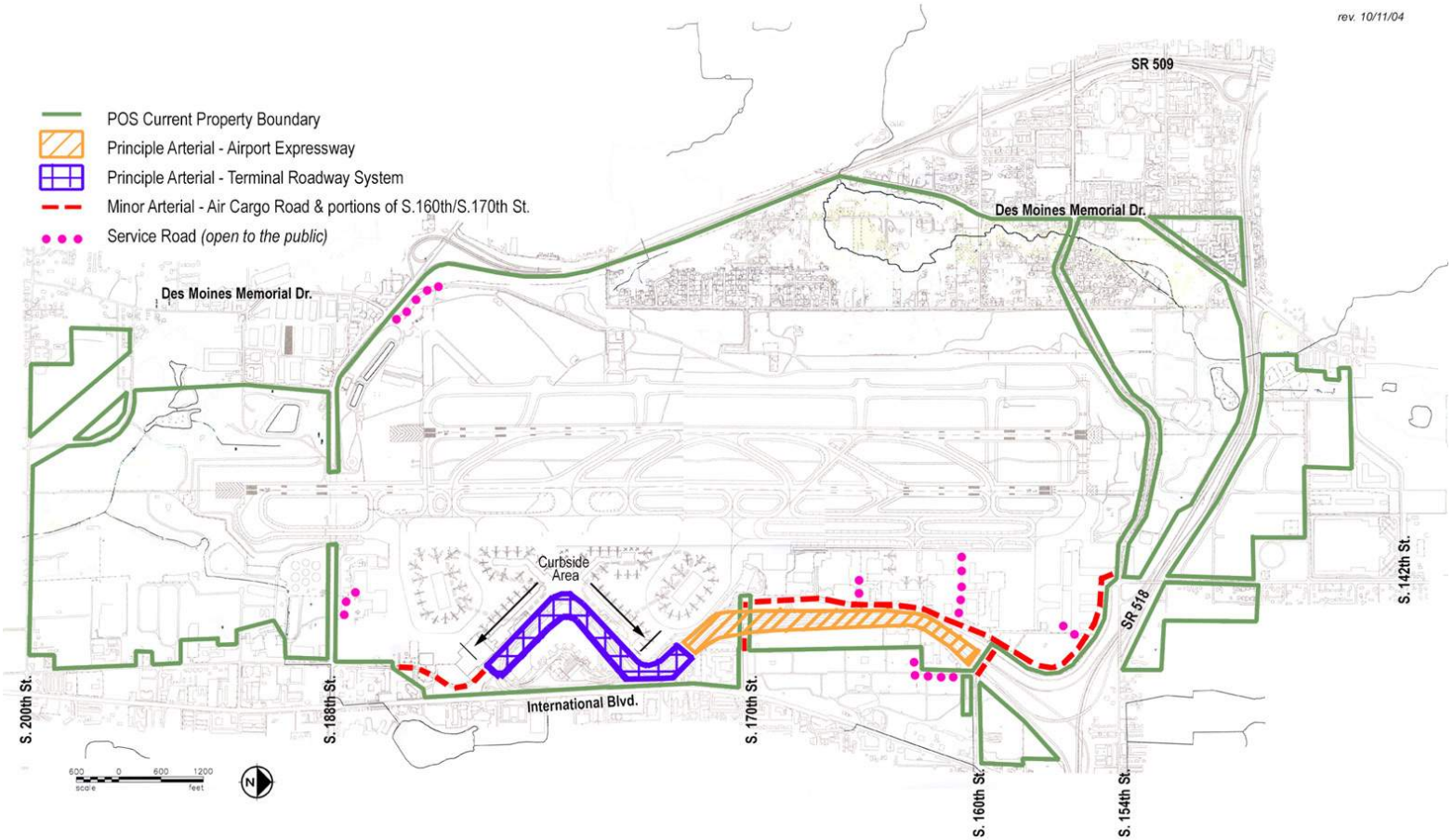
Seattle-Tacoma International Airport rev. 12/08/19

1. Members will strive for mutually acceptable decisions.
2. Safety and security of the traveling public and employees of SEA will be the primary basis for most decisions.
3. Decisions will be based on sound business principles.
4. If the Landscape Committee is not able to come to a mutually acceptable decision on an issue, the issue will be forwarded to Senior Aviation Management (SAM) for resolution.
5. City of SeaTac member does not have “approval”, or voting, authority within the committee.
6. If the City of SeaTac member has any concern that the POS is not meeting the requirements of the Landscape Standards, or that a variance was granted that does not meet the criteria spelled out in the Landscape Standards, then landscape work on the project in question shall be put on hold until the issue is resolved. If an agreement between the POS and the City of SeaTac cannot be reached within two weeks, the issue will be resolved via the process identified in the ILA.
7. In appeal to a decision made by the Landscape Committee may be made, in writing, within two weeks of the date the variance was approved or disapproved to the POS Senior Aviation Management (SAM). For POS projects within the City of SeaTac, appeals will be resolved via the process identified in the ILA.

Meetings

1. In-person meetings, teleconferences, or videoconferences will be held on a quarterly basis with additional meetings “as needed” for project support or standards updates.
2. If a committee member cannot attend a meeting or is not able to respond to a request, the alternate Committee Member will respond.
3. If a critical decision is required and a committee member is absent, that person’s written input will be solicited before a final decision is made.

D. STIA ROADWAY CLASSIFICATIONS



E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

Purpose

The purpose of this section is to define the contractual obligations and scope for the day-to-day maintenance of the landscape at the airport campus under Small Works. This includes maintaining existing landscape and landscapes after plants have been established.

Part 1 General

1.01 Summary of Work

A The extent and location of "Landscape Maintenance" of the SEA campus is indicated in the Landscape Maintenance Contract Document and occurs outside of the Airport Operations Area fence.

B The Landscape Maintenance scope of work in maintaining SEA exterior landscapes includes the requirements for furnishing all labor, tools, specialized equipment, materials, supervision, storage, and transportation necessary to

1. provide proper care and maintenance for all planters, landscaped areas, and plant material within project limits.
2. assure continued healthy growth of plant material.
3. present clean and visually-attractive landscape.

C The visual appearance of the landscape areas, will be the measure of performance rather than the quantity of products used and amount of labor applied.

D Any facilities, property, or landscape damaged during routine maintenance work must be repaired or replaced in-kind.

E The work includes regular maintenance services including the completion of all maintenance checklists that are submitted to the Port of Seattle.

1.02 Landscape Maintenance: Matrix and Inspections

A The Landscape Maintenance Matrix describing tasks and frequency of tasks is a guide to the minimum frequency of maintenance work as described herein. The Landscape Maintenance Matrix shall be used as basis for the Contractor's checklist of maintenance activities.

B Quarterly Inspection

1. Once each quarter, the Small Works Project Manager and/or their designated representative (hence-forth "Small Works Project Manager"), will conduct an on-site inspection (walk-through), accompanied by the Contractor's Superintendent or Foreman.
2. All planting areas including trees and lawn areas will be inspected. An assessment will be made regarding compliance with the Performance Requirements, listing all actions and/ or areas in need of correction or improvement. The Contractor will thereupon be provided a written notice listing these discrepancies in need of correction and any actions needed to be taken.
3. The Contractor shall reply with their proposed corrections to the Small Works Project Manager within 5 working days of the date of receiving the written notice.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

4. Conditions found unacceptable by Small Works Project Manager shall be corrected or improved within 14 working days immediately following receipt of written notice; unless the Small Works Project Manager agrees otherwise
5. After correction, the Contractor shall notify the Small Works Project Manager to schedule a reinspection.
6. Should the Small Works Project Manager determine that the Contractor is not providing regular, adequate, and proper care of plant material and lawns or is performing unacceptable work, the Small Works Project Manager will provide written notice to the Contractor to correct and remedy unacceptable work or practice(s).

C Monthly Status Report

1. The Contractor shall submit a Monthly Status Report, at the end of each calendar month, to the Small Works Project Manager.
2. The report shall summarize the current condition of all landscape areas and include a listing of any additional Work Authorization work that may have been required during the previous month.
3. Any items needing special attention must be noted, and any suggestion for improvement to the landscaping and landscape maintenance program should also be included.

D Annual Submittal of Qualifications

1. Licensing, Certification, and/or Registration information must be submitted on an annual basis to the Small Works Project Manager showing licensing, certification, and registration information, that has not expired and is current. See Section 1.03.

1.03 Quality Assurance

A All landscape maintenance work must be performed and managed by a licensed and bonded Contractor registered in the State of Washington.

1. Contractor must be familiar and comply with "American Standard for Nursery Stock" (ANSI Z60.1) published by the American Nursery & Landscape Association.
2. Contractor must be familiar and comply with:
   i. Best Management Practice series published by the International Society of Arboriculture.
   ii. Tree Care Industry Association (TCIA): Standards for Tree Care Operations ANSI A300.

B Maintain a competent superintendent or foreman during the progress of the work, with the authority to act for the Contractor in all matters pertaining to the landscape maintenance work.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

1. The superintendent or foreman must direct and guide the maintenance work and must be thoroughly familiar with the types of materials being maintained, have equipment and personnel adequate to perform the maintenance work, must apply the best horticultural practices for their maintenance.
2. The superintendent or foreman must either be part of the maintenance crew performing the work and/or visit the site when maintenance occurs.
3. The superintendent or foreman must be at least one of the following: certified Landscape Designer, licensed Landscape Architect, certified Arborist, or Certified Professional Horticulturalist and must be qualified for landscape maintenance work through at least one of the following:
   i. Certification by the Washington Association of Landscape Professionals (WALP).
   ii. Certification by the Washington State Nursery and Landscape Association (WSNLA).
   iii. Licensed and Registered Landscape Architect in the State of Washington.
   iv. Certification by the International Society of Arboriculture (ISA).
   v. Degree in Horticulture from an accredited technical college, community college, or university.

C Perform all necessary pruning of trees (existing or new) by an International Society of Arboriculture (ISA) certified arborist who has a current license as an arborist in the State of Washington.

D Application of all chemicals and fertilizers requires review and approval through the Small Works Project Manager from 1) a Port of Seattle Environmental Management Specialist and 2) the Airport Wildlife Manager.

1. Review and approval is needed for the chemical proposed to be used, the method of application, and the qualifications of chemical operator
2. For purposes of this section, chemicals include: Fertilizers, Pesticides, and Herbicides.
3. Each pesticide and/or herbicide applicator must be icensed for the specific class of chemical being applied and must be a commercial operator with a current Washington State Department of Agriculture (WSDA) Commercial Applicator pesticide license.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

Part 2 Products

2.01 General

A Except as otherwise indicated herein, products utilized or applied shall be selected by the Contractor to accomplish the required results.

2.02 Arborist Wood Chip Mulch

A Arborist Wood Chip Mulch must be coarse ground wood chips derived from the mechanical grinding of whole trees or portions of trees. It may contain wood, wood fiber, roots, bark, branches, and leaves, but must not contain visible amounts of soil.

B It must be free of weeds and weed seeds, including plants on the King County Noxious Weed list. It must be free of invasive plant portions capable of sprouting, including but not limited to Horsetail, English ivy, English Laurel, Evergreen & Himalayan Blackberry, Old Man's Beard, and Japanese Knotweed.

C It must not contain more than 0.50% by weight of any manufactured inert material (plastic, concrete, ceramics, metal, etc.). Visible traces of manufactured inert materials shall render Arborist Wood Chip Mulch unacceptable for use on Port of Seattle properties. It must not contain any amounts of other compounds in quantities that could be detrimental to plant growth.

1. Arborist Wood Chip Mulch, when tested, must meet the following loose volume gradation:

SIEVE SIZE	MINIMUM % PASSING	MAXIMUM % PASSING
2"	95	100
1"	0	50
5/8"	0	40
1/4"	0	20

2. Particles must not be longer than four inches

D Acceptable substitutes include chipped or shredded woody material left from tree trimmings, meeting the above size and inert material requirements, derived from composting operation screening ("overs"), or derived from recycling of clean dimensional lumber (e.g., pallets or framing lumber Pressure treated timber is not allowed) that has passed through a metal removal process to meet the 0.50% manufactured inert standard above.

E Prior to use, provide the following to the Small Works Project Manager and Port of Seattle Environmental Management Specialist for review and approval:

1. The source of the mulch and contents i.e., species of trees or shrubs included in it.
2. A sieve analysis verifying the product meets the above sieve graduation requirement.
3. A 5-gallon sample of the product.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

2.03 Herbicides and Pesticides

A Do not store herbicides and pesticides on Port of Seattle property.

B Furnish evidence that any chemical used as herbicide or pesticide is registered for the proposed use by the Washington Department of Agriculture according to the Washington Control Act (RCW 15.58.050 through 130) and the General Pesticide Rules (WAC 16-228-1400 through 1460).

C All chemical herbicide and pesticides must be carefully selected in accordance with U.S. Environmental Protection Agency (EPA), Washington State Department of Ecology, Washington State Department of Agriculture, King County Noxious Weed Control Board, and local sensitive area ordinances and regulations.

D Use extreme care to ensure confinement of chemicals within the areas designated. Sprayed chemicals require the use of anti-drift and activating agents, and a spray pattern indicator, unless otherwise allowed by the Small Works Project Manager.

E Do not apply herbicides and pesticides within 100-foot radius of on-site and off-site wells or open water bodies. Weed and pest control inside this 100-foot radius must be by hand or mechanical methods, unless otherwise approved by the Small Works Project Manager.

F The Contractor assumes all responsibility for rendering any area unsatisfactory for planting by reasons of herbicide or pesticide application. Replace, repair and pay for all damages caused by negligence to the satisfaction of the Small Works Project Manager.

2.04 Planting Soil

A Planting soil mix used for backfilling of replacement plant material or restoration of planting areas shall be a three-way mix soil consisting of 10% compost, 30% sand, and 60% sandy loam by volume thoroughly mixed together. Add the soil amendments as recommended by a Soil Testing Laboratory through a Soil Test Report. Planting Soil must have:

1. a pH range of 5.5 to 7.5
2. an organic content between 5% and 8% by weight as tested by the Loss on Ignitions method.

B Compost

1. Compost must be 'Medium Compost' and comply with the requirements of Washington State Department of Transportation Standard Specification 9-14.4(8).
2. Submit compost sources to the Small Works Project Manager for review and approval prior to use on the project site. Approved source: Cedar Grove Compost; Maple Valley, WA; (425) 432-2395.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

3. Prior to installation, compost delivered to project site must have a Solvita Compost Maturity Test performed with a test result of 6 or above. A Solvita Compost Maturity Test is available from Woods End research Laboratory, phone (800) 451-0337. Cost for test shall be Contractor's responsibility. Test must be dated within one month of delivery or use of compost. Submit test results to Small Works Project Manager for review and approval.

C Sand

1. Sand used in the Planting Soil Mix must be "Washed Building Sand" and meet the following analysis:

SIZE	SIEVE	% PASSING
1/4" & 3/8"	ASTM E-11	100
#46	ASTM E-11	95 - 100
#10	ASTM E-11	60 - 70
#18	ASTM E-11	30 - 40
#20	ASTM E-11	< 30
#40	ASTM E-11	< 15
#100	ASTM E-11	2 - 10
#200	ASTM E-11	1 - 5

2. Permissible Chemical Ranges:
   i. Salinity (milliohms per centimeter of saturation extract @ 25°C)
      Nil – 3.0
   ii. Boron (saturation extract concentration)
      Nil – 1.0ppm
   iii. Sodium (sodium absorption ratio – SAR)
      Nil – 6.0

D Sandy Loam

1. Sandy Loam shall be topsoil as defined by the United States Department of Agriculture Classification system and have a texture analysis of 60-75% sand, 15-30% silt and 0-15% clay
2. Sandy Loam particle size must meet the following sieve requirements:

SIEVE SIZE	% PASSING
1"	100
1/2"	> 90
#10	60 - 70
#100	20 - 30
#200	< 30
#270	< 25

3. Sandy Loam must be free of pests, toxic substances and other undesirable material harmful or detrimental to ornamental plant growth.
4. Sandy Loam must consist of loose, moderately well-drained, and friable soil. And be free of stones, debris, and/or similar objects.
5. Sandy Loam must not contain any viable seeds, roots, or rhizomes capable of sprouting any State-listed noxious weeds or invasive root propagating plants including but not limited to Horsetail, English ivy, Evergreen Blackberry, Old Man's Beard, Japanese Knotweed, etc. Remove, dispose of, and replace the soil found to contain these prohibited viable plant materials at the Contractor's expense.

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2.05 Replacement Plant Material

A Small Works Project Manager reserves the right to reject any or all plant material at time of inspection. Remove rejected plant material immediately from the site and replace with approved plant material.

B All plant material must conform to the requirements of the current issue of "American Standard for Nursery Stock" (ASNS) ANSI Z60.1 as published by the American Nursery & Landscape Association. In addition, plant material must comply with the following provisions:

1. Plant Labels and Tags
   i. All plants delivered to the project shall be clearly and accurately labeled with a securely attached, waterproof tag bearing a legible designation of the common name and full scientific name and the size of the plant. This must include the nomenclature for hybrid, variety, or cultivar.
   ii. Any plants, which are not accurately labeled and which do not conform to a Plant Schedule and or Contract Drawings, must be replaced immediately with plant material that conforms.
   iii. The Small Works Project Manager will inspect plant material.
   iv. Once approved, all tags and label materials shall be removed from the plant material.
2. All plant material must meet State and Federal requirements with respect to plant health and absence of diseases and pest infestation.
3. All plant material must be nursery grown stock that has been held in a nursery for less than one year.
4. All plant material specified must be first-class representatives of their normal species or varieties in healthy growing condition with normal well-developed branch system and vigorous root systems.
   i. Plant material must be free from, disfiguring knots, sun-scalds, abrasions of the bark, broken tops, broken branches, and torn roots.
   ii. Plant material, which have suffered damage as the result of girdling of the roots, stem, or a major branch; have deformities of the stem or major branches; have a lack of symmetry; have dead or defoliated tops or branches; or have any defect, injury, or condition which renders the plant unsuitable for its intended use, will be rejected.
5. Large plant material that has been cut back to meet specified sizes will be rejected. Plant materials must not have cuts or pruning wounds over 3/4-inch diameter that are not satisfactorily callusing over.
6. Plant material with weeds at the tops of rootballs, or show stressed condition like wilting leaves, yellowing leaves, or sudden leaf drop, or have dry rootballs, are unacceptable and must be replaced with acceptable plant material.

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7. Collected plant material may be used only when accepted by the Small Works Project Manager.
8. Container-grown Stock
   i. Plant material grown in a pot or container shall have a fibrous root system developed to hold its soil together and keep the root mass firm and whole when removed from the container. Root systems shall be sufficiently established to hold all the soil within the container they are planted in.
   ii. Plants must not be loose in the container.
   iii. Container stock must not be pot or root bound.
   iv. Plants furnished in pots or other containers must be acclimated to outside conditions and equal to field grown stock. To assure acclimatized plants are used, all plant materials used on the project must be grown continuously outdoors and supplied from nurseries north of the 42nd Latitude (Oregon-California border).
9. Trees
   i. Trees must have been grown with sufficient spacing to allow for symmetrical branch development and full canopy which reflects the natural characteristics of the species.
   ii. Tree trunks must display a consistent vertical alignment, have a straight central leader for species where this is typical, and there must be no “included bark” in the crotches between the trunk and side branches.
   iii. Trees with multiple leaders, unless specified, are unacceptable.
   iv. Trees with a damaged or crooked leader, “Y” crotches, missing leaders, bark abrasions, sunscald, disfiguring knots, insect damage, or cuts of limbs over 3/4 inch in diameter that are not completely closed are unacceptable.
   v. Pruning wounds with a diameter of more than one (1) inch must show vigorous callous on all edges. Trees shall not be pruned within 6 months prior to delivery.
   vi. Evergreen and deciduous trees must be furnished balled and burlapped (B&B) or in fabric bags. Broken or “made” root balls are unacceptable.
   vii. Trees grown in fabric bags must have a well-established root system reaching the sides of the fabric bag to maintain a firm ball when the fabric is removed, but without excessive root growth encircling the fabric bag.
   viii. Cracked, dried out, or mushroomed tree root balls are not acceptable.
   ix. Root flare must be visible on top of root ball. If root flare is not visible, soil shall be removed from top of root ball to expose root flare.

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2.06 Fertilizers

A Trees, Shrubs, Lawn and Ground Cover: Standard commercial grade fertilizer of organic or inorganic components, selected by the Contractor to best match the needs of each particular application and time of year and as required to achieve the performance indicated. Subject to the approval of the Small Works Project Manager.

B Fertilizers may be liquid or granular; and shall consist of the following

1. 12 parts per 100 total nitrogen.
2. 12 parts per 100 water-soluble potassium compounds.
3. 12 parts per 100 available phosphoric acid.

C The Contractor shall submit the following to the Small Works Project Manager for approval:

1. a list of the proposed fertilizer(s).
2. the laboratory analysis of the fertilizer listing materials and components.
3. the application rate of each fertilizer.
4. the proposed schedule for application in each lawn, tree, shrub and ground cover area.

D No fertilizer shall be applied until such approval is received and no change in fertilizer can be made without prior approval, once the schedule is approved and established.

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Part 3 Execution Standards

3.01 Contractor's Performance

A The Contractor shall provide proper care of all plant material and landscape areas within the scope of this Contract and per best management practices according to nursery industry standards. The use and application of water, fertilizers, mulches, and other supplies and equipment shall be in the best judgement of the contractor, unless otherwise noted and as required to achieve the execution standards per 32 01 90, Part 3 herein.

B Adequate and proper care shall include, but is not limited to, keeping all plant material in a healthy growing condition by watering, cultivating, and pruning; keeping all plant material trunks and stems free from mulch at all times; keeping planted areas free from insect infestation, weeds and grass infiltration, litter and other debris; retaining finished grades and mulch levels in a neat, tidy, uniform condition; and applying all other means to present a well-groomed and cared-for landscape per the Visual Appearance Standards.

C Visual Appearance Standards. Following are visual appearance requirements for the performance of the detailed functions of Landscape Maintenance under this contract.

1. Lawn: Lawn shall be uniform, free of bare or burnt spots larger than 2 inches square, free from debris, grass clippings, leaves, weeds, moles/rodents, fungus, and insect infestations and any other condition that detracts from the visual appearance of the lawn. Debris remaining in a maintained area over 24 hours maximum is unacceptable. Grass clippings will be removed within 24 hours. Lawn shall be neatly edged along all borders.
2. Groundcover: Groundcover shall be healthy, of uniform color, uniformly covering the planting area, of uniform height, with no bare soil or burned spots and free of weeds. Ground cover areas shall be free of debris, grass clippings, leaves, moles/rodents, fungus, and insect infestations and any other condition that detracts from the visual appearance of the area.
3. Shrubs and Planted Beds: Planted beds shall be free of weeds, debris, grass clippings, leaves, moles/rodents, fungus, dead plants, and insect infestations and any other condition that detracts from the visual appearance of the area. All Planted Beds shall be neatly edged along all borders and mulch layers replenished. Eroded areas shall be repaired.
4. Walks and Paved Areas: Sidewalks and pavements shall be free of debris, grass clippings, leaves and any other condition that detracts from the appearance of the area.

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5. Roadway - Gutters and Drains: Roadway - gutters and drains shall at all times be clear of landscaping debris and leaves. Curbs shall all be neatly edged.
6. Planter Boxes: Planter Boxes shall be free of weeds, debris, clippings, leaves, fungus and insect infestations and any other condition that detracts from the appearance of the area. Dead or damaged Shrubs and Plants shall be inventoried, reported to the Small Works Project Manager and then removed and replaced.
7. Trees: Trees shall present a clean and structured appearance with no dead branches, canopies, scarred or scraped trunks, or damaged root crowns. Canopies shall be full, well branched, and lush in the summer providing a healthy visual appearance.

3.02 Provision for Manual Watering

A Manually water any newly installed planting areas to maintain a moist soil condition for healthy plant establishment and for plant survival during periods of prolonged and/or severe drought.

1. Submit watering schedule to Small Works Project Manager listing proposed watering days and times, water volume, and method and means of application.
2. Adjust watering schedule based upon weather and seasonal factors such as drought conditions to maintain plants in a healthy growing condition.
3. For manually watered trees, apply minimum 15 gallons per tree, per each watering, on a 3-day schedule. Provide water bags installed on top of root balls. Fill water bags with water for manual watering of trees. Water bags must not be in contact with, or interfere with tree foliage.
4. Observe water infiltration into soils while manual watering for consistent infiltration. Alert the Small Works Project Manager of pooling water due to non-draining soils.
5. Manual watering shall be done in a manner that does not create run-off onto adjacent impervious surfaces, erodes soil or cuts trenches, or otherwise disrupts the finish grade of planting bed soils.

3.03 Maintenance and Operation of Irrigation System

A Irrigation systems and watering facilities including sprinkler heads, pipes, fittings, pumps and valves, as available, shall be maintained in good operating condition at all times by the Contractor if the system is in active use. All systems, with the exception of those irrigation systems that have been abandoned in place, must be in working order for the Port of Seattle to use in times of severe drought or extreme fire hazard warning conditions exist.

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B Standard maintenance of the irrigation system shall include repair of broken, missing or faulty sprinkler heads, pipes, fittings, dripper tubing, irrigation bubblers, pumps, or valves; the replacement of the above is as required whether because of improper equipment operation, vandalism, or misuse.

C The Small Works Project Manager shall be notified immediately of any sprinkler system malfunctions, breaks, and repairs, prior to proceeding with repairs.

1. Minor repairs to and adjustment of the sprinkler heads, dripper tubing, irrigation bubblers, irrigation controller sensors and automatic valves is to be included in the landscaping maintenance services, including damage due to Contractor's negligence.
2. Major repairs involving line breaks, automatic valve replacement and automatic control system components shall be brought to the attention of the Port and shall be repaired by Port of Seattle operating personnel or by the Contractor as a Work Authorization after notification to the Port, except where damage was the result of Contractor's negligence.
3. In the event the Contractor discovers a broken main line, lateral, or feeder line, they shall immediately shut off water to the broken line; check with the Small Works Project Manager for location; check location of other underground utilities; and then uncover the line and locate the break or source of trouble. i. When the break or source of trouble is in a pipe, valve, fitting, or within the connecting threads and the nominal diameter is one (1) inch or less, the Contractor shall make repairs immediately without regard to fault. ii. When the break is in pipe, valve or fitting whose nominal diameter is greater than one (1) inch, the Contractor shall notify the Small Works Project Manager immediately. The Small Works Project Manager will then affect repairs immediately (Emergency repair), close the excavation, if any, and return the system to the care of the Contractor.
4. When irrigation systems have been disabled for repair or maintenance for 5 or more days between the dates of June 1st and October 1st; areas that are not receiving water from automatic irrigation during this time and that were being irrigated, must be hand watered a minimum of two times weekly, beginning the 6th day after disablement of the irrigation system.
5. All systems repaired or replaced by the Contractor must be accomplished with materials of same type and quality to match existing.

D There shall be no plugged, broken or missing sprinkler heads. All sprinkler heads shall be properly set to water their design areas with head-to-head coverage and shall not spray water on roadways or parking lots, nor leave dry spots.

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E All dripper tubing shall provide consistent application with no plugged or broken emitters and no leaks or breaks within tubing or fittings. Dripper tubing shall remain staked in place, and shall not be visible by either covering with mulch or with layer of planting soil to hide it. Dripper tubing must remain in direct contact with the planting soil at all times.

F Contractor is to notify the Small Works Project Manager if the existing irrigation system is in need of equipment updates outside of repair and/or maintenance work. Equipment updates include items to address uneven water distribution through improper replacement parts made in the past, improper grouping of equipment within a zone (such as components with non-matched precipitation rates), and updates to the irrigation controller or sensors which could improve water usage efficiency and conservation.

G The Contractor will be responsible for the watering patterns and timing, including setting any automatic sprinkler controls. Automatic irrigation systems shall be operated fully automatic during plant establishment periods. Plants shall be watered by the Contractor as to insure adequate but not excessive soil moisture for healthy growth, establishment, and survival.

1. Operate automatic irrigation during the time period of 2:00AM to 5:00AM. Alert the Small Works Project Manager if the watering window does not allow for all irrigated areas to receive water during this time period.
2. When present, rain sensors, weather satellite technology, flow sensors, soil moisture sensors, and wind sensors, shall be enabled to override the irrigation controller schedule.
3. Irrigation scheduling shall be determined in conjunction with a WaterSense® Water Budget Approach as established by the Environmental Protection Agency (EPA). Contractor must establish a Landscape Baseline for water usage as determined through the WaterSense® Budget Approach formula, available at https://www.epa.gov/watersense/water-budget-tool. Total water use scheduled into the irrigation controller cannot exceed the Landscape Baseline for water usage. The Landscape Baseline for water usage must be updated as new irrigation zones are added, deleted, or have their planting type changed.
4. The Contractor shall furnish in writing a watering schedule to the Small Works Project Manager which includes the Landscape Baseline for water usage, and the water use percentage or reduction in gallons achieved through efficient irrigation programming.
   i. Landscape Baseline water usage updates will be due to the Small Works Project Manager within 14 days of programming new scheduling information into the irrigation controller.
   ii. If water restrictions are established, the Contractor shall develop and update watering schedules in consultation with the Small Works Project Manager.

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H For trees on their own irrigation zones, apply 10 gallons of water per caliper inch of tree per week, per each when trees are still in their plant establishment period or in times of severe drought. Deep root watering increases long-term drought resistance of trees especially during establishment.

I Irrigation systems will be drained and flushed by the Port at the end of each season and shall be turned on at the beginning of each season. Notification of the accomplishment of this Work shall be given to the Contractor when completed.

J A complete and thorough inspection by the Contractor of irrigation valves, spray bodies, spray nozzles, and controller sensors shall be performed at the beginning of each season. Inspection shall include observing the system operate in its entirety. This inspection shall be done within 14 days of the Contractor receiving notification the irrigation system has been activated. During this inspection, all adjustments and replacements shall be made, with any replaced equipment logged. Written verification of this inspection shall be provided to the Small Works Project Manager within 28 calendar days of the irrigation start up notification provided to the Contractor by the Port.

K Landscape planting areas shall be observed in relation to irrigation coverage throughout the irrigation season during regular maintenance.

1. Observations shall include, but are not limited to:
   i. dry spots that are not receiving irrigation water,
   ii. soil and mulch erosion,
   iii. special problems posed by irrigation on slopes, in median strips, and in narrow planting areas,
   iv. overspray onto paved or impermeable surfaces,
   v. pooling in depressions and areas of poor drainage, and
   vi. areas of excessive drainage leaving low soil moisture.
2. Adjustments to the irrigation system shall be made as they are observed when they fall within the Contractors scope as described above. When adjustments are not within the Contractors scope the Small Works Project Manager shall be notified in writing within 48 hours

L The Contractor will not be permitted to use fire hydrants as a source for watering.

3.04 Maintaining Lawns

A Mowing: Lawns are to be mowed weekly or as needed to maintain a neat appearance. All grass clippings shall be removed from the site within 24 hours, unless a mulching lawnmower is used.

B Avoid damage to tree trunks and shrub branches by mowing machines or trimming tools.

C Fertilizing:
1. Fertilizer shall be uniformly applied to lawn areas using an organic fertilizer at a minimum of 1 application every three years occurring between Sept. 15th to Oct. 31st.
2. Fertilizer shall be thoroughly watered in.

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D Reseeding: Reseed all bare spots and areas in existing lawns.

E Edging: Lawns to be edged along borders during active growing season or as needed to maintain a neat appearance. Grass along fence lines shall be trimmed to the same height as the adjacent lawn. All clippings will be removed from the area.

F Weed Control: Fine lawns to be sprayed with general or spot applications of trans- located chemicals to control broadleaf weeds as weather and turf conditions dictate.

G Mowing Schedule:

1. Fine Lawns: Mow whenever lawn exceeds an average height of 3 inches. Mow to a 2-inch height with all cuttings retained and disposed off-site, unless a mulching lawnmower is used.
2. Rough-cut Areas: Mow when rough-cut areas exceed an average height of 6 inches. Mow down to a 3-inch height with all cuttings and plant debris retained and disposed off-site.

H Watering: Lawns shall be watered manually or using the irrigation systems as available, to establish deep root systems during establishment.

I Thatching and Aerification: Thatching and aerification shall be accomplished as needed on lawn areas to promote deep rooting and a continuously healthy turf condition. Thatching and aerification shall be accomplished at least once a year or as needed. Where bare spots result from thatching, lawn shall be over- seeded with grass lawn seed at the rate of 2 pounds per 1,000 square feet. Excess thatch must be collected and disposed of off-site.

3.05 Maintaining Planting Beds & Tree Planting Areas

A Compost Topdressing: All planted bed areas and areas landscaped with trees shall receive a topdressing of compost in March and shall be lightly raked into the bed surface.

B Mulching: The Small Works Project Manager shall be notified prior to application of mulch to any Port facilities.

1. All planted bed areas and tree pits shall be covered with mulch to maintain a minimum thickness of 3” of mulch. Replenishment of mulch to maintain a 3” depth shall be accomplished once a year, in March.
2. Mulch Rings. Maintain a 2-foot-wide band of mulch around trees that are in lawn. The width is as measured from the trunk. The transition to lawn shall be kept neatly trimmed.

C Soil Amending.

1. Should established plants show signs of ill or degrading health, have a soil test performed by a soil testing laboratory for fertility analysis on two samples of planting

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soil from the target planting bed or soil area. Present the recommendations to the Small Works Project Manager. The Contractor is responsible for the cost for soil testing.

2. Apply soil amendments as recommended by the soil test laboratory for horticultural health.
3. Plants within the target planting bed or soil area may need to be replaced concurrent with soil amending activities.
4. Costs for soil amendments and plant material replacement shall be determined on a unit price basis and agreed upon by a Change Order prior to commencement of soil amendment work.

3.06 Pruning Of Trees And Shrubs

A Pruning: All shrubs, trees and plants shall be minimally pruned in accordance with standards of good horticulture practice and in accordance with the intended function of the shrub in its location. Natural plant form and shape shall be allowed to develop in all cases, unless otherwise stated in planting plans.

B Pruning shall produce a clean cut, without bruising or tearing at the bark, and shall be in living wood where the wound can heal. All pruning cuts in excess of 1/2-inch shall be treated with pruning paint. Trees and Shrubs damaged or killed due to Contractor's over-zealous pruning and/or hedging shall be reported to the Small Works Project Manager and repaired at Contractor's cost.

C All pruning debris shall be removed from the site.

D Prune during the dormant season to maintain the natural appearance of plant materials. Do not shear or hedge shrubs or trees unless otherwise noted in the original planting plans.

E Prune trees and large, woody shrubs per best arboriculture practices as published by the International Society of Arboriculture and the Tree Care Industry Association ANSI A300.

F Dead heading. Spent flower heads and seed pods shall be removed from all rhododendrons and azaleas following blooming each year.

G Remove all suckering or sucker growth from the trunk and base of trees to maintain a clean appearance.

3.07 Tree Fastenings

A Where existing, tree fastenings, ties, and stakes shall be kept intact and effective in maintaining firm support for plant material. Fastenings shall be adjusted as needed by the Contractor to prevent strangulation, bark scaring, non-plumb growth of the tree trunk, and irregular growth.

B Tree fastenings are not needed for deciduous trees that are 1.5" caliper or less; or under 6ft in height. If they are provided, tree stakes and fastenings should be removed after a 2-year growing period.

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C Remove fastenings, ties, and stakes at the completion of the any Guarantee Period and dispose off-site.

D Under no circumstances should tree fastenings, ties, and stakes remain longer than 3 years

3.08 Tree Grates

A Where existing, trees in tree grates shall be monitored to observe the growth of the tree. If the tree trunk width is within 1" of the inside ring or segment of the tree grate, remove the break-out rings or segments to ensure the grate does not girdle the tree trunk.

3.09 Maintaining Detention Ponds

A Generally, maintenance of Detention Ponds will be by the Airport's Airfield Crew.

B Should the landscape maintenance contractor be scoped to perform maintenance or assist in maintaining vegetation in Detention Ponds, performance of work will be directed by Airfield Crew. All landscape work within Detention Ponds must control the growth of unwanted vegetation and must comply with:

1. The Port of Seattle Stormwater Management Manual for Port Aviation Division Property (SWMM), current version; and
2. The Port of Seattle's Stormwater Pollution Prevention Plan (SWPPP).

3.10 Plant Replacement

A Contractor shall maintain a list of all plant material losses, removals, and replacements. Trees and shrubs and ground cover plants shall be listed by species name, location, and quantity. Review the list of losses, removals, and replacements shall at least twice per year with the Small Works Project Manager.

B Where plant material losses occur due to Contractor's negligence and/or failure to perform, plants shall be replaced at Contractor's expense.

C Any plant material that is 25% or more dead or disfigured shall be considered dead and must be replaced. A tree shall be considered dead when the main leader has died back or when 25% of the canopy is dead.

D All plants are subject to one (1) replacement per each item per year. This includes dead plants or plants that, in the opinion of the Small Works Project Manager are in an unhealthy or unsightly condition, or that have lost their natural shape and symmetry. Replace unacceptable plants with the same species, caliper, and/or equal size as the plants they replace, unless the Small Works Project Manager determines a substitute species plant of equal value or a different size may be provided. Repair all lawn areas that have been damaged by the acts of others before the end of the year. Provide plant replacements and lawn repairs in accordance with these Landscape Maintenance Specifications.

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E If plants are stolen or damaged by acts of others, the Port of Seattle will pay invoice cost for the replacement plants and the Contractor will be responsible for the labor and materials to install the replacement plants.

F Complete plant material replacements during the spring (March 15 to May 15) and/or autumn planting periods (Sept 25 to Nov 15) unless otherwise approved by the Small Works Project Manager. Plant material replacement and lawn repair is subject to the same conditions and same manner as specified for the original planting.

G Installation of plant material:

1. Trees
   - i. Tree pit excavation near a curb or sidewalk must allow a horizontal clearance of at least 12 inches from the curb or sidewalk without undermining foundation support of adjacent improvements.
   - ii. Before planting, completely remove all twine, burlap, wrapping material, fabric grow bags, and wire baskets and completely remove this material from the planting hole.
   - iii. All containers must be removed from rootballs before planting. Containers may require vertical cuts down the full depth of the container to accommodate removal.
   - iv. For ball and burlap and container trees, roots showing at the edge of the root ball must be loosened without tearing.
   - v. Set trees in the planting pit to proper grade and alignment.
     1) The rootball must be placed in the planting pit in a manner that ensures the roots are properly spread for lateral directional growth.
     2) Set trees upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure.
     3) Set crown of rootball up to one (1) inch above the finish grade elevation.
   - vi. Backfill must be carefully placed and compacted by water settling. When planting hole is 3/4 backfilled, apply water, to water-settle the backfill and remove voids. After settling occurs, the Contractor must add enough soil to cover the roots but must not rework the soil. Do not use frozen or muddy mixtures for backfilling. No soil filling will be permitted against trunks, root flare, stems or above grafts on grafted trees.
   - vii. Form a watering ring of soil around the edge of each planting pit to retain water.
2. Shrubs, Groundcover, and Vines
   - i. Plants supplied in containers must be kept moist at all times and must be removed from the container in a manner that prevents damage to the root system. The plants must not be removed from the container by pulling on the stem.

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ii. All plastic, burlap, ties, and other container material must be removed from the plant prior to planting. Containers may require vertical cuts down the full depth of the container to accommodate removal.

1) Space groundcover plants using triangular spacing in accordance with indicated dimensions and offsets in original planting plans. Adjust spacing as necessary to evenly and uniformly fill voids in the planting bed. Always plant groundcovers to within twelve inches (12") of the rootballs of trees and shrubs within planting bed.
2) Set shrub, groundcover, and vines in the planting pit to proper grade and alignment.
   a. Set upright. Install plants so that top of rootball is flush with the finished grade after settlement.
   b. Check top of root ball for root flare. If root flare is not found, carefully scrape away excess soil until root flare is exposed. This level must be the top of the rootball and installed flush to the finished grade.
3) Backfill must be firmly tamped or compacted without voids around the roots, then covered with mulch, and watered immediately after planting.

3.11 Application Of Chemicals

A Chemical Use and Water Quality:

1 The Contractor is cautioned that water or stormwater run off from landscaped areas may enter into waterways within a relatively short distance and may impact the water quality.

2 The Contractor shall be responsible to assure that the chemicals used and methods of application will not be detrimental to water quality.

B All chemical applications of herbicides, pesticides, fungicides, and fertilizers shall be made in a manner that will avoid their entry into waterways and storm drain systems, and shall comply with the Port's Stormwater Pollution Prevention Plan (SWPPP).

C All chemical applications shall be tracked in a spray log. The spray log must include recording sheets or forms and be readily available for review by the Small Works Project Manager.

1. Spray log will document the following:
   i. The start time of the application of chemical(s).
   ii. The site or location where the chemical(s) is applied.
   iii. The brand name of the chemical(s).
   iv. Active ingredients of the chemical(s)
   v. The name of the plant and/or plants that the chemical(s) was used on.
   vi. Application rate.

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vii. Size of the area that has been treated.
viii. Quantity of the chemical(s) which have been used in undiluted form
ix. The date and time of treatment.
x. The name of the person applying the treatment and their applicator's license number.

3.12 Weed Control

A Weed control shall be continuous in all shrub beds and tree island and shall be accomplished by a combination of hand weeding and application of mulches.

B Ground cover shall be kept free of weeds.

C Contractor shall be responsible for control and removal of weeds and grasses coming up through cracks in sidewalk and parking lot areas adjacent to landscaping.

D Preferred methods of weed control include mechanically or hand-pulled weeds. Reapply bark mulch after weed removal, and adjust watering schedule to avoid overwatering.

E Consider herbicide applications only as a last resort and only after other methods of control have proven ineffective.

1. Schedule all chemical treatment for weed control in late summer or early fall a minimum of 3 weeks prior to mechanical removal of noxious and/or invasive weeds.
2. Apply post-emergent herbicides while green and growing tissue is present. Should unwanted vegetation reach the seed stage in violation of these Specifications, physically remove and bag the seed heads. Dispose physically removed vegetation and seed heads off-site.

F Noxious weeds (Class A, B & C as defined by the County Weed Control Board) and invasive weeds, including but not limited to Horsetail (Equisetum sp.), reed canary grass, EnglishIvy, Himalayan blackberry, evergreen blackberry, policeman's helmet, bamboo, yellow flag iris, and Japanese knotweed, must be completely removed from the project site.

1. If an inspection discovers noxious or invasive weed species infestation: Submit a Weed Control Plan for review and approval to the Small Works Project Manager.
   i. The Weed Control Plan includes:
      1) of and scheduling of removal of invasive species and/or noxious weeds that occur within the project limit of work and in newly planted areas.
      2) methods of removal and scheduling of removal of weeds located inside the drip lines of existing trees.
   ii. The plan shall be prepared and signed by a licensed commercial operator with a Washington State Department of Agriculture (WSDA) Commercial Applicator license.
   iii. Include methods of weed control, timing and scheduling of control operations, and the name, application rate, and Material Safety Data Sheets (MSDS) of all proposed herbicides.
      1) Furnish the Small Works Project Manager with a

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copy of the current product label and MSDS for each herbicide and spray adjuvant to be used.

2) Identify and list the target weeds and unwanted vegetation to be removed specific to the project site.

2. All spray applications shall be made by persons possessing a valid applicator's license.
3. Contractor is responsible for all costs to remove invasive weed infestations, remove and replace existing soil, and replant vegetation per original planting plans

3.13 Pest Control

A If an inspection discovers pest or insect infestation: Submit a Pest Control Plan for review and approval to the Small Works Project Manager.

1. The Pest Control Plan includes:
   i. methods of and scheduling of removal pests that occur within the project limit of work and newly planted areas.
   ii. methods of and scheduling of removal of pests located inside the drip lines of existing trees.
2. The plan shall be prepared and signed by a licensed commercial operator with a Washington State Department of Agriculture (WSDA) Commercial Applicator pesticide license.
3. Include methods of pest control, timing and scheduling of control operations, and the name, application rate, and Material Safety Data Sheets (MSDS) of all proposed pesticides.
   i. Furnish the Small Works Project Manager with a copy of the current product label and MSDS for each pesticide and spray adjuvant to be used.
   ii. Identify and list the target to be removed specific to the project site.

B All plant material including lawns, shrubs and trees shall be regularly inspected throughout the year to determine the presence of pests, and the appropriate organic pesticide, fungicide, or insecticide shall be applied as necessary in accordance with City, State and Federal regulations.

C All spray applications shall be made by persons possessing a valid pesticide applicator's license.

D Mole, rabbit, rat, and other rodent control to be undertaken in turf and planting areas as needed. Safe procedures and practices as recommended by State Rodent Control Authorities shall be followed.

E Consider pesticide applications only as a last resort and only after other methods of control have proven ineffective. Preferred methods of pest control include mechanical means such as trap and release or use of organic insecticidal soap for insect infestations.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

3.14 Debris And Litter Control

A General: Debris and litter control shall be accomplished in all landscaped lawn, planting bed and tree areas at least weekly or more often where necessary.

B Debris and litter control will include leaf fall control in Autumn period. Leaves, wind blown into gutters and catch basins, are considered as litter and shall be removed as debris

C Policing for paper and litter in all areas shall be conducted daily except Saturdays, Sundays and Holidays.

3.15 Consultation

A Consultation and professional advice will be provided to the Port as requested at no extra cost.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

PART 4 Measurement and Payment

4.01 General

A No separate measurement or payment will be made for the Work required by this section. The cost for this portion of the Work will be considered incidental to, and included in the payments made for the applicable bid items in the Schedule of Unit Prices for the Project.

E. SEA SMALL WORKS LANDSCAPE MAINTENANCE

TASKS INVOLVED	FREQUENCY BY MONTH											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Inspections												
Quarterly Inspections with the Small Works Project Manager	1			1			1			1		
Maintenance Reports to the Small Works Project Manager	1	1	1	1	1	1	1	1	1	1	1	1
Trees, Shrubs, Perennials, Groundcovers, Vines												
Pruning of Large, Woody Shrubs and/or Trees (if needed)	AS	AS									AS	AS
Tree Fasteners Adjustments/Removal				AS								
Weed Control**		1	2	2	2	2	2	2	2	2	1	
Mulch Topdressing			AS									
Autumn Leaves Control	4	2								2	4	4
Debris Control	1	1	2	2	2	2	2	2	2	2	2	1
Pest/Disease Control				AS				AS				
Plant Material Inventory & Replacement									AS	AS		
Soil Test & Application of Amendments (every third year)			1	1								
Fertilizing (every third year)				1								
Arborist review of trees in public areas***				AS								
Lawn Areas												
Mowing, Trimming and Edging of Non-irrigated Lawn	Inactive	Inactive	2	4	4	2	1	Dormant	Dormant	1	2	Inactive
Mowing, Trimming and Edging of Irrigated Lawn	1	1	2	2	4	4	4	4	4	2	1	1
Fertilizing (every third year)				1								
Check for and Reseed Bare Spots in Lawns			1									
Weed Control**			1		1		AS			1		
Irrigation System *(for active, in-use systems only)*												
Activate System & Check for Operability				1								
Adjust Irrigation System				AS			AS					
Winterization (if system is active throughout growing season)										1		
Cross-Connection Assembly Test				1								

KEY:

AS: Accomplish task as needed during indicated month	2: Accomplish task at least twice month
1: Accomplish task at least once month	4: Accomplish task weekly during indicated month

* Hours to complete activity do not include traffic control, hours may be higher during first year maintenance
** Accomplish these tasks weekly during first year in areas of newly, installed plants
*** Review after major storm events

F. WILDLIFE ISSUES: BACKGROUND AND CONCERNS

Wildlife Collisions with Aircraft

An important safety hazard created by native birds and other wildlife involves collision with aircraft. These occurrences are relatively rare, but their risk and frequency of occurrence has increased with the sharp increase in air traffic. Aircraft collisions with wildlife can be deadly, and are always costly. Research into this problem began in earnest in 1960 when a small plane collided with a flock of starlings and killed 62 people (Pearson 1967). Since then, a variety of methods to reduce wildlife and aircraft collisions have been proposed (Friederici 1997), and the Federal Aviation Administration (FAA) has issued an Advisory Circular (FAA 1997) for airport planning to reduce collision risks.

In accordance with FAA requirements and airport certification standards, the Port of Seattle has a Wildlife Hazard Management Plan, which consists of both long term and short-term programs for controlling wildlife populations in the immediate vicinity of the airport. The primary goals of these programs are:

- Identifying potential wildlife attractants onsite.
- Alerting or eliminating these features to reduce the risk of a wildlife and aircraft collision.

FAA policies discourage incompatible uses, including planting types, that could attract and exacerbate wildlife hazards in Runway Protection Zones (RPZs)-areas extending 1,000 feet beyond the runways. The policies also prohibit obstacles of any kind. including plantings, that extend upward into the Object Free Areas (OFAs), which extend 200 feet beyond the runway ends.

All species of wildlife can potentially pose a threat to aircraft safety. However, some species are more commonly involved in aircraft strikes than others are. According to the FAA Advisory Circular (FAA 1997) titled Hazardous Wildlife Attractants On or Near Airports, gulls, waterfowl, raptors, and deer have accounted for 67 percent of all damaging aircraft strikes nationwide from 1993 through 1995. The remaining 33 percent of damaging aircraft strikes involved (in descending order of frequency) doves, vultures, blackbirds and starlings, crows, wading birds, and canids (coyotes and domestic dogs).

At Seattle-Tacoma International Airport, approximately 20 bird strike incidents occur each year (Port of Seattle FSEIS 1997; Bulman Pers. Comm.). including strikes with starlings, gulls, waterfowl (geese, ducks. and shorebirds), and pigeons. Although not as common as the most common hazard species, raptors are also a concern.

Wildlife Habitat at Seattle-Tacoma International Airport

The land surrounding the airport has been highly altered over the past 150 years by human activity. Most of the animal species that once lived in this area are greatly reduced in numbers, as their favored types of habitat have been converted to other land

F. WILDLIFE ISSUES: BACKGROUND AND CONCERNS

uses. Many wildlife species are also opportunistic; finding ways to survive in this highly urbanized landscape. Several species of native wildlife and some introduced species have adapted to and, indeed, have flourished in the habitats still found in the area.

The Seattle-Tacoma International Airport Master Plan Update EIS inventoried a total of 2,352 acres of terrestrial wildlife habitat, seven streams, and several water bodies in the 4-square-mile area encompassing the airport. Terrestrial habitat types include managed and unmanaged grassland (mowed and managed lawns, pastures, row crops, and unmowed fields), shrub and forest areas (deciduous and evergreen), and wetlands, along with several stormwater and wastewater detention ponds. Des Moines Creek, Miller Creek and Walker Creek are the largest streams near the airport. Each has large associated wetland areas.

If all of the facilities and improvements identified in the Airport Master Plan Update were implemented, approximately 700 acres of terrestrial habitat would be eliminated. The largest losses would be of open grassland and relatively uniform stands of deciduous forest. These landscape elements provide the most desirable habitats for the wildlife species of greatest concern at the airport. A reduction of the extent of these habitat types would help reduce the potential for damaging aircraft strikes.

Controlling Hazard Wildlife by Species

The wildlife species that present the greatest concern at Seattle-Tacoma International Airport include waterfowl, starlings, crows, gulls, and raptors.

Canada Geese

Problem:

Large numbers of Canada geese have modified their migratory habits to reside year-round in many areas of western Washington. Geese are especially attracted, as are gulls, to the mowed lawns and wetlands at the south end of the airport, which experience relatively little day to day human disturbance.

Solutions:

Extensions of the runway safety areas and construction of the South Aviation Support Area (SASA) project will reduce the amount of desirable habitat for this species, as will decreasing the open grassland in favor of more forested environment (see below). Currently, the Port of Seattle has an active program to relocate populations of Canada geese from the Tyee Valley Golf Course (Bulman, personal communication). Adults and young are transported to other habitats to discourage the numbers of resident birds.

F. WILDLIFE ISSUES: BACKGROUND AND CONCERNS

Starlings and Crows

Problem:

Starlings and crows are gregarious flocking birds attracted to dense uniform, even-aged stands of trees. Large flocks of these birds can be observed swarming to desirable overnight roosting sites. literally covering the crowns of tall trees at dusk. Frequently used habitats in the vicinity of the airport include the deciduous forests in the North SeaTac Park area and in the Miller Creek wetlands south of South 154th Street; the deciduous forests west of the present airport in the third runway expansion area; and deciduous groves in and around the large wetland system adjacent to the Tyee Valley Golf Course and in the Des Moines Creek corridor.

Solutions:

Ongoing management of these wildlife populations at the airport includes selective thinning of dense tree stands to eliminate overlapping branches and uniform height canopy, and using sound deterrents. Crows in particular will disperse at the sound of frightening noise created by crackers (shotgun shells loaded with firecrackers instead of shot) (Bulman, personal communication).

In general, hazards from these animals can be reduced by minimizing the amount of uniform, even-aged forest and instead encouraging forest stands with trees and shrubs of diverse heights and ages. Such complex forests are less desirable to hazardous wildlife such as crows (Kozloff, 1995; Marzluff, personal communication). Complex forests are created by planting the sites over many years and by incorporating diverse woody species of varying heights and crown structures.

With the reduction of grassland habitat and open wetlands that attract geese. gulls. and waterfowl, the wildlife species of greatest hazard concern are crows and starlings. Reducing perching, nesting, and foraging opportunities can actively reduce the problem. Roosting habits of crows should be continually monitored. If large communal roosts and their associated flight paths are found near the airport, they should be eliminated by means such as setting off explosives in the presence of large flocks of crows; this has been found effective in moving crow roosting locations elsewhere (Marzluff, personal communication). Active thinning of trees in roosting sites also deters crows, but may not be as cost-effective as using explosives as needed.

F. WILDLIFE ISSUES: BACKGROUND AND CONCERNS

Raptors

Problem:

Several raptor species are reported to occur in the vicinity of the airport. Red-tailed hawk is the most commonly occurring raptor. A raptor survey conducted for the Final Supplemental EIS (SEIS) reported that no raptor nests have been identified in the third runway expansion area. Other surrounding areas have not been surveyed to the level of detail provided for the Final SEIS; however, the most likely area for raptor nests is south of the Tyee Valley Golf Course in the deciduous forest surrounding Des Moines Creek.

Solutions:

According to the SEIS, raptor use of the airport area is primarily limited to foraging for food-typically small mammals. Raptors will use any elevated landing site (e.g., branches and tops of tall trees, lighting supports, and tall fence posts) that provides an unobstructed vantage point to perch and watch for prey in adjacent grasslands. They hunt open, grassy areas containing natural vegetation because rodents such as mice and moles will be abundant and visible.

Providing taller (approximately 12" high) unmowed grasses, augmented by significant shrub cover for potential prey in grasslands-particularly around edges that are closest to potential raptor perch sites-best reduces habitat suitability for raptors. They will move to other foraging sites where prey is more easily caught (Marzluff, personal communication).

Controlling Hazard Wildlife with Raptors

While wild raptors are a component of the wildlife hazard at the airport, their trained counterparts could be part of the solution. In addition to the general methods discussed above, creative means of controlling hazard wildlife include the use of falconers. A highly unusual method of eliminating aircraft collisions with flocking birds was employed at a British Navy airfield. A team of falconers, flying two falcons per year, sharply reduced airfield bird populations and, as a consequence, lowered air-strike damage from $600,000 per year to zero (Welty 1975, Kuhring 1969).

A similar program is underway at Kennedy International Airport. In 1996, the first year falconry was used at Kennedy. There was a 61 percent decline in the number of birds striking airplanes while falcon flights were underway, compared with the same period in 1995 (Revkin, A. C. 1997). The program was re-authorized for 1997 at a cost to the Port Authority of New York and New Jersey of $228,000. The head falconer for the Kennedy International Airport falconry program stated that the only deterrent birds never lose their fear for is the sight of a raptor.

F. WILDLIFE ISSUES: BACKGROUND AND CONCERNS

Water as Wildlife Attractant

With regard to water features such as streams, ponds, and waterfalls, the key to reducing their attractiveness to hazard wildlife, such as waterfowl, is to have them covered-most easily and naturally by a closed-canopy vegetative cover.

Waterfalls themselves do not attract hazard wildlife, so are not at issue (Marzluff, personal communication). Small bodies of flowing water such as Miller Creek can be covered by canopy to minimize their source of hazard. But larger, less linear bodies of water, such as stormwater detention facilities, are more difficult to cover with vegetation and are therefore hazard-wildlife attractants which should be discouraged in the airport area (Marzluff, personal communication). Smaller detention ponds can be heavily planted with aggressive, water-loving plants such as hardback (Spirea douglassi) to cover the water surface.

Mitigation Habitats

Many expansion and redevelopment projects are being planned or are currently underway at the airport, and some of these will impact natural wildlife habitats. Permit agreements between the FAA and environmental permitting agencies could include a clause that if mitigation habitats become a wildlife attractant for hazardous species, the Port of Seattle may alter the habitat to discourage wildlife use. This philosophy would likely influence projects undertaken as part of this conceptual plan.

Green Roofs

Green roof installations at SEA require specific considerations for mitigating wildlife risks. Although the Port does not currently have green roof installations, a pilot project is in development. Future green roofs will need to consider the following measures:

- Avoiding the creation of habitat or food sources for nuisance species.
- Including equipment such as cameras for monitoring the presence of nuisance species.
- Temporary application of bird netting during nesting season of nuisance birds
- Providing maintenance access for regular monitoring and removal of nuisance bird nests and eggs (may require special permits).

Additional conditions and measures will be added or amended is future updates to these standards.

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H. APPROVED PLANT LIST

Approved Plant List

The Port of Seattle maintains an Approved Plant List that identifies plants acceptable for use on landscape projects at SEA. The goal of the plant list is to provide a clear reference of plants that have been evaluated for functionality, performances, and risk mitigation.

The Approved Plant List can be accessed with this hyperlink.

A primary factor in plant approval is wildlife hazard management review. Plants that provide forage or nesting opportunities for species of concern are generally rejected. Refer to **Appendix F: Wildlife Issues** for additional guidance.

Additionally, projects that include Stormwater Management BMPs should refer to the SWMM for plant list information specific to those functions. A complete list of stormwater-specific plants is not included in the Approved Plant List and will require project review and approval.

Plant Approval Process

The Port allows requests for project-specific plant approvals to accommodate project conditions and goals. A general outline for requesting a Plant List Variance:

1. Check the Approved Plant List and Rejected Plant List for the plant species of interest before requesting a variance.
2. Use the Plant List Update Template to describe the species to be considered by the LAND Committee. Access a copy of this Excel spreadsheet with this hyperlink.
3. Email the completed Plant List Update Template to the SEA project manager and schedule a LAND review meeting.
4. Review the Plant List Variance request with the LAND Committee. Be prepared to discuss each plant species and rationale for requested approval. Meeting minutes will be provided with final decisions.
5. Incorporate feedback into a final plant list and return a copy to the SEA project manager.

Use plant list resources to develop the request based what is available locally and how the species meets important criteria such as:

- Wildlife attractants
- Height – within FAA guidelines and limitations
- Maintenance/Viability – long term plant health and establishment.

H. APPROVED PLANT LIST

Plant List Resources

The following is a list of additional resources for identifying and confirming plant species attributes.

Government Resources:

King County Native Plant List

- https://green2.kingcounty.gov/gonative/Plant.aspx?Act=list

WSDOT Roadside Manual Appendix F

- https://wsdot.wa.gov/publications/manuals/fulltext/M25-30/Appendices.pdf

City of Seattle Lists

- https://public.tableau.com/app/profile/city.of.seattle.transportation/viz/SDOTTreeSelector/Dashboard
- https://www.seattle.gov/documents/Departments/SDCI/Codes/GreenFactorPlantList2010.pdf
- https://www.seattle.gov/documents/Departments/SDCI/Codes/GreenFactorTreeList2008.pdf

USDA Plant Database

- https://plants.usda.gov/

King County Noxious Weed List

- https://kingcounty.gov/en/legacy/services/environment/animals-and-plants/noxious-weeds/laws/list

H. APPROVED PLANT LIST

Plant List Resources

Non-Government Resources:

Washington Native Plant Society

- https://www.wnps.org/native-plant-directory

Missouri Botanical Garden

- https://www.missouribotanicalgarden.org/PlantFinder/plantfindersearch.aspx

Great Plant Picks

- https://www.greatplantpicks.org/

J Frank Schmidt & Sons Co. (nursery)

- https://jfschmidt.com/

Monrovia (nursery)

- https://www.monrovia.com/shop.html

I. REJECTED PLANT LIST

Rejected Plant List

The Port of Seattle maintains an Rejected Plant List that identifies plants that are not approved for use on landscape projects at SEA. The goal of this plant list is to provide a clear identification of plants that have been reviewed and found unacceptable based on various factors, such as performance or wildlife attractant risk.

The Rejected Plant List is included at the end of the Approved Plant List, and it can be accessed with this hyperlink.