



# Sound Transit Sustainable Landscaping Best Management Practices Manual

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Prepared for Sound Transit by Cascadia Consulting Group, Inc.

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## Introduction

Sound Transit hires contractors to maintain transit facilities for all of Sound Transit's business lines, including commuter rail, regional express bus, and light rail operations. Sound Transit desires to improve horticultural maintenance practices at its facilities by ensuring Sound Transit facilities staff and landscape contractors are knowledgeable about Integrated Pest Management and sustainable landscaping principles.

This manual establishes clear guidelines for sustainable design and maintenance practices for Sound Transit's landscape and horticulture operations.

## Goal Statement

Sound Transit facility plant beds, trees, turf, hardscapes, irrigation systems, and other assets shall be designed, constructed, and maintained in a manner that is aesthetically pleasing, and that protects and enhances ecosystem function, natural resources, public health, and wildlife habitat, all through sustainable maintenance practices that model environmental stewardship to the community. Landscapes shall be maintained to a consistent standard that balances maximizing efficiency of resources, aesthetics, and environmental stewardship.

## Policies and Guidelines

Sound Transit has implemented policies to guide landscaping and other activity at Sound Transit facilities. In 2004, Sound Transit adopted an **Environmental Policy (Resolution R2004-06)** and was among the first wave of transit agencies to develop and implement an **Environmental and Sustainability Management System (ESMS)**. In 2007, Sound Transit's Chief Executive Officer signed **Executive Order No. 1: Establishing a Sustainability Initiative for Sound Transit**. This order encourages sustainable business practices and strategies to be integrated throughout the Sound Transit organization, including planning, designing, constructing, and operating existing and new transit systems and facilities. Sustainable planning, design, construction, and operation encompass the following topics: petroleum conservation and renewable fuel and energy; energy efficiency; greenhouse gas emissions; water conservation; toxics reduction; ecosystem mitigation; procurement; pollution prevention, re-use, and recycling; building and facility performance (green design/green building); and land use.

In 2007, Sound Transit became certified under the **International Organization for Standardization (ISO) 14001 in Environmental Management Systems**. The ISO 14001 standard requires that a community or organization implement a series of practices and procedures that, when taken together, result in an environmental management system, with the ultimate intent to drive continual improvement. The outcomes of these policies included creating an Integrated Pest Management Plan.

Sound Transit drafted an **Integrated Pest Management Plan (IPM Plan)** in 2009 to provide specific guidance for staff and consultants managing Sound Transit’s facilities and property. The IPM Plan’s goal is to reduce the use of toxic and hazardous chemicals in landscape management while providing a common basis for pest and vegetation management. The IPM Plan applies to both internal operations and contracted services. All departments and functions shall make decisions regarding the planning, design, installation, and maintenance of grounds, landscapes, road and utility rights-of-way, and water bodies consistent with the principles of the IPM Plan.

If a Sound Transit entity determines, after following the principles of IPM, that using pesticides is necessary, the IPM Plan dictates that the Sound Transit entity shall consider toxicity, environmental effects, and public health when selecting the pesticide. This IPM Plan also requires that all pesticide use requests be reviewed and approved by the IPM coordinator, enabling Sound Transit to identify, control, and over time, improve the environmental impact of its activities.

## About the Manual

This manual is divided into six chapters: Planning and Design; Plant and Plant Bed Management; Tree Management and Guidelines; Turf and Hardscape Management; Irrigation Management; and Glossary of Terms and Definitions. There are sub-sections within each of the management chapters with the following general structure:

- Definition of Resource: Basic information about the resource or operation.
- Goals and Guidelines: Sound Transit goals, policies, and guidelines pertinent to each resource or operation.
- Best Management Practices (BMPs): Required and recommended maintenance practices pertinent to each resource or operation.
- Integrated Pest Management (IPM): Pest tolerance thresholds and pest management strategies pertinent to the particular resource or operation.
- References: Resources and references helpful for the resource or operation.

An appendix contains Sound Transit’s Landscape Maintenance checklist, which is a monthly guide for landscape contractors and staff to record actions at each site throughout the year.



## 1. Planning and Design

### 1.1 Planning and Design of Plant Beds

The success of landscape bed design depends on selecting the right plant for the right place, and designing beds to fill in and shade out weeds while providing year-round seasonal interest. Drought tolerant and native perennials, shrubs, and trees are preferred in landscape beds at all Sound Transit sites. The following are important considerations and procedures for planning and designing landscape beds at Sound Transit facilities.

#### Cultural Conditions

- Determine all cultural conditions such as exposure to sunlight, reflected light and heat, wind, and rainfall.

#### Drainage and Irrigation

- Assess irrigation and drainage conditions.
- Design landscapes so that plants with similar water needs are grouped together. For example, lawns should be designed with separate irrigation “zones” from planted beds because their watering needs differ.
- Determine the type of onsite irrigation system.

#### Safety and Traffic

- Locate irrigation heads and underground utilities (sewer and drainage, water, and electrical). Call Dial-A-Dig (1-800-424-5555) to locate underground utilities not found. Safety issues associated with landscaping projects include possible falling branches, plant growth that blocks pathways, visibility through shrub beds, visibility in parking areas and driveways, and rerouting pedestrian traffic to sidewalks.

#### Plant Selection

- Match the needs of plants to the exposure and conditions of the chosen site. For example, if the site is generally wet, select plants that will tolerate these conditions.
- Select pest-resistant, drought tolerant, and native plant material.
- Choose plants from the Sound Transit Standard Plant List.
- Create species diversity and avoid the use of monoculture plantings, as these can be more susceptible to total failure in case of insect or disease infestations.
- Consider environmental tolerances and site adaptation.



- Select plants that can grow to their maximum size and will not require repetitive maintenance such as hedging.
- Consider texture, height, color effects, and display interests of each individual plant species and variety, as well as the visual effect of the combination of plants in a plant bed (display patterns or sequences). Plant combinations should display curb appeal and visual draw, and should complement the surrounding environment or adjacent landscape/artwork of the site.
- Preserve view corridors for safety, especially in parking areas and along walkways.
- Consider access and efficiency of maintenance.
- Consider foot traffic patterns and/or bike/vehicle routes in areas adjacent to the beds.
- Design beds to incorporate year-round seasonal interest, considering flowering, textures (such as bark or leaves), color, shape, and quantity of each species or variety.
- Determine spacing: Know your plants – how fast do they grow and how big do they get. Space plants accordingly.
  - A well-spaced planting should knit together within one or two years of planting. At maturity, the bed will require less weeding and watering.
  - Proper bed spacing is based on the species and varieties of plants chosen.

## Plant Ordering

- Plan plant ordering in advance to ensure that all material will be available at the optimum planting time, which is fall or spring.



## 1.2 Tree Selection

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The following design considerations enhance both the aesthetic and ecological value of trees in station sites. Proper planning and design will reduce maintenance needs and injury to trees.

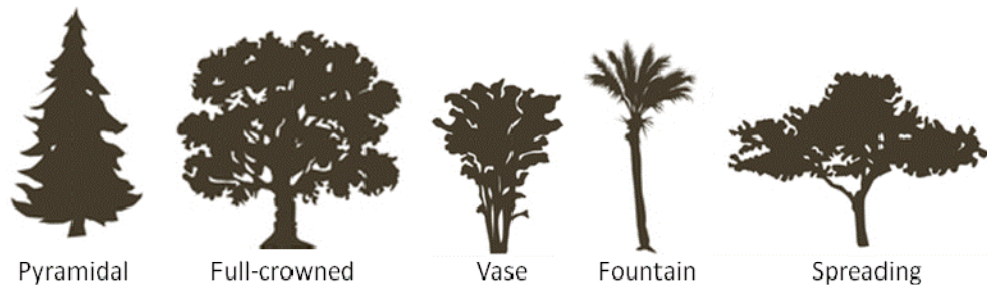
Selecting trees that will live long and healthy lives at their location, while enhancing Sound Transit sites, is a priority. A tree should be selected on the basis of its functional use, needs for survival, site resources, and the amount of care it will require.

Match a tree well suited to a site and both will benefit. The following four considerations determine **“the right tree for the right place:”**

1. **Tree Function:** Why is the tree being planted? Do we want the tree to provide shade, fruit, seasonal color, or act as a windbreak or screen?
  - A large shade tree provides relief from the sun that can protect other plants, and provides shade for commuters and vehicles.

- An ornamental tree provides beautiful flowers, leaves, bark, or fruit.
  - Evergreens with dense, persistent leaves can provide a windbreak, or a screen to reduce unwanted lighting for transit center neighbors.
  - Trees planted along streets decrease noise and glare, reduce runoff, and filter pollutants out of the air.
2. **Form and Size:** What is the size and location of the site? Does the space lend itself to a large, medium, or small tree? Are there overhead or below ground wires to be avoided? Do you need to consider clearance for sidewalks, patios, or driveways?
- Selecting the right form (shape) and size of tree to complement the desired function (what you want the tree to do) can significantly reduce maintenance costs and benefit the landscape. Consider mature tree size rather than what the tree looks like today. **Figure 1** indicates typical tree forms.

**Figure 1. Typical Tree Forms**



3. **Site Conditions:** What types of soil conditions exist? How much sun or wind will the tree receive? Is the space used for active recreation? Will vehicles be driving under it often? Is the area very wet or dry?

Selecting a tree that will thrive in a given set of site conditions is the key to long-term tree survival. Proper site conditions for a particular tree also significantly improve a tree's pest resistance. Following is a list of the major site conditions to consider before selecting a tree for planting:

- **Soil conditions:** The amount, depth, quality, and density of soil present will affect tree health. If the topsoil is shallow, compacted, or does not hold water well, a tree may not do well. Dig a hole to get a better sense of soil profile and site conditions and match soil conditions to the type of tree that likes these conditions.
- **Exposure:** Most trees require full sunlight for proper growth, but some do well in light shade. Some tree species perform well in dense shade. In addition, some trees bend well in wind while others break easily. Some trees are more resistant to pests than others.

- Examine the site to determine what environmental impacts a tree planted there will be exposed to. Decide if the tree will thrive under site-specific conditions.
- **Human activity:** Most tree decline and mortality in urban areas is caused by human activity. Impacts include injury, soil compaction by vehicles, too little water, too much water, and vandalism. Poor tree and site selection account for more tree deaths than all insect and disease-related tree deaths combined. Consider the potential human impacts (noise, vehicle exhaust, urban stormwater runoff, etc.) that trees will be exposed to at a given site. Choose tree species that can tolerate the human impacts of that site.
  - **Drainage:** Tree roots require oxygen to develop and thrive. Poor drainage from saturated soils can remove the oxygen available to tree roots and kill the tree. Consider how a site drains and what tree species will best tolerate saturated conditions or periodic changes in soil moisture.
4. **Maintenance Needs:** Will the tree require a great deal of pruning? Is there a suitable irrigation system to water the tree until established, and as needed to maintain plant health?

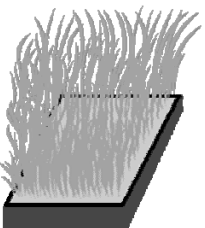
**Table 1** summarizes items to consider when planning trees for Sound Transit sites.

**Table 1. Tree Considerations for Different Areas**

Type of Area	Considerations
Platforms, entrances, and sidewalks	<ul style="list-style-type: none"> <li>• Require frequent maintenance because of proximity to people.</li> <li>• Create risk because of greater likelihood of tree/people interaction.</li> <li>• Suffer a high incidence of mechanical injury.</li> <li>• Have greatest restrictions on design considerations.</li> </ul>
Driveways and parking areas	<ul style="list-style-type: none"> <li>• Require frequent maintenance because of proximity to vehicular traffic, people, private property, and harsh growing conditions.</li> <li>• Likely to suffer from restricted root space, construction damage, and mechanical injury.</li> </ul>
Areas on outer edges of site	<ul style="list-style-type: none"> <li>• Require monitoring on a routine basis (quarterly at a minimum) and for storm damage.</li> <li>• Management directly impacts adjacent property owners.</li> </ul>

### 1.3 Turf Planning and Design Considerations

The following applies to the construction of new turf areas. Generally speaking, these bullets apply equally to seeding, sodding, or hydroseeding and are design considerations that improve the quality of turf plantings.



- Construct turf areas with a minimum slope of 2% to promote surface drainage and a maximum slope of 25% to allow riding mowers to safely access turf areas.
- If needed, amend the soil with sand to provide better drainage and a drier surface area. Dry surface areas allow easier and earlier (in the mowing season) maintenance and provide superior play quality. Please note that adding sand to heavy clay soils may not promote better drainage and could compound problems. Special consideration and research should be taken when attempting to amend these types of soils. Compost tilled into the top 6" of the soil of a new turf area will improve seed germination and grass stands.
- Rake and roll the area to finish, to produce a uniform soil profile and firm surface.
- Test the pH of the soil to determine whether lime should be added. If lime is needed, apply it before the area is tilled and then till it in thoroughly. Lime has to be incorporated into the soil so it can react most effectively.
- Seed the area with the selected seed mix at the specified pounds per 1,000 square feet and lightly rake it in.
- Apply the selected fertilizer just before or after seeding. Avoid high Nitrogen fertilizers; slow release fertilizers are preferred. If laying sod, apply the fertilizer to the soil surface before the sod is laid, assuming the sod does not come pre-fertilized (check to make sure). Reapply the same fertilizer in 4-6 weeks.
- Trees, signposts, benches, and other amenities should be carefully placed in turf areas to reduce the need for hand trimming. If possible, these amenities should have the turf immediately surrounding them removed (such as for a tree ring) for the same purpose.

### Grass Species Selection

Selection of grass species is based on site conditions, expected usage, and maintenance standards. Sites with optimum growing conditions and high maintenance standards are seeded with blends of several species of perennial rye grass. Sites with poor drainage, partial shade, and limited fertilizer applications require blends of perennial rye grass, red fescues, and chewings fescues.

The following site characteristics, usage, and maintenance practices guide seed selection:

- Ideal sites (full sun, good drainage, and reasonable fertility) are suited for perennial ryegrass blends.
- Lawns that are in partial shade or poorly drained should be seeded with mixes of perennial rye and fescues.
- Generally, Kentucky Bluegrass should be avoided. Although its rhizomatic growth can add strength to the turf root zone, it does not compete well with rye grass and can significantly add to thatch if not actively controlled.

## Use of 'Ecoturf'

'**Ecoturf**' is a mixture of various turf-type lawn grasses and water wise broadleaf perennials. Different mixes of Ecoturf are appropriate for a variety of sites or maintenance regimes. The application of Ecoturf results in a softer and less uniform meadow-like lawn. It is formulated to produce a green appearance year-round. It requires very little summer watering and essentially no fertilization. It can be mulch-mown at a height of 2" to 3" and is usually cut less frequently than other turf. Because it uses a lower seeding rate of 2 pounds per 1,000 square feet, it takes up to two full growing seasons to completely grow in. During the growing in period it requires irrigation similar to a regular turf lawn.

Consult with Sound Transit Facilities staff when considering using Ecoturf.

## 1.4 Irrigation Planning and Design

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The purpose of irrigation is not to water plants, but to water soil. The plants then use the water in the soil as they require. Plants with similar water needs should be grouped together, so irrigation planning should happen simultaneously with planting design.

The main things you need to consider for irrigation planning and design are:

- **Type of soil** (clay, loam, or sand), which will determine how fast water enters the soil.
- **Plant type** (lawn, shrubs, trees).
- **Evapotranspiration rate (ET)**, which is the amount of water lost to evaporation and transpiration, measured in inches (inches per hour, day, week, or month).
- **Precipitation rate**, which is the average rainfall for the irrigation season.
- **Slope**, which will determine how the water flows on or off the site.
- **Irrigation systems**. Use systems that can evaluate the ET rate when possible.

For the best comprehensive information on irrigation design and planning, consult [www.irrigationtutorials.com](http://www.irrigationtutorials.com), which provides free information and tutorials on irrigation, and is not associated with any irrigation, sprinkler, or drip equipment manufacturer, supplier, or installer.





## 2. Plant and Plant Bed Management

### 2.1 Definition of Resource

Plant bed areas are non-turf, planted areas that include woody plant material such as shrubs, trees, groundcovers, and herbaceous plants. Plant bed areas are the aesthetic focal point of a site. They enhance the experience of commuters and represent Sound Transit's commitment to sustainability. Plant management also includes management and maintenance of vegetation and in drainage swales and detention ponds.

### 2.2 Goals and Guidelines

Level of visibility and site use dictate maintenance standards for plant beds. Even within the same site, maintenance techniques can differ for formal plantings and high-traffic areas as opposed to more remote areas that may remain informal and natural. For that reason, plant bed BMPs are tailored to the specific requirements of plant material and site goals. The use of perennials is preferred above annuals for providing seasonal interest and reducing overall maintenance time.

Plant beds on Sound Transit sites are segregated into three subcategories, according to their design function, usage, and level of visibility:

- **High-Visibility Landscapes** are located in a focal point of a platform or entrance. They have high visibility and require a high standard of maintenance. High-visibility landscapes include platforms and facility entrance beds.
- **General Landscape Bed Areas** have moderate visibility and a moderate standard of maintenance. An example in this category is a bed along a driveway, sidewalk, parking garage, or parking island.
- **Low-Visibility Bed Areas** are plant beds that require moderate to low maintenance and may be targets for redesign or removal. These include shrub beds or natural areas on the outer edges of the site.

Prioritization of plant bed maintenance should be:

- Priority A: Platform beds
- Priority B: Entrance beds
- Priority C: Beds along driveways and sidewalks
- Priority D: Beds around parking garages and parking islands
- Priority E: Outer areas that are not as visible

## 2.3 Best Management Practices

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Consistent use of IPM practices ensures a standard of maintenance and appearance for all landscape beds.

### 2.3.1 Plant Replacement

Planted beds are aesthetically pleasing and shall be kept in good condition. Remove dead or unhealthy plants as needed, and replace plants in plant beds according to the Sound Transit Landscape Contractor Scope of Work.<sup>1</sup> Following these guidelines will ensure proper plant selection, good establishment, and healthy growth of plants in landscape beds.

#### Site Assessment

Before replacing plants, assess the following:

- **Existing plants:** Identify the existing plants. Clean, prune, divide, and remove if necessary.
- **Existing soil:** Assess the existing soil type and pH level. Soil may require amendment to improve drainage or water-holding capacity. Incorporating compost into heavy clay or very sandy soils will improve soil health. Two (2) to six (6) inches is recommended, and is determined by existing soil type and plant selection.
- **Bed form:** Determine bed form and size as dictated by site conditions or design. For example, the shape of the bed may be defined by a bordering lawn or sidewalk, or the soil within an area may change from dry to saturated.
- **Existing plant material:** Evaluate the condition of current plant material to understand existing cultural conditions. Assess compaction, low nutrients, and types of pest populations to determine renovation and plant selection options.
- **Existing trees:** Consider the coverage of the existing large trees and their impact on other existing and future plants.
- **Irrigation systems:** Review existing irrigation systems prior to any renovation.

#### Site Preparation

To prepare a site, follow these steps:

1. **Define and mark the shrub/tree bed line.** Consider irrigation coverage, drainage, and mowing patterns when outlining the shrub/tree bed line.

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<sup>1</sup> From Sound Transit Landscape Contractor Scope of Work: "Replace, at no additional cost to Sound Transit, any turf or plant materials damaged as a result of improper maintenance attention or procedures. Replacement material shall be of the same size and variety as the removed material, unless it is determined by Sound Transit staff to be unsuitable to the site. If it is unsuitable, Sound Transit will recommend plant material of the same cost, or cover any additional expenses for supplemental material."



2. **Remove weeds.** Avoid damaging any tree roots during site preparation.
3. **Remove any additional unwanted debris and add soil amendments if necessary.**
4. **Establish a well-defined bed edge.**

## Planting

Follow these steps when planting.

1. **Review design.** Prior to ordering and purchasing shrubs and trees, the contractor and Sound Transit staff should review the design plan to ensure the species and quantity of each plant are appropriate to the site.
2. **Order and purchase plant material.** The quality of the trees, shrubs, perennials and ground cover selected from a nursery can be just as important as species selection, site evaluation, or planting and maintenance in determining the success of a landscape plant bed. Select the best specimens. Check the crown and trunk characteristics, roots, and plant health of purchased materials. Reject any plant that does not meet standards and choose another healthy plant.
3. **Properly space plants.** Proper spacing with consideration of mature size and spread of plants ensures good establishment. Good air circulation and availability of sunlight, water, and nutrients will reduce weak growth and prevent disease development. Ground covers and floral plantings should be close enough to provide adequate coverage to prevent weeds, and provide effective display, without being too crowded at maturity.
4. **Onsite design adjustment.** Place lower plants toward the front of the bed or around irrigation heads. Adjust plant location to accommodate or preserve the tree roots, or any underground utilities.
5. **Plant at the proper depth.** Plants must be placed at proper depth, taking into consideration room for mulches. Holes should not be dug deeper than pot depth to avoid settling. Trees and larger shrubs will settle, so plant them a bit higher. Root bound material should be sliced, cut, or pruned before planting. The width of the hole should be a minimum of twice the diameter of the container or root ball. For bare-root plants, spread the roots out evenly without bending or crowding. Ensure that the tree base of ball and burlap trees is planted at the correct soil height; remove clay from the base of the tree as needed to reach the flare at the base.\*
6. **Fertilize.** Incorporate slow release fertilizer into the soil in landscape beds before adding plants. If synthetic fertilizers are to be used, add them after woody plants or trees are established.\*
7. **Irrigate.** Water new plantings to settle soil and reduce transplant shock. Ensure adequate moisture levels during establishment and growing season.\*
8. **Mulch.** Mulch at planting time using wood chips. Rake soil smooth and then add mulch. Avoid smothering small plants. Mulches must be weed free. Use a depth of 4" and keep the mulch more than 3" away from plant bases or trunks.\*



9. **Stake.** It is best to not stake young trees, but if needed, trees may be staked for support, protection, or anchorage. If newly planted trees will not stand upright without support or if frequent, heavy winds are a problem, staking is necessary. Be sure to check guying and staking to ensure that no tree damage occurs.\*

\*Refer to the Sound Transit Landscape Contractor Scope of Work for specific references.

### 2.3.2 Edging

Edging prevents lawn areas from entering a bed and plant materials in the beds from leaving a bed. The main purpose of edging is to maintain a neat edge to the planted area.

Edging can be done by mechanical means through the use of hand tools, like an edger or a line trimmer. Do not use chemical controls for edging beds. Manual edging will have the best results if done in early spring and again in mid- to late-summer. Remove all stolons and rhizomes of grasses. Physical barriers may also be effective, especially for bamboos and invasive tree roots.

### 2.3.3 Irrigation

*(See also Chapter 5 - Irrigation Management)*

Site conditions such as soil type, slope, exposure, and moisture requirements of plants play a crucial role in plant water demand, and dictate both frequency and duration of irrigation. Soil moisture levels should be regularly monitored and tested by digging.

Weather conditions, such as temperature and rainfall, require monitoring and subsequent active adjustment of irrigation response. Generally, most plants require at least 1" of water per week. Drought tolerant plants, once established, may need less. Floral plantings, particularly in containers, may require more frequent watering. Check containers to make sure water is draining.

- Infrequent, deep watering is preferred. Avoid creating runoff.
- Shrubs, ground covers, and flowers planted in the root zones of large trees need more water to balance the competition from the tree roots. Even in fall or winter, plants in this situation may dry out quickly.
- Morning is the best watering time, so leaves can dry off quickly and avoid water borne diseases. Drip systems are useful in plantings sensitive to overhead watering.
- Be sure to begin watering as soon as is necessary in the spring. Be especially attentive during dry periods, such as May, and from July to September. Be aware that shrub plantings under eaves and in courtyards will dry out even in fall and winter.
- Monitor plants for water stress. Visually inspect plants for symptoms of water stress. Signs of water stress include drooping, wilting, yellow foliage, leaf or needle drop, brown leaf tips, and rot. Remember that water stress can be caused by either too much or too little supplemental water.

- Monitor soil moisture levels throughout the growing season and during dry periods year-round. Pull mulches aside to see whether the ground below is moist. Use a soil probe OR dig a narrow hole with a trenching shovel or trowel 2"-6" deep to properly inspect soil moisture, especially if you suspect dry conditions or drainage problems.
- Visually test and monitor the irrigation system regularly. In March or April of every year, check automated irrigation systems for proper coverage.
- Consider pedestrian access, park usage, and available personnel when establishing irrigation schedules.
- Irrigate newly planted or renovated landscape beds and newly planted trees routinely until established (this is typically from one to three years). Automatic irrigation systems, if designed properly, should provide adequate water for most plant needs. Monitor all plants throughout the year for drought stress.

### 2.3.4 Mulching

Mulching planted beds conserves moisture, retains soil, suppresses weed growth, moderates soil temperature, reduces compaction, and supplies nutrients for plants and soil microbes. This treatment is also aesthetically pleasing, making it desirable for high, medium, or low visibility locations. Consider the following specifications when mulching:

- **Materials:** Materials used for mulching include a bark mix (such as fir and hemlock), compost, and wood chips, with a preference of arborist wood chips.
- **Depth of application:** This varies according to type of plant material but should be approximately 4" deep. Keep mulch materials a minimum of 3" away from contact with trunk or crown of plants to avoid stem rot.
- **Bed edges:** The edge of the plant bed should be approximately 2"-4" below the turf or surrounding landscape. Taper the edge gradually to the bed.
- **Landscape beds:** Mulch with a coarse material such as arborist wood chips, taking care to keep the mulch away from the plant stem or trunk. Mulch all plantings at a depth of 4" to provide weed suppression and moisture retention.
- **Shrub/tree beds:** Mulch at 4" deep. Arborist wood chips or a similar coarse material is preferred. Sheet mulching with cardboard or newspaper topped with compost, leaves, or wood chips is another option. Avoid the drip-line of existing plants. Sheet mulching is most effective during the moister periods of fall, winter, and spring.
- **Fertility:** Wood chips can deplete soil fertility if they are incorporated into the soil. Ensure that woodchips are raked away from planting areas and are not mixed into the soil.
- **Fallen leaves:** Fallen leaves as mulch may be appropriate in some areas. Avoid using diseased or insect-infested material. Leaves will decompose more quickly if they are shredded. It is important to avoid smothering the roots of the desirable plants with too thick a layer. A 2"

layer is best. Leaves should be left in the landscape beds and should only be removed if they inhibit plant growth and health. Leaves can also be used for sheet mulching.

### 2.3.5 Fertilization

Fertilizer, organic or synthetically derived nutrient compounds, can be formulated to meet specific requirements for plantings. Slow release, low-nutrient level fertilizers are preferred. Consider the following when fertilizing:

- **Nutrients:** Nutrient requirements differ according to plant type and the desired performance of a plant. Turf grass and other plants grown for their vegetative growth require more nitrogen than plants grown for flower and seed production. Plants grown for flowers and seeds require higher amounts of phosphorus and potassium. Too much nitrogen can cause excess growth, which leaves plants more susceptible to insect and disease damage.
- **Application timing:** Timing application to the biological cycle of the plants is important in maintaining optimum growth. Plants just becoming established may require higher amounts of potassium and phosphorus in fertilizer to encourage root development. Also, plants benefit most from fertilizer application at the onset of their new growth in the spring. Applications too close to fall may delay dormancy and promote soft growth, which can suffer winter damage.
- **Micronutrients:** Micronutrients are also important for plant health. It is best to test the soil to determine existing levels of these nutrients. An imbalance of nutrients can harm plants.
- **Soil pH:** The pH of the soil will determine whether to use an acid or base formulation of fertilizer, as whether lime applications are necessary. Always test for pH before applying lime.
- **Formula:** Select a formulation that is best for the soil type and time of year. Cold weather slows the activity of soil microbes that make nutrients available to the plants. A slow-release synthetic formula is better suited to cold months, and decreases leaching into surrounding soils.
- **Floral plantings:** Floral plantings can be fertilized at planting time with slow-release fertilizer.
- **Compost:** Compost can be applied as a nutrient source. It must be fully decomposed so that nutrients will be made available to plants. Most compost has no more than 3% nitrogen, which is slowly released. Compost's main benefit is that it encourages beneficial soil microbial growth.

### 2.3.6 Pruning

If the right plant species is selected for the right spot and purpose in the landscape, it is usually unnecessary to prune mature, well-established trees and shrubs. When done improperly, pruning can be one of the most destructive horticultural practices. This section guides proper pruning practices when pruning is necessary.



When major pruning is required, such as for street trees or pruning that will effect the flow of traffic, Sound Transit staff and adjacent neighbors need to be notified in advance of the work to be done. Notification should be a minimum of one week in advance or as directed by the Project Manager.

### Purpose of Pruning

The purpose of pruning is to:

- Encourage and direct new growth and flowering.
- Groom for appearance by removing spent blooms, grass seed heads, and foliage.
- Remove insect, disease, and weather damaged growth.
- Train, maintain, or control size and shape; this is particularly important for trees and larger shrubs in their first few years.
- Remove dead or crossing limbs or other potential safety issues.
- Maintain visibility.
- Improve safety.
- Create pedestrian and mower access.

### Pruning Considerations

- **Plant selection:** Use appropriate plant materials that grow to the correct size for the space. Good plant selection reduces the need for frequent pruning.
- **Natural form:** A natural form is most desirable in all sites.
- **Growth habit:** Growth habit and flowering cycles of specific plant material will determine optimum pruning method.
- **Timing:** The best time to prune most plant material is following flowering. However, dormant season pruning may be the easiest time to allocate resources to pruning.

The time to prune a tree depends on the kind of plant and the desired result. Best pruning time for radical renovation of shrubs and/or ground covers is early spring, just prior to bud break, generally late February to early March. Evergreen groundcovers, such as ivy and vinca, should be pruned in early spring before bud growth.

### Pruning Trees

*(See also Chapter 3 - Tree Management and Guidelines)*

- **Pruning trees at planting:** Landscape trees should not be pruned at planting time except to remove damaged branches or to correct those that show serious structural problems.

- **Pruning to train young trees:** Prune a young tree only enough to direct its growth habit effectively and correct any structural weaknesses. Many trees produce an abundance of lateral growth. Direct this growth during the growing season by heading back or thinning out shoots competing with the leader or interfering with those selected for scaffold branches.
- **Pruning mature trees:** The well spaced and branched tree will need little or no pruning for several years. Mature trees may need to be pruned for health and appearance, size control, pedestrian access and safety, and flowering and fruiting response.
- **Pruning conifers and other narrow leaf evergreens:** Conifers usually require less pruning than broadleaf trees. Prune to control size and to shape form.

### Pruning Hedges

Hedge pruning requires careful timing for optimum results:

- First cut should be made as new growth begins to harden off.
- Last hedging should be made no later than mid-August.
- Hedges should be wider at bottom than top.
- Hedge pruning is labor-intensive, and is best applied to plants with smaller leaves as they tolerate heavy pruning better.
- Because the intensity of maintenance required, formally pruned hedges are not desirable in most locations.

### Pruning Broadleaf Shrubs

Prune shrubs to keep their natural shape unless they are used as formal hedges. Shearing (heading cuts) should not be widely used; thinning of older, taller growth should be the primary type of pruning.

### Pruning Perennials

Groom and deadhead at least once per month. Remove all dead flower heads to promote continued flowering, Dead heads can be cut and left in the beds. In autumn, cut shoots down to the base, and remove dead and faded growth and weeds, leaving the border tidy in winter.

### Pruning Ornamental Grasses

Delay cutting and mulching perennials and ornamental grasses until spring, as they provide winter seasonal interest. Additionally, divide plants after they reach their mature size to avoid plant die-out in the center. Generally ornamental grasses need division every 3-4 years. Warm season grasses should be divided in late spring or early summer; cool season grasses should be divided from late winter to early spring, or late summer to early fall. For example, blue oat grass would best be divided in May or early June.

## Pruning Ground Covers

Ground cover pruning is usually necessary only to remove unhealthy tissue, remove awkward or straggling branches, or keep a plant from becoming too invasive. Many ground covers are prone to decline as they age; however, others are so vigorous that controlling their growth is an ongoing maintenance task. Periodic mowing is one way to keep ground covers vigorous, neat, and healthy with no significant loss of function or attractiveness.

### 2.3.7 Maintenance of Drainage Swales and Detention Ponds

Some Sound Transit sites contain drainage swales and detention ponds. Staff and contractors should refer to maintenance guidelines in the Sound Transit Landscape Contractor Scope of Work.:

#### Drainage Swales

- Cut and remove vegetation from drainage swales to a height of 4" above grade or water surface two (2) times annually in June and September.

#### Detention Ponds

- Cut and remove vegetation from detention ponds to a height of 4" above grade or water surface once annually in August.
- Mow areas a minimum of four times annually. Mow 5' along fence line perimeter (if detention pond is Sound Transit property and not a sensitive area).
- Keep access road and fence line weed-free.
- Treat noxious weeds, as per the Sound Transit IPM Plan and the section below: 2.4.3 Noxious Weeds.
- Consult the Agency Stormwater Management Plan for additional instruction.

## 2.4 Integrated Pest Management (IPM)

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Refer to the Sound Transit IPM Plan for broader context.

### 2.4.1 Pest Tolerance Thresholds

**Table 2** shows pest tolerance thresholds and IPM principles for selecting pest management strategies for plant beds and detention ponds.



**Table 2. Pest Tolerance Thresholds for Plant Beds and Detention Ponds**

Area	Weeds 	Insects 	Disease 
Highly-Visible Landscape Beds	Generally not acceptable.	Generally tolerated unless they threaten particularly valuable plants. Manual removal of obvious pests is encouraged.	Generally tolerated. Manual and cultural controls preferred. Chemical controls used only to preserve particularly valuable specimens.
General Landscape Bed Areas	Some weeds acceptable. Goal is for bed areas to be generally free of weeds for both asset protection and appearance. Weeds will not be allowed to out-compete desirable landscape plants.	Generally tolerated unless particularly valuable plants are actually threatened.	Generally tolerated. Manual and cultural controls preferred. Chemical controls used only to preserve particularly valuable specimens.
Low-Visibility Bed Areas	Generally tolerated. Control once a month by line trimming in the growing season.	Generally tolerated.	Disease problems tolerated. If disease persists, landscape will be replaced.
Newly-established Landscapes	Weed control is very important to ensure complete establishment of desired plants.	Generally tolerated. Presence of pests may result in host plant being removed and replaced.	Disease problems, if minor, will be tolerated. (Minor damage is that which will not threaten the life of the plant and which is not aesthetically unappealing.) Presence of disease problems may result in host plant removal and replacement.
Detention Ponds	Noxious weeds are not acceptable. Weeds along access road and fence lines should be controlled.	Generally tolerated since detention pond plants are not focal points.	Generally tolerated since detention pond plants are not focal points.

### 2.4.2 Weed Control

**The most serious pest management issue in plant beds is weed control.** As a result, weed control is the primary maintenance activity in plant beds. If uncontrolled, weeds not only make beds look untidy; but more importantly, they can choke out desirable landscape plants, resulting in loss of assets.

**Weed through the seasons.** Preventing weeds from infesting is more efficient than controlling them once established. Because one year’s seeds can produce many years’ weeds, the primary goal is to prevent weeds from going to seed. Some weeds produce seeds in summer, others in winter. Annual weeds reproduce by producing seeds every year, and can produce enormous quantities of seed, which can survive for years in the soil. Perennial weeds also reproduce by seeding, but their main means of reproduction tends to be vegetative. They can produce new top growth from buds located on the root structures or on above ground woody parts. Creeping grasses and clovers, buttercups, blackberry, and morning glory vines spread year-round by underground roots or stems, often spreading very quickly during their season of growth.

**Before choosing a strategy,** determine whether you are dealing with young or mature weeds, and whether they are annuals or perennials. Weed control is most effective on young plants. If annual weeds have grown beyond the seedling stage, it is important to remove them before they produce seeds. If perennial weeds have grown beyond the seedling stage, your control efforts must focus primarily on eliminating the perennial root resource. This is because perennial roots – bulbs, tubers, rhizomes, stolons, crowns and taproots – can continue to produce new top growth. **Table 3** lists common annual and perennial weeds.

**Table 3. Common Annual and Perennial Herbaceous Weeds**

Common Annual Weeds	Common Perennial Weeds
Chickweed	Thistles
Pimpernel	Morning Glory vine
Lambsquarters	Dandelions
Shotweed	Garlic Mustard
	Nightshades

**Suppression control strategies:** Weeds are suppressed and controlled by *habitat modification*, including *indirect or direct suppression strategies*.

- *Habitat modification* is a key element in weed management and has three major components:
  - Establishing realistic weed tolerance levels.
  - Modifying the habitat to minimize conditions that produce more weeds than you are willing to tolerate (indirect suppression).
  - Focusing efforts on specific weed populations, such as modifying pH or changing fertility (direct suppression).
- *Indirect suppression/control* is also referred to as mechanical and cultural control of weeds. It includes limiting resources such as water and light, through drip irrigation, mulches, cover



crops, or closer spacing of desired plants. For perennial weeds, this can also include repeated removal of the top growth or line trimming to remove top growth to draw down a plant’s energy reserves.

- *Direct suppression/control* is the physical removal of the undesired plant. It includes the use of manual or mechanical controls, biological controls, or chemical controls.

**Table 4** lists strategies for mechanical/cultural, biological, and chemical direct suppression controls.

**Table 4. Direct Suppression Weed Control Strategies**

Mechanical/Cultural	Biological	Chemical
Hand pulling	Predator inoculation	Herbicides
Mowing/cutting/line trimming	Pathogen inoculation	Plant growth regulators
Weed flaming	Grazing/browsing	
Solarization	Pheromone inoculation	
Cultivating		
Mulching		
Smothering		
Crowding		
Shading		

### 2.4.3 Noxious Weeds

All King, Pierce, and Snohomish County-listed noxious weeds will be controlled according to requirements and the Sound Transit IPM plan. Himalayan blackberry, Scotch broom and other highly competitive and invasive weeds will be controlled in all areas of Sound Transit facilities. This highly competitive vegetation will be controlled with weed wrenches, brush cutters, and mowers. The use of chemical control may be requested from and approved by the Sound Transit IPM Coordinator if mechanical methods fail. Refer to the Noxious Weed List of the county where the property is located.

Sound Transit properties will be surveyed every spring to determine which noxious weeds are present. Gardeners and/or environmental staff will conduct the surveys. Results of the surveys will be documented and used to monitor long term trends. Following the yearly surveys, environmental

staff will coordinate with the gardening staff to discuss survey findings. At this time, the group will discuss appropriate ways to control the noxious weeds. Class A weeds must be completely eradicated.

## 2.5 References

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- Sound Transit Standard Plant List



## 3. Tree Management and Guidelines

### 3.1 Definition of Resource

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Managing trees within landscaped areas is an important part of preserving Sound Transit assets, creating beautiful and welcoming public spaces, and protecting public safety. Trees are located within landscape beds and turf areas, in parking strips, paved areas, and next to buildings. Trees reduce runoff, modify temperatures, provide wildlife habitat, and provide beauty.

### 3.2 Goals and Guidelines

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Sound Transit's goal is to ensure that staff, contractors, and others have comprehensive knowledge of how to maintain, preserve and protect, and enhance tree health. This guidance will enable staff to safely care for our trees and identify problems that need to be reported to Sound Transit.

All work concerning the management of trees in landscaped areas shall be performed in accordance with the International Society of Arboriculture (ISA) and American National Standard (ANSI) pruning standards ( ANSI A300-1995 for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance-Standards Practices, American National Standards Institute, 1995).

The following guidelines outline the specific and designated roles and responsibilities for tree work:

- Tree pruning activities that occur 12' or higher on any tree are the responsibility of Certified Arborists or an appropriately trained vendor. Pruning activities at or below 12' may be performed by contractor landscape maintenance staff.
- Removal of trees of any diameter must be reported to Sound Transit Facilities staff.
- Sound Transit staff, local municipalities, and utility companies must be contacted if pruning needs to be done under power lines or in street areas.
- Landscape maintenance staff may use chainsaws to perform needed tree work only if that work can be accomplished while the operator of the chainsaw remains on the ground. Any elevated or complex chainsaw related tree work is to be performed by a Certified Arborist.

### 3.3 Best Management Practices

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The following management practices promote good tree health and prevent trees from becoming damaged or hazardous.

#### 3.3.1 Maintenance Pruning

The goal of pruning is to maintain a safe and healthy environment for the cohabitation of people and trees. Although forest trees grow quite well with only nature's pruning, landscape trees require a higher level of care to maintain their safety, health, and aesthetics.

Pruning should be done with an understanding of how the tree responds to each cut. Improper pruning can cause damage that will last for the life of the tree, or worse, shorten the tree's life. Proper pruning can maintain good tree health and structure while enhancing the aesthetic and economic value of our landscapes.

Before pruning begins, **consult with a Certified Arborist if one of the following conditions applies:**

- Pruning is to be performed on multiple trees.
- A tree is considered high value or in a highly visible area.
- Pruning is done to “lift” a tree. (“Lifting” is removing the lower branches of a tree to improve visibility.)
- Pruning would result in more than one quarter of a tree’s limbs being cut.

### Common Reasons for Pruning

- Improve visibility under a tree (“lifting”).
- Clear road, parking lot, and walkway corridors (“clearance pruning”).
- Improve access.
- Remove crossing or rubbing limbs.
- Aesthetically complement other landscape plantings.
- Remove a dead or diseased section of a tree.
- Eliminate hazards such as dead wood or limbs with weak connections (“hazard pruning”).
- Thin branches to increase light and air penetration to the inside of the tree or to the landscape below. This also reduces weight on heavy limbs and helps restore the tree’s natural shape (“thinning/reducing”).
- Remove dead, diseased, crowded, or weakly attached branches to lessen wind resistance and thus reduce potential damage from storms (“crown cleaning”).
- Making crown cleaning and thinning cuts to re-structure the canopy of a previously topped tree (“crown restoration”).

### Times of Year to Prune

- Pruning to remove weak, diseased, or dead limbs can be accomplished at any time during the year with little effect on the tree.
- For healthy limbs or trees, the absolute best time to prune is just before the spring growth appears.
- Avoid pruning just after the spring growth appears.
- Pruning **oak**, **elm**, or **cherry** trees should only be done at certain times of the year when pest and disease problems are least likely to occur. These trees are very susceptible to pests.

Pruning wounds allow insect and disease access into the tree. Generally, late fall and early winter is best for oaks and elms, and early spring is best for cherries.

- In all other cases, when done properly, pruning can be done any time of the year with minimal effect on tree health.

### How Much To Cut

At no time should more than one third of a tree’s branches be removed in a single pruning. In most cases, pruning should be done with a goal of not pruning again before a set amount of time in the future, usually 2-5 years.

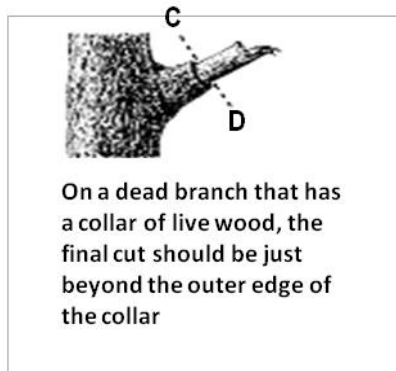
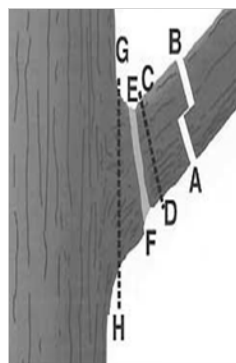
### Appropriate Pruning Methods

Use only clean and sharp tools. Dirty tools can spread disease or introduce pathogens and other debris into a tree. Dull or damaged tools may leave a larger surface area cut exposed to the environment that is harder for the tree to recover from.

The three most common types of pruning are:

1. **Removing entire limbs (from tree trunk):**
  - Pruning cuts should be made just outside the branch collar (**Figure 2, Cut E – F**). The branch collar contains trunk or parent branch tissue and should not be damaged or removed.
  - If a large limb is to be removed, its weight should first be reduced. First make an undercut about 12”-18” from the limb's point of attachment (**Figure 2, Cut A**). Make a second cut from the top, directly above or a few inches further out on the limb (**Figure 2, Cut B**). This removes the limb leaving the 12”-18” stub. Remove the stub by cutting back to the branch collar. (**Figure 2, Cut C – D**) This technique reduces the possibility of tearing the bark and preserves the collar on the tree that promotes proper healing.
  - If trunk collar has grown out on a dead limb to be removed, make the cut just beyond the collar (below, and Cut C–D above). Do not cut the collar.
  - See **Figure 2** for details.

**Figure 2. Proper Pruning Cuts for Entire Tree Limbs**



## 2. Removing sections of limbs:

- Remove sections of limbs (as opposed to the whole limb at the trunk of the tree) if the removal of the entire limb is not necessary to achieve your pruning target.
- Removing parts of limbs should be done properly so unwanted growth does not occur. Most of the time, this means cutting a limb back to its connection point to a larger limb rather than in its middle or near its end.
- Always cut limbs far enough back to reduce the need for pruning frequency and repeated stress on the tree.

## 3. Clearance pruning:

- Municipalities need to be consulted if tree work will occur in public roadways. Utility companies are responsible for pruning under power lines.
- Limbs should be removed from sidewalks, driveways, and parking areas to a height of 8', and at least 1' on either side of the sidewalk, driveway, or parking area.

## Inappropriate Pruning

Using incorrect methods to achieve a short-term goal can create an unhealthy tree. Poor pruning includes:

- Cutting off limbs flush with the trunk (flush cuts) and removing the branch collar as part of the limb (Refer to **Figure 2**, Cut G – H).
- Removing a limb without first making an undercut (**Figure 2**, Cut A). An undercut prevents bark ripping down a tree when the limb breaks off (“bark ripping”).
- Cutting off the upper-most portion of the trunk near the top of the tree canopy (“topping”). This will lead to irregular growth in the tree that will require higher maintenance and more frequent pruning in the future.
- Unauthorized or excessive lifting of tree canopy. This can cause damage to the lower trunk and can be visually unappealing. Before lifting a tree, always consult with Sound Transit Facilities staff.

### 3.3.2 Fertilizing

- In general, trees rarely need fertilization. Small amounts of slow-release fertilizer and nutrients like kelp may be added and mixed into the planting hole.
- Most new or mature trees do not need fertilizer, as excess nitrogen in the soils may cause weak growth and may encourage disease and insect attack.
- Monitor trees in areas where fertilizing of other plants (such as turf) is ongoing, as this fertilizer may effect a tree adversely.

### 3.3.3 Protecting Trees from Physical Damage

Physical damage to trees is a major factor in tree death. Poor pruning techniques and vandalism can permanently damage and even kill trees. If significant vandalism to trees occurs, report the damage to Sound Transit Facilities staff. Investigate methods to prevent future vandalism.

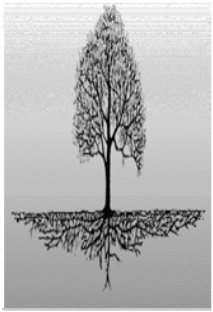
Most tree injuries occur during maintenance or construction activities. Three of the most common areas of the tree that are damaged during these activities are:

#### Roots

- Roots grow out rather than down. 80 percent of tree roots are in the top 16"-30" of soil. Roots are not protected by soil, nor are they woody and tough. Roots typically grow well beyond the drip line.
  - Avoid disturbing or compacting soil near trees and be aware of potential damage to root systems during project planning.
- Driving or parking vehicles or heavy equipment within the drip-line of a tree may tear roots or compact soil, thus reducing a tree's ability to absorb vital nutrients and weakening its foundation in the ground.
  - Provide for protection of tree roots during construction projects by installing either 6" of hog fuel, plywood sheets, or metal plates over tree root zones.
- Digging or trenching through a root system will compromise a tree's ability to absorb nutrients and will weaken its foundation in the ground.
  - Avoid trenching near trees. Digging many small holes or tunneling is preferred over trenching. Always cut roots clean and avoid cutting roots over 2" in diameter unless approved by Sound Transit Facilities staff.
- Fuel or other chemical spills can poison root systems.
  - Do not store or dispense fuel or other harmful chemicals within the drip line of any tree.

#### Trunk

- Striking a tree trunk with a vehicle, equipment, or the line or blade of a trimmer or mower will damage the cambium layer (the soft tissue just under the tree bark). The cambium layer is the only living section of a tree trunk and is responsible for carrying 100% of the nutrients from the roots to the leaves and from the leaves to the roots. Cutting into the bark and cambium layer diminishes a tree's ability to transport nutrients to its roots and leaves. If injury occurs around the entire trunk, nutrient flow will end and the tree will die.
- To avoid damaging a tree's trunk with mowers and weed trimmers, install a mulched tree ring around all trees to reduce the need to trim and mow near tree trunks.
  - **Instructions for installing a mulch tree ring:** Remove turf from around the tree base in the shape of a circle and replace with wood-chip or bark mulch to create a vegetation-free ring



at least 3 feet in diameter from the trunk. Keep mulch at least 2-3 inches away from direct contact with the trunk. In some cases, you may want to extend the tree ring out to the drip line or beyond. Keep tree wells weed-free. Always consult with Sound Transit Facilities staff for approval per Sound Transit's IPM Plan before using herbicide. Annually inspect tree wells and refresh mulch as needed. Figure X depicts a vegetation-free ring for a small tree.

**Figure 3. Example of Vegetation-free Mulch Ring**



### Branches

- Coming into contact with moving vehicles and equipment can damage tree branches. Breaks or tears in branches reduce nutrient flow to parts of the tree and provide a means of entry for insects and disease. Injury to branches will slow a tree's growth.
- Avoid hitting branches with vehicles and equipment.
- Prune or remove branches so they are not in the way of equipment, vehicles, or people.

### 3.3.4 Planting

Selecting the tree type best suited to the planting location, ensuring proper planting practices, and watering regularly for the first three years until the tree is established will help to ensure the tree's longevity.

### Times of Year to Plant

The best time to plant trees and shrubs is in the fall and winter. For leaf-bearing trees, this is after all the leaves have fallen off and before early spring buds break out. Fall and winter weather conditions are cool and allow plants to establish roots in the new location before spring rains and summer heat stimulate new top growth.



Trees properly cared for in the nursery and given the appropriate care during transport can be planted throughout the growing season (spring and summer) as long as daily watering is provided.

### For All Trees

- Locate all underground utilities and irrigation lines before you plant your tree.
- Avoid damaging the tree during transportation and planting: always lift the tree by the root ball or container, and never by the trunk or limbs.

### Balled and Burlapped Planting

If the tree you are planting is balled and burlapped (i.e. contained in fabric and/or wire), as opposed to in a pot, or with bare roots, it is important to understand that the tree's root system has been reduced by 90-95% of its original size. These types of trees will commonly exhibit what is known as "transplant shock". Transplant shock is indicated by slow growth and reduced vigor for the first year or two following transplanting. Proper site preparation before and during planting coupled with good follow-up care will reduce the amount of time the plant experiences transplant shock.

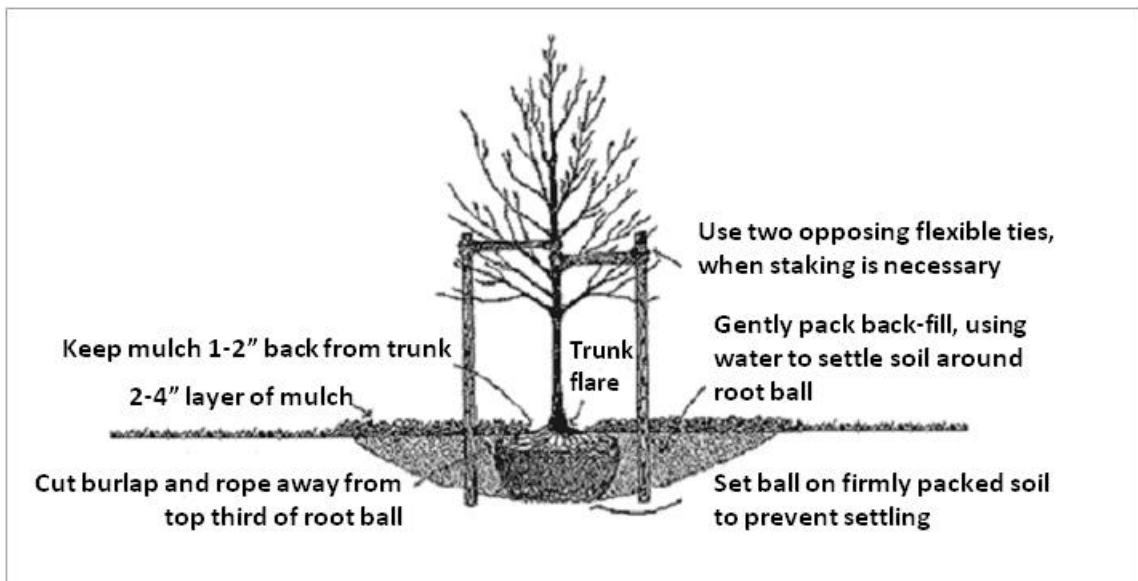
### General Tree Planting Steps

Follow these steps for planting:

1. Dig a hole where the tree will go. The planting hole should be 3 times wider, but no deeper, than the root ball. The bottom of the hole should be undisturbed and have a solid soil foundation.
2. If the tree is planted too deep, new roots will have difficulty developing due to a lack of oxygen. It is better to plant the tree a little high with the tree trunk flare 2"-3" above level ground. This will allow for some settling (see Figure 4).
3. Remove tree trunk wrapping materials, tags, and all ties at time of planting.
4. Place the tree in the center of the hole with the trunk pointing straight up. Do not remove any balled or burlap packaging material until the tree is placed in the hole and securely plumbed into its final position.
5. Ensure that the trunk flare is at or slightly above the level of the existing (surrounding) soil. Burying the trunk flare in soil will cause the bark at the base of the tree to rot and could eventually kill the tree. Ball and burlap trees typically have clay soil which extends above the tree base. Remove clay as needed to reveal base flare.
6. Remove the top third of the burlap from the root ball. Whenever possible, remove as much burlap as possible by cutting it away with a sharp knife. Trees in wire baskets shall have the top third of the basket removed, using bolt cutters. This should expose the top 12-18" of the root system/ball. It is preferable to remove the entire basket and all burlap.
7. Making sure the tree is pointing straight up, use the removed soil to fill in the hole around the tree.

8. Backfill soil in batches of 4"-6" at a time with compaction of each layer. Do not compact muddy backfill.
9. Water thoroughly after backfilling to settle the soil.
10. If project scope allows, watering soil rather than compacting is preferred. Do this by backfilling half the soil in the tree pit and thoroughly drench with water to settle. Complete backfilling and then thoroughly drench with water again. This method is preferred for removing air pockets and settling soil, but can be impractical on big jobs or jobs using volunteers.
11. Trees planted in sandy or loamy soils should have a 3" high berm erected just past the perimeter of the planting hole to funnel water to the root ball.
12. Mulch all trees with 2"-4" of blown-in bark mulch or arborist wood chips immediately after backfilling. Keep mulch at least 2"-3" away from the tree trunk. .
13. Mulch should extend at least six inches past the perimeter of the hole or to the berm.
14. Maintain 2"-4" of mulch annually around trees.
15. Water newly planted trees weekly through the first three summers. Tree roots should receive approximately 1" of water per week (including rainfall).
16. Remove weeds within the tree ring to eliminate competition and for aesthetics.

**Figure 4. Overall Tree Planting Guidelines**



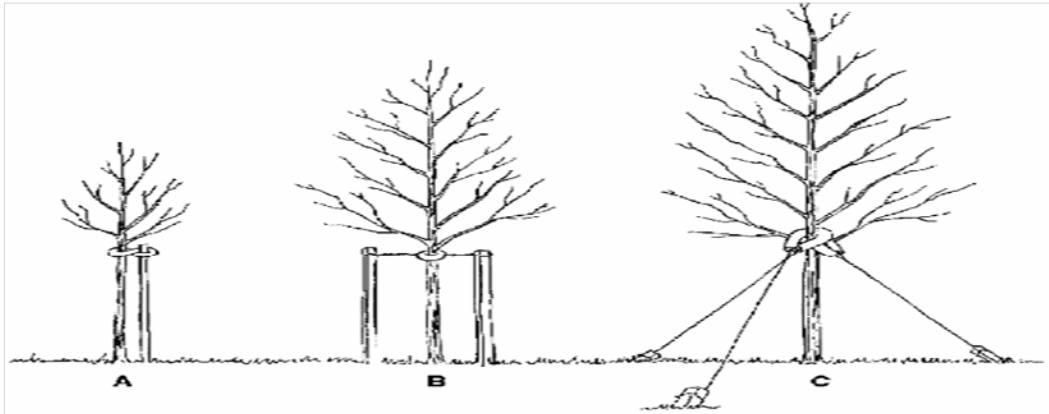
## Container/Bare Root Planting

- Container trees have a pot or other hard container for the roots that contains soil. Bare root trees have no soil around their roots and are typically wrapped in wet cloth or in sawdust.
- Follow the same planting instructions as described in the above section for “Balled and Burlap Planting” but ignore the steps that describe removing the burlap covering, and merely remove the tree from its container or wet cloth covering.
- Remove the tree from the container by gently lifting the tree out of the pot by holding the trunk of the tree nearest the pot, and lifting out. Tease/loosen pot-bound roots with hand tools such as a hori hori weeding tool prior to final placement in planting pit.
- For bare root trees, protect roots from drying out during the transportation and planting stages by covering them with wet fabric.
- Cleanly prune exceptionally long or girdling roots to create a uniform root mass.
- When placing bare root trees in the hole, fan roots out along bottom of hole or on top of a soil cone leading away from the tree trunk. Be sure to keep the root flare 2”-3” above final grade. Fill the hole with soil while tree is being held in place.

### 3.3.5 Staking

- Stake only in situations where normal planting procedures do not produce a stable plant. Otherwise, staking is generally not required.
- Staking is sometimes recommended to support the tree as its root system becomes established. Staking is also important as a vandal deterrent device or to prevent mechanical injury from mowers or trimmers.
- Ensure that a thick rubber tie or layer separates all parts of the tree from direct contact with staking or tying materials.
- Stake trees loosely enough to allow wind movement, but not too loose as to allow damage to the trunk during movement.
- Remove stakes during the spring after one full growing season. If the tree still is unstable (e.g. if it moves easily when lightly gripped and pushed), continue staking and monitor frequently to avoid damage from ties.
- See **Figure 5** for visual staking guidelines.

Figure 5. Tree Staking Guidelines



### 3.3.6 Mulching

Mulching is applying a layer of arborist wood chips, blown-in bark, and in limited cases leaves, to areas around newly planted and existing trees within landscapes. Mulching will:

- Retain soil moisture near tree roots.
- Restrict weed and turf growth near trees.
- Insulate roots from extreme temperatures.
- Prevent mechanical injuries.

#### Proper Mulching Techniques

- Do not apply mulch within 2"-3" of the trunk. Mulch that comes in contact with the trunk may create favorable conditions for bark diseases and insect habitat. Mulch should never touch a tree's trunk.
- Mulch the tree ring a minimum of 3' out from the trunk to a maximum width at the edge of the drip line.
- Apply mulch 2"-4" thick.

### 3.3.7 Tree Removal

Sound Transit Facilities staff must be consulted and approve all tree removals. Local ordinances may require permitting prior to tree removal, or after removal if there was an immediate safety issue.

The causes of tree failure that can lead to removal include poor tree architecture, summer branch drop, increased exposure, root loss, unstable rooting, girdling roots, leaning trees, unfavorable soil

conditions, cracks, cankers, conks, seams, decay, cavities, and root and butt diseases (see *Tatum Guide* for visual clues): <http://www.fs.fed.us/r10/spf/fhp/hazard/tatum.htm>.

The following guidelines can determine if a tree needs removal:

- Monitor for derelict trees that cannot be made safe or functional by corrective pruning.
- A tree must be defective and have a target to be considered a hazard.
- Always consult with a Certified Arborist to determine if a tree is hazardous.
- Hazard shall be the first determining factor in removal decisions.
- Trees may present a risk because of old age, storm damage, poor structure, old construction activities, or death of the tree.
- Trees that constitute a high hazard shall be removed if no other strategy will eliminate the risk.
- If trees are smaller than 10"-12" in diameter, it is possible to transplant them with a tree spade. The cost of transplanting using a tree spade should be weighed against the cost of replacing the tree with a new smaller caliper tree. Typically, transplanting of larger trees is less successful than planting a new smaller caliper tree.
- The value of the specimen to be transplanted should be taken into account when deciding on removal or replacement rather than transplanting. Different methods of appraising tree value are evaluated in the *Guide for Tree Appraisal (9<sup>th</sup> edition)* produced by the Council of Tree and Landscape Appraisers (see References, section 3.5).
- Trees may be removed for new park construction, access, or other issues not related to tree viability.



### 3.3.8 Irrigation

- In general, trees established for more than 3 years in a site do not require watering except during periods of extreme drought.
- A newly planted tree will need to be irrigated for at least 1-3 years to assure establishment.
- Valuable or specimen trees may have to be watered during periods of extreme drought.
- Turf irrigation around established trees may need to be modified to accommodate the water requirements of the trees.
- Persistent water spray on trunks can lead to decay in some species, including maple, willow, and cottonwood.

## 3.4 Integrated Pest Management (IPM)

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Trees should be managed and cared for to promote optimum health, which provides pest resistance and recovery from injury. Strategies for addressing tree pests include:

- Cultural control: sound horticultural practices in design, planting, and managing sites, to promote a healthy environment for tree growth.
- Mechanical control: use of tools and equipment to control or eliminate pests.
- Biological control: use of beneficial organisms to improve tree health or control invasive organisms.
- Chemical control: Application of approved, registered pesticide products to control pests. Chemical use must be appropriate and used only if other control means are not feasible or successful.

Staff applying pesticides to Sound Transit landscapes are required to be licensed as Public Operators through the Washington State Department of Agriculture (per 17.21 RCW Washington Pesticide Application Act) and complete Sound Transit's Pesticide Use Request Form.

## Pest Tolerance Thresholds

Tolerance thresholds are the limit of injury that can be tolerated in trees without compromising their health or aesthetic value.

- Trees will be monitored for insect and disease pests.
- In general, insect and disease pests in trees are tolerated but should be monitored.
- Selected high-value specimens, and those in high-profile locations, may require more pest control strategies than other trees.

## Pest Management Strategies

IPM strategies for trees target insects, disease, and physical damage to trees. Attention to overall tree health through cultural practices to promote resistance to pest damage is the first step in pest prevention and avoiding damage. Examples of control strategies are:

- Selecting trees that are suitable to the conditions of the site (soil type and fertility, sun/shade levels, and available water).
- Managing irrigation and drainage of a site to provide adequate, but not excessive, watering.
- Maintain an optimum level of mulch, which suppresses weeds, maintains soil moisture, and moderates temperature.
- Monitoring soil nutrient levels and pH, as necessary.

## Insects

Sound Transit does not actively control insect pests in trees, particularly tall trees that might require use of large aerial spray equipment. Such equipment carries with it a high probability of insecticide drift and thus could be a potential safety hazard or environmental risk.



If an insect pest threatens tree health, the following measures are used:

- Trees that are highly susceptible to specific insect pests may be removed from the landscape and replaced with resistant tree species.
- Use cultural, mechanical, or biological pest control strategies before using pesticides.
- When possible, physically remove the portion of the tree affected by the insect.
- If approved, an insecticide may be applied to control a specific insect pest in selected situations. These scenarios apply to pests on specimen quality trees in high-visibility locations where the presence of the pest threatens the life of the tree. In these situations, general foliar applications will not be made unless the potential for product drift can be controlled.
- Injection technology may allow for systemic control of certain insect pests with minimal or no impact to human or environmental health. Sound Transit will use this technology as a potential control for insect pests that may threaten the health of valuable trees.



### Disease

Sound Transit does not actively control disease pests in trees. However, increased concern for Pacific Madrone disease and Dutch elm disease requires a proactive effort in managing disease pests in significant trees populations. The following are IPM control measures that may be performed:

- Horticultural design, plantings, and managing sites for natural irrigation and drainage, soil quality and fertility, air circulation and other cultural practices may be utilized to eliminate the conditions that aggravate the diseases in trees.
- Trees susceptible to particular disease pathogens may be removed from the landscape and replaced with resistant varieties.
- When possible, parts of trees affected by disease should be pruned out and properly disposed of to stop the spread of disease within the tree and to adjacent trees.
- If approved, an appropriate fungicide may be applied to control a specific disease pathogen in selected situations. These cases include specimen quality trees in high-visibility locations where the presence of the disease threatens the life of the tree. In these situations, injection techniques are preferred and general foliar applications will not be made unless the potential for product drift can be controlled.
- Injection technology may allow systemic control of certain diseases in tree pests with minimal or no impact to human or environmental health. This technology will be used to protect valuable trees on Sound Transit property that may also pose a threat to neighboring properties.

### 3.5 References

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**International Society of Arboriculture (ISA).** Through research, technology, and education, the International Society of Arboriculture (ISA) promotes the professional practice of arboriculture and fosters a greater worldwide awareness of the benefits of trees. <http://www.isa-arbor.com/>.

**ANSI A300-1995 for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance- Standards Practices.** 1995. American National Standards Institute.

**Guide for Plant Appraisal, 9<sup>th</sup> Edition.** Council of Tree and Landscape Appraisers. Order through ISA: <http://secure.isa-arbor.com/webstore/Guide-for-Plant-Appraisal-9th-Edition-P45.aspx>



## 4. Turf and Hardscape Management

### 4.1 Definition of Resource

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Turf areas at the majority of Sound Transit sites are relatively small and do not receive pedestrian use. Hardscape areas include sidewalks, concrete pads, parking lots, and gravel areas.

### 4.2 Goals and Guidelines

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All turf and hardscape areas shall be maintained per Sound Transit's IPM Plan.

### 4.3 Best Management Practices

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#### 4.3.1 General Maintenance

Maintenance of turf includes weekly mowing during the growing season, and annual fall renovations to ensure plant health. The following guidelines apply to all turf plantings.

##### Mowing

**Frequency:** Growth should be monitored and mowing frequency controlled to avoid removing more than 1/3 of the leaf blade in one individual cutting.

**Cutting Height:** For most perennial rye turf, a mowing height of 2"-3" promotes healthier turf than a lower cutting height because it provides more opportunity for photosynthesis, deeper rooting, it shades the weed seed germination zone and encourages a healthier stand of turf.

**Mulch Mowing:** Grass clippings should rarely be removed from mowed turf areas. The plant nutrients returned to the soil play an important role in developing a healthy, productive environment for a healthy stand of turf. The use of mulching blades or mulching mowers is encouraged.

##### Trimming

Controlling grass along fence lines, around trees, and other landscape features helps preserve the asset by allowing large riding lawn mowers to steer clear of objects. This routine maintenance activity is especially important around trees where mower damage can easily lead to tree loss. See Chapter 3 Tree Management and Guidelines for further information concerning trimming near the base of trees. A mulch bed is more desirable around the base of trees than trimming right to the base.

An additional advantage of a regular mowing schedule is that it makes the sites appear clean and well kept. This image, in turn, has a positive impact on how the public uses our facilities. Well-



maintained sites experience less vandalism and misuse. Grass trimming is accomplished in the following ways:

- **Concrete mow strips:** As resources are available, it is sometimes possible to provide a “mow strip” of concrete or a similar low maintenance product around some landscape features to eliminate the need for grass trimming. For example, this could be used under fence lines. This control option can be costly and doesn’t work in all situations.
- **Mechanical:** Trimming can be performed with hand tools and/or walk behind mowers and line trimmers. If an area can be trim-mowed by a riding mower *without* damaging trees or other park assets, then that is allowable.
  - Trimming should be coordinated with other mowing activities on the site.

### Edging

- Turf edging is done to give a finished look to lawn areas that border paved surfaces or planting areas. Edging is performed 2 to 4 times per year, depending on the needs at the site.

### Irrigation

- Refer to Chapter 5 Irrigation Management for these practices.

## 4.3.2 Cultural Care

### Fertilization

- The soil in lawn areas should be tested as often as every 2 years. Special attention should be paid to pH as it directly drives nutrient availability. Area soils tend to be acidic and may require lime to increase pH to acceptable levels. Most turf will grow well in a pH range of 5.5 to 7.
- All fertilizers have a “Guaranteed Analysis” on the bag. This is the three number NPK ratio and should aid in determining how much fertilizer to apply to a certain soil type.
- Turf fertilizer should have an approximate 5-1-4 NPK ratio unless otherwise indicated by soil tests.
- Each application should apply approximately 1 lb. of nitrogen per 1000 square feet. This may vary depending on fertilizer formulation and release characteristics.
- A fertilizer’s nitrogen should be a blend of both water soluble (quick release) and water insoluble (slow release) formulations.
- Avoid applications during heavy rainfall to avoid runoff.
- Be sure irrigation is operational before growing season applications of fertilizer.
- Avoid applications in very hot weather without immediate and adequate irrigation (refer to fertilizer label).

- Have sprinkler heads marked to avoid damaging them during truck applications (very important!).
- A soil test may show a need for certain micronutrients, but this is seldom the case. Any application of micronutrients should be done only as needed, on a case-by-case basis.
- Site-specific fertilizer restrictions must be observed. Site-specific cautions include:
  - No fertilizer use in the immediate vicinity of streams and wetlands.
  - No fertilizer use within 50' of shorelines or streams.

### Aeration

- Best periods: March/April/late September, prior to overseeding.
- When using drum-type aerifiers, make at least two passes at right angles. This may vary depending on types of equipment used.
- Ensure sprinkler heads are marked to avoid equipment damaging them.
- Areas with drainage problems should be deep-tine aerified 1-2 times per year using tines that are as long as possible (10"-14").

### Thatch Removal

- Thatch should be removed at least once per year in conjunction with aerifying and over seeding in areas where thatch build up is an issue.
- Leaf removal should be done to avoid killing turf areas. Leaves can be mulch mowed and left if they do not inhibit grass growth.
- Mark sprinkler heads before thatching to avoid thatching equipment damage.
- Thatch removal is best timed when the soil is firm and relatively dry.

### Top Dressing

- The goal of top dressing turf is to achieve a firm and level surface, provide soil contact for grass seed, and improve surface drainage.
- Top dress with fine compost and spread evenly over surface.
- Top dressing is most effective when done lightly and frequently.
- Each top dressing application should be about 1"-2".

### Over Seeding

- Over seed areas once per year, as needed.
- The best germination rates occur before October 15 (the average first frost date) or after April 15 (the average last frost date).

- Over seed rate is approximately 5-lbs/1000 ft<sup>2</sup>. Use a higher rate in high wear areas.
- The following site characteristics, usage, and maintenance practices guide seed selection:
  - Ideal sites (full sun, good drainage, and reasonable fertility) are suited for perennial ryegrass blends.
  - Lawns that are in partial shade or poorly drained should be seeded with mixes of perennial rye and fescues.
  - Generally, Kentucky Bluegrass should be avoided. Although its rhizomatic growth can add strength to the turf root zone, it does not compete well with rye grass and can significantly add to thatch if not actively controlled.

### 4.3.3 Maintenance of Hardscapes

Sound Transit sites contain many sidewalks and gravel areas. The goal is to maintain these areas to a high aesthetic level. An IPM approach should be taken to manage weeds and moss. The following guides how hardscapes and gravel areas should be maintained. More information is in Section 4.4 Integrated Pest Management.

- Pressure wash sidewalks regularly and remove debris.
- Fill cracks as needed.
- Keep curbing clear of debris through parking lot sweeping.
- Use mechanical means to control weeds and moss in sidewalks and gravel, such as a flame weeder.
- Assess gravel areas that have become overgrown for possible renovation.
- When a flame weeder is not effective, use a less toxic 25(b) weed control product, with an active ingredient of vinegar or clove.
- If mechanical or less toxic methods are not effective, choose an herbicide product from the Thurston County pesticide table.

[http://www.co.thurston.wa.us/health/ehipm/ipm\\_homeownr.html](http://www.co.thurston.wa.us/health/ehipm/ipm_homeownr.html)

## 4.4 Integrated Pest Management (IPM)

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### 4.4.1 Pest Tolerance Thresholds

- Weed, insect, and disease pests are typically tolerated in general turf areas.
- Turf pests are generally controlled through good turf cultural practices.
- In rare situations where asset health or use function is threatened by insects, weed growth or disease, pest control shall strictly follow Sound Transit's IPM Plan.

## 4.4.2 Pest Management Strategies

### Broadleaf Weeds

Weeds in turf are generally tolerated (refer to the Sound Transit's IPM plan for weed thresholds). When control is necessary, the primary method is through the following cultural practices:

- Monitoring watering practices
- Fertilization- best in early fall
- Aeration
- Top-dressing with compost
- Over-seeding

By performing this preventive maintenance, turf is healthier and better able to compete with various broadleaf weeds.

- In rare situations, such as noxious weeds, the least toxic, least residual pesticide will be used for spot treatments.
- General broadcast treatments will be avoided.
- The timing of such applications will be made to avoid contact with the public to the extent possible.

### Insects

Currently, the only real insect pest of significance for turf in Sound Transit's areas is the European crane fly. While it can be damaging to turf areas, the crane fly is usually not treated by prophylactic control. Crane fly populations will be tolerated and not controlled by chemical means.

### Disease

Disease in turf is generally tolerated and is not actively controlled. The Sound Transit IPM Coordinator will be notified of disease issues. Disease will be controlled to a considerable degree by sound cultural practices such as cleaning mowing equipment after use in infected areas.

### Grass Trimming Abatement

Controlling unwanted grass or weeds growing along fence lines and around trees and bollards can be a time consuming task. Grass trimming is labor intensive, costly, and produces noise and air pollution when mechanical tools like push mowers or string trimmers are used. There are several strategies to reduce the need for excessive grass trimming:

- Design or redesign the site to cluster trees, posts, and other objects into landscape bed areas to eliminate the number of individual objects that might otherwise have to be trimmed around.



- Install mow-strips of concrete or other materials under fence lines and along rows of bollards etc.
- As a maintenance practice, use mulch as a grass and weed suppressant in tree wells and in landscape beds.
- Use weed flaming to control weeds along fence lines, in gravel areas, and in pavement cracks.



## 5. Irrigation Management

### 5.1 Definition of Resource

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It is the responsibility of all staff and contractors to monitor irrigation system performance in the field. Staff and contractors will have comprehensive knowledge of our irrigation systems and apply sound water management practices in the field. Irrigation programs will use the least amount of irrigation water possible while sustaining a diversity of landscape plantings.

### 5.2 Goals and Guidelines

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Sound Transit strives to conserve water resources and use the most efficient systems and sustainable management practices. Staff and contractors will continually assess performance and adapt system designs and practices, using new and improved technologies to create irrigation efficiencies that promote water conservation.

Any changes made to an irrigation system must be documented in the Sound Transit Irrigation “As-built” drawings. The Irrigation as-built drawings of the condition of all irrigation systems shall be maintained and updated whenever there are changes to the system.

### 5.3 Best Management Practices

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The purpose of irrigation is not to water plants, but to water soil. The plants then use the water in the soil as they see fit. The challenge with irrigation and watering is to put water into the soil at the right time and place. How much water to put into the soil is dictated by the rate at which plants use the water. This is referred to as the “evapotranspiration rate” (ET), which is the amount of water lost to evaporation and transpiration, measured in inches. **Table 5** provides guidelines for overall irrigation operations.

**Table 5. Overall Irrigation Operation Guidelines**

Action	Frequency	Season/Time of Year
<b>1. Assess the site.</b>		
Initial landscape assessment and familiarization. Evaluate plant types and age, microclimates, slope, sun and wind exposure, soil types.	Every 3-5 years	At initial site visit, then every 3-5 years as landscapes mature
<b>2. Program and adjust the controller.</b>		
For on-site controller or central control sites: evaluate and if necessary adjust run times or other settings to match weather/plant need, based on input from landscape monitoring.	Weekly	April/May - Sept
<b>3. Monitor the landscape.</b>		
Observe site conditions and plant stress.	Weekly	April/May - Sept
Gather input from other staff/contractors in field for landscape conditions that may require changes in scheduling or irrigation repairs. If repairs are needed, contact Sound Transit staff for approval.	Weekly	April/May - Sept
<b>4. Keep records and make regular adjustments.</b>		
Maintain inventory of maps may also use GPS/GIS for documentation and maps.	Annually, check for changes and make updates as approved by Sound Transit	Winter
<b>5. Protect the system so it performs efficiently.</b>		
Run zones and check for broken or misadjusted heads. Report repairs to Sound Transit staff.	Monthly	April/May - Sept
Clean around valve boxes for maintenance access. Repair and/or reset to grade if needed.	Annually	Winter
Work with plumbers for system start up.	Annually	Spring start up (March-May)



Work with plumbers for system repairs; may include assistance locating, digging and site restoration.	As needed	March – October
Trim grass and shrubs away from heads to allow clear and proper functioning. Keep mulches away from sprinkler heads.	Weekly-Monthly	April/May - Sept
Avoid damaging irrigation equipment by driving over sprinkler heads or hitting with aerators, tillers, or edgers.	Daily	Year-round
<b>6. Conserve water.</b>		
Monitor the landscape.	Weekly	April/May - Sept
Adjust the controller (budget, reduce minutes, days, landscape coefficients or other site factors).	Weekly	April/May - Sept
Report problems immediately. Follow up for completed repairs.	Daily/weekly	March – October

### Site Assessment and Controller Programming

Programming irrigation controllers relies more on site characteristics and plant type than the science of the system itself. When precipitation levels decline and plants need to have supplemental watering, such as in late May or mid June, irrigation systems should be turned on. Systems need to be monitored throughout the season to ensure adequate watering, and as the rains return in early to mid October, systems should be turned off. As the Pacific Northwest has spring and summer seasons that range from pouring rain to drought conditions, all systems should be monitored and adjusted accordingly. Following are the basics a contractor or Sound Transit Operations staff person must know for programming a controller:

- **Irrigation system**

- **Amount and rate of water applied.** The amount of water the system discharges in gallons per minute (gpm), the different precipitation rates of different sprinkler heads and nozzles, and how that translates into “inches of water per week” and minutes of run time.
- **Multiple programs.** Some controllers allow for multiple programs daily; others do not. Certain sites, such as those with steep slopes or distinct vegetation types, may require multiple programs.
- **Capabilities of each system.** Each type of controller operates slightly differently. Know enough about each type of controller and how it operates to be able to set up the right program for the job.

- **Site conditions**
  - **Soil conditions.** Soil type plays an important role in irrigation. If practical, increase soil's organic matter to improve soil structure and water holding capacity.
  - **Topography.** The more sloped the site, the greater the potential for runoff. Sloped sites may require multiple applications of irrigation water in shorter timing cycles (cycle and soak) than required for flat sites to reduce runoff.
  - **Exposure.** More water is lost to evaporation in a sunny site; thus, a very shady site requires less supplemental water. A windy site will also lose water to evaporation at a higher rate than a calm, protected site. A windy site may also distort the spray pattern of sprinkler heads.
- **Plant water needs**
  - **Plant species, size, and age.** Plant species, size, and age should be considered when developing a watering schedule. Apply no more water each week than required to sustain healthy plants.
  - **Season.** Incrementally reduce watering in late summer/early fall. Plant water needs are lower at this time.
  - **Weather.** Monitor the weather and adjust accordingly. Evaluate how many inches per hour, day, week, or month is required in a particular planting bed.
  - **Turf areas.** Water no more than 1" of irrigation water per week, including rainwater. Use manufacturer's published data for sprinkler precipitation rates to help figure out sprinkler timing.
- **Site use, supply, and design**
  - **Site use.** Determine how a site is used, special scheduling issues, and the potential for vandalism.
  - **Scheduling.** Set schedule times to least interfere with public use.
  - **System capacity.** Understand system capacity or local water service. For instance, it may not be possible to get sufficient water volume during certain times of the day.
  - **Design issues.** Look for fundamental design problems. Check for irrigation heads that are unsuited to the site or plant type.

### Irrigation Monitoring

Monitor the application of automated irrigation water carefully and adjust controller settings as needed throughout the season. Water plants adequately according to cultural needs. Check soil moisture levels routinely with a soil probe.

### Record Keeping

Develop a record keeping system for automatic irrigation operations. This system provides a database from which programming records can be retrieved for annual system reprogramming. Be

sure to archive records of site maps, site soils, vegetation, site history, periodic maintenance, and irrigation schedules.

### System Protection

- Clean sprinkler heads in spring and as needed throughout the season to ensure optimum performance.
- Maintain grass trimmed away from heads to allow proper functioning.
- When mulching, mark sprinkler heads and valve boxes before application and do not bury these components. Raise heads as needed.
- Avoid damaging irrigation equipment such as sprinkler heads by driving over them or hitting them with aerators, tillers, or edgers.
- Use the system winterization and de-winterization processes as opportunities to make complete system visual checks and perform any periodic maintenance.
- Perform annual preventive maintenance on heads, valves, controllers, and additional on site hardware and computer programs each spring.
- From May through September, continually monitor for signs of system problems, such as leaks, controller schedules, valve operation and sprinkler head alignment/grade adjustment.
- Adjust head heights, direction, or placement as needed. Water should not be applied outside intended coverage area (i.e. sidewalks and streets).
- As plants grow, monitor for sprinkler head interference and reduced coverage. Adjust sprinkler head heights or placement as needed.

### System Repairs

In the event of broken heads, controller malfunctions, or other repairs, assess the system and report problems to Sound Transit staff. Repair information should include the following:

- Site name
- Exact location in site, zone number if known, how marked in the field (e.g. paint, cones, etc.)
- Nature of problem – if a leak or stuck solenoid, status of water on/off, and if shut off, exactly where (e.g. double check valve or isolation valve at zone)
- Number of heads and other details
- Contact information for requestor.

Any irrigation zone or station with broken lines or sprinkler heads shall only be shut off by Sound Transit staff or contractors.

## Water Conservation

- Adjust automatic systems periodically to match plant water needs throughout the growing season.
- Avoid watering during the high ET times of the day, typically afternoon and early evening.
- Do not allow any system to apply water longer than needed. No system shall be turned on in the morning and turned off at the end of the day just for convenience.
- Do not operate manually operated systems at night unless staff is present or unless the system has an automatic shut-off valve.
- Monitor landscape for potential drought effects. If needed, use backup irrigation systems or set up temporary irrigation to avoid plant loss.

## 5.4 References

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**The Irrigation Association® (IA):** The leading membership organization for irrigation equipment and system manufacturers, dealers, distributors, designers, consultants, contractors and end users. Originally founded in 1949, IA is dedicated to promoting efficient irrigation. Together with experts and stakeholders from industry, academia and the public sector, IA works to: define best practices for effective water management; establish benchmarks and guidelines for irrigation products and applications; promote efficient irrigation technology and practices; and define sound policies to ensure the availability, quality and conservation of water supplies. [www.irrigation.org](http://www.irrigation.org)

**IrrigationTutorials.com:** Free irrigation information and tutorials on irrigation, not associated with any irrigation, sprinkler, or drip equipment manufacturer, supplier, or installer. [www.irrigationtutorials.com](http://www.irrigationtutorials.com)

**The Irrigation Water Management Society (IWMS):** A non-profit organization committed to promoting the wise and efficient use of water in golf courses, landscaping, and agriculture. [www.iwms.org](http://www.iwms.org)

**Saving Water Partnership:** The Saving Water Partnership is an effort by Seattle and participating local water utilities to provide guidance and financial incentives for conservation and stewardship of water resources for a variety of water uses, including irrigation. [www.savingwater.org](http://www.savingwater.org).

**Sprinkler Scheduling in 15 Minutes,** a book by Tim Wilson, CSWP, CTT+, CID, CLIA, CGIA, CIC. This short book provides a simplified method for developing proper watering schedules.

## 6. Glossary: Terms and Definitions

### Types of Plants in Plant Beds

- **Annuals/biennials:** An annual is a plant that completes its life cycle in a year or less. Biennials normally produce only foliage in their first year, bearing flowers and completing their life cycle in the following season.
- **Bulb:** Any plant that grows from a shortened or thickened underground stem containing embryonic plant tissue is commonly called a bulb. Corms, rhizomes, tubers, and tuberous roots are also called bulbs, but a true bulb contains a developing plant surrounded by scales.
- **Ferns:** Any of numerous flowerless plants characteristically having fronds with divided leaflets and reproducing by spores.
- **Ground covers:** Low growing herbaceous, evergreen or deciduous sub-shrubs, vines or spreading plants.
- **Ornamental grasses:** True grasses are members of Gramineae, the grass family, but many of the plants we think of as grasses are actually sedges and rushes, which belong respectively to Cyperaceae, the sedge family, or to Juncaceae, the rush family. Together these three families comprise the plant group known as ornamental grasses.
- **Perennial:** Perennials are non-woody plants that live for more than two years, with variable growth habits. Herbaceous perennials die to the ground at the end of each growing season and re-grow the following spring. Woody perennials have top growth that persists through the winter. Evergreen perennials keep their leaves year around.
- **Shrub:** Woody plant with multiple branches and no obvious trunk.
- **Tree:** Woody plant that normally produces a single or multiple trunk and branches forming a distinct elevated crown.

### Plant Bed Maintenance Strategies

- **Biological control:** The use of biological agents such as insects or diseases to suppress or control pests.
- **Chemical control:** The use of a registered pesticide or other chemical agent to suppress or control a specific pest, such as weeds or insects.
- **Cultivating:** The act of loosening or tilling the soil.
- **Cultural control:** The manipulation of the environment to suppress or control pests. Cultural controls include changing soil pH or fertility levels, irrigation practices, amount of sunlight, or temperature.
- **Edging:** The restricting of plant growth across the border of a plant bed by manual, physical, or chemical means.

- **Fertilization:** The use of organic or inorganic nutrients to adjust fertility levels in the soil.
- **Grazing/browsing:** The use of crop animals to eat vegetation.
- **Irrigation:** The supply of water to plantings, either through automatic irrigation systems or manual systems, including soaker hoses.
- **Line trimming:** The use of a power line trimmer to control vegetation.
- **Manual or mechanical control:** The use of hand or power tools to remove unwanted vegetation.
- **Mulching:** Use of wood chips, bark, composts, cardboard or other materials to cover bare soil areas to conserve water and soil temperature around plants.
- **New or renovated landscapes:** Landscapes planted within one year which require high maintenance through the plant establishment period of 1-3 years.
- **Pathogen inoculation:** Injecting plants with a microorganism or bacteria to control a pest.
- **Pheromone inoculation:** Injecting plants with a pheromone to control a pest.
- **Predator inoculation:** Introduction of a natural enemy to a specific pest, to control pest populations.
- **Sheet mulching:** Strategy for suppressing weed growth, while improving soil nutrient and water retention, enhancing soil structure and microbial activity, and improving plant vigor and health. The technique involves the following steps: weed the site; add an organic weed barrier that is permeable to water and air, such as cardboard or a thick layer of newspaper; and layer compost and mulch on top.
- **Solarization:** The technique of placing a cover (usually black or clear plastic) over the soil surface to trap solar radiation and cause an increase in soil temperatures to levels that kill plants, seeds, plant pathogens, and insects.
- **Weed control:** The suppression and control of undesirable plant species.
- **Weed flaming:** The use of a weed torch and propane tank to control vegetation with flame.

## Tree Management

- **Biological control:** Use of beneficial organisms to improve plant health or control damaging organisms.
- **Chemical control:** Application of registered pesticide products to control pests.
- **Clearance pruning:** The process of clearing tree branches or foliage from trail, road, and walkway corridors. The process of pruning, removing, or otherwise cutting trees or branches to avoid contact with overhead electrical or phone wiring.
- **Derelict tree:** Any tree in such poor condition that no reasonable restoration is possible.
- **Drip line:** The outer extent of branches of a tree.

- **Hazard tree:** Any tree with a valued target (should it fall) and a reasonable probability of failure.
- **Lift or lifting:** Removal of lower limbs of tree.
- **Mechanical control:** Use of tools and equipment to control or eliminate pests.
- **Shrub:** Generally, a plant that grows less than 12' high and has foliage that grows all the way to the ground.
- **Target:** An item of value (typically a structure) that could be damaged or destroyed by a tree or branch falling on it.
- **Target pruning:** Select removal of a branch or part of a tree, leaving vital tree systems and function intact.
- **Tree:** Woody plant that grows greater than 12 feet high at maturity, usually has one dominant trunk, and is topped by a crown of evergreen or deciduous foliage.
- **Tree spade:** A mechanized tool used for transplanting trees.

## Turf Management

- **Aerify:** To either punch holes or slices into the ground at varying depths for the purpose of relieving compaction and improving air and water movement through the soil profile.
- **Fertilizer:** A synthetic or organic based plant nutrient product that is primarily a combination of nitrogen (N), phosphorous (P) and potassium (K). Fertilizers always come in a numbered formulation based upon the relative amount of these three primary ingredients, such as 5-1-4.
- **Mulch blades/mulch mower:** A special type of lawn mower blade that is designed to cut grass blades and keep them in suspension so that they can be re-cut multiple times before falling back into the turf surface as a finely cut mulch. A mulch mower is designed to use mulch blades exclusively and produces very fine clippings that are distributed evenly during mowing.
- **Over seeding:** The addition of a specified turf seed to either repair worn areas or generally increase the number of grass plants within a given turf area.
- **pH:** The measure of the amount of acidity or alkalinity in the soil. Most turf types will grow well within a pH range of 5.5 to 7.
- **Thatch:** A layer of intermingled dead roots and partially decomposed grass stems that has accumulated below the grass blades and above the soil surface. Thatch layers thicker than ¼ to ½ inch can inhibit water flow and nutrient movement and can harbor plant pathogens and therefore should be removed.
- **Top dressing:** The application of sand/compost to the turf/soil surface to increase air/water movement, to keep the turf surface dry and firm and/or to incrementally level the turf area.
- **Turf:** Technical term applied to any lawn or grasses grown in a Sound Transit facility.

## Irrigation

- **Controller:** Any automatic controller that is programmed and operated on site. Schedules must be adjusted by staff at the site using minutes, a percentage adjustment, or days of operation.
- **Evapotranspiration rate (ET):** The amount of water lost to evaporation and transpiration, measured in inches. It is what we are trying to replace in the soil with rain and irrigation.
- **Irrigation inventory:** Complete inventory and status of irrigation systems.
- **Irrigation system:** A mechanical system used to apply additional water to a landscape. System parts include: a water supply, backflow prevention, manual or automatic valves, pipes, sprinkler heads, and hose bibs or quick coupler valves. May also include a *controller*. Types of systems:
  - Manual: Staff/contractors connect hoses and sprinklers to hose bibs.
  - Semi-automatic: Staff/contractors manually turn a valve to turn on/off “pop-up” sprinkler heads.
  - Automatic: Staff/contractors program irrigation schedules in electronic controllers, which control automatic valves to open/close, and run “pop-up” sprinkler heads.
- **Irrigation zone:** A smaller irrigated area within a site, controlled by a single irrigation valve. Zones should include only one hydro-zone – an area that has the same watering needs for all the plant types, topography and microclimate.
- **Irrigation management:** The efficient application of irrigation water to maintain healthy, functional landscapes.
- **Precipitation rate:** The average rainfall for the irrigation season.
- **Water budget:** An estimate of the annual amount of supplemental water needed in a given landscape, used as a baseline to compare to actual water use or to establish watering schedules.
- **Water conservation:** Managing irrigation systems to provide the amount of water needed to keep plants healthy while avoiding water runoff, or saturated soils.



## 7. Appendix: Sample Landscape Maintenance Checklist

See next page for a sample Sound Transit Landscape Maintenance Checklist.

SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST

Date: \_\_\_\_\_

Location \_\_\_\_\_

Maintenance Item	January	February	March	April	May	June	July	August	September	October	November	December
<b>IRRIGATION</b>												
Irrigation monitoring												
Valve Monitoring												
Two-wire path loop resistance test									(Record Date)			
Remove vegetation, sod and debris affecting head performance from all zones					(Record Date)							
Remove vegetation, sod and debris affecting access to valves, and reset/raise valve boxes, which have settled during the winter shutdown months					(Record Date)							
Flush out lateral lines and adjust heads and nozzles					(Record Date)							
Activate irrigation systems					(Record Date)							
Deactivate prior to freezing weather									(Record Date)			
Flush irrigation system									(Record Date)			
Clean and adjust heads, nozzles, and valves												
Clean drip irrigation valve strainers												
Vacate all water from the systems using an air compressor and adjust/set all valves and back flow prevention devices for winterization per manufacturer's recommendations												
Provide for inspection and testing of backflow prevention valves annually as required by law												
Fill out form for Additional Irrigation Repair Services												
Report for all additional services, system repairs and renovations, general operations, and recommendations												
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations												
(Annually for Winterization)												
<b>PEST MONITORING AND INSPECTION</b>												
Visual Pest Inspection												
Written Pest Monitoring Report												
Identification of any area where non-chemical IPM control methods should begin												
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map												
Pesticide Records Given to Sound Transit												
<b>PESTICIDE APPLICATION</b>												
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.												
Pesticide records given to Sound Transit												
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.												
Pesticide request form with specified information												
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.												
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.												
<b>TURF MAINTENANCE</b>												
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches			(As Needed)								(As Needed)	
Mechanically trim all landscape turf edges every other mowing												
Trim all formal lawns every other mowing												
Soil tests (First year of 3-year contract)												
Apply agricultural grade pellet lime (if needed according to soil test results)												
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio												
Monitor turf areas for pests												
Aerate 30% of square footage of turf areas					(Record Date)							
Seed immediately after aeration					(Record Date)							
Mechanically remove thatch from 30% of square footage of turf areas												
<b>PLANTING</b>												
Planting												
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)												
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)												

SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST

Date: \_\_\_\_\_

Location \_\_\_\_\_

Maintenance Item	January	February	March	April	May	June	July	August	September	October	November	December
<b>FERTILIZE TREES, SHRUBS, AND GROUNDCOVERS</b>												
Fertilize with slow-release "bridge" or natural-organic fertilizer (1-2-2 or similar nutrient ratio)												
Fertilize perennials												
Fertilize ornamental grasses												
<b>PLANTING BED MAINTENANCE</b>												
Weed beds and remove debris (hand pulling or other mechanical means)												
Trim groundcovers from walkways and from growing outside of planters												
Remove autumn leaves												
Mulch planting beds to 2" depth												
<b>PRUNING</b>												
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)												
Inspect and adjust tree staking and guying												
Remove guys and stakes												
<b>LANDSCAPE DEBRIS REMOVAL</b>												
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas												
Remove branches and debris from storm damage												
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility												
Remove autumn leaves (Regularly in autumn)												
Remove moss from curbs, stairs, and walkways												
<b>GENERAL MAINTENANCE</b>												
Remove trash												
Remove litter, leaves, weeds and debris from rockery areas												
Cut and remove vegetation from drainage swales to a height of 4" above grade or water surface												
Cut and remove vegetation from detention ponds to a height of 4" above grade or water surface												
<b>EMPLOYEE TRAINING REQUIREMENT</b>												
"Contractor Right-of-Way Access Certification" Training												
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>												
Work on ROW (After Sound Transit approval and communication)												

**JANUARY  
SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	January	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Valve Monitoring						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations (Annually)						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Soil tests (First year of 3-year contract)						
Monitor turf areas for pests						
<b>PLANTING</b>						
Planting						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						

**JANUARY**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	January					Time		Total Hours	Worker's Initials	Comments/Notes
						Start	End			
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility										
Remove moss from curbs, stairs, and walkways										
<b>GENERAL MAINTENANCE</b>										
Remove trash										
Remove litter, leaves, weeds and debris from rockery areas										
<b>EMPLOYEE TRAINING REQUIREMENT</b>										
"Contractor Right-of-Way Access Certification" Training										
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>										
Work on ROW (After Sound Transit approval and communication)										

**FEBRUARY**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	February	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Valve Monitoring						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations	(Annually)					
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Soil tests (First year of 3-year contract)						
Monitor turf areas for pests						
<b>PLANTING</b>						
Planting						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						

**FEBRUARY**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	February				Time		Total Hours	Worker's Initials	Comments/Notes
					Start	End			
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility									
Remove moss from curbs, stairs, and walkways									
<b>GENERAL MAINTENANCE</b>									
Remove trash									
Remove litter, leaves, weeds and debris from rockery areas									
<b>EMPLOYEE TRAINING REQUIREMENT</b>									
"Contractor Right-of-Way Access Certification" Training									
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>									
Work on ROW (After Sound Transit approval and communication)									

**MARCH**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	March	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Valve Monitoring						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches	(As Needed)					
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Soil tests (First year of 3-year contract)						
Apply agricultural grade pellet lime (if needed according to soil test results)						
Monitor turf areas for pests						
<b>PLANTING</b>						
Planting						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						



**MARCH**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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\_\_\_\_\_

Location \_\_\_\_\_

Maintenance Item	March	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>FERTILIZE TREES, SHRUBS, AND GROUNDCOVERS</b>						
Fertilize with slow-release "bridge" or natural-organic fertilizer (1-2-2 or similar nutrient ratio)						
Fertilize perennials						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
Inspect and adjust tree staking and guying						
Remove guys and stakes						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						
Remove moss from curbs, stairs, and walkways						
<b>GENERAL MAINTENANCE</b>						
Remove trash						
Remove litter, leaves, weeds and debris from rockery areas						
<b>EMPLOYEE TRAINING REQUIREMENT</b>						
"Contractor Right-of-Way Access Certification" Training						
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>						
Work on ROW (After Sound Transit approval and communication)						

**APRIL  
SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	April	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Irrigation monitoring						
Valve Monitoring						
Remove vegetation, sod and debris affecting head performance from all zones						
Remove vegetation, sod and debris affecting access to valves, and reset/raise valve boxes, which have settled during the winter shutdown months	(Record Date)					
Flush out lateral lines and adjust heads and nozzles	(Record Date)					
Activate irrigation systems	(Record Date)					
Clean and adjust heads, nozzles, and valves						
Clean drip irrigation valve strainers						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches						
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Soil tests (First year of 3-year contract)						
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio (Fertilize 3 to 5 times based on Soil Test results)						
Monitor turf areas for pests						

**APRIL**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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\_\_\_\_\_  
\_\_\_\_\_

Location \_\_\_\_\_

Maintenance Item	April (Record Date)	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
Aerate 30% of square footage of turf areas	(Record Date)					
Seed immediately after aeration	(Record Date)					
<b>PLANTING</b>						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>FERTILIZE TREES, SHRUBS, AND GROUNDCOVERS</b>						
Fertilize with slow-release "bridge" or natural-organic fertilizer (1-2-2 or similar nutrient ratio)						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
Mulch planting beds to 2" depth						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
Inspect and adjust tree staking and guying						
Remove guys and stakes						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						
Remove moss from curbs, stairs, and walkways						
<b>GENERAL MAINTENANCE</b>						
Remove trash						
Remove litter, leaves, weeds and debris from rockery areas						
<b>EMPLOYEE TRAINING REQUIREMENT</b>						
"Contractor Right-of-Way Access Certification" Training						
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>						
Work on ROW (After Sound Transit approval and communication)						

**MAY**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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\_\_\_\_\_

Location \_\_\_\_\_

Maintenance Item	May	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Irrigation monitoring						
Valve Monitoring						
Remove vegetation, sod and debris affecting head performance from all zones						
Remove vegetation, sod and debris affecting access to valves, and reset/raise valve boxes, which have settled during the winter shutdown months	(Record Date)					
Flush out lateral lines and adjust heads and nozzles	(Record Date)					
Activate irrigation systems	(Record Date)					
Clean and adjust heads, nozzles, and valves						
Clean drip irrigation valve strainers						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches						
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio (Fertilize 3 to 5 times based on Soil Test results)						
Monitor turf areas for pests						
Aerate 30% of square footage of turf areas	(Record Date)					

**MAY**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	May (Record Date)	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
Seed immediately after aeration						
<b>PLANTING</b>						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
Mulch planting beds to 2" depth						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
Inspect and adjust tree staking and guying						
Remove guys and stakes						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						
Remove moss from curbs, stairs, and walkways						
<b>GENERAL MAINTENANCE</b>						
Remove trash						
Remove litter, leaves, weeds and debris from rockery areas						
<b>EMPLOYEE TRAINING REQUIREMENT</b>						
"Contractor Right-of-Way Access Certification" Training						
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>						
Work on ROW (After Sound Transit approval and communication)						

**JUNE**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	June	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Irrigation monitoring						
Valve Monitoring						
Clean and adjust heads, nozzles, and valves						
Clean drip irrigation valve strainers						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches						
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio (Fertilize 3 to 5 times based on Soil Test results)						
Monitor turf areas for pests						
<b>PLANTING</b>						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						

**JUNE**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	June	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>FERTILIZE TREES, SHRUBS, AND GROUNDCOVERS</b>						
Fertilize perennials						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
Mulch planting beds to 2" depth						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
Inspect and adjust tree staking and guying						
Remove guys and stakes						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						
Remove moss from curbs, stairs, and walkways						
<b>GENERAL MAINTENANCE</b>						
Remove trash						
Remove litter, leaves, weeds and debris from rockery areas						
Cut and remove vegetation from drainage swales to a height of 4" above grade or water surface						
<b>EMPLOYEE TRAINING REQUIREMENT</b>						
"Contractor Right-of-Way Access Certification" Training						
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>						
Work on ROW (After Sound Transit approval and communication)						

**JULY**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	July	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Irrigation monitoring						
Valve Monitoring						
Clean and adjust heads, nozzles, and valves						
Clean drip irrigation valve strainers						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches						
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio (Fertilize 3 to 5 times based on Soil Test results)						
Monitor turf areas for pests						



**JULY**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	July	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>PLANTING</b>						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
Inspect and adjust tree staking and guying						
Remove guys and stakes						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						
Remove moss from curbs, stairs, and walkways						
<b>GENERAL MAINTENANCE</b>						
Remove trash						
Remove litter, leaves, weeds and debris from rockery areas						
<b>EMPLOYEE TRAINING REQUIREMENT</b>						
"Contractor Right-of-Way Access Certification" Training						
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>						
Work on ROW (After Sound Transit approval and communication)						

**AUGUST**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	August	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Irrigation monitoring						
Valve Monitoring						
Deactivate prior to freezing weather		(Record				
Flush irrigation system		(Record				
Clean and adjust heads, nozzles, and valves						
Clean drip irrigation valve strainers						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches						
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio (Fertilize 3 to 5 times based on Soil Test results)						
Monitor turf areas for pests						
<b>PLANTING</b>						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						

**AUGUST**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	August	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
Inspect and adjust tree staking and guying						
Remove guys and stakes						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						
Remove moss from curbs, stairs, and walkways						
<b>GENERAL MAINTENANCE</b>						
Remove trash						
Remove litter, leaves, weeds and debris from rockery areas						
Cut and remove vegetation from detention ponds to a height of 4" above grade or water surface						
<b>EMPLOYEE TRAINING REQUIREMENT</b>						
"Contractor Right-of-Way Access Certification" Training						
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>						
Work on ROW (After Sound Transit approval and communication)						

**SEPTEMBER**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	September	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Irrigation monitoring						
Valve Monitoring						
Two-wire path loop resistance test	(Record Date)					
Deactivate prior to freezing weather	(Record Date)					
Flush irrigation system	(Record Date)					
Clean and adjust heads, nozzles, and valves						
Clean drip irrigation valve strainers						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches						
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio (Fertilize 3 to 5 times based on Soil Test results)						
Monitor turf areas for pests						
Mechanically remove thatch from 30% of square footage of turf areas						
<b>PLANTING</b>						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						

**SEPTEMBER**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	September				Time		Total Hours	Worker's Initials	Comments/Notes
					Start	End			
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)									
<b>PLANTING BED MAINTENANCE</b>									
Weed beds and remove debris (hand pulling or other mechanical means)									
Trim groundcovers from walkways and from growing outside of planters									
Remove autumn leaves									
<b>PRUNING</b>									
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)									
Inspect and adjust tree staking and guying									
Remove guys and stakes									
<b>LANDSCAPE DEBRIS REMOVAL</b>									
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas									
Remove branches and debris from storm damage									
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility									
Remove autumn leaves (Regularly in autumn)									
Remove moss from curbs, stairs, and walkways									
<b>GENERAL MAINTENANCE</b>									
Remove trash									
Remove litter, leaves, weeds and debris from rockery areas									
Cut and remove vegetation from drainage swales to a height of 4" above grade or water surface									
<b>EMPLOYEE TRAINING REQUIREMENT</b>									
"Contractor Right-of-Way Access Certification" Training									
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>									
Work on ROW (After Sound Transit approval and communication)									

**OCTOBER**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	October	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Valve Monitoring						
Two-wire path loop resistance test	(Record Date)					
Deactivate prior to freezing weather	(Record					
Flush irrigation system	(Record					
Clean and adjust heads, nozzles, and valves						
Clean drip irrigation valve strainers						
Vacate all water from the systems using an air compressor and adjust/set all valves and back flow prevention devices for winterization per manufacturer's recommendations						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Remove litter and debris and mow to 1 1/2 to 2 1/2 inches	(As Needed)					
Mechanically trim all landscape turf edges every other mowing						
Trim all formal lawns every other mowing						
Fertilize according to soil test results. Turf fertilizer should not exceed 3-1-2 (N-P-K) nutrient ratio (Fertilize 3 to 5 times based on Soil Test results)						
Monitor turf areas for pests						
Mechanically remove thatch from 30% of square footage of turf areas						

**OCTOBER  
SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	October	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>PLANTING</b>						
Planting						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>FERTILIZE TREES, SHRUBS, AND GROUNDCOVERS</b>						
Fertilize ornamental grasses						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
Remove autumn leaves						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
Inspect and adjust tree staking and guying						
Remove guys and stakes						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						
Remove autumn leaves (Regularly in autumn)						
Remove moss from curbs, stairs, and walkways						
<b>GENERAL MAINTENANCE</b>						
Remove trash						
Remove litter, leaves, weeds and debris from rockery areas						
<b>EMPLOYEE TRAINING REQUIREMENT</b>						
"Contractor Right-of-Way Access Certification" Training						
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>						
Work on ROW (After Sound Transit approval and communication)						

**NOVEMBER  
SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	November	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Valve Monitoring						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Monitor turf areas for pests						
<b>PLANTING</b>						
Planting						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
Remove autumn leaves						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						
<b>LANDSCAPE DEBRIS REMOVAL</b>						
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas						
Remove branches and debris from storm damage						
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility						



**NOVEMBER**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	November					Time		Total Hours	Worker's Initials	Comments/Notes
						Start	End			
Remove autumn leaves (Regularly in autumn)										
Remove moss from curbs, stairs, and walkways										
<b>GENERAL MAINTENANCE</b>										
Remove trash										
Remove litter, leaves, weeds and debris from rockery areas										
<b>EMPLOYEE TRAINING REQUIREMENT</b>										
"Contractor Right-of-Way Access Certification" Training										
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>										
Work on ROW (After Sound Transit approval and communication)										

**DECEMBER**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

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Location \_\_\_\_\_

Maintenance Item	December	Time		Total Hours	Worker's Initials	Comments/Notes
		Start	End			
<b>IRRIGATION</b>						
Valve Monitoring						
Provide for inspection and testing of backflow prevention valves annually as required by law						
Fill out form for Additional Irrigation Repair Services						
Report for all additional services, system repairs and renovations, general operations, and recommendations						
Summary report of major renovations, replacements and equipment changes along with proposed renovations/upgrades and associated budget recommendations						
<b>PEST MONITORING AND INSPECTION</b>						
Visual Pest Inspection						
Written Pest Monitoring Report						
Identification of any area where non-chemical IPM control methods should begin						
Request for chemical use (note: for weeding, contractor must demonstrate efforts with alternate removal (e.g. hand pulling, mechanical removal, or burning) and must fill out request form and map						
Pesticide Records Given to Sound Transit						
<b>PESTICIDE APPLICATION</b>						
All pesticide applications (herbicides, insecticides, fungicides, and other substances used to control pests) need proof of monitoring and positive pest identification.						
Pesticide records given to Sound Transit						
Weed control plan shall be prepared and signed by a licensed Commercial Pest Control Consultant when chemical treatments are proposed. Submit MSDS and current product label with weed control plan.						
Pesticide request form with specified information						
Notification to Sound Transit of insect infestation or disease among trees, shrubs, and ground covers.						
Identify and Control Class A, B, and C weeds. Once identified, create a Landscape Work Plan to be approved by Sound Transit.						
<b>TURF MAINTENANCE</b>						
Monitor turf areas for pests						
<b>PLANTING</b>						
Planting						
Replacing dead, vandalized, or stressed plants (As Sound Transit approves)						
New plant material inspection (Contractor coordinates inspection with Sound Transit prior to planting)						
<b>PLANTING BED MAINTENANCE</b>						
Weed beds and remove debris (hand pulling or other mechanical means)						
Trim groundcovers from walkways and from growing outside of planters						
<b>PRUNING</b>						
Prune to enhance natural growth and shape of plant materials (According to appropriate species' needs)						

**DECEMBER**  
**SOUND TRANSIT LANDSCAPE MAINTENANCE CHECKLIST**

Dates of Service: \_\_\_\_\_

\_\_\_\_\_  
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Location \_\_\_\_\_

Maintenance Item	December				Time		Total Hours	Worker's Initials	Comments/Notes
					Start	End			
<b>LANDSCAPE DEBRIS REMOVAL</b>									
Clear leaves and branches from walks, patios, planting beds, roadway gutters and lawn areas									
Remove branches and debris from storm damage									
Remove biodegradable landscape debris (turf clippings, thatch, leaves, branches, annuals, dead plant material) and send to recycling facility									
Remove moss from curbs, stairs, and walkways									
<b>GENERAL MAINTENANCE</b>									
Remove trash									
Remove litter, leaves, weeds and debris from rockery areas									
<b>EMPLOYEE TRAINING REQUIREMENT</b>									
"Contractor Right-of-Way Access Certification" Training									
<b>TACOMA LINK RIGHT OF WAY WORK REQUEST</b>									
Work on ROW (After Sound Transit approval and communication)									





**Task Order Scope OF Work And Not To Exceed Cost**

Name  Location

Company Name

Representatives Name  Phone #  Fax #   
email:

Project Start Date  Project Complete Date

**PRIORITY STATUS:**

Payment will not exceed the individual like item amounts shown below without advance written approval in the form of a revised Task Order. Terms and conditions of the Purchase Order number above are in full force and effect and are not suspended by this task order. While the invoice shall not exceed the amount shown on this task order, invoices shall reflect itemized pricing at the unit prices (ie, hourly rates, percentage mark-ups, lump sum monthly prices) as contained in any contract documents and invoice shall match contractual prices. Contractor should use the contractual rates when determining the NTE price on this worked order and should not include mileage/trip charges, for example, if excluded by your contract.

**Scope Of Task**

Hours	
Labor Cost	
Materials Cost	
Sub Contractor/Other	
Mileage/Trip	
Sub Total	\$0.00
Tax 9.30%	\$0.00
Total	\$0.00

PO #

\*estimated tax amount

Prior to starting any work, contractor must have a signed notice to proceed for this Task Order. Any change in scope to this Task Order including but not limited to materials, labor cost, and mileage outlined above must be in writing.

\_\_\_\_\_  
Signature of Authorized Representative for Contractor

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Authorized Manager, Sound Transit Facilities Department  
**Notice to Proceed**

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Work Completed, Sound Transit Facilities Department  
**Final Acceptance**

\_\_\_\_\_  
Date