



Seattle
Parks & Recreation



CREW WORK SPECIFICATIONS

- 1. PROJECT IMPLEMENTATION 2
 - 1.1. Project Management 2
 - 1.2. Project Boundaries 2
 - 1.3. Project Phasing 2
 - 1.4. Project Access 6
 - 1.5. Weather Conditions 6
- 2. VEGETATION REMOVAL 7
 - 2.1. Focus Weed Species 7
 - 2.2. Manual Vegetation Removal 8
 - 2.3. Chemical Weed Treatment 8
 - 2.4. Weed Hygiene 10
- 3. STORMWATER AND EROSION CONTROLS 13
 - 3.1. Protect Waterways 13
 - 3.2. Prevent Erosion and Sediment Transport from the Site 13
 - 3.3. Prevent Erosion and Sediment Transport from the Site by Vehicles 14
 - 3.4. Stabilize Soils 14
 - 3.5. Protect Slopes 15
 - 3.6. Protect Storm Drains 15
 - 3.7. Control Pollutants 15
 - 3.8. Maintain Erosion and Sediment Control BMPs 16
- 4. SHEET MULCHING 16
- 5. WEED COMPOST PILE CONSTRUCTION 17
- 6. LITTER REMOVAL 17
- 7. PLANT INSTALLATION 18
 - 7.1. Plant Material Stock Type 18
 - 7.2. Wet Area Considerations 20
 - 7.3. Plant Staging 20
 - 7.4. Plant Spacing 22
 - 7.5. Plant Installation Details 22
 - 7.6. Plant Flagging 25
- 8. WOOD CHIP MULCH APPLICATION 25
- 9. IRRIGATION 26
 - 9.1. Hand Watering 26
 - 9.2. Cistern Fill 26
- 10. REPORTING 26

Purpose: This document is a compilation of best management practices to be used while carrying out Green Seattle Partnership restoration activities on properties managed by Seattle Parks and Recreation or on public lands in the City of Seattle where work is directed by Seattle Parks and Recreation. The body of work outlined in the GSP Crew Work Specifications is intended to be carried out by professional crews, not by volunteers. The City of Seattle has determined that if City staff, their contractors, and GSP volunteers comply with the BMPs, then GSP is following the restrictions included, but not exclusive, in the City's Critical Areas Ordinances (CAO), Citywide Pesticide Use Reduction Strategy and Policy, and Seattle Parks Natural Area Best Management Practices.

1. Project Implementation

1.1. Project Management

- **Scope of Work:** The Plant Ecologist/Project Manager will develop a Scope of Work document prior to the Work Schedule that will define any project-specific requirements different than or in addition to the best management practices outlined below. This includes but is not limited to: an explanation of the type and area of work, details on project-specific stormwater management requirements, plant lists, timing considerations, as well as invoicing and reporting requirements. The Crew Work Specifications accompany all GSP Scopes of Work.

1.2. Project Boundaries

- **GSP Work View Map:** The [GSP Work View Map](#) is included in the Scope of Work to delineate Project areas. A mobile version of ArcGIS can be downloaded for use in the field.
- **Define and Field Identify Clearing Limits:** Before beginning restoration activities, clearing limits shall be marked with flagging or similar best management practices (BMPs) where necessary. Clearing limits may identify, but are not limited to: property boundaries, habitat areas, wetlands, streams, and other Environmental Critical Areas.

1.3. Project Phasing

- **Bird Habitat Considerations:** From February 1 through July 31, during early and primary bird nesting season, limit substantial clearing activities or crew size in Work Zones during this period. These dates may be modified for certain early and late nesting species. Notify Plant Ecologist of nesting bird concerns. Reference the GSP document [Forest Parkland Restoration Planning Related to Breeding Birds](#) and Scope of Work for phasing considerations.
- **Wet Areas:** Work in wetlands or wet areas shall be avoided when inundated (flooded) or when soils are saturated up to the surface. Work in areas with standing open water (at least 10 cm deep) and adjacent areas shall be avoided during amphibian breeding season, December 1 – June 30. Reference the GSP document [Wetland Best Management Practices](#) and the Scope of Work for more information and appropriate restoration phasing. Contact the Plant Ecologist if crews encounter wet areas not identified in the Scope of Work.
- **Pollinator Habitat Considerations:** Utilize non-pesticide pest control options as appropriate and combine approaches of mechanical, manual, cultural and chemical control. Avoid spraying pollinators, change to early/late season application, or spray early in the morning before pollinators are active. Reference [The Native Pollinator Habitat Restoration Guide](#) and the Scope of work for guidance on working around pollinators.
- **Native Pruning Considerations:** Generally late summer and fall (leaf-on) is the desired timing for native pruning or brushing to promote a more lasting effect on vegetation response. Reference the [Green City Partnerships Best Management Practices for Crime Prevention Through Environmental Design in Natural Landscapes](#) and the Scope of Work for more information and appropriate methods for pruning native species.
- **Seasonal Work Limitations:** From October 31 through April 1, clearing, grading, and other soil disturbing activities will be subject to additional limitations unless otherwise specified in the Scope of Work.

Table 1: Stewardship calendar

STEWARDSHIP CALENDAR	1	2	3	4	5	6	7	8	9	10	11	12	NOTES
	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	Dec	
planting considerations:													
primary planting season													optimal planting is when plants are dormant during the rainy season
wetland planting season													applies to soils that dry out during part of year
wetland planting season													applies to soils that are saturated year-round
wildlife considerations:													
primary bird nesting season													includes majority of songbird species; some birds nest later into end of August
early bird nesting season													includes larger species such as herons, geese, raptors, and hummingbirds
duck nesting season													avoid shoreline/adjacent areas
amphibian reproduction													applies to sites with 10 cm standing open water, avoid 25 feet from waters edge
professional crew considerations:													
steep slope work													do not carry out activities that have potential for soil disturbance in winter without BMPs in place
knotweed herbicide treatment													early or late applications may be acceptable to avoid impacts to pollinators
ivy herbicide treatment													early applications may be acceptable, but not as effective for long-term control
blackberry herbicide treatment													do not make applications to fruiting vegetation

Legend:
■ go
■ proceed with care
■ stop

Table 2: Habitat management guidelines for breeding birds

Adapted from Appendix D in Forest Parkland Restoration Planning Related to Breeding Birds in Seattle, WA				
WEED SPECIES REMOVAL				
Species	Non-nesting season August 1 – January 31	Early nesting season February 1 – April 15	Primary nesting season April 15 – July 31	Watch For
Ivy (Ground) <i>Hedera helix</i>	Herbicide treatment and hand pulling ok.	Herbicide treatment and hand pulling ok.	Avoid disturbance if nesting species present. Hand pull with caution.	Spotted Towhee, Winter Wren
Ivy (Tree) <i>Hedera helix</i>	Survival ring and manual section removal ok.	Vine cutting ok, but leave vines in tree.	Vine cutting ok, but leave vines in tree.	American Robin, Vireo species
Blackberry <i>Rubus armeniacus</i>	Herbicide treatment, mechanical removal and hand pulling ok.	Herbicide treatment, mechanical removal and hand pulling ok.	Avoid disturbance if nesting species present. Hand pull with caution.	All species, esp. early-nesting Anna's Hummingbird and late-nesting Willow Flycatcher*+
Clematis <i>Clematis orientalis</i>	Vine cutting and manual root removal ok.	Vine cutting and manual root removal ok, but avoid pulling down vines.	Vine cutting ok, but avoid root removal and pulling down vines.	Spotted Towhee, Winter Wren
Field Bindweed (Morning Glory) <i>Convolvulus arvensis</i>	Herbicide treatment and hand pulling ok.	Herbicide treatment and hand pulling ok.	Avoid disturbance if nesting species present. Hand pull with caution.	Seed-eating species, esp. waterfowl
Garlic Mustard <i>Alliaria petiolata</i>	Herbicide treatment and hand pulling ok.	Herbicide treatment and hand pulling ok.	Selective herbicide treatment and hand pull with caution.	Ground nesting species, esp. Killdeer+, and ducks
Holly and Cherry Laurel <i>Ilex aquifolium</i> (Holly) <i>Prunus laurocerasus</i> (Laurel)	Herbicide treatment and injection ok; mechanical removal and hand pulling ok.	Mechanical removal and hand pulling ok.	Avoid disturbance if nesting species present. Mechanical removal with caution.	American Robin
Common Hawthorn <i>Crataegus laevigata</i>	Herbicide treatment and injection ok; mechanical removal and hand pulling with caution.	Girdling ok. Avoid tree removal if nesting species present.	Avoid disturbance if nesting species present.	Cedar Waxwing, American Robin, late-nesting Willow Flycatcher*+
Poison hemlock <i>Conium maculatum</i>	Herbicide treatment or digging ok.	Herbicide treatment or digging ok.	Selective herbicide treatment and digging with caution.	
Scotch Broom <i>Cytisus scoparius</i>	Herbicide treatment, mechanical removal and hand pulling ok.	Herbicide treatment, mechanical removal and hand pulling ok.	Herbicide treatment, mechanical removal and hand pulling ok.	
Shiny geranium <i>Geranium lucidum</i>	Herbicide treatment and hand pulling ok.	Herbicide treatment and hand pulling ok.	Selective herbicide treatment and hand pull with caution.	Ground nesting species, esp. Killdeer+, and ducks

Knotweed** <i>Polygonum x. bohemicum</i>	Herbicide treatment and injection ok.	Herbicide treatment and injection ok.	Herbicide treatment and injection ok.	
OTHER VEGETATION REMOVAL				
Type	Non-nesting season August 1 – January 31	Early nesting season February 1 – April 15	Primary nesting season April 15 – July 31	Watch For
Live Tree	Girdling and tree removal ok.	Girdling ok. Avoid tree removal if nesting species present.	Girdling ok. Avoid tree removal if nesting species present.	All species, esp. early-nesting Anna's Hummingbird and raptor species
Snag (Dead Tree)	Removal ok.	Avoid removal if nesting species present.	Avoid removal if nesting species present.	Cavity-nesting species and raptor species
Shrub	Removal ok.	Remove with caution.	Avoid removal if nesting species present.	All species, esp. early-nesting Anna's Hummingbird and ducks
Mowing and Ground Cover	Mowing and removal ok.	Mow and remove with caution.	Avoid mowing and removal if nesting species present.	Ground nesting species, esp. Savannah Sparrow+, Killdeer+, and ducks
PLANTING AND MONITORING ACTIVITIES				
Type	Non-nesting season August 1 – January 31	Early nesting season February 1 – April 15	Primary nesting season April 15 – July 31	Watch For
Planting	Planting ok.	Planting ok.	Planting ok.	Any species occupying habitat adjacent to the treatment site.
Plant establishment and watering	Weeding, watering and mulching ok.	Weed with caution. Avoid if nesting species present.	Water and mulch with caution. Avoid if nesting species present.	Ground nesting species during early growing season weeding.
Site monitoring and vegetation measuring	Monitoring and measuring ok.	Monitoring and measuring with caution. Avoid if nesting species present.	Monitoring and measuring with caution. Avoid if nesting species present.	Consider recording observed bird and wildlife use at the site.
OTHER MAINTENANCE				
Type	Non-nesting season August 1 – January 31	Early nesting season February 1 – April 15	Primary nesting season April 15 – July 31	Watch For
Structural and Building	Removal and maintenance ok if no species roosting. If roosting, flush bird(s) and encourage/observe roosting elsewhere prior to disturbance.	Avoid if nesting species present.	Avoid if nesting species present.	Osprey*, Barn Owl, Vaux's Swift+, Cliff Swallow, Barn Swallow+, House Finch

1.4. Project Access

- **Means of Access:** To minimize compaction, spread of undesirable species and erosion effects on soil due to accessing work sections, a single means of ingress and egress located in an area that is less susceptible to erosion or compaction shall be established. Trips through the access routes shall be kept to a minimum by identifying the necessary work and equipment needed to complete the activities planned within the project boundary. A single access route is preferred for work areas that are near each other.
- **Access in Wet Areas:** If it is necessary to work on saturated soils, temporary planks (duck boards), three layers of jute fabric, or wood chips to a minimum 6" depth, shall be installed to create a protective surface on saturated soils where stewardship access trails are to be developed. Prior to removing coir or scattered wood chips, assess the impacts to vegetation and soils. Leave materials in place to biodegrade if it is determined that removal would create an erodible or unstable surface or would damage colonizing native plant species.
- **Minimize Soil Disturbance:** Limit access routes across steep slopes. Install access routes parallel to slope contours and perpendicular to water flows. Stabilize slopes prior to restoration work by installing wood chip mulch to a minimum depth of 6 inches, and/or installing woody debris or coir logs perpendicular to runoff and along the outer edge of the access path. If the means of ingress and egress will be used over subsequent days to access unfinished work sections, the pathway shall be stabilized with BMPs outlined in Section Stabilize Soils.
- **Crew Size:** In wet areas, limit crew size to six people.
- **Project Staging:** In wet areas, establish work center (i.e. tool and material storage, delivery and staging locations, and lunch location) outside of the wet area where soils are more stable, and avoid staging near storm drains.
- **Access Route Restoration:** After work is closed out of the work section(s), the access route(s) shall be restored.
- **Prevention of Noxious Weed Spread:** Known infested areas of noxious weeds can be flagged or fenced off to prevent further spread during non-weed control related projects.

1.5. Weather Conditions

Contractors shall monitor weather conditions to assure restoration effectiveness, crew safety, and compliance. Project operations will be halted when the Plant Ecologist determines weather conditions are injurious to the plants or the Project. Weather conditions during which Seattle Parks may not allow Work include, but are not limited to:

- Potential for rain conditions that would affect herbicide effectiveness, soil erosion
- Air temperature of less than 32 degrees F (32°F) or greater than 75 degrees F (75°F);
- Less than 50 percent Relative Humidity (RH);
- Sustained wind velocity greater than twenty-five (25) miles per hour;
- Sustained wind velocity greater than five (5) miles per hour during pesticide applications;
- Soil frozen more than one-half (1/2) inch deep;
- Snow cover greater than two (2) inches; and
- Wildfire smoke conditions that may impact crew health. GSP will use Puget Sound Clean Air Agency air quality map found at: <https://secure.pscleanair.org/AirQuality/NetworkMap>

Section 1 Performance Measures:

- *Meet project timeline, phasing, seasonal benchmarks and limitations as specified in Scope of Work and Specifications*
- *Work occurs only within zone boundaries or as specified in Scope of Work and GSP Work View Map*
- *Access and staging areas not left susceptible to soil disturbance or social use*
- *Compliance with weather conditions limitations*

2. Vegetation Removal

2.1. Focus Weed Species

GSP focus weed species includes the complete [King County Noxious Weeds List](#) (including Class A noxious weeds, Class B noxious weeds, Class C noxious weeds, and Non-regulated noxious weeds), as well as the Noisome Focus Weed List and Focus Woody Species List shown below.

Table 3: GSP Noisome Weed Species

Botanical name	Common Name
<i>Lapsana communis</i>	Nipplewort
<i>Scilla spp.</i>	Scilla varieties

Table 4: Focus Woody Species

Botanical name	Common Name
<i>Acer campestre</i>	Hedge Maple
<i>Acer platanooides</i>	Norway Maple
<i>Acer psuedoplatanus</i>	Sycamore Maple
<i>Aesculus hippocastanum</i>	Horse Chestnut
<i>Ailanthus altissima</i>	Tree-of-Heaven
<i>Buddleia davidii</i>	Butterfly bush
<i>Clematis vitalba</i>	Traveler's Joy
<i>Cotoneaster spp.</i>	Cotoneaster
<i>Crataegus monogyna</i>	Common Hawthorn
<i>Cytisus scoparius</i>	Scotch Broom
<i>Ilex aquifolium</i>	Holly
<i>Laburnum anagyroides</i>	Golden Chain Tree
<i>Ligustrum sinense</i>	Privet
<i>Populus alba</i>	Silver Poplar
<i>Populus nigra</i>	Black Poplar, Lombardy Poplar
<i>Prunus domestica</i>	Domestic Cherry
<i>Prunus spinosa</i>	Sloe
<i>Prunus avium</i>	Bird Cherry
<i>Prunus cerasifera</i>	Thundercloud Plum
<i>Prunus laurocerasus</i>	Cherry Laurel
<i>Prunus lusitanica</i>	Laurel
<i>Pyracantha spp.</i>	Firethorn
<i>Robinia pseudoacacia</i>	Black Locust
<i>Sorbus aucuparia</i>	Mountain Ash
<i>Tamarix ramosissima</i>	Saltcedar

2.2. Manual Vegetation Removal

Selectively remove the shoots and roots of all target weed species (explained above), including any hybrids, varieties, or cultivars. Avoid damage to all native vegetation. Follow composting guidelines (see *Section 5. Weed Compost Pile Construction* below) unless otherwise specified in the Scope of Work.

Additional considerations:

- For mechanical “knockdown” of blackberry canes, cut canes to 2 ft and scatter canes evenly to ground contact.
- **Brushing Trees:** Unless otherwise specified, utilize reduction cuts to clear 3-5 ft around each seedling or sapling tree by cutting back any competing shrub vegetation. Prune overhanging vegetation (both native and target weeds) to ground level sufficient to create a 45-degree cone of light for the tree seedling.
 - Reduction cuts shorten the length of a stem by cutting to a lateral branch large enough to serve as the new, shorter leader. Choose a lateral branch that is at least one third the diameter of the main stem.
 - Removal cuts remove an entire branch at its point of attachment. These cuts are made at the branch collar on trees and larger shrubs, and down to the root crown for multi-stem shrubs and cane plants.
- For woody species smaller than 1” that are not root suckering, use a weed wrench where possible.
- Trees or shrubs greater than 1” diameter at 6” above the soil level, as well as species that respond negatively to mechanical removal (i.e. knotweed and yellow archangel) shall not be removed manually. See *Section 2.3 Chemical Weed Treatment*.
- **Survival Rings:** For target weed climbing vines on native trees, cut completely at shoulder height. Strip vines from the trunk of the tree, between the shoulder-height cut and where the ground meets the base of the tree. Remove roots (“grub”) within a three-foot radius away from the trunk of the tree OR lance inject woody vines of an appropriate size. Do not attempt to pull vines above shoulder-height from of the tree. Seek approval of the Plant Ecologist for any modification to this method. Survival rings shall not be carried out on trees surrounding an active homeless camp until the structure has been removed. Use the standing tree height as an equivalent buffer distance.
- When removing thickets adjacent to a wetland, establish a 75 ft buffer area surrounding the wetland. Ensure that only 25% of the entire buffer area is removed. Delay further weed removal until the installed native vegetation has grown to provide 50% of the functional structure (measured by density of vegetation) of the vegetation that was removed.
- When manually removing focus weed species from areas adjacent to or near to waterways, prevent sediment and vegetative debris (stems, roots, flower parts, fruits, and seeds) from entering the waterway. Use a barrier if necessary. Barriers may include a sheet, tarp, cardboard, or other BMPs outlined in *Section 3.2. Prevent Erosion and Sediment Transport from the Site*.
- Designate “haul-and-drag” routes for removing plant material for least disturbance and potential spread of noxious weed material.
- Install temporary erosion and sediment controls as necessary or directed by Plant Ecologist. See *Section 3. Stormwater and Erosion Controls*.

2.3. Chemical Weed Treatment

2.3.1. Citywide Pesticide Reduction and Integrated Pest Management Program

Seattle Parks’ Integrated Pest Management program includes all potential pest suppression and control strategies but focuses on non-pesticide strategies whenever possible. Certain levels of weed populations are accepted within established thresholds and all reasonable non-pesticide pest control options are considered first before resorting to the use of pesticides. This strategy aligns with [Seattle Parks and Recreation Integrated Pest Management](#). Pesticide applicators shall strictly follow this pesticide reduction policy and rules. All pesticide applications must be made under direct supervision of a licensed pesticide applicator and conform to all applicable state and federal regulations and City of Seattle policies.

2.3.2. Application Methods

Use the following herbicide application methods for treatment of focus weed species where indicated in the Scope of Work. Consult with Parks Plant Ecologist before treating any trees 6" DBH or greater. See the table below for species-specific specifications.

- **Foliar:** Apply to leaves and green stems. Avoid drift. Avoid formulations and/or air temperatures that would volatilize herbicide.
- **Cut & Dab:** Cut stems of weed species between ground level and 6" in height and immediately apply an herbicide to the fresh cut. While applying herbicide, a person is not allowed to handle cutting tools or plant material that could damage their PPE. Crews working in teams of two or three people are recommended.
- **Frill & Treat:** For all woody species greater than 3" diameter at 6" above ground, do not cut the tree down, but instead clear branches necessary to access the main trunk(s). Make a series of downward angled cuts through the bark and cambium, leaving the frilled bark connected to the tree. Make these cuts completely around the entire circumference of the trunk, at a spot 12" from ground. Immediately apply herbicide to the cambium of the freshly frilled trunk at the recommended rate.
- **Lance:** Use for woody species greater than 2.5" diameter at 6" above ground. Do not cut the tree down, but instead clear branches necessary to access the main trunk(s) and use EZ-Ject lance per the manufacturer's instructions to inject herbicide into the tree at the rate outlined below. For trees greater than 6" diameter at 6" above the ground, consult with Plant Ecologist before treating.
- **Cut Stump:** Apply to woody species smaller than 2.5" diameter at 6" above ground. Cut the tree or shrub down to a stump between ground level and 6 inches in height. Apply herbicide immediately to entire surface of the stump/stem at the rates outlined below. Cut all branches to lengths 18" or less and scatter, avoiding direct ground contact.
- **Stem Injection:** Using a stem injection gun for knotweed species, inject herbicide into stems greater than ½" between the first and second nodes from the ground (or between the second and third node if the stem is too woody lower). Use marker spray (orange) to indicate treated canes. Follow manufacturer's directions carefully, especially on calibration and cleaning of equipment.

2.3.3. Contractor Pesticide Application Responsibilities

All pesticide applications must be made under direct supervision of a licensed pesticide applicator and conform to all applicable state and federal regulations, City of Seattle policies and Green Seattle Partnership guidelines. Contractor shall provide and be responsible for the following:

- Only pesticides [approved by the City of Seattle](#) shall be used in Seattle Parks;
- [FSC® List of 'highly hazardous' pesticides](#) shall not be used in Seattle Parks;
- Notify listed with Washington State Department of Agriculture prior to any pesticide application;
- Pesticides shall not be used within 50 feet of play areas, picnic shelters, picnic table groupings, wading pools/water play features or active homeless camps on Seattle Parks and Recreation property or adjacent properties. This includes parks with community centers or other facilities that have an active licensed public or private day-care; public kindergarten, elementary or secondary school; and where day camps are present. Under these circumstances, coordination with the Plant Ecologist to provide the facility or program notification of herbicide applications will be required.
- Pesticides will not be used to control plants that are in flower or fruit;
- Avoid spraying when pollinators are active on focus weeds or adjacent native vegetation;
- Utilize wind monitoring equipment to monitor conditions that may lead to drift;
- Monitor local weather for indications of inversions;
- Equipment must be maintained to satisfactorily accomplish treatment;
- All safety equipment must be utilized to meet legal requirements for the Work, including appropriate personal protective equipment and a spill kit;
- Use blue marker dye with application unless directed otherwise;
- Upon request, provide a sample of the herbicide solution being applied;
- Properly dispose of all herbicide solutions, residues and empty containers in accordance with applicable laws;

- Take precautions to avoid incidental overspray into water resources, including waterways and wetlands that are wet during herbicide application or will become wet while the active ingredient is biologically available and;
- Comply with all requirements of [Department of Ecology's Aquatic Noxious Weed Management General Permit](#) when using herbicides near water resources (streams) and in areas that are wet during herbicide application or will become wet while the active ingredient is biologically available.
- Applicator shall have an aquatic endorsement when applying herbicides in a wetland.

2.3.4. Signage

The contractor is solely responsible for placing and removing necessary signage at treated sites, in accordance with the [Citywide Standard Pesticide Application Signage](#). For aquatic applications accomplished under the Washington State Aquatic Noxious Weed General Permit, use required signage included with Permit.

Use the following guidelines for signage:

- **Signs shall be posted for a minimum of 24-hours or longer where re-entry restrictions are listed on the herbicide label; signs shall be removed promptly after the 24-hour period.**
- Post at key facility entrances (if applicable) and other usual points of entry, as well as in front of treated area;
- For high-use recreational areas such as near picnic areas and playgrounds, post signs at a minimum interval of every 50 ft;
- For linear applications in Parks or other recreational areas such as along sidewalks, paths etc., post at ends of treated area and at trail intersections or other key crossings at a minimum of every 200 ft; and
- For roadways or fence lines with low pedestrian traffic, signs shall be posted at block or median ends and at pedestrian crossings at a minimum of one sign per 500 ft.

2.3.5. WSDA Pesticide Application Records

Contractors must use the WSDA-approved Seattle Parks and Recreation Pesticide Application Record, available as a [PDF here](#) or as a [Microsoft Word document here](#). An example form is available [here](#). Submit to the project Plant Ecologist. Reference your project Scope of Work for details on submittal requirements. Record all information completely and be sure to provide total quantity of each product applied in ounces per gallon for tank mixtures, in fluid ounces for straight product, or in number of shells for lance injections.

2.4. Weed Hygiene

Avoid moving weeds on tools, materials, boots and clothing within a restoration site or from site to site. King County Noxious Weed suggests that crews are responsible for moving noxious weed species between restoration areas. To reduce the potential for moving weeds, employ basic precautions prior to entering the field by ensuring equipment, vehicles and clothing are free of seeds and soil, including:

- Clean all soil from tools while still on site using a stiff brush;
- Remove and wash/brush boots that are potentially carrying soil and seeds;
- Wash clothing that is potentially carrying soil and seeds;
- Consider your parking location, trying not to park in areas that have soil or seed sources nearby;
- Keep vehicles clean from day to day and between work sites; and
- Limit access through known noxious weed infestations to prevent seed/ propagule spread. Flag or fence off infested areas.

Section 2 Performance Measures:

- Reduce focus weed cover to less than 5% within each zone listed in the Scope of Work;
- Complete survival rings on 100% of trees found within the project area;
- Marker dye is used to verify foliar chemical application on 100% of focus weed species;
- EZ-Ject shell casings are visible at the correct rates in all woody focus species; and,
- There is less than 5% damage to native plants

Table 5: Select Chemical Treatment Methods

* Follow pesticide label, including re-entry period information and total solution per acre information

Species	Method	Timing	Additional Notes
bamboos	Foliar: 1% solution of Imazapyr and 0.25-0.5% nonionic surfactant (if needed)		Apply until foliage is just wet. Combination of methods: Small stands of both types of bamboo can be controlled through hand removal. Herbicide application after plants have been dug or to regrowth after knockdown. Imazapyr is nonselective and may injure some desirable species. It has long soil residual activity, depending on the site.
blackberry (<i>Rubus</i> spp.)	Foliar: 0.75-1% solution of Triclopyr and 0.25-0.5% nonionic surfactant (if needed)	Apply when plants are actively growing. Post-emergence in mid-summer or early fall after flowering and start of fruit set.	Consider knocking down mature patches for easier application of re-growth. Foliage must be thoroughly wet until point of runoff. Most effective on smaller plants. Avoid applications when impacts to pollinators on flowers and fruiting plants is likely.
blackberry (<i>Rubus</i> spp.)	Cut & Dab: 100% solution of Triclopyr immediately after cutting stems	Apply when plants are actively growing.	Preferred method on steep slopes with high native plant cover to help avoid soil disturbance
blackberry (<i>Rubus</i> spp.)	Basal bark treatment: 20% Triclopyr mixed with approved basal or seed oil		Avoid applications when impacts to pollinators on flowers and fruiting plants is likely.
Creeping thistle (<i>Cirsium arvense</i>)	Foliar: 2.5 to 4 pints/acre of Triclopyr. Add approved nonionic surfactant at surfactant manufacturer's recommended rate (apply in at least 10 gal/acre water by ground)	Apply from rosette to bud stage to actively growing thistle	Do not exceed 4 pints/acre per year
ivy (<i>Hedera</i> spp)	Foliar: 2-5% solution Triclopyr (2.67 oz/g) and .25-.5% nonionic surfactant (if needed)	With single applications per year, late summer treatments show the greatest reduction in cover the following year. Treatment on new growth in spring may provide better control in sunny exposures. Fully coat foliage.	Consider treating new growth in spring to help meet Performance Measures by end of project work schedule
ivy - aquatic (<i>Hedera</i> spp)	Foliar: 1-2% solution Imazapyr and .25-.5% nonionic surfactant (if needed)	Post-emergence when plants are growing rapidly in mid-summer or early fall	Imazapyr is nonselective and may injure some desirable species, including gasses and broadleaves. It has long soil residual activity, depending on the site.
ivy (<i>Hedera</i> spp)	Basal bark application: 33% dilution of triclopyr	Within 5 minutes of cutting	Only perform this treatment after severing survival ring. Cut each vine stem close to the ground and treat freshly cut surfaces. Plants shall not be cut for 4 months after basal bark treatment.
ivy (<i>Hedera</i> spp)	Lance: Inject one Imazapyr (Copperhead) shell every 4" of circumference; for stems <2.5" use 1 shell/stem	Injection can occur during any season, except when vines are frozen	Only perform this treatment after severing survival ring
garden loosestrife (<i>Lysimachia vulgaris</i>)	Foliar: 4% Imazapyr and 1% surfactant approved for aquatic use	Postemergence to growing plants in late June to early August	Imazapyr is nonselective and may injure some desirable species, including gasses and broadleaves. It has long soil residual activity, depending on the site.
garlic mustard (<i>Alliaria petiolate</i>)	Foliar: 2% solution Triclopyr and .25-.5% nonionic surfactant (if needed)	Best before natives emerge, late fall to early spring at the rosette stage	

Species	Method	Timing	Additional Notes
herb robert (<i>Geranium robertianum</i>)	Foliar: 1.5 to 2 pt Imazapyr/acre and .25-.5% nonionic surfactant (if needed)	Preemergence to postemergence	Imazapyr is nonselective and may injure some desirable species, including gasses and broadleaves. It has long soil residual activity, depending on the site.
knotweeds (<i>Fallopia</i> spp)	Foliar: 0.75%-1% solution Imazapyr and 1% Agridex surfactant (if needed)	Apply when knotweed is actively growing, and most canes have reached the bud to early flowering stage, until the first hard frost	To avoid spraying pollinators, change to early/late season application, or spray early in the morning before pollinators are active. Imazapyr is nonselective and may injure some desirable species, including gasses and broadleaves. It has long soil residual activity, depending on the site.
lesser celandine (<i>Ficaria verna</i>)	Foliar: 1- 1.5% solution of Imazapyr	Must be treated in early (March-mid April) spring before plant goes dormant by late spring.	
bindweed (<i>Convolvulus arvensis</i>)	Foliar: 3 to 4 pt Triclopyr/acre; 8 to 12 oz Imazapyr/acre and .25-.5% nonionic surfactant (if needed)	Triclopyr: Postemergence at bud stage or at summer fallow in mid-summer. Imazapyr: Preemergence or postemergence when plants are growing rapidly.	Imazapyr is nonselective and may injure some desirable species, including gasses and broadleaves. It has long soil residual activity, depending on the site.
nightshade (<i>Solanum dulcamara</i>)	Foliar: 2% solution Triclopyr and .25-.5% nonionic surfactant (if needed)	Triclopyr shall be applied when plants are actively growing.	Apply by spot-spraying foliage and stems of nightshade. Triclopyr may also be effective as a cut-stem treatment by applying triclopyr to freshly cut stems, but this method will be labor-intensive due to nightshade's multiple crowns. Apply herbicide to the freshly cut surface according to label directions.
poison hemlock (<i>Conium maculatum</i>)	Foliar: Foliar: .5-2.5% solution Triclopyr (2.67 oz/g) and .25-.5% nonionic surfactant	Postemergence in seedling to rosette stage	Broadleaf selective, most effective on smaller plants. Use in warm temperatures may increase risk of volatilization..
reed canary grass (<i>Phalaris arundinacea</i>)	Foliar: 1% Imazapyr and .25-.5% nonionic surfactant (if needed)	Foliar application before summer dormancy (July) and again when it regrows.	Mow before seeding and spray regrowth at 1 ft. tall and then again in 2 weeks or as needed. Imazapyr is nonselective and may injure some desirable species, including gasses and broadleaves. It has long soil residual activity, depending on the site.
woody species	Cut & Dab: 100% solution of Triclopyr	Most effective in late summer immediately after cutting stems	
woody species	Lance: Inject one Imazapyr (Copperhead) shell every 4" of circumference at 6" above ground; for trees <2.5" use 1 shell/stem	Injection can occur during any season, except when trees are frozen	For aquatic sites, this product may be injected into stems of trees and brush standing in water or wetlands. Do not apply directly to water or inject stems below the water level.
yellow archangel (<i>Lamium galeobdolon</i>)	Foliar: 1% Imazapyr (1.27 oz/g), 0.5% MVO (Competitor) (0.64 oz/g)		

3. Stormwater and Erosion Controls

Temporary erosion and sediment controls (TESC) shall be constructed in conjunction with all focus weed removal and treatment activities where appropriate in Environmentally Critical Areas. TESC installation will comply with all applicable Washington State laws and City of Seattle standards and requirements, including those defined in the following documents:

- [2021 City of Seattle Stormwater Manual](#) (CSSM)
- [2019 Stormwater Management Manual for Western Washington](#) (SWMMWW)
- [Slope Stabilization Erosion Control Using Vegetation: A Manual of Practice for Coastal Bluff](#) (SSECUV)
- City of Seattle Standard Specifications for Road, Bridge and Municipal Construction, especially [Section 8-01: Construction Requirements Stormwater Pollution Prevention](#) (CSPP)

The following sections outline elements of Construction Stormwater Pollution Prevention Plans (CSECP) for GSP projects. Refer to the Project Scope of Work for site-specific BMPs to be used throughout the Work Schedule. Retain a copy of this at the restoration project or within reasonable access to the project.

3.1. Protect Waterways

- Wood chip mulch shall not be installed below the ordinary high-water mark (OHWM). OHWM will be determined by Parks staff.
- If soils are unstable and an erosion control practice is determined to be necessary below the OHWM, coir mat shall be installed along the banks. Install only the coir as shown along the upper (outermost) banks within the detail (Figure 1). Install coir so that any upstream mat is laid over any downstream mat where they meet. Overlap shall be 12" with staples installed through overlap (refer to [CSSM BMP E1.15](#) pg=154).
- When manually or mechanically removing focus weed species from areas adjacent to or near to waterways, sediment and vegetative debris (stems, roots, flower parts, fruits, and seeds) prevented from entering the waterway. Use a barrier if necessary. Barriers may include a sheet, tarp, or cardboard and may require affixing to existing vegetation or assistance to temporarily position in place (refer to [CSSM BMP E3.30](#) pg=207 and [CSSM BMP E3.35](#) pg=208).

3.2. Prevent Erosion and Sediment Transport from the Site

All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the CSECP.

- **Preserving Vegetation:** Phase restoration activities to minimize exposed soils and consequent erosion by removing only focus weeds where restoration will occur (refer to [SWMMWW BMP T5.40](#) pg=685).
- **Buffer Zones:** An undisturbed area or strip of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and runoff velocities (refer to [CSSM BMP E1.35](#) pg=165).
- **Filter Fence:** A temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts and entrenched. The filter fence is constructed of stakes and synthetic filter fabric with a rigid wire fence backing where necessary for support (refer to [CSSM BMP E3.10](#) pg=197).
- **Brush Barrier:** Barriers of dead organic material used to reduce the transport of coarse sediment from a restoration site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. In some cases, the compost "windrows" may serve as brush barriers (refer to [SWMMWW BMP C231](#) pg=365).
- **Vegetated Strip:** A vegetated area located downslope of a disturbed area that is capable of filtering coarse sediment from runoff and slowing runoff velocities (refer to [CSSM BMP E3.30](#) pg=207).
- **Straw Wattles, Compost Socks, and Compost Berms, Coir Logs:** Temporary erosion and sediment control barriers consisting of burlap-encased straw, encased compost, or a compost berm. The wattles and logs are placed in shallow trenches and staked along the contour of disturbed or newly constructed slopes (refer to [CSSM BMP E3.35](#) pg=208).

- Straw wattles can be installed across slopes to control erosion. Wattles should be installed within shallow trenches parallel with the contour and perpendicular to runoff.
- On clay soils, trenches shall be 2-3" deep, on steep slopes or on more granular soils, trenches shall be 3-5" deep or ½ the diameter of the wattle, whichever is deeper.
- A sequence of wattles shall be installed starting at the base of the slope and continuing uphill at a frequency that allows no more than 6 vertical feet between wattle rows. Wattles shall be installed snugly into trench and staked at both ends and no less than every 4 ft along length of each wattle. Adjacent wattles shall be butted up to each other with minimal overlap.
- Wooden stakes should be approximately 3/4 x 3/4 x 24 inches min. Livestake cuttings may also be used for stakes.

3.3. Prevent Erosion and Sediment Transport from the Site by Vehicles

- **Cleaning Inlets and Catch Basins:** Removal of debris from existing inlets, catch basins, and connecting pipelines to protect and maintain private facilities and the public drainage system (refer to [CSSM BMP E3.65](#) pg=220).
- **Street Sweeping and Vacuuming:** Use of human-powered and/or mechanical equipment to collect sediment on paved surfaces to minimize sediment accumulation in private systems and the public drainage system (refer to [CSSM BMP E3.70](#) pg=222)

3.4. Stabilize Soils

Exposed un-worked soils (and piles) shall be stabilized with effective BMP to prevent erosion and sediment deposition. Soils shall be stabilized at the end of the shift, before a holiday or weekend as needed based on the weather forecast. Any area stripped of vegetation and left as bare soil in which **no further work is anticipated for five days** shall be stabilized by an approved erosion and sediment control method. Soils susceptible to erosion shall be covered. Approved erosion control BMPs include jute or coir mat, wood chip mulch, wood straw, coir logs, and plastic sheeting; as well as materials that may be found on site, such as leaves, downed wood, blackberry canes (cut to 2 feet lengths), and forest duff.

- **Temporary Seeding:** The establishment of temporary vegetative cover on disturbed areas by seeding with appropriate rapidly growing annual plants (refer to [CSSM BMP E1.10](#) pg=151).
- **Mulching, Matting, and Compost Blankets:** Application of plant residues or other suitable materials (e.g. WoodStraw, downed wood, blackberry canes or combination thereof) to the soil surface to provide immediate protection to exposed soils during the period of short restoration delays or over winter months through the application of plant residues, or other suitable materials, to exposed soil areas (refer to [CSSM BMP E1.15](#) pg=154).
- **Clear Plastic Covering:** The covering with clear plastic sheeting of bare areas that need immediate protection from erosion (refer to [CSSM BMP E1.20](#) pg=159).
- **Permanent Seeding and Planting:** The establishment of perennial vegetative cover on disturbed areas (refer to [CSSM BMP E1.40](#) pg=167).
- **Dust Control:** Reducing surface and air movement of dust during land-disturbing, demolition, and restoration activities (refer to [CSSM BMP E2.45](#) pg=187).
- **Surface Roughening:** Surface roughening aids in the establishment of vegetative cover, reduces runoff velocity, increases infiltration, and provides for sediment trapping through the provision of a rough soil surface. Horizontal depressions are created by suitable equipment on the contour or by leaving slopes in a roughened condition by not fine grading them. Use this BMP in conjunction with other BMPs such as seeding, mulching, or sodding (refer to [SWMMWW BMP C130](#)pg=307).

3.5. Protect Slopes

- **Level Spreader:** A level spreader is constructed at zero percent grade and can be used to distribute concentrated runoff to sheet flow. Level spreaders can be used as either a temporary or a permanent BMP to convert concentrated runoff to a thin layer of sheet flow to promote release onto a stable receiving area. For example, an existing vegetated area or a vegetated strip (refer to [CSSM Appendix E.4 pg=805](#)).
- **Check Dams:** Small dams constructed across a swale or drainage ditch to reduce the effective slope of the channel and, therefore, the velocity of concentrated flows; reduce erosion of the swale or ditch; and slow water velocity to allow retention of sediments (refer to [CSSM BMP E2.35 pg=182](#)).
- **Earth Dike and Drainage Swale:** A ridge of compacted soil or a swale with vegetative lining located at the top or base of a sloping disturbed area to intercept stormwater runoff from drainage areas above unprotected slopes and direct it to a stabilized outlet (refer to Section [CSSM BMP E2.80 pg=193](#)).
- **Grass-lined Channels:** Provide a channel with a vegetative lining for conveyance of runoff (refer to [SWMMWW BMP C201 pg=332](#)).
- **Surface Roughening:** Surface roughening aids in the establishment of vegetative cover, reduces runoff velocity, increases infiltration, and provides for sediment trapping through the provision of a rough soil surface. Horizontal depressions are created by operating a tiller or other suitable equipment on the contour or by leaving slopes in a roughened condition by not fine grading them. Use this BMP in conjunction with other BMPs such as seeding and mulching (refer to [SWMMWW BMP C130 pg=307](#)).
- **Modified Straw Wattles and Fascines:** Can be used to help stabilize soils on gradual slopes. See *Section 7. Plant Installation* for additional details on fascine installation. Modified straw wattles and fascines can also be installed and staked within rills (down-cutting erosional features) formed on wet slopes. Wattle, or fascine cuttings can be shortened to fit within rill. Structure should be fit snugly into rill ensuring good ground contact. A sequence of structures shall be installed within the rill starting at the base of the slope and continuing uphill at a frequency such that the vertical distance between structures is two times the diameter of the structure (refer to [SSECUV Planting Techniques: Contour Wattling](#))

3.6. Protect Storm Drains

Storm drain inlets operable during restoration are protected. Existing storm drains within the influence of the project are protected. This measure includes all points of access.

- **Storm Drain Inlet Protection:** A sediment filter or an excavated impounding area around a storm drain or catch basin (refer to [CSSM BMP E3.25 pg=202](#)).
- **Cleaning Inlets and Catch Basins:** Removal of debris from existing inlets, catch basins, and connecting pipelines to protect and maintain private facilities and the public drainage system (refer to [CSSM BMP E3.65 pg=220](#)).
- **Street Sweeping and Vacuuming:** Use of human-powered and/or mechanical equipment to collect sediment on paved surfaces to minimize sediment accumulation in private systems and the public drainage system (refer to [CSSM BMP E3.70 pg=222](#)).

3.7. Control Pollutants

Waste materials and debris handled and disposed of to prevent contamination of stormwater. Cover provided for all chemicals, liquid products, petroleum products, and other material. Contaminated surfaces cleaned immediately after a spill incident. Spills reported immediately to Plant Ecologist.

- **Material Delivery, Storage, and Containment:** Best practices for all deliveries, storage, and containment of materials, liquid and solid on a project site that may potentially pollute stormwater (refer to [CSSM BMP C1.15 pg=225](#) and CSPP 8-01.3(2)C SPILL PLAN pg=5).
- **Solid Waste Handling and Disposal:** Methods used to protect stormwater from pollution associated with the management, handling and disposal of all solid waste generated on a project site (refer to [CSSM BMP C1.45 pg=235](#)).

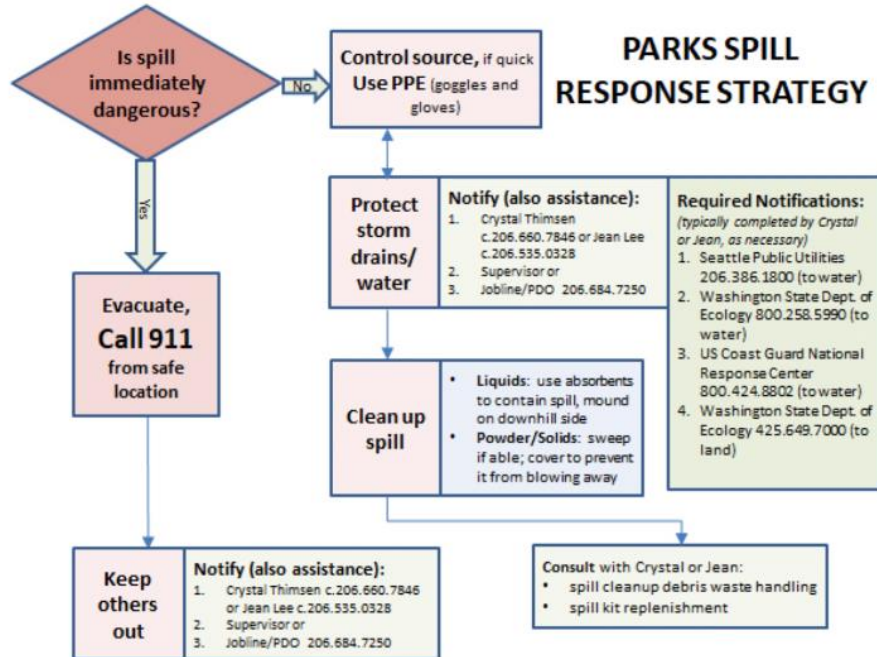


Figure 1: Seattle Parks and Recreation Spill Response Strategy

3.8. Maintain Erosion and Sediment Control BMPs

- Maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function.
- Protect all stormwater BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs.
- Restore the BMPs to their fully functioning condition if they accumulate sediment during restoration.
- Remove all temporary erosion and sediment control BMPs within 5 business days after final site stabilization is achieved, or after they are no longer needed—whichever is later.

Section 3 Performance Measures:

- BMPs installed per the Design Criteria and maintained during the duration of the Work Schedule;
- No soil exposed to risk of erosion
- No potential for sediment transport into bodies of water, drainage systems, flow off site, or flow within wetland.

4. Sheet Mulching

If outlined in the Scope of Work for the site, cover cleared areas completely with 3/8" of burlap or cardboard, working around existing native plants. Cover burlap or cardboard with minimum 6" to 8" arborist wood chip mulch. Sheet mulching shall be used only in areas where there is little native seed bank, such as when there is minimal canopy or existing native plants. Do not sheet mulch in wet areas that will become inundated (flooded). Burlap and cardboard are appropriate for use in wet areas or wetlands.

Section 4 Performance Measure:

- No weed re-growth through mulch during the duration of the Work Schedule.

5. Weed Compost Pile Construction

Pile all weeds on burlap, cardboard sheets, or downed logs using the following steps:

1. Find an area free of native plants and remove all plants and roots. It is very important that the area is cleared well before building your compost piles.
2. Lay out a frame of branches that will define your compost area. The area of the pile shall not be more than 40 sq. ft. If you are using cardboard, lay the cardboard down first and put the frame of branches on top of the cardboard edges and skip Step 3.
3. Fill in your frame with dead branches and sticks found on site. Place them in both directions to form a grid. This helps prevent the composting weeds from having direct contact with the soil.
4. Put pulled weeds on top of the pile. Stack ivy in smaller bundles and contain all debris inside the frame. Take care to separate herbaceous material from woody material to allow more rapid decomposition of the pile. Do not make the pile higher than 3 feet tall.

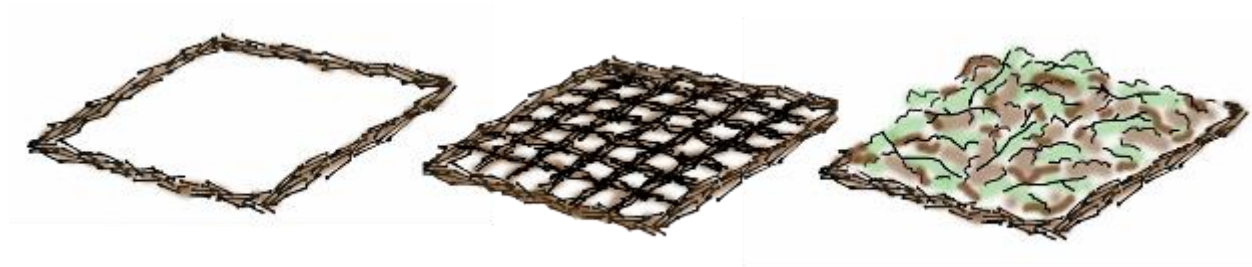


Figure 2: Weed compost pile construction diagram

Section 5 Performance Measures:

- No piles constructed over 4 ft. wide x 3 ft. tall (3 ft. wide x 2 ft. tall if windrow);
- No focus weed re-generation from compost pile; and
- No piles located within wetlands

6. Litter Removal

Collect and bag all litter found during field work. Litter required for removal does not include biohazardous material, personal belongings, or large material (i.e. refrigerators). Bags are to be placed in a location jointly determined by Contractor and Plant Ecologist for pick up by Seattle Parks and Recreation staff. Plastic, steel, aluminum, and glass containers shall be placed in separate bags for recycling. Planting pots shall be removed from the Project Area to be recycled, reused, or returned to Jefferson Horticulture.

Notify the project Plant Ecologist immediately if excessive dumping, property encroachment, or illegal camping is encountered. There are specific policies and procedures that need to be initiated and may impact the crew's work timeline or work area.

Sharps have been encountered by Professional Crews and so the following is provided for your reference. If the crew is not capable of following this procedure, please submit a request for clean up to the Project Plant Ecologist. Sharps are items that are potentially contaminated with blood or body fluids that can puncture the skin and transmitting blood borne infections. Sharps can include needles, razor blades, broken glass, or lancets. A specific pick-up procedure has been developed by Seattle Parks and Recreation:

1. Put on gloves
2. Open the sharps container carefully and place on a sturdy, flat surface

3. Using the litter stick, pick up the syringe from the plastic end and use caution to point the tip away from your body
4. Place in container one at a time, needle point down. Do not force anything inside. (If you are not using a biohazard container, please label appropriately).
5. Carefully close and secure container, take off gloves and sanitize hands (or ideally wash hands with hot soapy water)
6. Discard gloves and any other trash in the garbage
7. When container is full, take to disposal site

If you are stuck by a needle, allow the area to bleed as much as possible. Then, wash the area immediately with soap and water. Seek immediate medical attention to address potential blood borne infections.

Section 6 Performance Measure:

- 100% removal of all litter by end of project.

7. Plant Installation

7.1. Plant Material Stock Type

Stock type refers to the materials and procedures used by nurseries to propagate plants. Stock type can indicate the age, size, container type, container size or other characteristics of the plant material. There are three basic types of nursery stock: container, bareroot and live stake.

Container plants are typically grown in rigid plastic or styrofoam containers. The shape and volume of the containers are chosen based on how they influence root and shoot growth. Relatively small containers with conical shapes are known as plugs. Nomenclature varies from nursery to nursery, but volume is a commonly used metric for differentiating container stock. For example, "7ci" would likely refer to a plug with a volume of 7 cubic inches, whereas "plug-15" would refer to a plug with a volume of 15 cubic inches. Another approach to naming container stock is to describe the diameter of the container (e.g. 4" pot).

Bareroot plants are grown in beds for a period of time before being root pruned, sorted, graded, and/or replanted for further growth. Bareroot trees are the most common stock type in commercial forestry, but woody shrubs are also propagated as bareroot stock. Nomenclature for bareroot seedlings has a commonly used format referring to the number of years that seedlings are grown at the nursery before and after they are transplanted (Table 6).

Bareroot stock generally does not refer to other related stock types where soil is removed from belowground structures, such as bulbs, tubers or rhizomes.

Live stakes are dormant branches harvested from species that propagate easily from cuttings. In addition to being an efficient method of installing trees and shrubs, live stakes can be used for engineering purposes, such as the construction of fascines or for securing logs, netting and other erosion control materials. Willow (*Salix* spp) and



Figure 3: Examples of different container stock types. From left to right: 7ci plug (*Sisyrinchium californicum*), 10ci plug (*Ribes sanguineum*), 19ci plug (*Vaccinium membranaceum*), 27ci plug (*Anaphalis margaritacea*), and 40ci plug (*Acer macrophyllum*).
Photo: Oxbow Farm & Conservation Center.

cottonwood (*Populus* spp.) are among the more commonly harvested species, although other species can also be propagated with live stakes, including osoberry, red-twig dogwood, salmonberry and snowberry.

Table 6: Nomenclature for bareroot stock types. Adapted from the Washington DNR Webster Forest Nursery.

Stock Type	Description
Plug+1 (P+1)	After growing in the greenhouse for a year, this type of seedling is extracted from the container, root pruned and transplanted to a nursery bed for an additional year of growth. As with the 1+1 stock type, root pruning and transplanting generates a larger caliper stem and more mass in the root system.
1+1	This term designates a seedling grown for one year in a seedbed before being harvested, root pruned and transplanted back into a nursery bed for an additional year of growth. The transplanting process results in a larger caliper and a more fibrous root system. The root system on a 1+1 seedling and the extra storage of nutrients in the stem and root system will allow the seedling to better survive on an infertile site, compete with other vegetation, and give it a better chance of surviving herbivory from deer or other animals.
2+0	These seedlings are grown for two years before being dug up for out-planting. Production costs are low because the seedlings are never transplanted during the two-year period of growth. The root systems may be pruned horizontally in the ground and vertically between each row at the end of the first growing season. This stock type is less resilient to competing vegetation or herbivory.
2+1	This stock type is grown in the initial seedbed for two years before being harvested, sorted, root pruned and transplanted back into the nursery bed for an additional year of growth. The result is a seedling with a large caliper and root mass. This large stock type is useful for areas requiring quick green-up or areas of extreme animal browse. In most situations, a 1+1 or Plug+1 are more suitable and less expensive than 2+1 stock type.

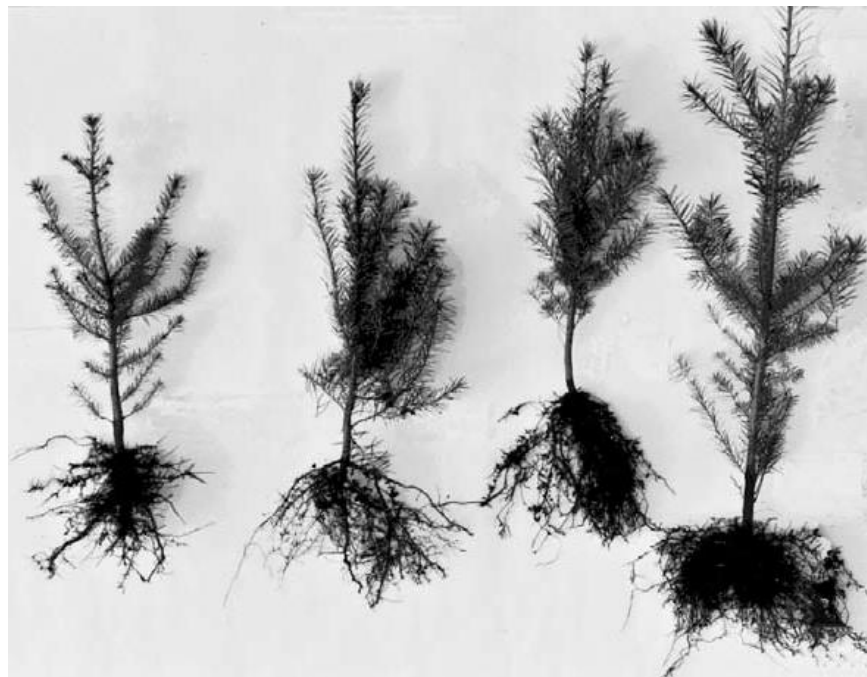


Figure 4: Examples of different bareroot stock types. From left to right: P+1, 2-0, 1+1 and 2+1. Photo: Oregon State University Extension Service.

Stock type specifications:

- Unless otherwise specified in the Scope of Work, all conifer seedling stock will be Stock Type 1+1 (12 to 36 inches in height, and stem caliper of 6 mm/0.24 inches) and from a seed source suited to the site unless otherwise noted in the Scope of Work. This material type generally designates a seedling aged for one year in a seedbed, harvested, root pruned and transplanted back into a nursery bed for an additional year.
- Hardwood tree and shrub stock shall be a minimum of 2-3 ft tall displaying multiple branching. Some specific plant material types are noted in the plant lists.
- Tree seedlings and shrubs shall have healthy foliage, well-developed buds, a fibrous root system, and good stem diameter.

7.2. Wet Area Considerations

Plant installation timing shall vary with the moisture regime of the wetland.

- In sites that dry out during part of the year, plant in the fall, as soon as the soils becomes wet again. Or in the spring after soils have dried enough that you can access the area but several months before the start of the dry period.
- In sites where soils within the plant's root zone remain saturated all year, plant between late spring and early fall, when the soil is saturated only (not flooded). To ensure plant establishment, do not plant within the 2 months prior to site flooding (mid- to late-fall) as plants can float out of their holes if submerged. Avoid planting a site if it is under water.
- If recent precipitation has flooded or saturated a site temporarily, delay work activities until the site has drained and returned to a drier more stable state.
- Avoid planting during the primary bird nesting season, April 1st to July 31st, if possible. In sites with open water, ducks may start nesting in March, a month earlier than primary nesting season. Avoid areas with active nests.
- In areas that have standing open water at a depth of at least 10 cm between Dec 1 and June 1, avoid work near (within 25 ft) to the water's edge during this period as it may impact breeding and developing amphibian species. Establish and mark a perimeter 25 ft (landward) from the water's edge and keep all work activities outside of the protection zone.

7.3. Plant Staging

Staging is the distribution of plants across a site in preparation for planting. Consult Vegetation Management Plans (VMPs) and the Plant Ecologist for guidance in staging plants.

Plant palettes are selected to meet general site conditions, however within each site there is variability in soils, sunlight, moisture, and nutrient availability. The following considerations should be made for microsites:

- The Clump-Gap mosaic planting pattern should be used to address microsites. The basic pattern is 3-5 plants grouped together. Between these clumps are gaps where individuals of the different species are randomly placed with wider spacing. This layout ensures that each species will be distributed across the site and in association with several different other suites of species as well as alone. It provides several unique opportunities to enhance wildlife habitat and increase plant survival. Do not plant trees or shrubs below overhanging vegetation unless otherwise directed in the Scope of Work.
- For shade tolerant conifers (STC), plant in an appropriate microsite adjacent to (within 2 ft) coarse woody debris, slash, dead brush, or compost pile. STC are not subject to the desired spacing and can be planted within four feet of another STC and within six feet of any other plant species. STC shall be planted in microsites where available, otherwise they shall be planted evenly across the planting area. Do not plant below overhanging vegetation.

- Consider the trail corridor when placing plants. Seattle Parks natural area trails standard is 3 to 4 feet wide and a brushing width of 6 feet wide. Do not plant material that will grow significantly over 18 inches within 2 feet of the trail corridor. Plant trees at least 10 feet away from the trail corridor.
- Consider above and belowground utilities. Seattle City Light requires the following safe clearances from underneath and to the sides of overhead power lines: 10-foot clearances from distribution lines and 16.5-foot clearances from transmission lines. Install trees at least 25 to 30 feet away from these utilities respectively to accommodate for mature crown spread. Trees are discouraged under or near transmission lines and towers. For belowground utilities, review the GSP Work View Map "Sewage and Drainage Lines" layer. In some cases, it may be necessary to call for utility location services before plant installation. Call 811 - <http://call811.com/map-page/washington>.

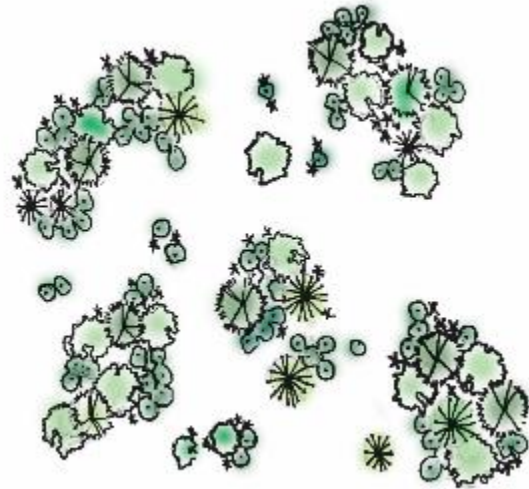


Figure 5: Clump-gap mosaic diagram

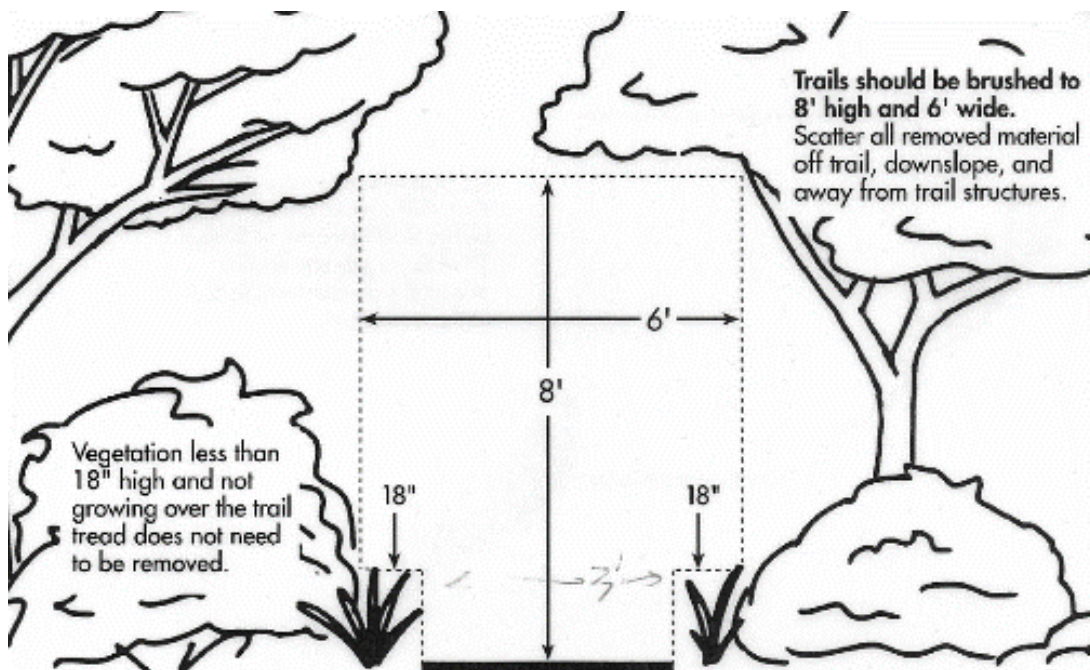


Figure 6: Trail corridor diagram

7.4. Plant Spacing

The following plant spacing specifications shall be implemented for any planting activities unless otherwise specified by the Plant Ecologist (Table 7).

Table 7: Plant spacing guide

Plant and Stock Type	Desired Plant Density	Spacing Average (on center)	Divide Square Footage by:
Trees	Dense	6 ft.	36 ft ²
	Medium	8,9, or 10 ft.	64, 81, or 100 ft ²
	Sparse	15 ft.	225 ft ²
Shrubs	Dense	3 ft.	9 ft ²
	Medium	4 ft.	16 ft ²
	Sparse	5 ft.	25 ft ²
Live Stakes	Dense	1 ft.	1 ft ²
	Medium	2 ft.	4 ft ²
	Sparse	3 ft.	9 ft ²
Emergent Plugs	Dense	6 in	0.25 ft ²
	Medium	12 in	1 ft ²
	Sparse	18 in	2.25 ft ²
Herbaceous/Ground Cover (4" pots in groups of 3)	Dense	2 ft.	4 ft ²
	Medium	3 ft.	9 ft ²
Herbaceous/Ground cover (1-gallon pot)	Dense	2 ft.	4 ft ²
	Medium	3 ft.	9 ft ²

7.5. Plant Installation Details

• Container Plants

- Inspect container for potential weed seedlings.
- Dig the planting hole twice the width of the container and deep enough so the plant, when set in the hole, will have the top of the root crown flush with the soil surface, but doesn't cover the stem above the roots.
- Soil shall be at the same level it was in the pot; make sure the plant is placed at its original depth.
- Return native soil to the planting hole and push down firmly to remove any air pockets. When available, incorporating compost and/or wood chip mulch with native soil is encouraged.



Figure 7: Container plant installation diagram

- **Bareroot Plants**

- Dig the hole wide enough to completely spread out the plant roots, without crowding or bending the roots. No root pruning shall be performed.
- Keep the roots moist until planting by storing them in moist sawdust or soil. In addition, you may soak them for 1–2 hours (never longer than 6 hours).
- Before planting, prune back any badly bruised, broken, kinked, or jagged roots to sound wood. No other root pruning shall be performed.
- Set the plant in the hole such that the top of the root crown is flush with the soil surface.
- Return native soil to the planting hole and push down firmly to remove any air pockets.

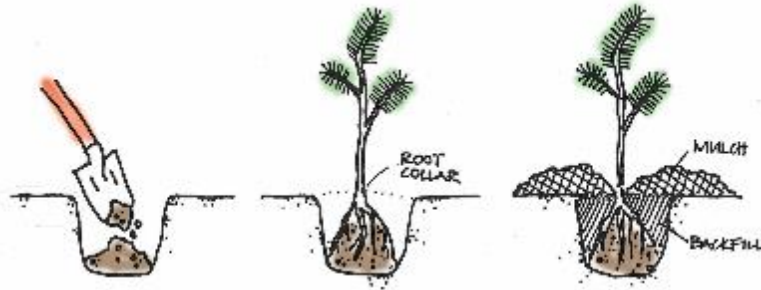


Figure 8: Bareroot plant installation diagram

- **Live Stakes**

- Insert into the soil such that one-half to two-thirds of the entire stake length is in the soil. Live stakes shall be a minimum of 18" in length unless otherwise specified by the Plant Ecologist.
- If soil permits, insertion may be accomplished without pilot holes as long as stakes are not damaged in the process. If necessary, pilot holes of the appropriate depth shall be made prior to insertion using a length of rebar.
- No watering or mulching required.
- Flag live stakes with appropriately colored forestry tape.

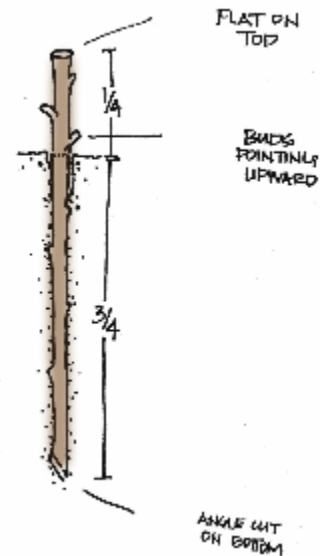


Figure 9: Live stake installation diagram

- **Emergent Bareroot Plugs**

- Keep plugs in their packaging until time of installation. Using a narrow-bladed shovel or trowel to make a slit in the soil, levering back and forth so that the plug will fit into the slit. Alternatively, make a pilot hole with a rock-bar, a piece of rebar, or a dibble tool, that is larger than the diameter of the plug.
- Insert the plug. Once properly inserted, tamp soil around the plug to eliminate large air gaps. Do not over compact.
- Do not flag the plants as the leaves are fragile. Flag the perimeter of the planting if determined to be necessary by Plant Ecologist.
- Only apply wood chips if directed to by Plant Ecologist. (See *Section 8. Wood Chip Mulch Application* below)
- Water the plant immediately using enough water to saturate the soil to a depth of 12" when directed in Scope or Work.

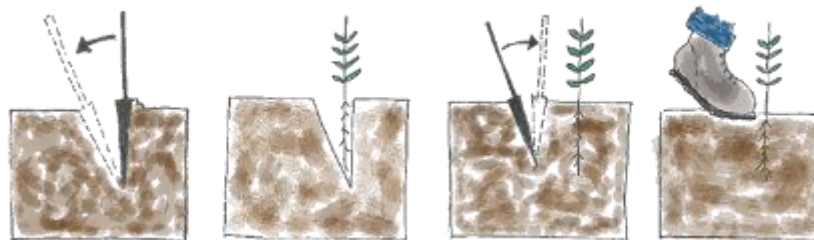


Figure 10: Emergent bareroot plug installation diagram

- **Fascines**

- Fascines can be constructed of live material if soil moisture is adequate to allow for growth. Fascines are bundled cuttings of live or dried branches/stakes. Build fascine by bundling alternately oriented cuttings so that diameter of the bundle is even throughout its length. Bundle shall be 6" to 8" in diameter, a minimum 6' long and made of cuttings ½" to 2" in width. Live cuttings shall be quick rooting materials (i.e. willow, cottonwood, dogwood).
- Dig a shallow trench that follows the contour of the slope and perpendicular to the runoff. The trench shall be deep enough to bury ¾ of the fascine below the soil surface. When digging the trench, place soil on the upslope. Any soil that is not replaced into the trench during installation will end up there through the course of gravity and surface runoff.
- If more than a single fascine is needed to run the length of the trench, overlap the fascines enough to eliminate gaps.
- Use stakes to anchor the fascines at intervals of 3-4 feet. Use standard, untreated wooden stakes or live stakes, 2-3 feet in length, and pound the stakes into the soil immediately down slope and angled slightly away from the fascine. For extra stability, pound tapered wood stakes through the middle of the fascine at a 45° angle to the slope, staggered between the down slope stakes.

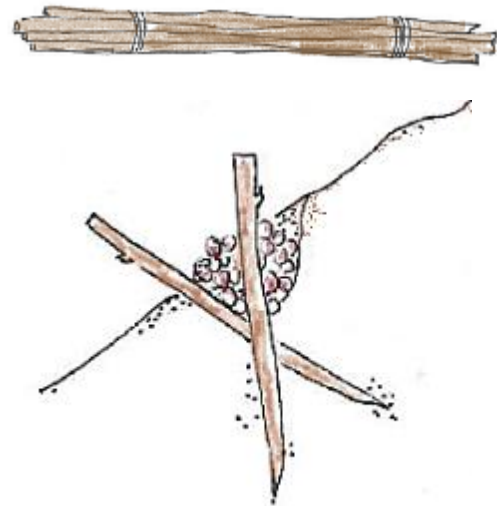


Figure 11: Fascine bundle and installation

- Shovel the soil back over the top of the fascine and into the trench and stomp it down well to work the soil through the fascine. Following backfilling, only the very top (10-15%) of the fascine shall be visible.

7.6. Plant Flagging

Flag the plant with 6" x 1" wide flagging tape attached to a lateral branch. Do not tie tape on the main stem. Use flagging color as indicated by the Plant Ecologist for the given planting season. Mark herbaceous plants with an appropriately colored flagging tape tied to a stick inserted into the ground adjacent to the plant as determined by the Plant Ecologist. For emergent bare root stock, do not flag the plants as the leaves are fragile. Plant material from expanded seed provenances shall be flagged with appropriate-colored flagging in addition to flagging for the season it was installed. Flag the perimeter of the planting if determined to be necessary by Plant Ecologist.

Section 7 Performance Measures:

- Plant material size and stock type as specified in Scope of Work or Specifications
- Plants staged and installed as specified
- All plants flagged unless otherwise specified
- Plants planted with root crown flush with soil level and according to details above.

8. Wood Chip Mulch Application

- Apply wood chip mulch to the top of the soil in a circle at least as wide as the roots, but not touching the stem. Spread 10 gallons of wood chips evenly to a depth of 4" to 6" around the base of the plant. Make sure that wood chips are not in contact with the stem or trunk of the plant.
- When working near a waterway, do not apply wood chip mulch below the ordinary high-water mark (OHWM). OHWM will be determined by Plant Ecologist. See CSSM for explanation of coir mat installation (refer to [CSSM BMP E1.15](#) pg=154).
- All wood chip mulch used in wetlands shall be free of weed seeds. Use chipped wood only.
- Apply wood chip mulch only in wetland areas that are under intensive weed pressure (weed seeds, roots, or rhizomes present in soil) or that dry out for longer than two months of the year. In areas with low or no weed pressure, or where soils retain moisture within the root zone for longer than ten months of the year, wood chip mulch shall be avoided.

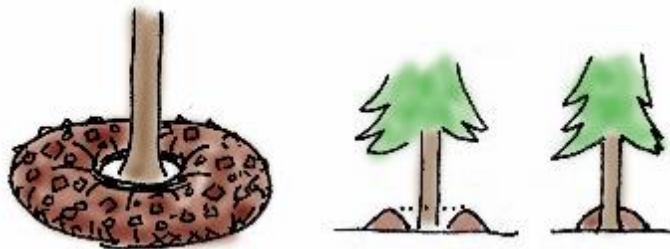


Figure 12: Mulch ring diagram

Section 8 Performance Measure:

- Wood chips installed as specified

9. Irrigation

9.1. Hand Watering

Apply a minimum of 2 gallons of water per plant per visit to recently planted native plants to achieve soil saturation to 12" depth.). Repair or replace any damaged or missing plant flagging. Measure, tally and record water use. Report water use per zone on GSP work logs.

9.2. Cistern Fill

Haul water to fill cistern water tanks. Inspect cistern systems for functionality and vandalism prior to filling. Repair and maintain tanks and irrigation tubing as needed. Keep lids and valves locked so that water may not be removed without Parks issued 2396 key. Parks will provide padlocks and tanks; all other parts and materials will need to be provided by contractor.

Section 9 Performance Measures:

- Apply water to achieve soil saturation to 12" depth and water use reported on work logs;
- Tank filled based on specified schedule
- Tanks and valves maintained in working order and lids and valves locked after filling; and,
- Equipment maintained graffiti-free

10. Reporting

Reporting requirements and timelines will be outlined in detail in the project Scope of Work. Contractors must submit work logs using the [GSP CEDAR website](#), pesticide records and other documentation at the same time as invoices before payment is processed. Key CEDAR information shall include but is not limited to the following information: Lead Agency - "Seattle Parks"; Blanket vendor contract number with the City, and work accomplished per Zone. There is no need to attach pesticide records to the CEDAR work log.

Section 10 Performance Measure:

- Invoices, worklogs and records submitted by 5th business day of the month for previous month's work completed