

Notes

Lined area for notes.

For more information contact the City of Seattle
Office of Environmental Management
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ENVIRONMENTAL STEWARDSHIP

These Guidelines are intended to provide a framework for environmental responsibility in how the City plans, designs, constructs, commissions, manages, and maintains the several thousand acres it owns in park lands, rights of way, and other landscaped areas. The focus of these Guidelines is on environmental stewardship of City-owned land. As such, they are not intended as comprehensive guidelines on all issues related to landscape planning and management.



The purpose of this document is to provide City staff and contractors:

- general guidance on implementing the City's Landscape and Grounds Management Policy and other relevant policies contained in the City's Environmental Management Program; and,
- an inventory of environmental stewardship issues to evaluate in planning, managing, and maintaining open spaces owned by the City.

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A Design Stage

A successful landscape requires comprehensive analysis and planning in a variety of areas. Many of these concepts are applicable to existing sites.

1. Assess and inventory physical site characteristics

- Soil stability
- Planting media
- Water table, existence of springs, sheet flow
- Grading and slope issues
- Construction staging issues
- Proximity to sensitive areas

2. Assess site usage characteristics

- Identify existing plants for retention and salvage.
- Sun /shade.
- Access and parking issues.
- Impacts on neighboring properties and vice versa.

3. Develop program theme

- Convene stakeholders including planning and construction team, program planning team, maintenance team and community representatives to form a vision of a design theme that meets expectations of all four interests.
- Assure stakeholder review with enough frequency to avoid significant mid-course correction.
- Specify monitoring milestones and responsible parties. Identify likely problem areas and budget for crucial monitoring at necessary levels.
- Specify that maintenance staff be properly represented in punch list development.

- Check with project manager to ensure that there are adequate staff and funds to support the degree of development and complexity of design.

4. Debrief completed project

- Assess lessons learned, right and wrong.
- Assist/coordinate solutions to unresolved issues.

B Drainage

Drainage systems are water-collection devices to manipulate the movement of water. Components of drainage systems occur in various forms, such as swales (natural or paved), area drains, and subsurface pipes that direct concentrated surface runoff into an underground network connected to the city's stormwater system.

Other forms of drainage, including gullies and sediment basins, serve to recharge the groundwater table or aquifer. Areas prone to landslides are identified in DCLU's Environmentally Critical Areas Folio.



Following are considerations in site drainage plan design:

- Minimize alteration of natural drainage patterns around existing vegetation that is to be preserved.
- Conform to natural drainage patterns.
- Provide opportunities for surface runoff of water to replenish the groundwater table.
- Minimize soil erosion by designing for even water flow across the ground surface.
- Reduce water velocity and increase soil permeability with plantings and mulch. On steep slopes or areas that are prone to landslides avoid using plants that require supplemental irrigation.
- Permanent irrigation systems should not be installed in landslide hazard areas.
- Implement erosion control devices as a form of preventative maintenance, e.g., slope protective material, protective berms, silt fences.
- Ensure plans for the drainage system include maintenance schedule and specifics.

I Record Keeping

Effective landscape management includes good record keeping. In time, the City will move to a database system to track landscape maintenance practices. In the interim, the following landscaping records should be kept:

- Pesticide and fertilizer applications: chemical name, brand name, area of application, amount and rate of application, and dates
- Pruning schedule
- Automatic irrigation clock settings, location of important structures such as main water shutoffs, and irrigation controllers
- Equipment inventories

J Training

Training permanent and seasonal employees on the basics of these Guidelines will help ensure that the Guidelines are understood and consistently followed.

1. All staff associated with the design, construction, and maintenance of City parks, rights-of-way, and other landscaped areas should receive an orientation to these Landscape Guidelines.
2. Gardeners and laborers (i.e., workers responsible for planting and maintaining plant beds, lawns, etc.) should receive training on:
 - An overview of Integrated Pest Management
 - Basic lawn care
 - Identifying weeds
3. Staff responsible for maintaining irrigation systems should receive training on:
 - Irrigation system maintenance and how to conduct audits
 - Basic lawn care

WATER BUDGET How much water for irrigation?

The following formula helps the irrigation professional estimate how much water should be used at a site per year, depending on the size and type of plant material. The water budget to be used is:

$$\frac{E_{to} \times E_{tadj} \times LA}{CF}$$

Where: E_{to} Reference Evapotranspiration (inches per year)
 E_{tadj} ET Adjustment Factor = KL/IE
 KL Average Landscape Coefficient
 IE Irrigation Efficiency
 LA Landscape Area
 CF Conversion Factor for CCF¹ = 1,200
¹ CCF = One hundred cubic feet of water, the billing unit used by Seattle Public Utilities. One ccf = 748 gallons.

South Seattle Community College 1998 Actual Irrigation Water Use 4,131 ccf

1998 water use if maximum efficiency:
 E_{to} 15.72 inches (70% Jefferson Golf Course ET)
 E_{tadj} 0.64
 KL04
 IE625
 LA 435,000 sq ft (10 acres)
 CF 1,200
 1998 Irrigation Water Budget 3,647 ccf
 Potential Water Savings (4,131 - 3,647) 484 ccf/yr

1998 ET, water budget by:			
Month	Percent	Inches	CCF
April	11.84%	1.86	431.97
May	12.25%	1.93	446.61
June	16.06%	2.53	585.86
July	20.12%	3.16	733.79
August	18.73%	2.94	683.03
September	13.64%	2.14	497.36
October	7.37%	1.16	268.96

EXAMPLE

G Automatic Irrigation Systems

Using irrigation water efficiently conserves water and reduces run-off. Irrigating City landscapes is one of the most publicly-visible landscaping activities, reinforcing the need for effective water management by departments.

- ❑ Develop a water budget for the site by identifying site irrigation needs based on use, plant needs, soil permeability, and topography. See next page, “Water Budget.”
- ❑ To achieve maximum efficiency, perform system maintenance and repairs.
 - use check valves to eliminate low head drainage
 - troubleshoot controller and field wire
 - Check for the following:
 1. misaligned heads
 2. sunken heads
 3. broken heads; repair bad seals, which cause flow-by
 4. proper valve function
- ❑ Set irrigation controllers based on Water Budget. Avoid irrigating in the heat of the day.
- ❑ Initially, monitor weekly to adjust scheduling to the most efficient regimen; observe for run-off.
- ❑ Once an effective schedule is established, it should be monitored bi-weekly to avoid “brown outs.” Clean heads at least once a year and preferably more often.
- ❑ Cut back on irrigation as weather indicates.
- ❑ Reduce irrigation in increments in late summer.
- ❑ Inspect backflow preventors annually consistent with state law.
- ❑ Conduct a complete system audit every five years.
- ❑ Create a permanent record system to allow resources to be used to “fine tune” the system rather than recreate it each year.



H Integrated Pest Management (IPM)

IPM is a decision making process to determine if, where, when, and how pest control practices should be applied (“pests” include insects, diseases, weeds, and animals.) IPM protects pests’ natural enemies to help keep pests in check, and it avoids unnecessary chemical use that may endanger human health and the environment.

- ❑ Routinely monitor populations of potential pests and their natural enemies to determine if and when pest control treatments are needed.
- ❑ Determine the acceptable aesthetic or economic injury levels.
- ❑ Employ physical, mechanical, cultural, biological, and educational tactics to keep pest numbers low enough to prevent intolerable damage or annoyance.
- ❑ Use chemical controls as a last resort, and use the least toxic chemicals.¹
- ❑ Any form of treatment should avoid disrupting natural pest controls present and should aim to suppress the pest population, not eliminate it. A portion of the pest population must remain to sustain natural enemies.
- ❑ If treatment is needed, treat only the area where the problem occurs.
- ❑ Only treat when information from monitoring shows that natural controls are not adequately suppressing the pest populations.
- ❑ Only treat when the pest is most vulnerable and natural enemies are in their least susceptible life stage.
- ❑ Use the most selective treatment possible to avoid initiating outbreaks of other pests and negative impacts on beneficial organisms.
- ❑ Evaluate treatment results.
- ❑ When pesticides are applied, signage should be prominently posted for at least 24 hours indicating the following: what area is affected, when the pesticide was applied, the specific pesticide used, and a phone number to call with questions.

¹ At this writing, a process to identify, define, and phase out undesirable pesticides is underway. When complete, the results of that process will supplement these guidelines.

C Plant Selection

In the context of these Guidelines, plant selection should be guided by four criteria:

1. Aesthetic and thematic schemes
2. Plant culture and environmental conditions
3. Maintenance impacts
4. Environmental issues

1. Aesthetic and thematic schemes

- Use of indigenous native plantings should be considered, especially in large areas.
- The full range of horticultural species and cultivars may be appropriate for high use, high visibility landscapes.

2. Plant culture and environmental conditions. It is essential that the cultural and environmental requirements of the plants be matched with the site conditions.

3. Maintenance impacts

Pruning. To avoid routine pruning, select plant cultivars based on their size and shape when mature. When specific site issues override pruning concerns and when associated resource impacts are identified, plant cultivars requiring frequent pruning may be considered. Plants such as forsythia and sheared hedges may be appropriate for specialty gardens and selected focal points.

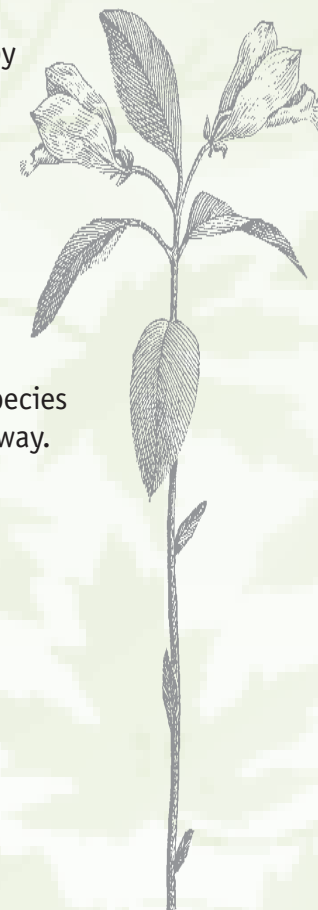
Plant pest management. Species and cultivars that are resistant to insect infestations and plant disease should be specified. Only in limited situations like the Rose Garden should exceptions occur. Existing tree plantings may need pesticide applications.

Weed management. Plant selection should embrace weed management principles. Vigorous groundcovers, shade canopies, and plant spacing are factors that can reduce the need for weed control.



4. Environmental Issues

- Provide native wildlife habitat when conditions indicate, such as when adjacent landscapes do provide habitat.
- Select plants with low water needs whenever feasible. Limit high water use plants to specialty plantings or where the natural water table will support the plants without supplemental irrigation; group plants with similar water needs together.
- Avoid plants that will require significant pest management. Select disease resistant cultivars and avoid insect prone species.
- Avoid plant species with invasive growth or seeding habits. English ivy (*Hedera helix*) shall not be planted except in containers. Landscape designs and purchase plans should be checked against the Washington State Department of Ecology and King County lists of noxious weeds.
- Prevent surface soil erosion by covering soil with plants or mulch.
- Plants with similar horticultural needs should be grouped together.
- The City Arborist should be consulted in selecting tree species intended for public rights of way.



D Plant Health

Following are guidelines for environmentally responsible maintenance of plant health.

- Plant in the fall, when feasible, to take advantage of fall and winter rains and to reduce the need for supplemental irrigation.
- Prior to planting, assess the soil conditions and amend the soil appropriately; include organic material.
- Test and monitor soil conditions regularly and modify practices accordingly.
- When replanting beds or turf areas, mature compost (about 20 percent by volume) should be incorporated to a depth of 8 to 12 inches or, preferably, the full rooting depth of the plants to be installed.
- Use only organic and slow-release fertilizers.
- Avoid over watering plants to conserve water and to improve plant health. Over watering is a primary cause of plant disease and demise.

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E Mulch

Use of organic material as a soil topping helps reduce evaporation; improves water infiltration; reduces run-off and erosion; enriches soil fertility and texture; and inhibits the growth of competing, nutrient-absorbing weeds. In addition, using wood chips generated on-site for mulch reduces the need to haul green-wastes, thereby saving energy. It should be noted that, where wood chips are used for mulch, nitrogen may need to be added (5 pounds/1000 square feet).

- Maintaining a 2-inch minimum layer of mulch in planted areas is recommended.
- A mulchless zone around the base of tree trunks is recommended to discourage root-rotting fungi.
- Wood chips should be used whenever appropriate. On-site chipping simplifies the maintenance process. Chips are effective, free, readily available, and have a natural look. Aesthetics may suggest other acceptable materials such as compost, shredded bark, Steerco, Groco, and Nutra Mulch.
- When purchasing mulch materials, they should be specified to be "weed and disease free."
- Unless disease problems are present, allow leaf litter to accumulate upon the soil within planted areas that are not intended to have a manicured appearance.



F Lawn Maintenance

Lawns are a key element of many City landscapes and are used for a variety of purposes. Lawn maintenance practices significantly affect the environment. The intended use of a lawn or turf area will determine many of the maintenance specifics. Healthy lawns can resist disease and drought damage and out-compete most weeds without reliance on chemicals. Properly maintained lawns also require less supplemental irrigation.



1. **Assess the condition of the lawn or turf. Look for turf density, percent weed cover, and color.**
 - Healthy lawns are a medium green color.
2. **To identify what changes in lawn maintenance may be appropriate, start by assessing the effectiveness of the existing maintenance schedule, including an evaluation of the following practices:**
 - mowing and edging
 - irrigating
 - fertilizing
 - hand weeding
 - pesticide applications
 - aerating
 - de-thatching

Consider whether acceptable results can be achieved at lower maintenance levels or significant improvements can be realized through minor program adjustments.

3. **Develop maintenance schedules incorporating the results of the assessment of each of the elements of 2, above. Use the following maintenance practices:**

- Mow high, mow often, and leave the clippings.
 - Set mowing heights to about 2 inches.
 - Mow at least weekly in spring.
- Fertilize lightly in the fall and late spring with a natural-organic or slow-release fertilizer.
- Water deeply to moisten the root zone, but water infrequently. Lawns newly planted in spring need frequent watering.
- Avoid using pesticides, quick release fertilizers and weed-and-feed.
- Leave a natural vegetation buffer along streams and lakes to filter pollutants.
- Do not use pesticides or soluble fertilizers near streams, ditches, wetlands, or shorelines.
- Aerate annually, in the spring or fall, to improve root development; high-use turf should ideally be aerated two to three times a year.
- During Smog Watch events declared by Puget Sound Air Pollution Control Agency, all mowing (except by electric machines) should be postponed.
- In late summer, avoid irrigating areas that are browned out. Seriously degraded turf can be improved with aeration, overseeding and top dressing with compost.