PARKING LOT
LANDSCAPE MAINTENANCE MANUAL

PREPARED FOR

PENINSULA COLLEGE

1502 East Lauridsen Blvd.
Port Angeles, Washington 98362

October 2010

Prepared by;
Nakano Associates
Landscape Architects
3609 S. Mt Baker Boulevard
Seattle, WA 98122
Phone:206.292.9392

Table of Contents

1. INTRODUCTION

1.1 PURPOSE

The purpose of this manual is to provide the maintenance staff at Peninsula College with a guide to maintaining the landscape and soils within the parking lot area.
It is a working and living document and is not intended to be a stand alone maintenance resource. Maintenance of the parking lot landscaping and stormwater facilities should be adaptive, adjusting in response to what is learned on-site and current industry best practices. For maintenance of stormwater related structures, please refer to the Stormwater Facility Operation and Maintenance Manual (KPFF Engineers, June 2010).

1.2 BACKGROUND

The landscaping at the parking lot was installed in the late summer of 2010.
The plantings consist of traditional planting beds with a combination of deciduous and evergreen trees, shrubs and perennials. There are also rain gardens and bio filtration swales that receive stormwater runoff from the paved areas within the parking lot. This system allows for detention and cleaning of stormwater by infiltration through the planting beds and soil before excess stormwater is discharged to the Port Angeles stormwater system.

The plant material is a combination of northwest native plant species and adapted plants that have been selected based on recommendations and project experience in Western Washington.
Rain gardens and swales are planted with species that are suitable for variable conditions. Plants on the bottom of the swales and rain gardens prefer and/or are tolerant of mild inundation. The side slopes of the swales and rain gardens typically has moist to dry soils, so these plants are drought tolerant and help stabilize the slope.

Hardiness zone:
Peninsula College is located in Hardiness zone 8b.

Weather:
PORT ANGELES, WASHINGTON
Period of Record Monthly Climate Summary

Period of Record : 7/ 1/1948 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	45.1	47.7	50.5	55.3	60.6	64.7	68.4	68.4	65.7	57.4	49.9	45.9	56.6
Average Min. Temperature (F)	34.0	35.5	36.9	40.1	44.8	49.0	51.7	51.7	48.8	43.3	38.1	35.2	42.4
Average Total Precipitation (in.)	4.02	2.73	2.18	1.34	0.96	0.86	0.55	0.80	1.10	2.62	4.15	4.25	25.57
Average Total SnowFall (in.)	1.7	0.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	3.8
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 98.6% Min. Temp.: 98.6% Precipitation: 98.8% Snowfall: 95.8% Snow Depth: 95.1%
Source: Western Regional Climate Center

Soil:
Existing top soils on site are part of the Clallam Series- moderately well drained soils consisting of gravelly sandy loam. Since the parking lot was previously all paved over, soils were imported for the landscape areas at the parking lot.
The planting mix used for the planting beds is a mix of 67% Sandy Loam soil mixed with 33% compost (by volume).
The planting mix used for the rain gardens and bio filtration swales are 30% compost and 70 % sand (by volume).

1.3 LONG TERM VISION

The long term vision for the landscaping at Peninsula College parking lot is to;
-provide a welcoming, attractive and lush entrance to the College for students, visitors and college staff.
-clean and reduce stormwater runoff from the parking lot before it enters the City of Port Angeles Stormwater System.
-have a "natural" character to the plantings, reflecting the unique location of the college with its close proximity to the Olympic Mountains and the Strait of Juan de Fuca.
-Minimize the heat island effect and increase habitat for birds and other wildlife.

Lush swales

Lush rain gardens

(photos from the High Point community in Seattle)

1.3.a. Succession

Succession refers to the more or less predictable and orderly changes in the composition or structure of a plant community. This means that over time the plantings will change as plant species grow and spread differently over time. Life expectancy varies between species and shaded areas will increase as the trees grow bigger.

Succession means that maintenance over time will have to change as the plantings mature. What to expect;
2-5 years; the ground cover and shrub plantings should fill in, minimizing the need for weeding.
5-15 years; some thinning and replacement of plants might be necessary.
>15 years; a well established lush and "mature" landscape, some plants will have fared better than others. Supplemental infill planting might be necessary.

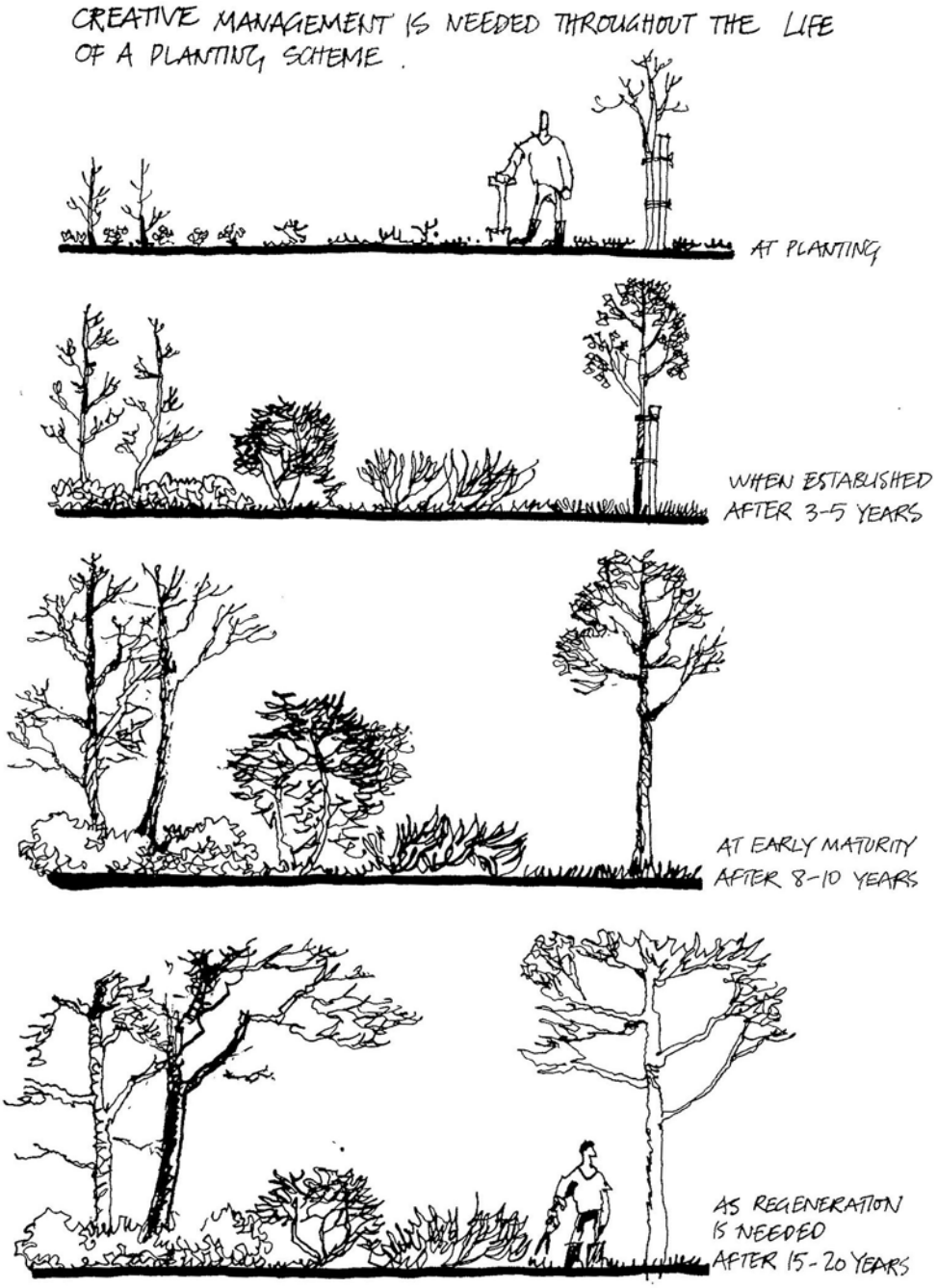

Image source; The Planting Design handbook

1.4 MAINTENANCE GOALS

Proper maintenance is vital for the long term survivability of the landscape and for adequate functioning of the stormwater facilities.

Maintenance goals;

-Support an attractive, safe and user-friendly landscape.
-Use sustainable methods to maintain the landscape.
-Protect and enhance the natural character of plantings.
-Minimize water waste.

1.4.a. Maintenance

See attached for a yearly maintenance schedule. Carry out maintenance in accordance with the schedule and the information contained below.

1.4.b. Maintenance Record Keeping

See attached for a maintenance log to be used for record keeping of maintenance activities.

LAURIDSEN BLVD.

ENNIS ST.

LAURIDSEN BLVD.

LAURIDSEN BLVD.

LIBERTY ST.

WET

WET

OHP

STD

STD

STD

STD

STD

STD

CONCRETE SIDEWALK

BPA
POWER
STATION

TELCOM VAULT

LEGEND

- LAWN
- MIXED LANDSCAPE
- RAIN GARDEN
- BIO FILTRATION SWALE

30 0 15 30 60

SCALE: 1" = 30'-0"

PENINSULA COLLEGE PARKING LOT
OCTOBER 2010

2. LANDSCAPE MAINTENANCE GUIDELINES

2.1 TREE AND SHRUB CARE

2.1.a. Irrigation

Establishment of landscaped areas will require regular irrigation during the growing season for 2-3 years. As the landscape becomes established the irrigation frequency might be reduced to one or two deep waterings per week with additional watering during periods of high temperatures (above 80 degrees). Adjust your watering to reflect weather changes. Plants typically need half as much water in June and September as July and August.

During the establishment period all trees and shrubs shall be watered by thorough deep watering at least every week during the dry season (usually May 15 to October 1) to keep the ground moist to a depth of at least 12 inches.
To keep the plants healthy and vigorous, and to prevent wilting;
-Irrigate approximately 1 inch of water per week.
-Irrigate trees and shrubs longer and less frequently rather than short and frequent events to promote deep root systems.
-Avoid irrigating during periods of heavy rainfall.

Irrigation Guides
See attached document
-Smart Watering

2.1.b. Pruning

Pruning of Deciduous Trees:
Prune trees during the dormant season to facilitate the following:
-To enhance the natural growth and shape of the plant.
-Maintain proper sight lines for vehicular and pedestrian circulation.
-To eliminate diseased or damaged growth.

Pruning of Coniferous Trees:
Prune only to eliminate diseased or damaged growth.

Pruning of Shrubs:
Prune shrubs during the dormant season.
Do not prune shrubs into ball shapes, and do not prune off lower branches.
Allow shrubs to spread and form masses to prevent weed growth below the shrubs.

Pruning Guides
See attached documents.
-Develop a preventive pruning program-Young Trees
-Develop a preventive pruning program-Mature Trees

Web links of interest;
http://hort.ufl.edu/woody/pruning.shtml
http://www.plantamnesty.org/pruning_guides/pg_northwest_pacific_maritime.htm

2.1.c. Fertilization

1. Fertilize in early spring and late spring, all recently established plants. Use a bridge-type fertilizer (part natural, part synthetic slow release) and follow manufacturer's recommendations for application rate. Provide three (3) pounds of nitrogen per 1,000 square feet.
2. Avoid applying fertilizer to root ball and base of main stem. Spread evenly under plant to drip line.

Tree fertilizers shall meet the following guidelines:
-Contains all natural ingredients.
-Use a deep root pressurized injection system.
Approved products may include:
Plant Health Care, MycorTree Injectable −
Plant Health Care (PHC) for Trees (select specific −
blend based on tree health, soil testing and location)

In mixed planted areas (shrubs, ground covers and perennials) use multi-purpose fertilizers.
Acceptable products include:
Hendrikus Organics, Complete 6-4-4 −
Nature Safe, Landscape Fertilizer 8-5-5 −
Walt's Rainy Pacific NW Blend 7-4-9 −

DO NOT USE FERTILIZERS IN RAINGARDENS OR BIOFILTRATION SWALES
USE CORN GLUTEN FOR ADDING NUTRIENTS.
See next section for information about Corn Gluten

2.1.d. Integrated Pest Management

Integrated Pest Management (IPM) is an environmentally sensitive approach to pest management. Pests include weeds, insect infestations and diseases that can plague the landscape. To control the pests, IPM relies on a combination of monitoring, prevention and control practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment. IPM takes advantage of all appropriate pest management options including, but not limited to, cautious use of pesticides.
IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions and controls. The US Environmental Protection Agency defines IPM in four steps, these are:

1. Set Action Thresholds
Before taking any pest control action, IPM first sets an action threshold, a point at which pest populations or environmental conditions indicate that pest control action must be taken. Sighting a single pest does not always mean control is needed. The level at which pests will either become an economic and ecologic threat or visual eyesore is critical to guide future pest control decisions.

2. Monitor and Identify Pests
Not all insects, weeds, and other living organisms require control. Many organisms are harmless, and some are even beneficial. IPM programs work to monitor for pests and identify them accurately, so that appropriate control decisions can be made in conjunction with action thresholds. This monitoring and identification removes the possibility that pesticides will be used when they are not really needed or that the wrong kind of pesticide will be used.

3. Prevention

As a first line of pest control, IPM programs work to manage the lawns and planting beds to prevent pests from becoming a threat. This should include using a variety of plant species and species that are pest resistant and attract beneficial insects and birds. It should also include building good soils with compost and other organic amendments that give plants the nutrients they need. A healthy plant is better able to resists insect pests and diseases.

4. Control
Once monitoring, identification, and action thresholds indicate that pest control is required, and preventive methods are no longer effective or available, IPM programs then evaluate the proper control method both for effectiveness and risk. Effective, less risky pest controls are chosen first, including highly targeted chemicals, such as pheromones to disrupt pest mating, or mechanical control, such as trapping or weeding. If further monitoring, identifications and action thresholds indicate that less risky controls are not working, then additional pest control methods would be employed, such as targeted spraying of pesticides. Broadcast spraying of non-specific pesticides is a last resort.

Weed Control
Keep basins and planting areas free of weeds. Remove weeds manually or by torch. Use broadcast herbicides only as a last resort and use approved natural herbicides.
Accepted products include;

-Vinegar based products (use great caution in handling!) such as;
Burn-Out

-Non-selective fatty acid soap based herbicides such as;
Safer brand fast acting Weed and Grass Killer

-Corn Gluten
Corn gluten is a natural corn by-product that adds nitrogen and suppresses weed seed germination. University researchers discovered that amino acid chains abundant in this material prevent the secondary roots from developing properly in germinating seeds. Therefore, it provides pre-emergent weed-control. It is effective with preventing germination on all kinds of seeds (it is non-selective).
Acceptable products include;
Walt's Organics −Organic Weed-Stopper Plus 10-0-1
http://www.waltsorganic.com/index.html

Insect and Disease Control
Maintain a reasonable control with approved materials, using IPM practices and least toxic methods.
The following biological controls are acceptable:
-Beneficial nematodes
Available from on-line suppliers; Select nematode species based upon target pest.
-The following natural/organic pesticides are acceptable:
Safer brand Insect Killing Soap II (OMRI Listed)
Safer brand Bug Patrol (OMRI Listed) (test for colorfastness before use on evergreens)
-The following natural products can be used to control aphids, cutworms, leaf-miners, whitefly and mites:
Neem oil
-The following natural products are approved to control mildew:
Neem oil
Vegetable oil
A 10:1 mix of water and milk

DO NOT USE PESTICIDES IN RAINGARDENS OR BIOFILTRATION SWALES

IPM Guides
See attached documents.
-Alternative pest & disease controls
-Pro IPM Fact Sheets

IPM Resources
City of Seattle Pesticide Reduction Program
http://www.cityofseattle.net/environment/pesticides.htm
US Environmental Protection Agency -Pesticides
http://www.epa.gov/pesticides/controlling/index.htm

2.1.e. Mulching

Mulch areas with locally obtained free of charge wood chip mulch, and maintain a 2" depth of mulch.

2.1.f. Trash removal

Remove trash in planting beds and parking areas on a weekly basis to maintain attractive appearance and ensure proper drainage.

2.1.g. Leaf Clean-up

Leaves in planting beds can be left in place depending on location and amount of leaves, especially when the trees are young and limited in size. The leaves will act as a natural mulch. Be sure to monitor the amount of leaves and remove leaves in planting beds if it seems detrimental to the plants.
Remove fallen leaves on paved surfaces and in planting beds where necessary once every two (2) weeks between the dates October 15 to December 15.
Prior to and after this time period, leaf litter shall be removed around building entrances and surface drainage structures on a once per month basis.

2.2 GROUND COVER AND PERENNIAL CARE

2.2.a. Irrigation

All groundcover and perennial beds shall be watered by thorough deep watering every week, or more often, during the dry season (approximately May 15 to October 1), to keep the ground moist at root-level, to keep the plants healthy and vigorous, and to prevent wilting. Refer to tree and shrub care section for further information.

2.2.b. Fertilizing

Refer to fertilizers listed in the tree and shrub care section.

2.2.c. Grooming

Deadhead flowering perennials after each species finishes flowering. Do not deadhead or cut back ornamental grasses until early spring. Clean up dead leaves and debris in the fall.

2.3 LAWN CARE

2.3.a. Irrigation

Water at such frequency as weather conditions require to replenish soil moisture below root zone (12 inch depth). A total of one (1) inch of water is needed weekly in hot, dry weather.

-Irrigate lawns longer and less frequently rather than short and frequent events to promote deep root systems.
- Avoid irrigating during periods of heavy rainfall.
- Set irrigation system timer so it runs during off hours (very early morning) to reduce conflicts with users.

2.3.b. Integrated Pest Management

Provide adequate level of weed control to maintain a healthy stand of grass. Refer to tree and shrub care section for further information.

2.3.c. Fertilization

Turf shall be fertilized with a natural, or bridge-type combination fertilizer (part natural, part synthetic slow release), 6-2-4, at the rate of 1 pound nitrogen per 1,000 square feet.
Acceptable brand is Nature Safe or similar product

2.3.d. Mowing and Edging

Mowing height of two (2) inches in warm weather and one and one half (1-1/2) inches during rainy season.
Trim lawn edges at least twice monthly or as needed for neat appearance. Do not leave clippings on paved areas.
Remove clippings from lawns and meadows and paved surfaces and dispose of off-site. If using a mulching mower, leave clippings in place in lawn and meadow areas. Do not allow buildup of mulch that is deleterious to health of lawn.

2.3.e. Seeding

Reseed, mulch, and repair any bare areas and washout in lawn areas.
Seed used for lawns at Peninsula College;

Earthcarpet Tuff Stuff Lawn Seed Mixture

29.80%	Transcend Intermediate Ryegrass
29.33%	SR4600 Perennial Ryegrass
24.14%	Zoom Perennial Ryegrass
SR5250	Creeping Red Fescure.

2.3.f. Lawn care resources

Web links of interest:
Ecologically Sound Lawn Care for the Pacific Northwest.
http://www.seattle.gov/util/groups/public/@spu/@csb/documents/webcontent/ecological_200312021255394.pdf

3. IRRIGATION

To encourage healthy plant growth both drought and over watering should be avoided. Monitor the plant and root system health and make adjustments to the irrigation schedule as needed.

3.1 IRRIGATION SYSTEM MAINTENENCE

Areas of dry patches, over saturated areas or other inconsistencies are a sign that the irrigation coverage needs adjustment.
Monitor irrigation heads, controllers, control valves and quick coupler valves for damage or improper function.
-Field monitor to insure that the irrigation system is operating properly.
-Repair irrigation system and keep operational at all times.

3.1.a Vehicular Damage

Maintain a record of locations of broken irrigation heads associated with vehicular damage.
-Where appropriate, install a half buried one-man rock to protect sprinkler head from vehicles.
-Where vehicles will continue to impact system, modify system layout.
-Relocate sprinkler heads further away from pavement.

4. ADDITIONAL RESOURCES

Fertilizer and Amendment Suppliers:

Walt's Organics −
http://www.waltsorganic.com/index.html
(206)783-6685 (phone)

Hendrikus Organics
www.hendrikusorganics.com/
(425) 392-9977

Nature Safe −
(800)252-4727
www.naturesafe.com

Plant Health Care −
(800)421.9051
www.planthealthcare.com

References:

Up By Roots- Healthy Soils and Trees in the Built environment by James Urban, ISA 2008
Sunset Western Garden Book, 2001 edition
High Point Community- Natural Drainage and Landscape Maintenance Guidelines, SVR Design 2010
The Planting design handbook by Nick Robinson Gower publishing 1994
US Environmental Protection Agency –Pesticides http://www.epa.gov/pesticides/controlling/index.htm

Peninsula College Parking Lot Maintenance Schedule

	Planting beds, swales and rain gardens										Lawns			
	Remove trash	**Remove leaf and branch debris**	**Trim planted areas along paved edges**	**Weed planted areas and swales**	**Groom perennials and grasses**	**Prune trees and shrubs**	**Irrigation system**	**Apply compost mulch**	**Add wood chips**	**Fertilize**	**Mow lawn**	**Trim lawn edges**	**Weed lawns**	**Aerate, Overseed and topdress lawn**
JANUARY	Weekly													Aerate every 3-5 years. Over seed as needed.
FEBRUARY	Weekly			1 time					After 1st weeding	Planting beds- 1 time in early spring. Lawn- 1 time late spring				
MARCH	Weekly			1 time							Start March 15 weekly	Start March 15 weekly	1 time	
APRIL	Weekly			As needed			System Start-up				weekly	weekly	1 time	
MAY	Weekly		1 time	1 time				1 time			weekly	weekly	1 time	
JUNE	Weekly			As needed	1 time					Planting beds- 1 time	weekly	weekly	1 time	
JULY	Weekly	As needed		1 time		Prune suckers					weekly	weekly	1 time	
AUGUST	Weekly	As needed		As needed	1 time						weekly	weekly	1 time	
SEPTEMBER	Weekly	As needed	1 time	1 time	1 time				After last weeding	Lawn- 1 time	weekly	weekly	1 time	
OCTOBER	Weekly	2 times 1 major leaf clean up					System Winterizing				Weekly End October 15	Weekly End October 15	1 time	
NOVEMBER	Weekly	As needed												
DECEMBER	Weekly													

Peninsula College Parking Lot Maintenance Log

Year:_____ **Record Keeper:**_____

	Planting beds, swales and rain gardens									Lawns				
	Remove trash	Remove leaf and branch debris	Trim planted areas along paved edges	Weed planted areas and swales	Groom perennials and grasses	Prune trees and shrubs	Irrigation system	Apply compost mulch	Add wood chips	Fertilize (includes lawn areas)	Mow lawn	Trim lawn edges	Weed lawns	Aerate, Overseed and topdress lawn
JANUARY														
FEBRUARY														
MARCH														
APRIL														
MAY														
JUNE														
JULY														
AUGUST														
SEPTEMBER														
OCTOBER														
NOVEMBER														
DECEMBER														