Guiding Principles & Sustainable Best Practices (Revised 2/2020)

STATEMENT OF PURPOSE

ecoPRO Sustainable Landscape Professional Certification is an advanced certification for professionals working in the landscape industry in Washington. It is administered by the Washington State Nursery & Landscape Association (WSNLA) to ensure a unified standard for sustainable practices within the horticultural industry that also enhances marketing, networking, and educational opportunities.

- Certified landscape professionals will have demonstrated knowledge of, and voluntarily practice, the sustainable best landscape practices presented in this document.
- Certified landscape professionals will be able to offer knowledgeable, enthusiastic, profitable, and environmentally sound landscape design, installation, and maintenance services. Participants' work will strive to have a positive impact on the environment and on their local Washington State community.
- The Program provides science-based information that promotes, guides, and informs ecological, sustainable landscape management.

ecoPRO sustainable best practices align as much as possible with existing business and site certifications. There are several sustainable certifications applicable to landscape businesses and sites in Washington State. Some of these include: EnviroStars—a certification for businesses that reduce their use and input of toxics in the environment; Sustainable Sites Initiative (SITES)—a national certification for landscapes designed, installed, and including a maintenance plan for sustainable practices; Salmon Safe—a land management certification for sites that protect water quality and preserve and restore habitat; the regional BuiltGreen, national LEED, and Living Building Challenge--green building certifications that include site development best practices; Greenroads—for road construction; Envision—for infrastructure projects; and Oregon Tilth's Organic Land Care accreditation program, which applies USDA National Organic Program agricultural standards and policies to landscapes.

BACKGROUND & ACKNOWLEDGEMENTS

Program standards and requirements were developed by a nine-person volunteer Advisory Committee in 2011-2012 with additional input by outside reviewers. The standards and requirements were updated in 2019. The Initial Advisory Committee, convened by WSNLA, Washington Association of Landscape Professionals, and Cascadia Consulting Group in 2011, was comprised of landscape professional leaders in the private and public sectors: designers, builders, maintenance professionals, horticulture educators, and growers. The Initial Advisory Committee members, as well as subsequent committee members, are associated with other relevant initiatives and professional organizations, including the regional EnviroStars certification program and national Sustainable Sites Initiative (SITES), Association of Professional Landscape Designers (APLD), Washington Chapter of the Society of Landscape Architects (WASLA), International Society of Arboriculture (ISA), Coalition of Organic Landscape Professionals (COOL), Washington Native Plant Society, Sports Turf Management Association (STMA), and Building Owner and Management Association (BOMA).

The Initial Advisory Committee had the overarching goals of developing a program that:

- Serves landscape professionals in Washington state;
- Addresses Washington state habitat, water quality, conservation, and toxics reduction issues;
- Holistically addresses the landscape; and
- Builds on existing programs.

The Initial Advisory Committee first reviewed existing organic and sustainable landscape certification programs in California, Oregon, British Columbia, Connecticut, and nationwide, with the goal of adopting and adapting policies, standards, and material. The committee chose to develop a menu of Sustainable Best Practices that encourage professionals to consider the whole landscape, from design to installation to maintenance over time. They designed the program as a second tier certification that builds on and does not duplicate existing basic horticultural education and certification opportunities. The program is geared to professionals who already have basic landscape horticultural knowledge, experience, and certification, and who serve a wide range of clients – from public to residential to commercial.

We want to acknowledge the following individuals and entities instrumental in the initial development of this program for Washington State:

Initial Advisory Committee
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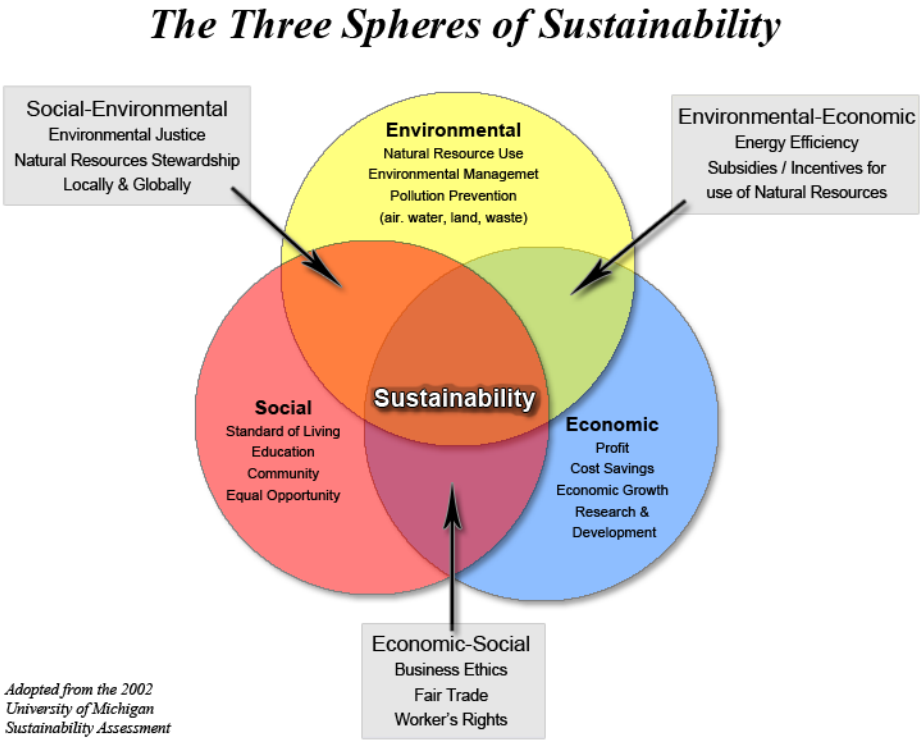
WSNLA Scholarship & Research Charitable Fund

GUIDING PRINCIPLES

United States Environmental protection Agency (from US EPA): www.epa.gov/sustainability):
Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly on our natural environment. Sustainability creates and maintains the conditions under which

humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations.

Brundtland Commission of the United Nations 1987: *Sustainability is defined as design, construction, operations, and maintenance practices that meet the needs of the present generation without compromising the ability of future generations to meet their own needs.*



Sustainable Landscaping is the work of designing, constructing, and maintaining landscapes to conserve and regenerate water, air, soil, plant, and wildlife resources, and protect and enhance human health and well-being. Sustainable practices focus on the environment of an ecoregion[1] while striving to be socially equitable and economically feasible.

Sustainable Landscape Practice is the use of ecologically sound principles to work in concert with natural ecoregional systems. It encourages working within closed systems with regard to organic matter and nutrient cycling. It aims to be pesticide-free. The goal of sustainable landscape practice is to design, construct, and maintain landscapes that will continue to be aesthetically pleasing, ecologically resilient, and enduring in the ecoregion in which they are located.

ecoPRO Certified Sustainable Landscape Professionals have passed an exam that tests their knowledge of sustainable landscaping principles and best practices. They abide by the ecoPRO Code of Conduct to design, construct, and manage landscapes using the most current, ecologically sound principles and practices. Where possible, ecoPRO certified professionals collaborate across the disciplines of design, construction, and maintenance.

[1] An "ecoregion" is an area that reflects broad ecological patterns occurring on the landscape. In general, each ecoregion has a distinctive composition and pattern of plant and animal species distribution. Abiotic factors, such as climate, landform, soil, and hydrology are important in the development of ecosystems, and thus help define ecoregions. Within an individual ecoregion, the ecological relationships between species and their physical environment are essentially similar. Washington State is generally considered to encompass nine ecoregions. http://www.landscope.org/washington/natural_geography/ecoregions/

ecoPRO SUSTAINABLE BEST PRACTICES

(Revised 12/2018)

This section outlines Sustainable Best Practices for landscape design, construction, and maintenance. The best practices are organized around **eight key principles**:

- Protect and Conserve Soils
- Conserve Water
- Protect Water and Air Quality
- Protect and Create Wildlife Habitat
- Conserve Energy
- Sustain Healthy Plants
- Use Sustainable Methods and Materials
- Protect and Enhance Human Health and Well-being*

**Human Health and Well-being BMPs are blended into all the BMP sections.*

HOW TO USE

The tables of best practices on the following pages present choices for sustainable landscaping that a professional may apply to each site, as appropriate. The understanding is that every site and situation is unique.

Best practices designated with a *diamond (♦)* indicate a "core" best practice that ecoPRO certified professionals should employ on all sites, where applicable. Since many practices conform to multiple principles, the right-hand columns cross-link the practices to the applicable principles. There is some duplication of best practices.

Underlined terms are defined in the Glossary located at the back of the book.

PROTECT AND CONSERVE SOIL

Key concepts: soil protection zones, soil management plans, amending soils, mulching, mulch-mowing, composting, managing stormwater runoff and erosion, minimize soil disturbance, closed system management

Protect & Conserve Soil

DESIGN

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
1.	**Identify and map soil characteristics of landscape site**								
☐	♦Perform a soil test and analysis to inform design and management decisions	X	X				X		
☐	♦Designate soil protection, disturbance, and other construction management areas on a Soil Management Plan (See requirements in Washington State Stormwater Management Manual in "Sources" at end of this document)	X					X		
☐	Test soil drainage in several locations	X	X				X		
☐	Define the location and boundaries of all vegetation and soil protection zones	X					X		
☐	Design the landscape with designated onsite recycling areas	X				X		X	X
2.	**Review site grading specifications for accuracy**								
☐	♦Limit overall cut and fill through efficient design and layout	X			X	X		X	X
☐	♦Limit vegetation clearing to avoid soil erosion and compaction	X			X		X		
☐	Retain natural topographic features that slow and store stormwater flows and limit steep, continuous slopes	X		X					

CONSTRUCTION

1.	**Use the least invasive construction methods and tools and site sensitive construction methods**								
☐	♦Protect soil from compaction, wherever possible	X		X			X		X
☐	♦Minimize major grading, soil disturbance, and compaction	X					X	X	
☐	♦Avoid creating soil interfaces when preparing soils for planting	X					X		
☐	♦Prevent loss of onsite and stockpiled soils from stormwater runoff and wind erosion	X						X	
☐	♦Restore disturbed/compacted soil with compost amendment	X						X	
☐	Perform grading operations during the low rainfall seasons	X		X					X
☐	Avoid handling and installing saturated soils, especially during wet weather	X					X		
☐	Use heavy equipment fitted with flotation tires or wide tracks that distribute heavy loads	X		X			X		X

Protect & Conserve Soil

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
☐	Prevent concrete waste and materials washout into adjacent properties and waterways	X		X				X	X
2.	**Protect tree root zones**								
☐	♦Define and fence off the tree root protection zone. If access is necessary cover zone with 4-6 inches of coarse wood chips, crushed rock, or with metal plates (See ANSI 300 tree protection standards and "Tree Protection on Construction and Developments Sites" in the "Sources" at end of this document)	X	X				X	X	
3.	**Reduce import and export of earth materials**								
☐	♦Remove and stockpile existing topsoil before grading, for reuse onsite	X						X	
☐	♦Improve existing soil as an alternative to importing topsoil	X				X	X	X	X
☐	♦Inspect imported topsoils and soil amendments to verify specifications are met	X						X	
☐	Identify an area to store topsoil during construction	X						X	
☐	Reuse organic debris onsite, or recycle at a composting facility	X				X		X	X
4.	**Prepare or amend soil to maximize water holding capacity and drainage**								
☐	♦Amend soils over entire planting area with 2-4 inches of <u>compost</u> tilled to a depth of 8-12"	X	X	X			X	X	X
☐	♦Install topsoils properly by ripping in the first lift (layer) to mix into existing native soil	X	X	X			X	X	X

MAINTENANCE

1.	**Build healthy soils**								
☐	♦Perform a soil test and analysis when analyzing problems or when renovating landscapes	X					X	X	
☐	♦Maintain 2-4 inches of large particle size organic mulch over the surface of soil	X	X	X			X	X	X
☐	♦Apply organic <u>mulches</u> a few inches from the base of trees and plants and extending at least to the dripline	X	X	X			X	X	X
☐	♦Use <u>compost</u>, compost tea, or other amendments to establish beneficial soil organisms and release nutrients over the long term	X	X	X			X	X	X
☐	♦Use organic recycled materials onsite by mulching, mulch-mowing, and composting	X				X	X	X	X
☐	Sow nitrogen fixing or deeply rooted cover crops to improve soils and limit erosion, then till these in before seed set.	X	X	X			X	X	X
☐	Allow fallen leaves to remain as <u>mulch</u> in landscaped beds and natural areas	X				X	X	X	X
☐	Assess and apply <u>compost</u> and/or mulch to landscaped beds annually or as needed	X	X	X			X	X	X
☐	Avoid practices that degrade soil fertility and biodiversity	X	X	X			X		X
☐	Avoid synthetic barriers or <u>mulches</u> that prevent or inhibit natural biodegradation of organic matter	X		X		X	X	X	X

Protect & Conserve Soil

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
2.	**Address problem drainage areas with appropriate drainage solutions**								
☐	Keep debris and leaves away from storm drains	X		X					X
☐	Replant with plants adapted to wet conditions	X		X			X	X	
☐	Mechanically aerate and top dress turf soils as needed	X		X			X		X
☐	Use power augers, water jets, or air spades to create holes in compacted tree and shrub root zones and fill with compost	X		X			X	X	X
3.	**Create a sustainable plant nutrient management program**								
☐	♦Base nutrient management programs for turf, trees, and shrubs on soil tests, tissue analysis, and clear indication of need	X		X	X	X	X		X
☐	♦Base any application of phosphorus on soil test indicating plant need	X		X			X	X	X
☐	♦Use naturally derived fertilizers from organic sources such as blood or bone meal, alfalfa, fishmeal, kelp, and natural minerals that slowly release nutrients over a 1-to-4 month timeframe	X		X	X	X	X	X	X
☐	Schedule fertilization for site conditions, plant needs, and dry weather	X		X			X		X
☐	Select fertilizers that contain 30% or more of the nitrogen in slow release form	X		X		X	X	X	X
☐	Follow fertilizer label rates and schedule recommendations	X					X		
☐	Apply mycorrhizal inoculants, as appropriate	X	X				X		

CONSERVE WATER

Key concepts: irrigation water conservation, irrigation system/design/maintenance efficiency, certified designers, sustainable irrigation materials, water budget, conservation/weather-based irrigation management, water use monitoring and auditing

Conserve Water	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
DESIGN								
1. Map and assess site hydrology								
♦Map hydrozones, existing plantings, and soil types	X	X	X			X		X
♦Map topography and drainage		X	X			X		X
2. Design high-efficiency irrigation systems								
♦Design watering systems with zones to match plant water needs		X	X			X		X
♦Specify smart controllers that are weather-based or add soil moisture sensors		X	X			X	X	X
♦Include irrigation system controller and maintenance instructions in a Landscape Management Plan		X				X	X	X
Specify rain shut-off sensors		X	X			X	X	X
Specify system monitoring features such as flow meters		X				X	X	X
Specify that irrigation designs be prepared or reviewed by an Irrigation Association certified irrigation designer		X					X	X
Specify non-PVC pipe such as PEX or HDPE for irrigation systems		X	X		X		X	X
3. Maximize use of onsite water conservation options								
♦Specify water supply systems for the period of planting establishment		X				X		
♦Design with drought tolerant and low water use plants that require no or minimal irrigation		X				X	X	
Collect rainwater for onsite graywater use (check with local regulatory agencies)		X	X				X	X
Design recycling water features		X						
Design drip irrigation systems for maximum efficiency		X	X			X	X	X
CONSTRUCTION								
1. Install automatic irrigation systems as designed								
♦Follow industry best practices for installation		X					X	
♦Audit system at installation to ensure uniform coverage and verify application rates		X	X			X		X

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
Conserve Water									
☐	Pressure test lines and test controllers		X					X	
MAINTENANCE									
1.	**Develop a <u>water budget</u> and multi-year watering plan to guide irrigation scheduling**								
☐	♦Plan to adjust watering after plant establishment period (1-3 years)		X				X	X	
☐	♦Test and repair irrigation systems at start of each season and by draining at end of season		X					X	
☐	♦Set and adjust irrigation schedules as needed to minimize evaporation and overwatering		X	X			X		X
☐	♦Set and adjust irrigation schedules for seasonal weather conditions, site characteristics, edible crops and vegetation water needs		X	X			X		X
2.	**Monitor and maintain systems for best performance and efficiency**								
☐	♦Monitor irrigation regularly for broken heads, leaks, runoff, and uniform distribution, and repair irrigation problems promptly		X	X			X	X	
☐	Maintain and analyze irrigation water consumption records to find leaks and to maximize opportunities for efficiencies		X	X			X	X	
3.	**Improve system efficiency with conservation features**								
☐	Add <u>smart controllers</u>		X				X	X	
☐	Add <u>rain shut-off sensors</u>		X				X	X	
☐	Add flow sensors or flow management detection devices		X				X	X	
☐	Use Pressure regulation devices		X				X	X	
4.	**Manage plantings with irrigation**								
☐	♦Manage water use for plant health and best root development		X				X		
☐	♦Group plants into <u>hydrozones</u> by water needs and drought tolerance		X				X		
☐	♦Apply organic <u>mulches</u> a few inches from the base of trees and plants and extending at least to the dripline	X	X				X	X	
☐	Irrigate turf to deeper depths while watering less frequently		X	X			X	X	X
☐	Maintain low-traffic turf areas for no/minimal irrigation, allowing them to go dormant in summer		X	X		X	X		X
☐	Reduce turf area where possible, to reduce water, fertilizer, and maintenance inputs	X	X	X				X	X
☐	Use soaker hoses or inline drip irrigation under mulches, where appropriate		X	X			X	X	
5.	**Manage irrigation for edible crops**								
☐	Exercise caution with using unfiltered, harvested rainwater for irrigating edible food crops		X					X	X

PROTECT WATER AND AIR QUALITY

Key concepts: Green Stormwater Infrastructure (GSI), Low Impact Development (LID), onsite water infiltration/dispersion, prevent erosion, air movement, sound absorption, carbon cycle

Protect Water and Air Quality

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
DESIGN									
1.	**Minimize water runoff**								
☐	♦Design Green Stormwater Infrastructure (GSI) features that direct runoff into compost-amended soil/vegetated areas, swales, rain gardens and bioretention cells, pervious paving, cisterns, rain barrels, and vegetated roofs – check with regulatory agencies (See "LID -Low Impact Development Technical Guidance Manual" in "Sources" at end of this document.0	X	X	X					X
☐	♦Minimize impervious surface area	X		X			X		X
☐	Avoid materials specifications for roofs and other impervious surfaces that contain toxins or release pollutants, including treated wood, copper, or zinc anti-moss strips	X		X	X			X	X
☐	Specify bio-engineering and other "soft" methods to manage stream bank and slope erosion	X		X	X	X		X	X
☐	Avoid use of concrete bulkheads or other hardscape solutions to manage erosion	X		X	X			X	X
2.	**Improve air quality and sound absorption and reduce fuel use**								
☐	♦Specify paints, sealants, and coatings that emit low levels of volatile organic compounds (VOCs)	X		X	X	X		X	X
☐	♦Source local materials to reduce transportation			X		X		X	X
☐	Design with consideration for existing and desirable air flow patterns			X	X		X		X
☐	Select and locate plants and hardscape features to encourage air flow and sound absorption			X	X		X		X
☐	Specify existing site materials to reduce transportation			X		X		X	X
☐	Design for minimal power tool use in construction and maintenance			X		X		X	X
CONSTRUCTION									
1.	**Prevent erosion before and during construction**								
☐	♦Avoid draining, disturbing, or filling wetlands	X	X	X	X		X		X
☐	♦Cover bare soils and maintain throughout construction with tarps, wood chip mulch, compost blankets, and/or compost filter socks	X	X	X				X	X
☐	Maintain all soil covers during construction	X	X	X				X	X
2.	**Maximize on-site water infiltration and detention capacity**								
☐	♦Prepare and/or amend soil to maximize water-holding capacity and drainage	X	X	X			X		

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
Protect Water and Air Quality									
☐	♦Install Low Impact Development (LID) and Green Stormwater Infrastructure (GSI) features	X	X	X		X		X	X
☐	♦Ensure final grades direct rainfall runoff to spread and disperse into soil, swales, and other Green Stormwater Infrastructure (GSI)			X					
☐	Avoid creating drainage to neighboring properties	X	X	X	X		X		X
3.	**Reduce fuel use and noise pollution**								
☐	♦Use energy-efficient equipment and power tools	X		X		X		X	X
☐	♦Maintain all equipment and tools in optimal working condition	X		X		X		X	X
☐	Use hand tools as appropriate	X		X		X		X	X
☐	Reduce the need for landscape supplies and materials that require factory processing and transportation	X		X		X		X	X
MAINTENANCE									
1.	**Use closed system management**								
☐	♦Recycle and compost organic waste and reuse landscape materials on site			X		X	X	X	X
☐	♦Maintain all onsite stormwater infiltration, Low Impact Development (LID), and other Green Stormwater Infrastructure (GSI) to WA Dept of Ecology standards (See "LID Manual")	X		X	X		X	X	X
☐	Maintain pervious paving by keeping it free of debris and vacuuming at least once per year			X	X			X	X
☐	Improve/enhance a plant's ability to process CO2 and pollutants on site	X		X			X	X	X
2.	**Minimize point source pollution into stormwater**								
☐	♦Base nutrient management inputs for turf trees, and shrubs on soil tests, tissue analysis, and clear indication of need			X			X	X	X
☐	♦Minimize or eliminate use of chemical pesticides	X		X	X	X	X	X	X
☐	♦Minimize use of synthetic fertilizers	X		X	X	X	X	X	X
☐	Avoid contaminating water with soluble landscape chemicals, oil, cleaners, etc.			X	X			X	X
3.	**Minimize air and noise pollution**								
☐	♦Maintain vehicles, equipment and power tools in optimal working condition to prevent fuel, hydraulic fluids and oil drips, leaks, and spills	X		X	X	X		X	X
☐	♦Use energy-efficient equipment and power tools	X		X		X		X	X
☐	Use 4-cycle power gasoline powered equipment	X		X		X		X	X
☐	Avoid use of 2-cycle gasoline-powered equipment	X		X	X	X		X	X
☐	Use electric, propane, or natural gas-powered equipment	X		X		X		X	X
☐	Choose cultural maintenance strategies and hand tools	X	X	X	X	X	X	X	X

Protect Water and Air Quality

	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
☐ Avoid burning piles of organic waste material	X		X	X			X	X
☐ Maintain appropriate air movement and circulation in the landscape			X			X		X
☐ Prune to optimize air flow for plant and human health			X			X		X
☐ Implement management practices based on an understanding of the carbon cycle	X	X	X	X		X		X

PROTECT AND CREATE WILDLIFE HABITAT

Key concepts: protect/conserve/build/enhance biodiversity and wildlife habitats

Protect and Create Wildlife Habitat

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
DESIGN									
1.	**Prioritize designs that improve or create healthy habitats for native wildlife**								
☐	♦Survey, conserve, and protect existing native wildlife and their habitats	X		X	X		X		X
☐	♦Design landscape to provide food, water, and shelter for native wildlife				X				
☐	Minimize high-maintenance landscapes with less habitat for native wildlife	X	X	X	X	X	X	X	X
☐	Preserve existing mature trees and other vegetation that provides functional wildlife habitat	X		X	X		X		X
☐	Retain wetlands and existing natural areas	X		X	X		X		X
2.	**Use local native <u>plant communities</u> as models to support biodiversity**								
☐	Plan for natural evolution of the landscape and habitat changes				X				
☐	Plan for adaptive management in response to wildlife impacts and modification of landscapes				X				
CONSTRUCTION									
1.	**Protect onsite wildlife habitat**								
☐	♦Protect existing habitat including wetland areas and landscape features	X	X	X	X		X		X
☐	♦Minimize impacts to existing desirable vegetation during construction activities				X		X		
☐	Create and manage refuge areas for wildlife during construction				X				
2.	**Construct wildlife habitat**								
☐	Create shelter sources, such as brush and rock piles from landscape waste				X	X		X	
☐	Create water sources				X				
☐	Plant vegetation food sources for specific native wildlife				X				
MAINTENANCE									
1.	**Maintain and enhance sources of food, water, and shelter for native wildlife**								
☐	♦Survey, conserve, and protect existing habitat for native wildlife				X				
☐	♦Schedule maintenance tasks to avoid disturbing native wildlife and their habitats				X				
☐	♦Preserve and plant native vegetation to enhance native wildlife diversity	X		X	X		X		
☐	Avoid cultivation of landscaped areas to retain soil organisms and soil habitat				X				

Protect and Create Wildlife Habitat

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
☐	Avoid disturbing wildlife habitat during critical times in the wildlife cycle (e.g. nesting seasons)				X				
☐	Minimize pruning to enhance habitat				X				
☐	Create brush and rock piles from landscape waste				X	X		X	
☐	Maintain water sources				X				
☐	Maintain shelter sources, such as brush and rock piles				X				
☐	Avoid premature removal of flowers, stems, and seed heads that provide a food source or habitat for wildlife				X				
2.	**Look for opportunities to create habitat**								
☐	♦Allow decomposition of organic matter on the surface of garden beds as natural mulch to protect and build habitats for amphibians, insects and arachnids		X	X	X		X	X	
☐	♦Maintain habitat for <u>pollinators</u> and biological predators				X		X	X	X
☐	Convert dead or declining trees to habitat snags for cavity-nesting birds and other wildlife				X	X			
3.	**Practice <u>Integrate Pest Management (IPM)</u> and <u>Plant Health Care (PHC)</u>**								
☐	♦Eliminate or reduce the use of pesticides harmful to wildlife	X	X	X	X	X	X	X	X
☐	♦Create diversity in landscapes to encourage natural, biological pest control processes				X	X	X		X

CONSERVE ENERGY

Key concepts: embodied-energy, low energy use materials/features, fuel efficient equipment/power tools, vehicle fuel reduction, manual tools and methods

Conserve Energy

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
DESIGN									
1.	**Design low-energy use landscapes**								
☐	♦Select site-appropriate turf and plants to minimize power tool use for mowing, shearing and pruning maintenance	X	X	X	X	X	X	X	X
☐	♦Design with plants and hardscape materials that minimize adjacent buildings energy consumption (heating, cooling, natural lighting)					X		X	X
☐	♦Consider the sustainability of manufacturing and transportation when specifying plants and hardscape materials		X		X	X		X	X
☐	♦Specify efficient lighting systems by using solar, low-voltage and LED fixtures, photo cells, and timers					X		X	X
☐	Purchase plants and landscape materials from manufacturers whose practices increase energy efficiency					X		X	X
☐	Specify features designed to mitigate the Heat Island Effect in urban areas		X		X	X		X	X
☐	Specify low embodied-energy materials				X	X		X	X
☐	Design for minimal use of energy in landscape construction					X		X	X
CONSTRUCTION									
1.	**Use energy-efficient vehicles, power tools, and heavy equipment**								
☐	♦Maintain all vehicles and equipment in optimum working condition	X		X		X		X	X
☐	Select battery-powered, electric, propane, or other alternative energy power tools	X		X		X		X	X
2.	**Use hand tools**								
☐	Choose hand tools when practical for construction tasks	X		X		X		X	X
MAINTENANCE									
1.	**Allow minimal use of equipment and power tools**								
☐	Choose and use hand and mechanical tools	X		X		X		X	X
2.	**Minimize energy and fuel use and optimize fuel efficiency**								
☐	♦Optimize landscape contribution to adjacent building energy conservation (heating, cooling,					X		X	

Conserve Energy

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
☐	natural lighting)								
☐	♦Schedule landscape maintenance and related activities to minimize miles driven	X		X		X		X	X
☐	Purchase plants and landscape materials from manufacturers whose practices increase energy efficiency	X		X		X		X	X
☐	Choose low-emissions equipment, such as electric, propane, or natural gas	X		X		X		X	X
☐	Choose and use four-cycle gasoline-powered equipment	X		X		X		X	X
☐	Choose vehicles and equipment that prevent air pollution	X		X		X		X	X
☐	Avoid use of two-cycle gasoline-powered equipment	X		X		X		X	X

SUSTAIN HEALTHY PLANTS

Key concepts: Right plant/right place, low input landscapes, no pesticide use, Integrated Pest Management, Plant Health Care, Human health issues

Sustain Healthy Plants

DESIGN

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
1.	**Use sustainable selection and purchasing practices**								
☐	♦Specify locally produced, propagated, and sourced plant material and seed					X	X	X	X
☐	♦Purchase plants/seed when possible from sources that certify sustainable production and business practices	X	X	X	X	X	X	X	X
☐	Specify organic seed and plant stock when possible	X	X	X	X	X	X	X	X
2.	**Design landscape plantings appropriate for the site, climate, and ecoregion**								
☐	♦Incorporate and protect existing thriving plants and trees where possible and desirable	X	X	X	X		X		X
☐	♦Design plantings to encourage maximum soil coverage	X	X				X		
☐	♦Specify plants needing minimum inputs for water, fertilizer, pruning, and other maintenance needs	X	X	X	X	X	X	X	X
☐	♦Specify native, climate-adapted, or other low water use plants that require no or minimal irrigation		X		X		X	X	X
☐	Use natural communities as a guide to group plants by cultural needs		X		X		X		
☐	Reduce turf area where possible, to reduce water, fertilizer, and maintenance inputs	X	X	X				X	X
☐	Select turf varieties labeled by the Turfgrass Water Conservation Alliance (See “Sources”)		X	X			X		X
3.	**Design landscape plantings appropriate for the site and climate**								
☐	♦Place plants in the proper location to prevent poor performance		X				X		
☐	♦Regularly consult the local Noxious Weed List for plants to avoid in the landscape design	X	X	X	X	X	X	X	X
☐	♦Specify disease and pest-resistant plants	X		X		X	X	X	X
☐	Avoid use of non-native plants in natural areas or areas directly adjacent to high quality natural areas				X		X		
☐	Specify weed-free nursery stock	X		X	X		X	X	X
☐	Specify locally produced, propagated, and sourced plant material and seed					X	X	X	X

Sustain Healthy Plants

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
4.	**Develop a Landscape Management Plan, including Plant Health Care (PHC) and Integrated Pest Management (IPM), to guide annual and future maintenance**								
☐	♦Develop a Landscape Management Plan to guide maintenance activities	X	X	X	X	X	X	X	X
☐	♦Design and plan for plant growth, species longevity, and succession during the life of the landscape	X	X	X	X	X	X	X	X
☐	Encourage plant biodiversity, especially plants native to an ecoregion, and use plants that attract beneficials and biological pest predators				X		X		
☐	Survey for known pests, noxious weeds, and invasive species on site	X		X	X		X		X

CONSTRUCTION

1.	**Protect existing trees and vegetation**								
☐	♦Follow best management practices to protect existing trees and other plants during construction (see Tree Protection Handbook at http://pnwisa.org)	X	X	X	X		X		X
2.	**Select and install healthy plants**								
☐	♦Inspect all vegetation for health, pests, and diseases				X		X		
☐	♦Install plants properly (ecoPRO Required Reading, Version 2, Chapter 8 "Managing Trees, Shrubs, and Beds Sustainably", pages 157-160, "The Planting Hole")						X		
☐	♦Use local, reputable nurseries as sources for plants			X		X	X		X
☐	♦Monitor, water and protect plant material until installation					X	X		X
☐	♦Make planting adjustments in the field based on actual site conditions		X				X		
☐	♦Remove and replace non-site-adapted, pest-susceptible plants and noxious weeds	X	X	X	X	X	X	X	X
☐	Inspect plants that are field-grown and container grown for proper root mass and development appropriate to the size of the plant (See ANSI Z60 – American Standard for Nursery Stock in "Sources" at end of this document)						X		
☐	Use the most appropriate materials to create ideal habitat for chosen trees and plants						X	X	
☐	Avoid placing edible plants in contact with known toxic materials, such as treated wood						X		X
☐	Avoid using non-organic seeds and plants if organic choices are available			X		X	X		X

MAINTENANCE

1.	**Maintain and update a Landscape Management Plan to guide annual and future maintenance practices**								
☐	♦Maintain and update a Landscape Management Plan to guide annual and future maintenance practices	X	X	X	X	X	X	X	X

Sustain Healthy Plants

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
2.	**Manage all landscapes to be healthy and functioning ecosystems that maximize plant health and diversity**								
☐	♦Practice Plant Health Care (PHC)	X	X	X	X	X	X	X	X
☐	♦Avoid use of synthetic fertilizers	X	X	X	X	X	X	X	X
☐	♦Encourage plant establishment and continuing health by appropriate watering and mulching	X	X		X		X	X	X
☐	♦Remove and replace diseased or failing plants with resilient or more site-appropriate selections		X	X		X	X	X	X
☐	♦Avoid use of combination pesticide and fertilizer products	X	X	X	X	X	X	X	X
☐	♦Avoid use of synthetic mulches, such as rubber	X	X	X	X	X	X	X	X
☐	♦Prune properly to maintain the natural form of the plant				X				
☐	♦Apply organic mulches a few inches from the base of trees and plants and extending at least to the dripline	X	X		X		X	X	
☐	Manage water use for plant health and deepest root development	X	X	X			X		X
☐	Minimize disturbance of naturally occurring beneficials, such as biological predators and other natural control mechanisms				X		X		
☐	Fertilize plants with natural, organic products for healthy growth and flower/fruit production	X	X	X	X	X	X	X	X
☐	Thin or transplant overplanted material as needed to allow room for growth and air circulation						X		
☐	Avoid shearing plants	X	X	X	X	X	X	X	X
☐	Avoid off-target impacts to plants, animals, birds, fish and humans while applying pesticides	X	X	X	X	X	X	X	X
3.	**Use sustainable lawn care practices**								
☐	♦Use mowing practices, fertilization, aeration, topdressing, and over seeding to control weeds and sustain dense turf	X	X	X	X	X	X	X	X
☐	♦Promote nutrient cycling and deep rooting by mulch mowing at 2-4 inches or as appropriate for grass species		X	X	X	X	X		X
4.	**Practice Integrated Pest Management (IPM)**								
☐	♦Maintain healthy plants						X		
☐	♦Choose plants that are pest- and disease-resistant						X		
☐	♦Monitor for, remove/contain/control, and properly dispose of invasive plants found on the local Noxious Weed List for the local county area	X	X	X	X	X	X	X	X
☐	♦Monitor the worksite often to detect and identify potentially damaging pests and diseases				X		X		
☐	♦Identify all pest insects, weeds, and diseases and understand their lifecycle				X		X		
☐	♦Tolerate a few insects, weeds and diseases						X		

Sustain Healthy Plants

	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
♦Replace plants that attract damaging pests and diseases				X		X		
♦Establish action thresholds for actively managing pests						X		
♦Manage pests and diseases most susceptible lifecycle stage, when management is easier, less costly, and more likely to succeed						X		
♦Utilize IPM strategies and methods that reduce or eliminate the need for chemical pesticides	X	X	X	X	X	X	X	X
♦Minimize or eliminate the use of chemical pesticides	X	X	X	X	X	X	X	X
♦Use 2-4 inches of organic mulches to suppress weeds, such as cardboard, arborist wood chips, and bark	X		X			X	X	X
♦Use ground covers to shade soil for weed control	X		X		X	X	X	X
♦Evaluate how IPM strategies work, modify and adapt new strategies						X		
♦Recognize and protect common beneficials	X		X	X		X		X

USE SUSTAINABLE METHODS AND MATERIALS

Key concepts: sustainable materials, salvage landscape plants and materials, recycled content, composting, closed system management

Use Sustainable Methods and Materials

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
DESIGN									
1.	**Design with existing and local materials from sustainable businesses**								
☐	♦Specify renewable, biodegradable, and recycled materials	X	X	X		X		X	X
☐	♦Specify new materials with recycled content		X	X		X		X	X
☐	♦Specify locally sourced materials			X		X		X	X
☐	Design with sustainable materials that can be later re-purposed, reused and recycled		X	X		X		X	X
☐	Specify Forest Stewardship Council (FSC) certified wood products	X		X	X	X	X	X	X
☐	Specify recycled compost and mulch	X		X		X	X	X	X
☐	Reuse on-site structures, hardscapes, and landscape amenities			X		X		X	X
☐	Avoid use of polyvinyl chloride (PVC) and non-biodegradable materials as weed barriers	X	X	X	X	X	X	X	X
☐	Purchase materials from manufacturers whose process reduce resource consumption and waste		X	X		X		X	X
2.	**Avoid specifying toxic products or materials**								
☐	♦Specify paints, sealants, and coatings that emit low levels of volatile organic compounds (VOCs)	X	X	X	X	X		X	X
3.	**Consider human health issues in plant selection**								
☐	Use edible plants in planting design							X	X
☐	Avoid use of noxious weeds or genetically modified organisms (GMOs)	X		X	X	X	X	X	X
☐	Avoid specifying known allergenic plants or materials			X				X	X
☐	Avoid specifying poisonous plants, especially for clients with children							X	X
4.	**Design to maximize use of water and energy conservation options**								
☐	♦Design to maximize water and energy conservation options		X			X		X	X
CONSTRUCTION									
1.	**Use closed system management**								
☐	♦Salvage, reuse, compost and recycle materials from site, demolition, and construction	X	X	X	X	X		X	X
☐	♦Dispose of waste material in the most environmentally sound manner available	X	X	X		X		X	X

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
Use Sustainable Methods and Materials									
☐	♦Use landscape materials that are salvaged or have recycled content	X	X	X	X	X		X	X
☐	Salvage existing plants for reuse					X	X	X	X
☐	Reuse plants salvaged from an alternate, local site					X	X	X	X
☐	Recycle used plant containers		X	X		X		X	X
2.	**Manage stormwater onsite**								
☐	♦Manage erosion through Temporary Erosion and Sediment Control (TESC) practices	X		X	X			X	
☐	♦Install low impact development (LID) and green stormwater infrastructure (GSI) features	X		X	X		X	X	X
MAINTENANCE									
1.	**Minimize fuel use, air and noise pollution**								
☐	♦Use energy-efficient vehicles, equipment and power tools			X		X		X	X
☐	♦Maintain vehicles, equipment and power tools in optimal working condition to prevent fuel, hydraulic fluids and oil drips, leaks, and spills	X		X	X	X	X	X	X
2.	**Use closed system management**								
☐	♦Recycle or reuse organic matter generated during site operations and maintenance	X	X	X	X	X	X	X	X
☐	♦Provide plant nutrition from renewable materials such as compost and mulches	X	X	X	X	X	X	X	X
☐	♦Reuse salvaged materials on site					X		X	X
☐	Apply organic mulches a few inches from the base of trees and plants and extending at least to the dripline	X	X		X		X	X	
☐	Compost organic waste and materials on site			X		X		X	X
☐	Reduce the need for offsite sources of landscape materials and supplies	X	X	X	X	X		X	X
3.	**Support sustainable business practices**								
☐	♦Send organic debris and materials that cannot be used onsite to an offsite composting or recycling facility	X		X	X	X		X	X
☐	Provide plant nutrition from renewable materials that are sustainably harvested	X	X	X	X	X	X	X	X
☐	Purchase materials from manufacturers whose process reduce resource consumption and waste	X	X	X	X	X		X	X
4.	**Practice Plant Health Care (PHC)**								
☐	♦Know your plants	X	X	X	X	X	X	X	X
☐	♦Determine key problems: biotic and abiotic	X	X	X	X	X	X	X	X
☐	♦Optimize plant health	X	X	X	X	X	X	X	X
☐	♦Study the landscape ecosystem	X	X	X	X	X	X	X	X

Use Sustainable Methods and Materials

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
☐	♦Employ Integrated Pest Management (IPM) strategies	X	X	X	X	X	X	X	X
5.	**Practice Integrated Pest Management (IPM)**								
☐	♦Create an IPM plan to produce a long-term, sustainable suppression and prevention of pests and diseases	X	X	X	X	X	X	X	X
☐	♦Avoid using toxic products or materials	X	X	X	X	X	X	X	X
☐	♦Establish action thresholds for actively managing pests							X	
☐	♦Use cultural, mechanical and biological IPM strategies	X		X	X		X	X	X
☐	♦Create diversity in landscapes to encourage natural, biological pest control processes	X		X	X	X	X	X	X
☐	♦If pesticides are necessary, choose the least toxic products	X		X	X	X	X	X	X
☐	Choose manual pest management methods such as hand pulling weeds	X		X		X		X	X
☐	Remove non-site-adapted, pest-susceptible plants and noxious weeds	X	X	X	X		X	X	X
6.	**Be aware of human health and safety issues in landscapes**								
☐	Avoid using toxic landscape products or materials	X		X	X		X	X	X
☐	Exercise caution with using unfiltered, harvested rainwater for irrigating edible food crops							X	X
7.	**Provide regular training for staff**								
☐	♦Train staff in green stormwater infrastructure (GSI) feature function, repair, and maintenance							X	
☐	♦Train staff to use and maintain irrigation systems for maximum efficiency and plant health							X	
☐	♦Train staff in wildlife identification, biology, and habitat design management							X	
☐	♦Train staff in proper pruning practices							X	
☐	♦Train staff in PHC practices, strategies and methods							X	
☐	♦Train staff in IPM practices, strategies and methods							X	

Note: Human Health and Well-being BMPs are blended into all the BMP sections.

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