GUIDELINES FOR TREE PLANTING, PRUNING, RELOCATION, MAINTENANCE, AND RESTORATION AT UNIVERSITI MALAYSIA PAHANG AL-SULTAN ABDULLAH (UMPSA)

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1.0 INTRODUCTION

1.1 DEFINITION OF LANDSCAPE

General Definition

A landscape refers to the visible features of the earth's surface, shaped by natural elements and human-made structures..

From the Architectural Perspective

Landscape architecture is an interdisciplinary field that combines science and art to create functional and aesthetic outdoor spaces. It consists of two main components: softscape and hardscape..

1.2 MAIN COMPONENTS IN LANDSCAPE

Softscape

Softscape includes natural elements such as topography, water bodies, and vegetation (e.g., trees, shrubs, and grass)..

Hardscape

Hardscape encompasses human-made features that enhance the built environment, including street furniture, walkways, gazebos, fountains, garden lights, sculptures, and other structural elements..

1.3 IMPORTANCE OF LANDSCAPE IN DEVELOPMENT

Landscape planning and the provision of open spaces are essential in physical development, aligning with the government's objective to enhance the quality of life for all citizens..

These requirements are outlined in the **Town and Country Planning Act 1976 (Act 172)**, which mandates that developers comply with landscape

enhancement, tree preservation, and open space provisions before obtaining planning permission or development orders from the Local Authority.

Under **Section 21 of Act 172**, developers must consider landscape aspects when submitting development proposals, including:

i. Environmental protection and enhancement measures at the project site.
ii. Preservation of natural topography.
iii. Landscape improvement initiatives.
iv. Tree preservation and planting measures.
v. Identification of trees with a circumference exceeding 0.8 meters and other vegetation on-site.
vi. Allocation of open spaces.

Developers must submit landscape plans as part of the building plan approval process, a prerequisite for obtaining the **Certificate of Completion and Compliance (CCC)**

2.0 SOFTSCAPE

PLANTING FUNCTIONS

2.1 Microclimate Protection

a. Protection and shading
Tree canopies provide shade and protection from rain and heat.

b. Urban temperature reduction
Tree planting helps lower urban microclimate temperatures.

2.2 Environmental Protection

a. Noise and smoke control
Dense tree planting acts as a buffer against noise and smoke from vehicles and industrial areas.

b. Dust pollution control
Trees absorb and reduce the spread of dust.

c. Air pollution reduction

Dense tree planting helps mitigate widespread air pollution.

d. Soil and riverbank erosion control
Planting on slopes and riverbanks reinforces them against erosion and landslides.

e. Oxygen production and carbon absorption
Dense tree planting provides an oxygen source and absorbs carbon dioxide.

2.3 Landmark and Direction Indicators

a. Boundary markers
Trees serve as natural boundaries.

b. Intersection indicators.
Strategic planting helps mark intersections.

c. Curve markers.
Trees highlight road curves for better visibility.

f. Directional indicators
Planting patterns can guide movement within spaces.

2.4 Barriers

a. Reducing sunlight glare
Trees helps shield road users from direct sun glare.

b. Controlling vehicle glare
Trees on road dividers reduce glare from oncoming traffic.

c. Screening unattractive views
Dense planting blocks undesirable sights such as squatter areas, landfills, and cemeteries.

2.5 Ecology and Biodiversity

Preserving natural landscapes supports stable ecosystems, biodiversity, providing habitats for small wildlife.

2.6 Aesthetics

Attractive plant features enhance the visual appeal of landscapes, particularly in urban areas.

2.7 Enhancing Quality of Life and Economic Growth

High-quality landscape development boosts the tourism sector and contributes to economic growth while improving societal well-being through health and social benefits.

2.8 Research and Education

Conservation, preservation, and enhancement of trees support research on local plants species, ensuring their preservation as part of the nation's natural heritage and educational resources.

3.0 TREE PLANTING

Guidelines for tree planting within the university campus focus on creating a sustainable, aesthetically pleasing, and functional landscape. Below are general guidelines tailored to specific needs and environmental conditions.

3.1 Site Analysis

3.1.1 Climate

Understand local climate conditions, including temperature range, rainfall, humidity, and wind patterns as different plants require varying levels of water and humidity to thrive.

3.1.2 Soil

Conduct soil tests to determine pH levels, nutrient content, and drainage capacity.

3.1.3 Sunlight Exposure

Identify areas receiving full sun, partial shade, and full shade to match plant types with suitable locations.

3.1.4 Existing Vegetation
Record an inventory of existing trees, shrubs, and plants in the area.

3.1.5 Water Sources
Determine the availability and distribution of water sources for irrigation.

3.1.6 Walkways
Consider pedestrian pathways used by students, staff, and visitors to ensure accessibility and minimize disruption.

3.2 Plant Selection

3.2.1 Native and Adaptive Species
Select native or climate-appropriate plants to reduce maintenance and water use.

3.2.2 Diversity
Ensure species diversity to support a resilient and healthy ecosystem.

3.2.3 Seasonal Plants
Choose plants that provide year-round functionality through flowers, foliage, or fruits.

3.2.4 Functionality
Select plants that serve multiple purposes, such as providing shade, acting as windbreaks, or supporting wildlife habitats.

3.2.5 Invasive Species
Avoid planting invasive species that could disrupt the local ecosystem.

3.3 Planting Design

3.3.1 Zoning

Create zones based on water needs (hydrozoning), sunlight exposure, and intended use (e.g., rest areas, study spaces).

3.3.2 Tree Placement

Strategically position trees to provide shade for buildings and outdoor spaces, reducing energy costs and enhancing aesthetics.

3.3.3 Shrubs and Ground Cover

Use shrubs and ground cover to define spaces, guide foot traffic, and prevent soil erosion.

3.3.4 Pollinator Gardens

Include plants species that attract bees, butterflies, and other pollinators.

3.3.5 Edible Landscapes

Integrate fruit trees, herbs, and vegetable gardens where suitable .

3.4 Planting Media Preparation

3.4.1 Soil Enhancement

Improve soil equality with compost, organic matter, or necessary nutrients based on soil test results.

3.4.2 Mulching

Apply mulch around plants to retain moisture, suppress weeds, and enhance soil health.

3.4.3 Erosion Control

Implement erosion control measures such as terracing, retaining walls, or ground cover planting on slopes.

3.5 Irrigation

3.5.1 Efficient Systems

Install drip irrigation or soaker hoses to minimize water waste.

3.5.2 Rainwater Harvesting

Utilize harvested rainwater or other collection systems to reduce reliance on treated water.

3.5.3 Smart Controllers
Implement automated irrigation systems that adjust watering based on weather conditions.

3.5.4 Watering Schedule
Develop a watering schedule tailored to plant needs and local climate conditions.

3.6 Maintenance Plan

3.6.1 Regular Monitoring
Conduct routine inspections to detect pests, diseases, or other issues early.

3.6.2 Pruning
Schedule pruning for maintaining trees health, shape and safety.

3.6.3 Fertilization
Apply fertilizers as needed, based on soil test recommendations.

3.6.4 Weed and Pest Control
Use integrated pest management strategies to reduce chemical use.

3.6.5 Seasonal Tasks
Plan for seasonal maintenance including leaf cleanup, mulching, and adjustments for weather changes.

3.7 Sustainability Practices

3.7.1 Composting
Establish composting systems for plant debris and organic waste.

3.7.2 Green Waste Recycling
Implement program for recycling pruning waste and organic materials.

3.7.3 Habitat Creation
Incorporate features such as birdhouses and insect hotels to support local wildlife without threatening the community.

3.7.4 Educational Signage
Install signs to educate the campus community about plants species, sustainability initiatives, and ecological benefits.

3.8 Student and Community Engagement

3.8.1 Volunteer Programs
Encourage student and community participation in planting and maintenance activities.

3.8.2 Workshops and Classes
Offer workshops on sustainable landscaping, gardening, and plant care.

3.8.3 Research Opportunities
Collaborate with academic departments to use the campus landscape for research projects.

3.8.4 Public Engagement Events
Organize events such as tree planting days, garden tours, and sustainability exhibitions.

3.9 Budget and Funding

3.9.1 Cost Estimation
Develop a detailed budget covering plant acquisition, soil amendments, irrigation systems, and ongoing maintenance costs.

3.9.2 Funding Sources
Explore funding options such as grants, donations, or partnerships with local organizations.

3.9.3 Long-Term Planning
Allocate resources for long-term maintenance and potential future landscape expansions.

3.10 Review and Adjustments

3.10.1 Ongoing Evaluation

Regularly assess planting success and make adjustments as needed.

3.10.2 Adaptation to Change

Modify plans in response to climate change, evolving sustainability practices, or campus expansion.

By following these guidelines, the university can establish a sustainable, and functional campus landscape that enhances the environment and meets the needs of the entire community.

4.0 PRUNING/CUTTING TREE

Pruning and tree cutting are vital aspects of tree management, aimed at maintaining tree health, safety, and aesthetics. Here are guidelines to follow:

4.1 Purpose of Pruning and Cutting

4.1.1 **Safety**

Reduce the risk of falling branches or limbs that could cause accidents.

4.1.2 **Tree Health**

Prevent and control diseases by removing diseased, damaged, or dead parts.

4.1.3 **Formation**

Shape trees to achieve the desired form and enhance aesthetic appeal.

4.1.4 **Growth and Productivity**

Improve air circulation and sunlight penetration, supporting growth and flower/fruit production.

4.2 Ideal Times for Pruning and Cutting

4.2.1 **Dormat Season**

The best time to prune is during dormancy (typically winter for trees in temperate climates), as this reduces stress on the tree and lowers disease risk.

4.2.2 **Growing Season**

For flowering trees, prune after flowering to avoid interfering with next season's blooms.

4.3 Tools Used

4.3.1 **Loppers**

Suitable for smaller branches and twigs.

4.3.2 **Tree Saw**

Used for cutting larger branches or thick trunks.

4.3.3 **Pruning Shears**

Used for delicate pruning of small branches and tree tops.

4.4 Pruning and Cutting Techniques

4.4.1 **Clean Cuts**

Ensure each cut is clean and smooth to prevent tissue damage, which could lead to disease.

4.4.2 **Cut Above the Node**

Always cut above the node or leaf bud to encourage healthy regrowth.

4.4.3 **Three-Step Cutting Method**

For large branches, use the three-step technique: first cut from the bottom, then from the top to remove the branch, and finally, cut the remaining stub.

4.5 Disposal of Cut Branches

4.5.1 **Composting**

If suitable, cut branches can be composted.

4.5.2 **Burning**

In authorized areas, unsuitable branches can be burned.

4.5.3 **Disposal**

Branches and tree waste can be taken to recycling centers or garden waste disposal sites.

4.6 Safety Considerations

4.6.1 **Protective Gear**

Wear protective gear such as gloves, safety goggles, and a helmet when pruning.

4.6.2 **Area Safety**

Ensure the surrounding area is free from people or pets who could be at risk from falling branches.

4.6.3 **Pruning Near Power Lines**

Only trained professionals should prune near power lines to avoid electric shock hazards.

4.7 Pruning Mature Trees

4.7.1 **Avoid Drastic Pruning**

Avoid removing more than 25% of a mature tree's branches in one pruning session.

4.7.2 **Structural Assessment**

Before pruning, assess the tree's structure and determine which branches to keep for stability and balance.

4.8 Pruning Young Trees

4.8.1 **Early Pruning**

Shape young trees early to develop strong and good structure. This often involves removing competing branches or those forming narrow angles with the trunk.

4.8.2 **Removing Weak Branches**

Remove weak branches that could pose issues as the tree matures.

4.9 Post-Pruning Care

4.9.1 **Watering**

Ensure newly pruned trees are well-watered, especially in hot weather.

4.9.2 **Fertilization**

Pruning can reduce a tree's photosynthesis capacity, so post-pruning fertilization may help restore its energy.

4.9.3 **Monitoring**

Monitor the tree for stress signs, such as wilting leaves or reduced growth, and take corrective actions as necessary.

If performed correctly, pruning helps maintain tree health, safety, and maximizes the benefits derived from the trees.

5.0 TREE TRANSPLANTING AND RELOCATION

Relocating and transplanting decorative trees require proper planning and techniques to ensure the tree survives and thrives in its new location. Here are guidelines for this process:

5.1 Initial Assessment

5.1.1 **Tree Type**

Determine the type of ornamental tree being moved. Some trees are more sensitive to transplantation than others.

5.1.2 **Size and Age**

Smaller and younger trees are easier to transplant than larger, mature ones.

5.1.3 **Tree Health**

Ensure the tree is healthy before moving it. Diseased or damaged trees may struggle to adapt to the new location.

5.2 Selecting a New Location

5.2.1 Soil Conditions

Choose a location with soil conditions suitable for the specific type of ornamental tree. Ideal soil should be fertile and well-drained.

5.2.2 Sunlight

Ensure that the new location receives the appropriate amount of sunlight according to the tree's needs.

5.2.3 Growth Space

Ensure there is sufficient space around the new location for the tree to grow.

5.3 Preparation Before Relocation

5.3.1 Soil Loosening

Loosen the soil around the base of the tree a few weeks before relocation to encourage new root growth.

5.3.2 Root Pruning

If necessary, prune the roots to reduce the size of the root system and facilitate relocation. This should be done a few weeks or months before the move.

5.3.3 Watering

Ensure the tree is well-watered before relocation to reduce stress on the tree.

5.4 Relocation Process

5.4.1 Digging

Carefully dig around the tree to ensure that most of the root system can be removed along with the tree. Use a sharp, clean spade.

5.4.2 Root Wrapping

After digging, wrap the root system with burlap or canvas to protect the roots during transportation.

5.4.3 Transportation

Carefully transport the tree to the new location using appropriate methods, such as a wheelbarrow or a small truck.

5.5 Planting in the New Location

5.5.1 Digging the Hole

Dig a hole at the new location that is large enough to accommodate the entire root system of the relocated tree. The hole should be slightly wider and deeper than the root system.

5.5.2 Planting the Tree

Place the tree in the hole at the same height as it was in its original location. Avoid planting the tree too deeply, as this can cause root rot.

5.5.3 Filling the Hole

Fill the hole with the dug-out soil, ensuring the soil is gently compacted to avoid air pockets that could dry out the roots.

5.6 Post-Relocation Care

5.6.1 Watering

Water the tree generously immediately after relocation. Continue regular watering until the tree adjusts to its new location.

5.6.2 Fertilization

Provide suitable fertilizer to help the tree adapt and encourage new root growth.

5.6.3 Additional Support

If the tree needs additional support, use stakes or supports to keep the tree upright during the adjustment period.

5.6.4 Monitoring

Monitor the tree for several months after relocation to ensure it shows no signs of stress, such as leaf drop or wilting.

5.7 Safety Considerations

5.7.1 **Protective Equipment**
Use gloves, safety shoes, and protective clothing when handling trees, especially when working with heavy equipment.

5.7.2 **Avoiding Injury**
Be cautious when lifting or transporting heavy trees to avoid injury.

Compliance with these procedures can enhance the success of ornamental tree relocation and ensure the tree continues to thrive and grow in the new location.

6.0 TREE CARE AND CONSERVATION

The tree care and conservation guide is essential to ensure the health and longevity of trees, as well as to ensure that trees continue to provide environmental benefits. The following guidelines can be followed:

6.1 Tree Care

6.1.1 Watering

a. **Frequency**
Young trees require more frequent watering than mature trees. Watering should be done regularly, especially during dry seasons.

b. **Watering Technique**
Water at the base of the tree to ensure the water reaches the roots. Avoid watering the foliage, as this can cause fungal diseases.

c. Watering Time
Morning or evening is the best time to water to reduce evaporation.

6.1.2 Fertilization

a. **Type of Fertilizer**
Use organic fertilizers like compost or slow-release organic fertilizers to provide continuous nutrients.

b. **Fertilization Frequency**

Young trees typically require fertilization two to three times a year, while mature trees may need fertilization once or twice a year.

c. **Fertilization Technique**
Spread the fertilizer around the tree base at the same distance as the drip line of the foliage, then water to aid absorption.

6.1.3 Pruning

a. **Purpose**
Pruning is done to control the shape of the tree, remove dead or diseased branches, and promote new growth.

b. **Pruning Time**
Prune during the tree's dormant phase or after the flowering season to avoid disturbing growth.

c. **Technique**
Use clean, sharp tools. Cut at an angle to prevent water from accumulating on the cut surface, which can cause rot.

6.1.4 Pest and Disease Control

a. Routine Inspection
Conduct routine inspections to detect signs of pest or disease attacks, such as holes in leaves, discoloration, or fungal growth.

b. **Biological Control**
Use biological pest control methods by introducing natural predators or using neem oil.

c. Treatment
If necessary, carefully use appropriate insecticides or fungicides according to the label instructions.

6.1.5 Mulching

a. **Function**
Mulching helps retain soil moisture, reduce weed competition, and add organic matter to the soil.

b. **Mulching Materials**
Use organic materials such as bark, wood chips, or dried leaves.

c. **Application Method**
Spread mulch around the tree base but avoid covering the base of the trunk directly to prevent rot.

6.2 Tree Conservation

6.2.1 Structural Reinforcement

a. **Tying**
Use ropes or stakes to tie young or weak trees, especially if exposed to strong winds. Ensure the ties are not too tight to hinder growth.

b. **Selective Pruning**
Trim excess branches or those that may disrupt the balanced structure of the tree.

6.2.2 Injured Tree Recovery

a. **Wound Sealing**
For small wounds, let them heal naturally. For large wounds, use tree sealant to protect the area from pests and diseases.

b. **Crack Control**
If there are cracks in the trunk or main branches, consider using binders to stabilize the cracks while the tree heals.

c. **Root Recovery**
If roots are exposed or damaged, add soil around the roots and cover with mulch.

6.2.3 Habitat Preservation

a. **Soil Restoration**

If the soil around the tree becomes compacted or degraded, loosen the soil and add compost or organic fertilizer to improve fertility.

b. **Area Surveillance**
Protect the area around the tree from development or activities that could damage the roots or reduce soil fertility.

6.2.4 Mature Tree Management

a. Routine Evaluation
Conduct routine evaluations of mature trees to identify signs of structural weakness or damage.

b. Selective Cutting
If necessary, cut diseased, dead, or overly heavy branches to prevent the risk of tree collapse or causing damage.

6.2.5 Community Involvement

a. Public Education
Conduct awareness programs to educate the community on the importance of tree care and conservation.

b. Conservation Activities
Encourage community involvement in tree conservation activities such as tree planting programs, clean-up drives, or tree care campaigns.

This guideline is a general guide to help ensure trees grow healthily and are well-preserved, thereby contributing to the well-being of the environment and local communities. Ensure you also understand the guidelines in force in specific areas, as there may be slight differences subject to local regulations.

END

REFERENCES

1. **NATIONAL LANDSCAPE GUIDELINES – Department of Country Landscape (KPKT)**
2. **AMENITY TREE PRUNING MANUAL – Department of Country Landscape (KPKT)**