Chapter 2

# Sustainable Landscape Maintenance – Planning and Strategies

## In this Chapter

- **What are our goals for sustainable landscape maintenance?**
- **What is sustainable landscape maintenance?**
- **How is a sustainable landscape maintenance strategy developed?**

## What are our goals for sustainable landscape maintenance?

**Remember**

**Sustainable landscape maintenance along State highways contributes to the following goals in order of priority:**

- Be a good steward of the land.
- Provide safe and reliable transportation.
- Comply with legal and policy mandates.
- Maintain infrastructure and vegetation at the lowest life-cycle cost.
- Improve HDOT's public image.
- Be environmentally responsible.
- Be a responsible community member/good neighbor.
- Provide a Hawaiian sense of place.
- Contribute to aesthetic appeal.

## Provide safe and reliable transportation

Design and construction phases of a project set the stage for maintenance programs by planting and establishing vegetation consistent with engineering needs, safety standards, sustainability, and aesthetic considerations. Immediately after completion of a project and long afterward, vegetation maintenance influences road safety by reducing or increasing risk associated with roadside vegetation. Other safety issues for providing safe and reliable transportation include:

- Keeping workers and the public safe while work is carried out.
- Meeting standards that promote safe conditions for road users.

## Comply with legal and policy mandates

A number of different laws and policies provide guidance or describe expectations related to roadside vegetation management and many have an influence on vegetation maintenance activities. There are many laws that may be relevant; this section is not comprehensive. The policies and laws identified are the most relevant ones. Apart from the specifications and best management practices outlined in this manual, there are key legal and policy sources, standards, and best management practices you should know:

**AASHTO Roadside Design Guide:** National standards for safe roadside design; this manual contains the latest design practices for highway geometric design.

**Safety:** A high priority for all work done in the State right-of-way is to maintain safety for road users and workers. Relevant laws and authorities that seek to protect workers include Occupational Safety and Health, Department of Labor and Industrial Relations, State of Hawaii (HIOSH), and Occupational Safety and Health Administration/Act, U.S. Department of Labor (OSHA). Safety practices for traffic control are outlined in the DOT, U.S. 2004, **Manual on Uniform Traffic Devices (MUTCD)**, Federal Highway Administration, Washington, D.C.

**Stormwater:** The Hawaii State Department of Health (HDOH) and the U.S. Environmental Protection Agency (USEPA) require HDOT highways to have a permit for discharge of storm water into State waters.

This permitting mechanism is designed to prevent stormwater runoff from washing harmful pollutants and debris into local surface waters, such as streams, rivers, lakes or coastal waters. Best management practices and courses are put in place by HDOT to ensure compliance. Specific training is required of contractors working in rights-of-way, especially with pesticide and fertilizer use. Contractors have specific responsibilities and should receive training. HDOT is subject to $25,000 in fines per day if ditches and swales are not correctly maintained, free of rubbish and debris.

**http://stormwaterhawaii.com/program_plan/pdfs/app_j9.pdf**

**http://stormwaterhawaii.com/program_plan/pdfs/app_h1.pdf**

**http://stormwaterhawaii.com/pdfs/PermanentManual.pdf**

**Pesticides:** The basic federal law administered by the EPA in regulating pesticides is the **Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)** enacted in 1947. This law has been amended several times.

State pesticide laws are administered by the **Hawaii Department of Agriculture HAR §4.66.32.** See http://hawaii.gov/hdoa/admin-rules. Pesticide users should also meet the requirements outlined under stormwater best management practices (see above).

The FHWA issued guidance on implementing 23 U.S.C. § 329, a new provision of law added to Title 23 by §6006 of the **Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)**. This guidance discusses the new eligibility of federal aid funds for the control of noxious weeds and aquatic noxious weeds and establishment of native species.

**Statewide Sustainable Landscape Masterplan:** Guidelines for the development of the landscape in a consistent, durable, sustainable, and Hawaii context or sense of place.

## Improve HDOT's public image

HDOT's vegetation management activities contribute to the upkeep of publicly owned lands, and are ways in which the Department presents itself to the public. The personnel involved in this work, State workers or private contractors, represent the Department and should consciously strive to be good stewards and make a positive impression on the public.

### Tips

**Liability:** Tort law applies to cases in which the plaintiff seeks to recover money to compensate for personal injuries or property damages they claim were caused by the defendant. This is what is meant by the word "liability." To recover money damages from a roadway agency in a negligence case, the plaintiff must prove that:

- The roadway agency owed them a duty;
- The roadway agency breached that duty;
- The roadway agency's conduct was the proximate cause of the harm; and,
- The plaintiff was actually injured or damaged.

In general, the law imposes the duty to exercise ordinary care to avoid harm to others while carrying out an activity. The law requires that we act reasonably under the circumstances. Failure to do so is negligence.

Roadway agencies must keep streets open for travel and free from obstructions. Failure to do so could be the basis for a court claim. For example, shrubbery obstructing an intersection or tree limbs blocking a STOP sign in the street right-of-way can be considered negligence in failing to maintain the streets in a reasonably safe condition.

## Maintain infrastructure and vegetation at the lowest life-cycle cost

The benefit-to-cost ratio should always be considered in making vegetation maintenance decisions. Decisions should look to the long-term cost where appropriate. Sometimes short-term or high upfront costs can save money or create benefits over time. For example, the establishment of grass on steep slopes may be relatively cheap to establish compared to trees, but landslides may be more frequent. Also, you should consider intangibles, such as environmental benefits which may have no clear monetary value. Cost-effective vegetation maintenance actions perform the following:

## Tips

- Reduce the required frequency of visits that will be needed to undertake vegetation maintenance at a given site.
- Prevent damage to infrastructure that may be caused by vegetation (e.g., roots breaking up concrete).
- Reduce the need for irrigation.
- Prevent reasonably foreseeable problems or costs (e.g., erosion, weed invasion, crashes or liability).
- Increase worker effectiveness and efficiency.
- Decrease the amount of travelling that maintenance contractors or staff must do.
- Improve efficiency and thereby provide opportunities to work on neglected vegetation maintenance problems.
- Reduce the amount of fertilizer, herbicide or pesticide that may enter waterways.
- Address environmental impacts.
- Reduce the risk of accidents for workers and the public.

## Eco

**Be environmentally responsible!**

It is important to be aware of the environmental impacts of any vegetation maintenance activities. Vegetation maintenance choices should seek to:

**Tips**

- Reduce HDOT's carbon footprint.
- Prevent or reduce erosion.
- Reduce invasive plants.
- Maintain good drainage.
- Reduce flooding and flooding impacts.
- Provide wildlife habitat.
- Prevent reef contamination by sediments, fertilizers & herbicides.
- Mitigate or reduce noise pollution.

## Being a responsible community member/good neighbor

HDOT is an important community member and neighbor. Vegetation maintenance activities may impact neighboring land owners and land managers, and their land management decisions may impact ROW vegetation management. As good stewards of the land, HDOT maintenance staff should always seek to join partnerships with adjacent land owners so they are aware of the impacts of their actions and can work collaboratively to address issues that transcend property lines.

## Provide a sense of place

- Protect native plants and animals unique to Hawaii.
- Promote the use of naturally occurring vegetation for roadside landscaping.
- Facilitate an appreciation of unique Hawaiian scenery and maintain scenic vistas.
- Protect and maintain Hawaiian cultural values.
- Protect the marine environment and coastal environment.
- Prevent the establishment of unwanted alien plants.
- Maintain vegetation consistent with local climate and vegetation.
- Protect and preserve roadside elements that are uniquely local.

### Contribute to aesthetic appeal

The majority of Hawaii State roads are under some sort of vegetation maintenance regime. Depending on the context – urban, suburban, rural or coastal conservation areas – appropriate, aesthetically pleasing roadsides can range from wild to manicured landscaping. Thousands of people may view a given stretch of road every day and might appreciate the roadside aesthetic. Tourism in Hawaii is the primary industry driving our economy. Maintaining the aesthetics and local context of our roadsides is directly tied to our economy.

**Remember**

**Effective highway landscape maintenance will:**

- Integrate vegetation maintenance with overall the roadway maintenance system and existing resources.
- Integrate roadside vegetation maintenance practices with a monitoring, reporting and evaluation system and decide to continue or revise practices.
- Integrate the understanding of ecological relationships and look for ways to make our roads maintain a sense of place.
- Integrate expertise from various sources.

## What is sustainable landscape maintenance?

Sustainable Landscape Maintenance is the foundation of this manual. Its approach is based on the principles of Integrated Vegetation/Pest Management which appropriately combines the use of mechanical, chemical, biological and cultural methods for controlling weeds and other pests. Similar to an Integrated Vegetation/Pest Management, Sustainable Landscape Maintenance is a decision-making process that integrates and applies the most appropriate vegetation management tools in a sustainable manner. This decision making involves that you continuously monitor, evaluate and modify these tools to meet the goals of roadside vegetation maintenance. Sustainable Landscape Maintenance is a continuous process evolving to meet the changing needs of roadside vegetation.

## How is a sustainable landscape maintenance strategy developed?

The urban, rural or conservation setting of the road discussed in the table below should guide the development of the SLM strategy for any roadside. The level of effort and care provided to roadsides varies depending on the road type, rural versus urban setting and traffic volumes. Urban areas with high traffic volumes take the most attention; rural areas with low traffic volumes take the least attention. Roadsides in a conservation area may need a "do no harm" approach or heavy maintenance to keep the area free of certain weeds. Safety considerations are the only constant.

| Context | High Traffic Volume | Low Traffic Volume |
|---|---|---|
| **Urban** | **Cost:** Highest<br>**Vegetation maintenance:** manicured landscape on important commercial areas | **Cost:** High<br>**Vegetation maintenance:** less developed, less manicured roadside; extra care taken at intersections and entry areas; maintenance focuses on safety hazards |
| **Suburban** | **Cost:** High<br>**Vegetation maintenance:** less developed, less manicured roadside; extra care taken at intersections and entry areas; maintenance focuses on safety hazards | **Cost:** Medium<br>**Vegetation maintenance:** less developed, less manicured roadside; maintenance focuses on safety hazards |
| **Rural** | **Cost:** Low<br>**Vegetation maintenance:** preserve regional landscape character, low maintenance focuses on safety hazards | |
| **Rural Conservation/ Native Habitat/ Coastal** | **Cost:** Medium<br>**Vegetation maintenance:** keep roadside looking like surrounding natural lands; restoration areas may be established and maintained; highest concern for invasive plants; maintenance focuses on safety hazards | |

*Managers and HDOT staff who decide the level of maintenance needed will consider the broad guidelines outlined here, and the intended use of the roadside, aesthetics and budget.*

**Consider the steps outlined below for planning a sustainable landscape maintenance strategy:**

## Tips

**Determine if the roadsides you are managing qualify as urban, suburban, rural or conservation area.**

**Evaluate on-going vegetation management practices (mowing, trimming, etc.) to determine if:**

- They meet the vegetation management goals.
- The level of effort for various activities (mowing, trimming, etc.) matches the context (urban, suburban, rural and conservation).

**Apply context-sensitive standards (see Chapters 4-12) to various vegetation management activities to meet the overall management goals described above.**

**Document/log the details on various vegetation management activities (see Chapter 14, "Reporting").**

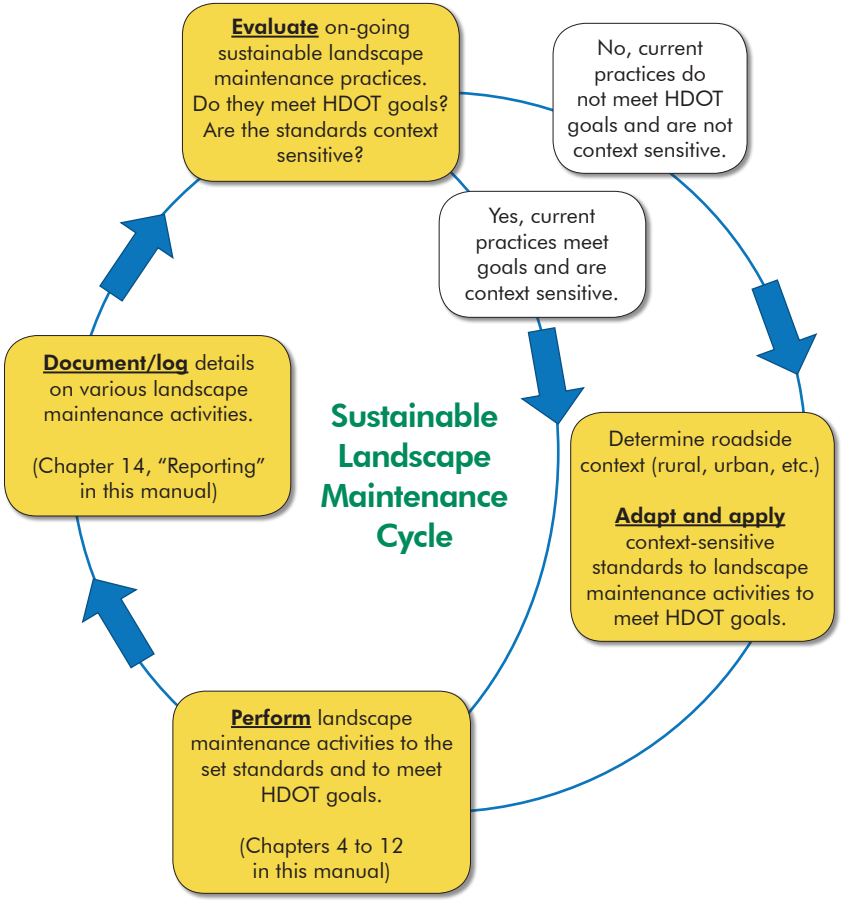
**Periodically review or assess to determine:**

- Has the context of your roadside changed, e.g., from rural to suburban or urban (as a result of recent development)?
- Are the various vegetation management activities being performed in a context-sensitive manner?
- Are the various vegetation management activities meeting the overall vegetation management goals?
- Appropriately modify vegetation management practices to be context sensitive and to meet the HDOT goals.

| Maintenance Activities | Urban/ Suburban | Rural | Conservation | Coastal |
|---|---|---|---|---|
| Mowing (Ch 5) | Yes | Generally only at interchanges | Generally only at interchanges | Along developed areas only |
| Edging & Trimming – lawns (Ch 6) | Yes | Generally only at interchanges | Generally only at interchanges | Along developed areas only |
| Edging & Trimming – vines and ground cover (Ch 6) | Yes | Generally only at interchanges | Generally only at interchanges | Along developed areas only |
| Bark mulch – trees and planting beds (Ch 8 & 11) | Yes | Yes if planted tree. No for volunteer trees. | Yes if planted tree. No for volunteer trees. | Yes if planted tree. No for volunteer trees. |
| Weeding (Ch 5 & 9) | Yes | Yes within LMZ | Yes entire ROW. Particularly priority target weeds. | Yes within LMZ |
| Invasive plant removal (Ch 9) | Yes | Yes | Yes | Yes |
| Trimming and care of shrubs (Ch 6) | Yes | Yes within LMZ | Yes within LMZ | Yes within LMZ |
| Trimming trees greater than 3 years old – crown cleaning & raising (Ch 6) | Yes | Yes within LMZ | Yes within LMZ | Yes within LMZ |
| Trimming trees less than 3 years old – structural pruning (Ch 6) | Yes | Yes within LMZ | Yes within LMZ | Yes within LMZ |
| Palm Pruning – removing fruits, buds, flowers (Ch 6) | Yes | Yes within LMZ | Yes within LMZ | Yes entire ROW |
| Planting requiring additional/special tasks (Ch 8) | Yes | Yes | Yes | Yes |
| Controlling vegetation intrusion of Right-of-Way line (Ch 6) | Yes | Yes if ROW line is within LMZ | Yes | Yes if ROW line is within LMZ |
| Fertilize Lawns (Ch 11) | Yes | Generally only at interchanges | Generally only at interchanges and done with caution to not impact conservation area. If used, only apply slow-release fertilizer. | Generally only at developed areas and done with caution to not drain into water. If used, only apply slow-release fertilizer. |

| Maintenance Activities | Urban/ Suburban | Rural | Conservation | Coastal |
|---|---|---|---|---|
| Fertilize Shrubs (Ch 11) | Yes | Generally only at interchanges | Generally only at interchanges and done with caution to not impact conservation area. If used, only apply slow-release fertilizer. | Generally only at developed areas and done with caution to not drain into water. If used, only apply slow-release fertilizer. |
| Fertilize Trees and Palms (Ch 11) | Yes | Generally only at interchanges | Generally only at interchanges and done with caution to not impact conservation area. If used, only apply slow-release fertilizer. | Generally only at developed areas and done with caution to not drain into water. If used, only apply slow-release fertilizer. |
| Spraying pesticide and herbicides (Ch 10) | Yes | Generally only at interchanges | Generally only at interchanges and done with caution to not impact conservation area. Notify conservation manager. | Generally only at developed areas and done with caution to not drain into water or use herbicide approved for water use. |
| Irrigation Maintenance (Ch 12) | Yes | Rarely unless system exists. | Rarely unless system exists. | Rarely unless system exists. |
| Clearing gutters, swales and ditches (Ch 7) | Yes | Yes | Yes | Yes |
| Removing and disposing rubbish and debris, including waste material resulting from work activities (Ch 5, 6 & 7) | Yes | Yes | Yes | Yes |
| Reporting maintenance activities (Ch 14) | Yes | Yes | Yes | Yes |
| Comprehensive annual Inspection (Ch 15) | Yes | Yes | Yes | Yes |

Below is a diagrammatic representation of the cyclic nature of the sustainable landscape maintenance process for Hawaii highways.




**Reporting & Inspection**

All your work will be inspected and you are required to submit reports on various vegetation activities. See Chapters 14 and 15.

## In a Nutshell

1. Sustainability is essential for our very existence in this special place.
2. Sustainable Landscape Maintenance means that you constantly evaluate current practices and apply the most appropriate landscape management tools in a sustainable manner.
3. The context (urban, suburban, rural and conservation) should guide your strategy for sustainably managing the roadsides.