

March 2006

Chemical Applications Training Plan

Develop an Environmental Management Program for the State of Hawaii, Department of Transportation, Highways Division Facilities, Hawaii

Prepared For:

*State of Hawaii
Department of Transportation
Highways Division*



Prepared By:



U.S. Army Corps of Engineers
Honolulu Engineer District



Environet, Inc.

PRESERVING EARTH'S RESOURCES FOR THE FUTURE

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State of Hawaii
Department of Transportation
Highways Division



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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
SECTION 1. INTRODUCTION.....	1-1
1.1 Purpose.....	1-1
1.2 Enforcement Penalties	1-2
1.2.1 Civil Penalties	1-2
1.2.2 Administrative Penalties	1-2
SECTION 2. BACKGROUND AND RESPONSIBILITIES.....	2-1
2.1 Background.....	2-1
2.2 Standard HDOT Chemical Application	2-1
2.3 Responsibilities	2-2
2.4 Training Schedule	2-2
SECTION 3. TRAINING PROGRAM.....	3-1
3.1 General Vegetation Management	3-1
3.2 Fertilizer Management	3-4
3.3 Chemical Applications for Vegetation Control	3-6
SECTION 4. DOCUMENTATION.....	4-1
4.1 Fertilizer Usage Log	4-1
4.2 Herbicide/Pesticide Usage Log.....	4-1
4.3 Disposal of Expired Landscaping Chemicals Log.....	4-1
4.4 Training Log	4-1
SECTION 5. REFERENCES.....	5-1

LIST OF APPENDICES

<u>Appendix</u>	<u>Title</u>
A	Fertilizer Usage Log
B	Herbicide/Pesticide Usage Log
C	Disposal of Expired Landscaping Chemicals Log
D	Training Schedule and Log

LIST OF ACRONYMS

<u>Acronym</u>	<u>Meaning</u>
BMP	Best Management Practice
CATP	Chemical Application Training Program
EI	Environet, Inc.
EMP	Environmental Management Program
HAR	Hawaii Administrative Rules
HDOH	State of Hawaii Department of Health
HDOT	State of Hawaii Department of Transportation
HRS	Hawaii Revised Statutes
MS4	municipal separate storm sewer system
MSDS	Material Safety Data Sheet
NPDES	National Pollutant Discharge Elimination System
SWMP	Storm Water Management Plan
SWPCP	Storm Water Pollution Control Program
USEPA	United State Environmental Protection Agency

Section 1.

Introduction

Environet, Inc. (EI) was contracted to develop a Chemical Application Training Plan as part of the Storm Water Management Program (SWMP) and Storm Water Pollution Control Program (SWPCP) portion of the Environmental Management Program (EMP) for the State of Hawaii, Department of Transportation (HDOT) Highways Division.

This Chemical Application Training Plan (CATP) will be used to train HDOT Highways personnel and contractors on the Best Management Practices (BMPs) for the use of chemicals applied in landscape maintenance. The information presented in this CATP is based upon Section IV (Chemical Application BMP Program Plan) of the HDOT's *Storm Water Management Program Plan, Oahu District, Pre-Final Compilation*, dated December 2003.

1.1 Purpose

The Hawaii State Department of Health (HDOH) and the United States Environmental Protection Agency (USEPA) require HDOT Highways to have a permit for discharge of storm water from the municipal separate storm sewer system (MS4) to State waters. The HDOH reissued National Pollutant Discharge Elimination System (NPDES) Permit No. HI 0021245 (hereinafter Highways Division's NPDES permit) on June 20, 2000, effective July 20, 2000 and expiring at midnight, September 8, 2004. This permit establishes discharge limitations, receiving water limitations, and specific provisions, including the requirement for HDOT to complete development and implementation of the storm water management program outlined in the permit application, dated November 15, 1999 and subsequently detailed in a series of SWMP planning documents, or program plans. These latter program plans were specifically required by an Order for Compliance issued to HDOT Highways by the USEPA in September 1999.

The purpose of the Chemical Application BMP Program Plan is to present Best Management Practices (BMPs) for the use of chemicals applied in landscape maintenance. When applied improperly, landscape maintenance chemicals can lead to pollution of storm water runoff with subsequent degradation of receiving water quality and damage to aquatic life. The BMPs presented in the Chemical Application BMP Program Plan address: (1) general vegetation management; (2) fertilizer management; and (3) herbicide/pesticide management. The BMPs are to be followed by both Highways Maintenance District(s) personnel and private landscaping contractors. The goal of the BMPs described in the program plan is to minimize pollutant loading in storm water from the application of fertilizers and pesticides within Highways Division rights-of-way.

This CATP will provide guidance to the responsible Highways Maintenance District(s) individuals with respect to reducing the impact on storm water runoff from chemical applications to the maximum extent practicable, as required by law. This CATP is not intended to address the specific characteristics of chemicals to be used on landscaping within Highways Division's

rights-of-way. Additionally, this CATP is not intended to address the health and safety aspects that should be employed during the use of any chemicals.

1.2 Enforcement Penalties

Enforcement of storm water regulations is the responsibility of HDOH and USEPA. Per the Hawaii Revised Statutes (HRS) Section 0340D, non-compliance with storm water regulations (i.e. NPDES permit requirements) is enforceable by penalties. There are two possible types of penalties: 1) civil penalties, and 2) administrative penalties.

1.2.1 Civil Penalties

Any person who violates HRS Section 0340D, any rule, or any term or condition of a permit or variance issued pursuant to this chapter shall be fined not more than \$25,000 for each separate offense. Each day of each violation shall constitute a separate offense. Any action taken in court to impose or collect the penalty provided for in this section shall be considered a civil action.

1.2.2 Administrative Penalties

There are three types of Administrative penalties.

1.2.2.1 Negligent Violations

A negligent violator is any person who:

1. Negligently violates HRS Section 0340D or any rule adopted by the department pursuant to this chapter, or any condition in a permit issued under this chapter or any requirement imposed in a pretreatment program under this chapter; or
2. Negligently introduces into a sewerage system or into a publicly owned treatment works any water pollutant or hazardous substance which such person knew or reasonably should have known could cause personal injury or property damage or, other than in compliance with all applicable federal, state, or local requirements or permits, which causes such treatment works to violate any effluent limitation or condition in any permit issued to the treatment works under this chapter.

Negligent violators shall be punished by a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than one year, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under HRS Section 0340D, punishment shall be by a fine of not more than \$50,000 per day of violation, or by imprisonment of not more than two years, or by both.

1.2.2.2 Knowing Violations

A knowing violator is any person who:

1. Knowingly violates HRS Section 0340D or any rule adopted by the department pursuant to this chapter, or any condition in a permit issued under this chapter or any requirement imposed in a pretreatment program; or
2. Knowingly introduces into a sewerage system or into a publicly owned treatment works any water pollutant or hazardous substance which such person knew or reasonably should have known could cause personal injury or property damage or, other than in compliance with all applicable federal, state, or local requirements or permits, which causes such treatment works to violate any effluent limitation or condition in a permit issued to the treatment works under this chapter.

Knowing violators shall be punished by a fine of not less than \$5,000 nor more than \$50,000 per day of violation, or by imprisonment for not more than three years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under HRS Section 0340D, punishment shall be by a fine of not more than \$100,000 per day of violation, or by imprisonment of not more than six years, or by both.

1.2.2.3 Knowing Endangerment

Any person who knowingly violates HRS Section 0340D or any rule adopted by the department pursuant to this chapter, or any condition in a permit issued under this chapter, and who knows at that time that the violation places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than \$250,000 or imprisonment of not more than fifteen years, or both. Additionally, a person which is an organization, upon conviction of violating this section, shall be subject to a fine of not more than \$1,000,000. If a conviction of a person is for a violation committed after a first conviction of such person under this section, the maximum punishment shall be doubled with respect to both fine and imprisonment.

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Section 2.

Background and Responsibilities

2.1 Background

The respective HDOT Highways Maintenance Districts are responsible for maintaining landscaped areas within Highways Division rights-of-way. Landscape maintenance is conducted to keep rights-of-way in a safe and an aesthetic condition. Chemical fertilizers and herbicides are used for effective landscape maintenance. The proper management of these chemicals is important to assure protection of surface waters receiving runoff from right-of-way areas.

Proper growth and maintenance of vegetation requires physical care, such as mowing and pruning, along with application of chemicals to provide nutrients and control pests. Plant nutrients are provided through application of fertilizers. Pest (weed and insect) control is accomplished by the use of herbicides and pesticides. Fertilizers are used to provide nutrients to promote the healthy growth of grass and ground covers, as well as shrubs and trees. Three types of fertilizers are commonly used: conventional or fast release, slow release, and organic materials. Conventional fertilizers release nutrients rapidly, making them available for immediate growth but without providing a sustained supply of nutrients. Slow release fertilizers release nutrients over a longer period of time, and are thus less susceptible to leaching out from watering or storm events. Organic fertilizers, such as animal manure or composted plant material, provide nutrients but often vary widely in nutrient concentrations; they are best used as a soil conditioner or amendment in conjunction with other types of fertilizers. The types and compositions of fertilizers acceptable for use within Highways Division rights-of-way are specified in the *Hawaii Standard Specifications for Road, Bridge, and Public Works Construction* (Standard Specifications). Conventional, slow release, and organic fertilizers are included in the Standard Specifications. Slow release fertilizers are desirable due to their ease of application, but they are more costly than conventional fertilizers. Organic fertilizers are not widely used by the Highways Maintenance Districts.

2.2 Standard HDOT Chemical Application

Unwanted vegetation growth is controlled using herbicides and manual weeding. The only herbicides used by Highways Maintenance are the brand-name herbicides, Roundup® and Oust®. Roundup® is a systemic contact weed killer. Oust® is used as a pre-emergent agent. Both of these herbicides are biodegradable. Chemicals are applied to large areas by Highway Maintenance District(s)' special services unit and/or landscape crews using a spray truck and/or hand sprayers. Spray trucks are used with a two-person crew for herbicide applications. The crew is required to wear protective clothing and accessories, follow all herbicide manufacturers' application guidelines, and carry the relevant Material Safety Data Sheets (MSDS) for reference. Highway Maintenance District(s) special services unit and/or landscape crews also do manual weeding and routine mowing/cutting of ground cover. Control of insect pests and diseases are

conducted on a site-specific basis to address a particular problem. There are no standard pesticides used for these purposes, and routine application of pesticides for other than weed control is not conducted by the Highways Maintenance Districts.

Product	Manufacturer's Application Instruction	Possible Active Ingredients
Roundup®	Apply when weeds are actively growing. For best results, apply during warm, sunny weather (above 60°F). Spray when air is calm to prevent drift to desirable plants. Weeds usually begin to wilt within two to four days, with complete kill in one to two weeks. All ornamental flowers, trees and shrubs may be planted one day after application.	Glyphosate Diquat Triclopyr
Oust®	Apply Oust as a preemergence or early postemergence spray during the rainy season when weeds are actively germinating or growing.	Sulfometuron Methyl

Material Safety Data Sheets (MSDS) for all chemicals used shall be available to all personnel involved in chemical application activities.

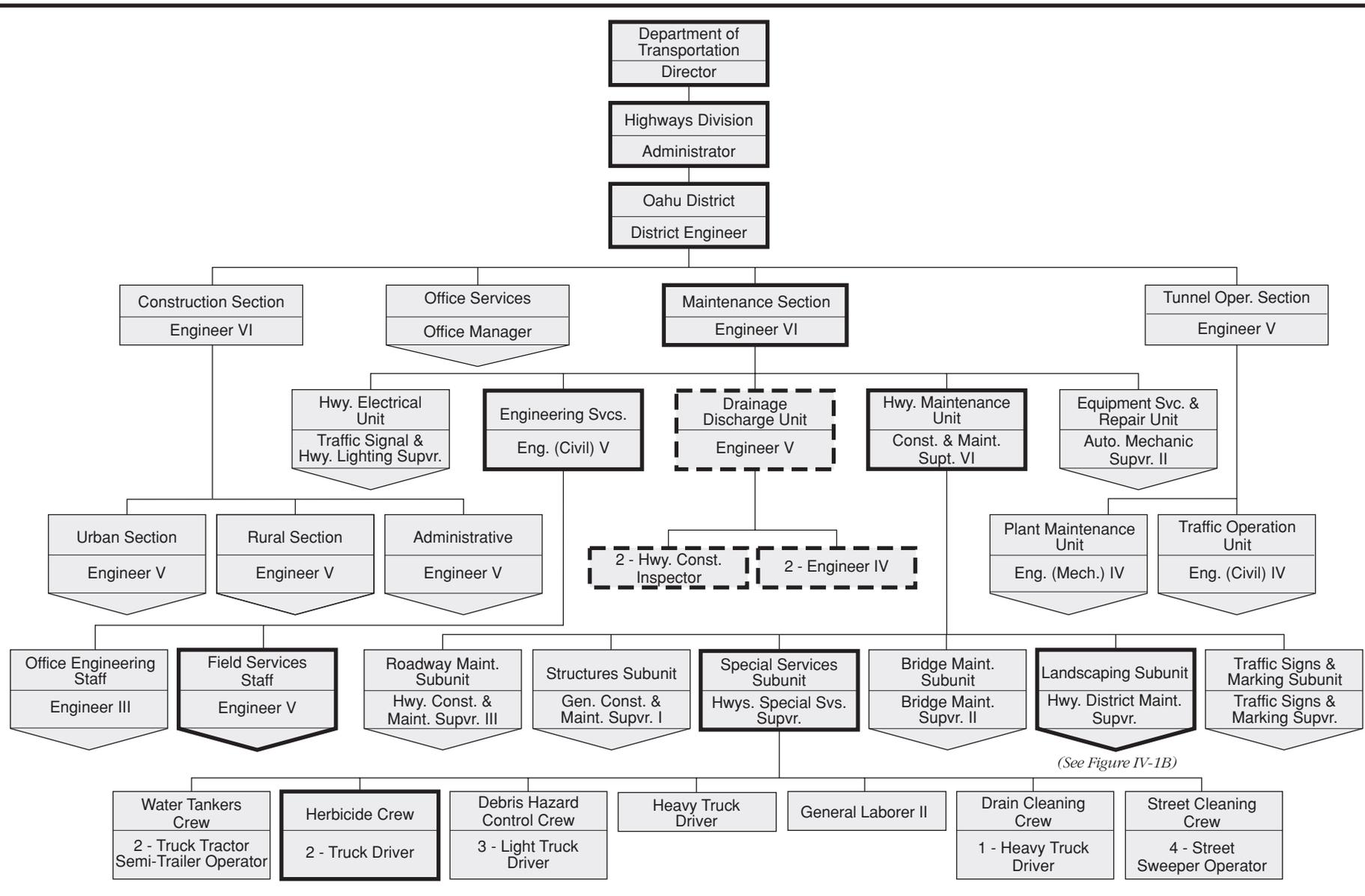
2.3 Responsibilities

An organizational chart that indicates the positions with primary and secondary responsibility for chemical application BMPs in the Oahu District is provided in Figure IV-1A and 1B. Units and positions with primary responsibility are responsible for actively implementing the Chemical Application component of the SWMP. Units and positions with secondary responsibility are to provide supporting effort and/or information to those with primary responsibility.

Right-of-way landscape maintenance is performed by Highway Maintenance District(s) landscaping and special services subunit personnel and by private licensed contractors under contract to Highways Division. The landscaping unit routinely maintains sections of Highways Division rights-of-way with less intensive maintenance requirements, such as rural highway sections, and responds to emergency situations such as fallen tree limbs. Licensed private contractors maintain primarily urban sections of Highways Division rights-of-way. Both Highways Maintenance District (s)' landscaping unit and the contractors are responsible for proper growth of vegetation and general maintenance of their assigned areas.

2.4 Training Schedule

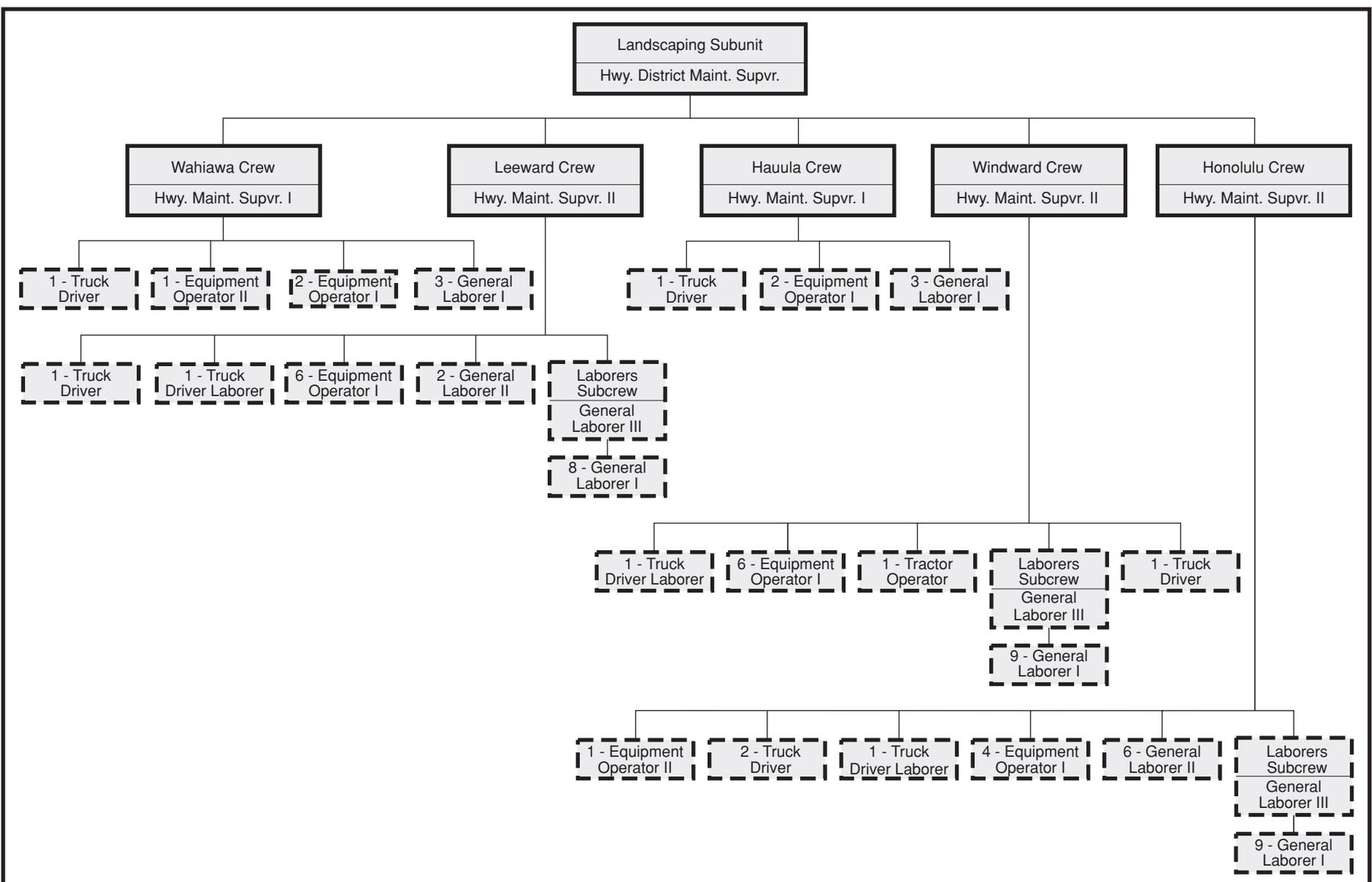
This CATP is intended for training of the Highway Maintenance District(s) landscape and special services subunits supervisors, their personnel, and private licensed contractors. A training schedule for supervisors and personnel is included in Appendix D – Training Documentation.



LEGEND

- Primary Responsibility
- No Direct Responsibility
- Secondary Responsibility
- Additional Personnel (may not be shown) Report to this Position

Figure IV-1A
ORGANIZATIONAL CHART FOR
CHEMICAL APPLICATION (Sheet 1)



LEGEND

- Primary Responsibility
- Secondary Responsibility
- No Direct Responsibility
- Additional Personnel (may not be shown) Report to this Position

Figure IV-1B
ORGANIZATIONAL CHART FOR
CHEMICAL APPLICATION (Sheet 2)

Section 3.

Training Program

Both the Highway Maintenance District(s)' landscaping unit and the licensed private contractors are responsible for proper growth of vegetation and general maintenance of their assigned areas. This training program summarizes the information presented in Section IV (Chemical Application BMP Program Plan) of the HDOT's *Storm Water Management Program Plan, Oahu District, Pre-Final Compilation*, dated December 2003, and provides guidance to the responsible Highway Maintenance District(s) individuals with respect to reducing the impact on storm water runoff from chemical applications to the maximum extent practicable, as required by law.

Three BMPs are covered by this CATP:

1. General Vegetation Management
2. Fertilizer Management
3. Pesticide/Herbicide Management

The following subsections present each of these BMPs.

3.1 General Vegetation Management

Proper general vegetation management is a BMP that applies to routine landscape maintenance within Highways Division's rights-of-way. Such management includes **preventive measures** and **good housekeeping practices**, both of which will reduce the amount of pollutants entering the storm drainage system.

Landscape maintenance personnel that handle or have responsibility for landscaping chemicals are to be trained in good housekeeping procedures regarding vegetation management and landscape maintenance, in particular, application of fertilizers and pesticides, equipment cleaning, and empty container rinsing and disposal.

Preventive measures and good housekeeping practices that should be implemented to protect the storm drainage system and receiving water quality from potential pollutants caused by general vegetation management include the following:

#	Best Management Approach	Discussion Points
1	Maintain all chemical application equipment in good operating condition. Check for proper operation of controls, valves and regulators prior to leaving the base yard. Assure that all hoses are attached properly and that no leaks will occur.	<ul style="list-style-type: none"> Leaks may enter the storm drainage system. Inspect equipment on a routine schedule.
2	Clean the spray truck, hand sprayers, mowers, weed whackers, and any vehicles used during vegetation management. Perform cleaning in a location that will not result in contamination of storm drains, channels, or surface waters. All residual chemicals and contaminated rinse water is to be recycled for use in future applications.	<ul style="list-style-type: none"> Cleaning will prevent cross contamination. Cleaning operations should not cause contamination to the storm drainage system.
3	Properly locate chemical mixing and equipment rinsing stations to prevent runoff or accidental spills from entering the storm drains.	Runoff and spills may enter the storm drainage system.
4	Do not fuel or service any equipment near drain inlets, drainage channels, or receiving waters.	Spills from maintenance and fueling may enter the storm drainage system.
5	Perform fueling and maintenance of vehicles and equipment in designated areas within baseyards whenever possible.	Spills from maintenance and fueling may enter the storm drainage system.
6	Store all chemicals in closed containers. Cover any materials that can be conveyed in sheet-flow runoff.	Spills may enter the storm drainage system.
7	Maintain accurate inventory of all chemicals stored at Highways Division maintenance baseyards.	Proper accounting of chemicals prevents waste and minimizes disposal costs.
8	Review the work requirements and determine the best means to perform the necessary maintenance. Consider hand weeding for small, isolated areas.	Avoid use of chemicals whenever possible.
9	Use weed-blocking geotextiles where applicable.	Avoid use of chemicals whenever possible.
10	Mow/cut grass and ground covers to appropriate height.	Grass and ground cover are effective in minimizing runoff.
11	Trim trees and shrubs to prevent overgrowth, eliminate traffic hazards, maintain a neat appearance, and maintain healthy growth.	Proper maintenance of trees and shrubs prevents decay.
12	Do not apply fertilizers or pesticides during or immediately preceding rainy weather.	Runoff from rain will enter the storm drainage system.
13	Do not spray chemicals during high winds (over 8 miles per hours).	Over spray may enter the storm drainage system and wastes the chemical.

#	Best Management Approach	Discussion Points
14	Upon mobilizing at a work site, identify all storm drainage system facilities in and around the area.	Knowledge of sensitive areas is important in preventing pollutants entering the storm drainage system.
15	Identify areas for waste material collection and stockpiling. Prevent grass or other vegetative cuttings from entering the storm drains where possible. Do not stack or leave removed vegetation or other debris on or near drain inlets or in the storm drainage system.	Proper planning and organization will help prevent pollutants from entering the storm drainage system.
16	Clean all storm drainage facilities in the site area prior to demobilization.	Good housekeeping is important to prevent pollutants from entering the storm drainage system.

3.2 Fertilizer Management

Maintaining healthy and aesthetically pleasing landscaping within Highways Division's rights-of-way requires application of fertilizers. **Proper management of fertilizer application and irrigation** will enhance vegetative growth and prevent excess fertilizer from being released with storm water runoff and entering receiving waters.

Contractors and landscaping personnel must be trained in proper fertilizer application to prevent plant burn and contamination of storm water runoff.

Proper management of fertilizer application and irrigation will enhance vegetative growth and prevent excess fertilizer from being released with storm water runoff and entering receiving waters. Application of fertilizers shall follow the following guidelines:

#	Best Management Approach	Discussion Points
1	Review the General Vegetation Management Guidelines, and implement as appropriate.	Items discussed in under general vegetation management also apply to fertilizer application.
2	<ul style="list-style-type: none"> • Perform soil analysis for landscaped areas wherever possible to determine the need for and composition of fertilizers required. • Use fertilizers only as needed. • Base fertilizer type and composition upon the soil analysis and site conditions. • Base frequency of fertilizer application upon the guidelines in the Standard Specifications. 	Proper application is important to insure proper uptake and minimal runoff.
3	Use only State Department of Agriculture approved chemicals.	Proper application is important to insure proper uptake and minimal runoff.
4	Furnish fertilizers in new, clean, sealed, and properly labeled containers.	Spills may enter the storm drainage system.
5	Protect fertilizers from the weather at all times.	Spills may enter the storm drainage system.
6	For newly planted areas, till the top four inches of soil to evenly incorporate fertilizer into the soil and protect the fertilizer from being washed away by storm water. Place temporary diversion berms or implement other control measures as may be required to prevent storm water from flowing onto newly fertilized sites.	Runoff may enter the storm drainage system.
7	Do not use fertilizers on slopes steeper than 3:1.	Steep slopes encourage runoff.
8	Follow all manufacturers' guidelines for fertilizer application.	Proper application is important to insure proper uptake and minimal runoff.

#	Best Management Approach	Discussion Points
9	Exercise proper caution and take measures necessary to avoid plant burn and excess runoff.	Proper application is important to insure proper uptake and minimal runoff.
10	Do not apply fertilizers during or immediately prior to rainy weather.	Runoff from rain will enter the storm drainage system.
11	Do not spray fertilizers during high winds. Do not spray if wind speeds are over 8 miles per hour.	Over spray may enter the storm drainage system and wastes the chemical.
12	Use the Fertilizer Usage Log to track the amount of fertilizer used and the locations where it is applied. Include the total amount of fertilizer used (pounds) on an annual basis in end-of-year NPDES reports.	Proper accounting of chemicals prevents waste, minimizes disposal costs, and provides documentation and accountability.

3.3 Chemical Applications for Vegetation Control

Maintaining landscaping along Highways Division's rights-of-way in a healthy, safe and aesthetically pleasing condition may require application of chemicals (herbicides and pesticides). The chemicals used are generally herbicides that are used to control the growth of weeds and undesirable vegetation. Pesticides for control of diseases and insect pests may also be used on a site-specific base as warranted. Contamination of storm water runoff and receiving waters by chemicals is to be **prevented through proper handling and application procedures**. Irrigation systems also need to be adjusted to suit the site conditions and avoid conveying chemical contaminated runoff to down-slope areas where it can enter storm drainage systems or receiving waters.

Contamination of storm water runoff and receiving waters by chemicals (herbicide and pesticide) is to be prevented through proper handling and application procedures. Application of chemicals shall follow the following guidelines:

#	Best Management Approach	Discussion Points
1	Review the General Vegetation Management Guidelines and implement as appropriate.	Items discussed under general vegetation management also apply to chemical application.
2	Assess the vegetation and pest control requirements. Use only the least toxic and most effective chemicals available that are suited to the vegetation or pest to be controlled.	Avoid use of chemicals whenever possible.
3	Use only State Department of Agriculture approved chemicals.	Avoid use of chemicals whenever possible.
4	Keep chemicals in their original containers, properly sealed and labeled. Any diluted chemicals remaining from job site use are to be retained only for the duration recommended by the manufacturer. The manufacturer's recommendations on type of storage container and environmental conditions, such as exposure to sunlight, storage temperature, etc., are to be followed. Label containers used for diluted pesticide storage with the pesticide name, mix concentration, expiration date and any other pertinent information as recommended by the manufacturer.	<ul style="list-style-type: none"> • Proper planning and organization will help prevent pollutants from entering the storm drainage system. • Spills may enter the storm drainage system.
5	Store chemicals in sealed containers, in a covered location, when not in use.	Spills may enter the storm drainage system.

#	Best Management Approach	Discussion Points
6	Keep the pesticide inventory current. Check expiration dates on all pesticides monthly and properly dispose of any chemicals held beyond the stated shelf life. If the pesticide is classified as a hazardous waste according to Hawaii Administrative Rules 11 – 261, “Hazardous Waste Management – Identification and Listing of Hazardous Waste,” contract a hazardous waste transporter to ship the waste to an approved disposal facility. Obtain the hazardous waste transporter’s USEPA identification number and a copy of the Uniform Hazardous Waste Manifest from the transporter. If the pesticide is not classified as a hazardous waste (Roundup® and Oust® are not), contact the City’s Department of Environmental Services for disposal options. Use the Disposal of Expired Landscaping Chemicals Log to track disposal.	Proper accounting of chemicals prevents waste and minimizes disposal costs.
7	During the monthly inventory check, look for leaking or corroded containers, chemical discoloration, or other change in the containers or contents that may indicate a potentially hazardous condition or chemical deterioration.	Spills may enter the storm drainage system.
8	All personnel performing chemical applications must wear proper protective clothing, which includes wearing long pants, long sleeved shirt, dust mask, rubber gloves, rubber boots, and goggles or face shield.	Proper personal protective equipment is necessary for worker health and safety.
9	Only apply chemicals according to the manufacturers’ recommendations.	Proper application is important to insure proper usage and minimal runoff.
10	Properly locate chemical mixing and equipment rinsing stations to prevent runoff or accidental spills from entering the storm drains.	Spills may enter the storm drainage system.
11	Control spills promptly. Protect the storm drainage system from any spilled material.	Spills may enter the storm drainage system.
12	Spray no chemicals near standing water, drainage channels, or natural waterways.	Runoff may enter the storm drainage system.
13	Spray no chemicals during windy conditions (over 8 miles per hour), or during occurring or expected precipitation.	<ul style="list-style-type: none"> • Over spray may enter the storm drainage system and wastes the chemical. • Runoff may enter the storm drainage system.
14	Spot spray rather than broadcasting or using the spray truck where feasible.	Over spray may enter the storm drainage system and wastes the chemical.

#	Best Management Approach	Discussion Points
15	Protect newly treated areas from storm water sheet-flows. Place temporary diversion berms or implement other control measures as may be required to prevent storm water from flowing onto newly treated sites.	Runoff may enter the storm drainage system.
16	Rinse empty chemical containers three (3) times before properly disposing of them. Collect and reuse the rinse water. DO NOT DISPOSE RINSE WATER IN A STORM DRAIN, SANITARY SEWER, OR TO THE GROUND.	Runoff may enter the storm drainage system.
17	Use the Herbicide/Pesticide Usage Log to track all chemicals used, including amount and location applied, application method, weather conditions, and other pertinent data. Include total amount of pesticides applied (gallons) on an annual basis in end-of-year NPDES reports.	Proper accounting of chemicals prevents waste, minimizes disposal costs, and provides documentation and accountability.

Section 4.

Documentation

Proper accounting of chemicals prevents waste, minimizes disposal costs, and provides documentation and accountability.

4.1 Fertilizer Usage Log

Highways Maintenance personnel and landscape contractors shall maintain a log of the amount of fertilizer used and the locations where it is applied. The landscape contractors are required to complete the fertilizer and pesticide usage log forms provided in this program plan and to deliver the completed forms to Highways Division on a *quarterly* basis.

See Appendix A for the Fertilizer Usage Log.

4.2 Herbicide/Pesticide Usage Log

Highway Maintenance personnel and landscape contractors shall maintain a log of the amount of pesticide/herbicide used and the locations where it is applied. The landscape contractors are required to complete the fertilizer and pesticide usage log forms provided in this program plan and to deliver the completed forms to Highways Division on a *quarterly* basis.

See Appendix B for the Herbicide/Pesticide Usage Log.

4.3 Disposal of Expired Landscaping Chemicals Log

Highways Maintenance personnel shall maintain a log of the amount of landscaping chemicals disposed. Disposal manifests should be kept on file with the disposal log.

See Appendix C for the Disposal of Expired Landscaping Chemicals Log.

4.4 Training Log

The training schedule for Highways Maintenance personnel is presented in Appendix D. All training sessions shall be documented by completing the Training Log, which is also included in Appendix D. The BMPs that are covered during the training should be checked off on the training log. The completed training logs should be submitted to *Highways Division annually*.

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Section 5.

References

City & County of Honolulu, Department of Environmental Services, *Best Management Practices Manual for Construction Sites in Honolulu*, May 1999.

Hawaii Administrative Rules (HAR) Title 11, Chapter 55, Water Pollution Control.

Hawaii Revised Statutes, Chapter 342D, Water Pollution.

Hawaii Revised Statutes, Chapter 342E, Non-point Source Pollution Management and Control.

State of Hawaii Department of Transportation, Highways Division, *Guidelines for the Proper and Safe Application of Herbicides*, 1987.

State of Hawaii Department of Transportation, Highways Division, *Storm Water Management Program Plan, Oahu District, Pre-Final Compilation*, December 2003.

U.S. Environmental Protection Agency, *The Clean Water Act of 1987*, 40 CFR 122, 403.

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APPENDIX A

FERTILIZER USAGE LOG

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FERTILIZER USAGE LOG

DATE	LOCATION (Route, Milepost, Direction, and Distance from Nearest Intersection)	WEATHER	TYPE AND AMOUNT APPLIED (pounds)	COMMENTS								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Sky</td> <td style="width: 50%;">Precipitation</td> </tr> <tr> <td> <input type="checkbox"/> Clear <input type="checkbox"/> Partly Cloudy <input type="checkbox"/> Overcast </td> <td> <input type="checkbox"/> Rain expected today, DO NOT APPLY <input type="checkbox"/> Raining – if raining, DO NOT APPLY <input type="checkbox"/> Rain not expected today </td> </tr> <tr> <td colspan="2">Wind</td> </tr> <tr> <td colspan="2"> <input type="checkbox"/> Calm <input type="checkbox"/> Mild Breeze <input type="checkbox"/> High Wind, DO NOT SPRAY </td> </tr> </table>	Sky	Precipitation	<input type="checkbox"/> Clear <input type="checkbox"/> Partly Cloudy <input type="checkbox"/> Overcast	<input type="checkbox"/> Rain expected today, DO NOT APPLY <input type="checkbox"/> Raining – if raining, DO NOT APPLY <input type="checkbox"/> Rain not expected today	Wind		<input type="checkbox"/> Calm <input type="checkbox"/> Mild Breeze <input type="checkbox"/> High Wind, DO NOT SPRAY			
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<input type="checkbox"/> Calm <input type="checkbox"/> Mild Breeze <input type="checkbox"/> High Wind, DO NOT SPRAY												
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Sky	Precipitation											
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APPENDIX B

HERBICIDE/PESTICIDE USAGE LOG

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HERBICIDE/PESTICIDE USAGE LOG

DATE	LOCATION (Route, Milepost, Direction, and Distance from Nearest Intersection)	WEATHER	CHEMICAL USED AND AMOUNT APPLIED (gallons)	APPLICATION METHOD	COMMENTS								
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APPENDIX C

DISPOSAL OF EXPIRED LANDSCAPING CHEMICALS LOG

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APPENDIX D

TRAINING SCHEDULE AND LOG

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TRAINING SCHEDULE

Training Type	Frequency	Topics Covered
Unit Supervisor (classroom training)	Annually	<ul style="list-style-type: none">• Purpose and Background of Chemical Application BMPs• BMPs – General Vegetation Management, Fertilizer Management, Pesticide Management• Training Documentation
Highways Maintenance Landscape Personnel (toolbox training)	Periodic toolbox training, cover each topic at least once per year	<ul style="list-style-type: none">• BMPs – General Vegetation Management, Fertilizer Management, Pesticide Management• Usage Log Documentation
Private Licensed Contractors (classroom and toolbox training)	Upon contact award and annually for supervisors and monthly for field personnel	<ul style="list-style-type: none">• Purpose and Background of Chemical Application BMPs• BMPs – General Vegetation Management, Fertilizer Management, Pesticide Management• Training Documentation

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