

Weed, Pest and Disease Procedure

1. Purpose

The purpose of this Procedure is to provide a summary of tasks, responsibilities, tools and templates applicable to renewals programs delivered by the Project Delivery Group relevant to weed, pest and disease management. The Procedure includes:

- Minimum requirements for weed, pest and disease management
- Site planning for weed, pest and disease management
- Weed Management
- Pest and Disease Management

This document should be read in conjunction with the following Procedures:

- Incident Management - Reporting and Investigation Procedure
- PDG Environmental Management Plan
- Flora and Fauna Management Procedure
- Establishing and Managing Environmental No-Go Zones Procedure
- Working in and Around Water Procedure
- Waste Management Procedure

2. Scope

<input type="checkbox"/> Planning	<input checked="" type="checkbox"/> Delivery	<input type="checkbox"/> Handover
<input type="checkbox"/> Program Management	<input type="checkbox"/> Procurement	<input type="checkbox"/> Community & Stakeholder
<input type="checkbox"/> Safety	<input checked="" type="checkbox"/> Environment	<input type="checkbox"/> Quality

This Procedure steps through the processes for weed, pest and disease management on projects and programs delivered by TasWater.

3. Definitions

This Procedure should be read in conjunction with the Project Delivery Group Acronyms and Glossary document.

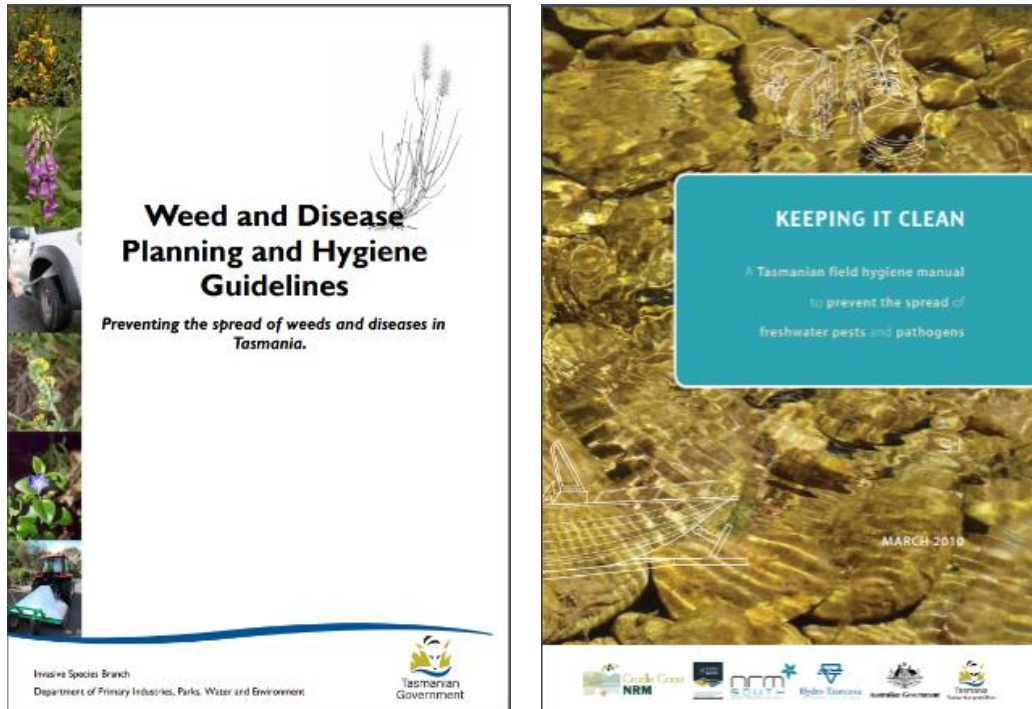
This is not an exhaustive list. It provides step-by-step guidance. Please refer to the relevant management plan or tools for detailed information.

4. Minimum Requirements for Weed, Pest & Disease Management

TasWater requires weed, pest and disease management to align with the requirements of the Department of Primary Industries, Parks, Water and Environment's (DPIPWE) **Weed and Disease Planning and Hygiene Guidelines** (the Guidelines). The Guidelines set the standard for weed, pest and disease management in Tasmania and are referred to throughout this procedure, they contain:

- Information on key controlled weeds, diseases and pathogens of Tasmania
- Guidance on the development of weed, pest and disease management plans
- Recommended hygiene standards and control measures
- Guidance on the development and construction of hygiene control measures
- Clean-down checklists and disinfection guides for specific vehicles and machinery.

Other relevant guidelines to be utilised in the management of weeds, pests and diseases in Tasmania include the **Keeping It Clean Field Hygiene Manual – To prevent the spread of freshwater pests and pathogens** and the various information sheets available through the DPIPWE and Commonwealth environment websites.

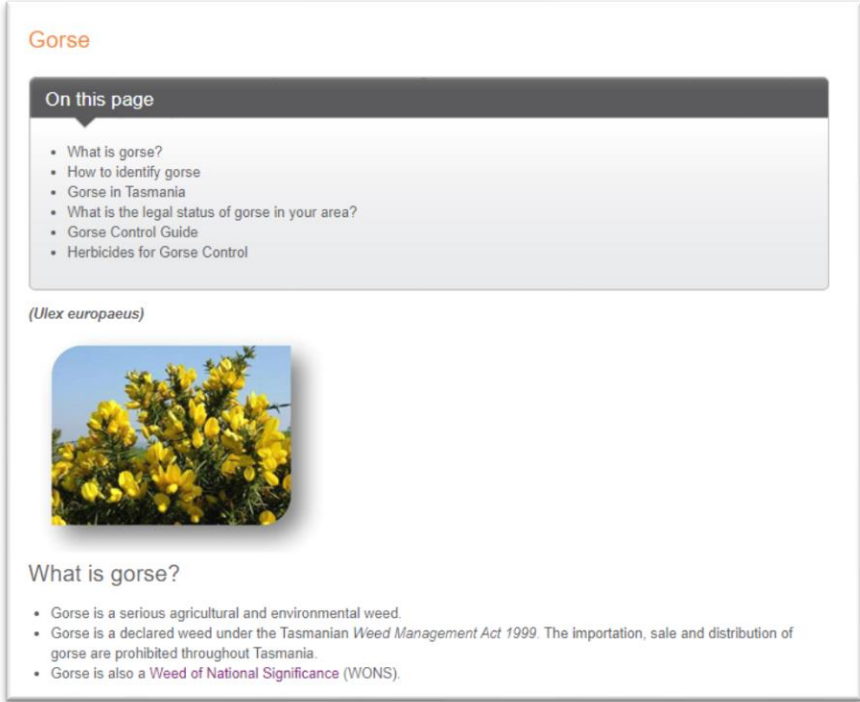


5. Weed Management

Weeds in Tasmania are managed under the *Weed Management Act 1999* (WMA). Weeds that require management under the WMA are referred to as ‘declared weeds’, of which there are currently 115 listed (<https://dpiipwe.tas.gov.au/invasive-species/weeds/weeds-index/declared-weeds-index>). Statutory Weed Management Plans and information of each of the 115 listed species are available through the abovementioned link.

Other relevant legislation and management initiatives include:

- The *Seeds Act 1985*, which lists a range of prohibited seeds - which should be observed in relation to rehabilitation activities for projects.
- The *Plant Quarantine Act 1997*, which governs the broader control of plants and diseases, including requirements in relation to the importation of construction machinery into Tasmania for civil projects.
- Weeds of National Significance (WoNS) are weeds that have been nominated for a collaborative, national-based approach to their management. There are currently 32 WoNS which were nominated based on their invasiveness, potential for spread and potential for environmental, social and economic impact. Each of the 32 WoNS have coordinated national plans developed which identify responsibilities and management strategies, where WoNS exist on site, the national approach should be adhered to. All WoNS in Tasmania are also ‘declared weeds’ under the WMA.


PROCEDURE	RESPONSIBILITY
GENERAL	
<ul style="list-style-type: none"> • Management information for each of the 115 weed species declared under the WMA is available on the DPIPWE website at: https://dPIPWE.tas.gov.au/invasive-species/weeds/weeds-index/declared-weeds-index • The declared weeds index lists all 115 declared weed species in Tasmania. Clicking on each of the weed species provides information on: <ul style="list-style-type: none"> – The identification of the weed – The legal status of the weed – Its distribution around Tasmania – A control guide to the species, including the most suitable management and mitigation strategies and the effectiveness of each. – Suitable timing for control of the weed with respect to seasonal change. – Lists of effective herbicides or chemicals for control of the weed species. – Available management plans for the species. • Mechanical removal or chemical control are suitable weed control methods for TasWater projects. 	Contractor
 <p style="text-align: center;">Example screenshot of the DPIPWE Invasive Species Declared Weed Index</p>	
WEED MANAGEMENT - MECHANICAL REMOVAL	
<p>There are several methods of mechanical removal of weeds. These methods are usually used in combination with other methods, as they are generally not effective long-term eradication solutions on their own. Methods include:</p> <ul style="list-style-type: none"> • Hand Weeding: useful for small outcrops of woody weeds without extensive root systems. • Mowing/Slashing: Useful for bulk removal in the short-term of large volumes of weeds but is not suitable for weeds that will regrow from slashed roots or fragments. The use of this technique can hinder the effects of other weed control methods through making it more difficult for chemical uptake of the weeds. 	Contractor


PROCEDURE	RESPONSIBILITY
<ul style="list-style-type: none"> • Scalping: this technique involves removing the weeds/vegetation and top layer of soil. This method is only suitable just prior to rehabilitation with other species or in preparation of the use of other techniques such as application of herbicides. • Burning: This control method can be very effective at removing the initial mass of a weed infested area; but must then be followed up with a secondary treatment such as a weed spray. 	
WEED MANAGEMENT – CHEMICAL CONTROL	
<p>Herbicides are chemical agents used to kill target flora species. There are many different types of herbicides and many different application techniques. The DPIPWE weed index (https://dpiipwe.tas.gov.au/invasive-species/weeds/weeds-index/declared-weeds-index) provides recommended herbicide products, doses and application techniques for some species.</p> <p>The following herbicide application techniques can be used to control weeds:</p> <ol style="list-style-type: none"> 1. Basal bark spraying: An oil-soluble herbicide is mixed with diesel and sprayed around the full circumference of the trunk or stem of the plant. The whole circumference of the stem or trunk must be sprayed or painted with herbicide solution from ground level to a height of 30 cm. Suitable for thin-barked woody weeds and undesirable trees with basal diameters up to 10 cm and heights of 30 to 100 cm. 2. Foliar spraying: Use of a diluted herbicide to spray over weed foliage to the point of runoff (until every leaf is wetted, but not dripping). Suitable for shrubs, grasses and dense vines where complete spray coverage can be achieved. 3. Cut and Paint: Stems/trunks are cut as close to the ground as possible and herbicide is then applied immediately to the exposed area via spray or brush. A horizontal cut prevents runoff of poison. Suitable for vines, multi-stemmed shrubs as well as trees and woody weeds. 4. Stem injection methods: Herbicide is injected into holes or cuts made by drilling or cutting through the bark into the inner tissue of the plant (the cambium) where the herbicide will be transported throughout the plant. Suitable for trees and woody weeds with stems or trunks greater than 5 cm in circumference. 5. Stem-scraping: Also called bark-stripping or stem-painting. A sharp knife is used to scrape a very thin layer of bark from a 15–30 cm section of the stem. Herbicide is then immediately applied to the exposed soft underlying green tissue. Suitable for plants and vines with aerial tubers. <ul style="list-style-type: none"> • Where chemical control is undertaken the Herbicide and Pesticide Checklist must be completed and accepted by the TasWater Environmental Advisor prior to commencement of chemical control. 	Contractor


6. Pest and Disease Management

There are several pests and diseases already in present in Tasmania that pose significant threats to the ecological stability of the island. These include phytophthora (root rot, dieback), myrtle rust, fire blight, chytrid frog disease, platypus mucor disease, and the freshwater pest didymo. Whilst the management of environmental pests and diseases are not all specifically covered under legislation, their spread is known to detrimentally impact the environment and therefore should be considered under Section 5 of the Environmental Management and Pollution Control Act 1994, as a minimum, in relation to their spread having an adverse effect or causing harm to the environment. The prevention of their spread is therefore considered an environmental responsibility for TasWater and its Contractors and is managed/monitored by the DPIPWE

through several divisions, including the Tasmanian EPA, Biosecurity Tasmania, and the Invasive Species Branch.

PROCEDURE	RESPONSIBILITY
GENERAL	
<p>There are three main diseases that are of major concern in Tasmania during construction projects (excluding marine pests, which are covered in Working in and Around Water Procedure):</p> <ol style="list-style-type: none"> 1. Phytophthora (also known as root rot or dieback), a soil-borne disease that kills native plant species; 2. Chytrid Fungus, which is harmful to native amphibians; and 3. Didymo or “rock snot”, which smothers aquatic ecosystems. <p>The following sections provide information and management guidelines for these pests/diseases.</p>	All
DISEASE INFORMATION AND MANAGEMENT: PHYTOPHTHORA	
<ul style="list-style-type: none"> • Phytophthora (also known as root rot or dieback) is a soil borne disease caused by the pathogen <i>Phytophthora cinnamomi</i>. • Root rot poses a significant threat to a variety native plants, causing disease and death in a number of susceptible plants and ecosystems, including coastal heathlands, eucalypt woodlands and buttongrass moorlands. • Spores of the dieback pathogen can be transported hundreds of kilometres between sites in soil affixed to machinery, cars and clothing, where it is then dislodged to the new site. • The spores can rapidly germinate and decimate susceptible areas of native vegetation within a matter of months. • The key controls for the management of phytophthora, with methods discussed in Section 1.4, are: <ol style="list-style-type: none"> 1. Disinfection of clothing and boots 2. Washing of construction equipment and vehicles 3. Certification of any soils imported to site (e.g. fill material) 	All
 <p style="text-align: center;">A phytophthora infected plant visible in the foreground</p>	
DISEASE INFORMATION AND MANAGEMENT: CHYTRID FUNGUS	
<ul style="list-style-type: none"> • The pathogen <i>Batrachochytrium dendrobatidis</i>, more commonly known as chytrid fungus causes the disease chytridiomycosis, which affects frog species through impacting regular skin structure and function. Chytrid fungus has spread significantly around Tasmania, especially in populated areas. 	All

PROCEDURE	RESPONSIBILITY
<ul style="list-style-type: none"> • The pathogen is spread about the state through transmission of fungal spores in water and soil, which can be picked up through construction sites on clothing, boots and vehicles/machinery. • The key controls for the management of chytrid fungus, with methods discussed in Section 1.4, are: <ol style="list-style-type: none"> 1. Avoid the handling of any amphibians 2. Disinfection of clothing and boots that has come into contact with areas of aquatic habitat, including swamps, creeks and wetlands. 3. Washing of construction equipment and vehicles that has come into contact with aquatic habitat. 	
<div style="text-align: center;">  <p>A frog affected by chytrid fungus</p> </div> <ul style="list-style-type: none"> • More information on the disease and its management is available in the guideline <i>Tasmanian Chytrid Management Plan</i>; and in • <i>Keeping It Clean Field Hygiene Manual – To prevent the spread of freshwater pests and pathogens</i> 	
DISEASE MANAGEMENT: DIDYMO	
<ul style="list-style-type: none"> • Didymo (<i>Didymosphenia geminata</i>), also known as ‘rock snot’, is an invasive species of diatom from the northern hemisphere that forms extensive slimy algae mats made up of millions of microscopic cells. • Didymo coats freshwater habitats, causing significant ecological damage and visual impact to waterways. The algal mats smother rocky aquatic invertebrate habitat, preventing their growth, which in turn impacts the available food for fish and larger invertebrates. Didymo can also impact water quality during blooms, reducing oxygen levels significantly. • Didymo also can impact the recreation of a waterway both visually and functionally by making rocks extremely slippery. • The diatoms can be transferred significant distances, with only a single diatom cell required to successfully translocate the species. This has generally occurred via transfer of freshwater recreational fishing equipment, including waders, rods, tackle etc, but can also be transferred via construction equipment, clothing, boots, and vehicles/machinery. 	All

PROCEDURE	RESPONSIBILITY
 <p style="text-align: center;">Didymo covering a rocky substrate</p>	
<ul style="list-style-type: none"> • The key controls for the management of didymo, with methods discussed in Section 1.4, are: <ol style="list-style-type: none"> 1. Disinfection of clothing and boots that has come into contact with areas of aquatic habitat, including swamps, creeks and wetlands. 2. Washing of construction equipment and vehicles that has come into contact with aquatic habitat. • More information on the disease and its management is available in <i>Keeping It Clean Field Hygiene Manual – To prevent the spread of freshwater pests and pathogen.</i> 	

7. Hygiene Management

The control of the spread of weeds, pests and diseases during construction projects comes down to sound hygiene management. The below procedure outlines key hygiene management techniques that should be incorporated into a site plan where suitable.

PROCEDURE	RESPONSIBILITY
ISOLATION OF INFESTED OR INFECTED AREAS	
<ul style="list-style-type: none"> • Areas that are known to contain declared weeds, diseases, or pathogens should be cordoned off in accordance with the Establishing and Managing Environmental No-Go Zones Procedure for the duration of site works or until the area(s) are determined to be low-risk (e.g. following treatment). • No entry to these areas should be permitted without a Enter 'No-Go' Zones Permit. 	Contractor
SOIL AND OTHER MATERIAL IMPORTS TO SITE	
<ul style="list-style-type: none"> • All soil and quarried material must come to site certified as being in a weed and disease-free state from the supplier in written form. • For quarries this is commonly in the form of a Quarry Inspection Report performed by a qualified consultant (e.g. Quarry Clean). 	Contractor
VEHICLE CLEAN-DOWN AND DISINFECTION PROTOCOLS	
<p>Where deemed necessary, construction sites should have at least one dedicated vehicle clean-down/washdown station.</p> <ul style="list-style-type: none"> • The clean-down station should be adequately sized to serve the types of vehicles or machinery to be used onsite (e.g. light vehicles vs excavators). • The site should be located as close to the entry/exit point as possible to minimise the transmission of any material into or out of the site. 	Contractor

PROCEDURE	RESPONSIBILITY
<ul style="list-style-type: none"> • Ideally the washdown facility should be developed on a hard surface with adequate drainage sumps to capture runoff. Runoff must be captured, treated and disposed of in accordance with the chemical and biological constituents of the runoff (i.e. disinfectants, diseases, seeds etc). • The clean-down bay should have as a minimum a high-pressure hose available and an air compressor, together with disinfectants, fungicides, detergents, and cleaning tools (e.g. brushes, scraping tools etc). • Phytoclean (1:50 dilution) and F10 Super Concentrate (F10 SC) (1:125 dilution) are the two disinfectants recommended for use against the pathogens mentioned in this procedure for washdown of vehicles. • For the clean-down of vehicles the following approach or similar should be followed: <ol style="list-style-type: none"> 1. Safely park the vehicle or machinery at the clean-down station within the bunds, free of any hazards (overhead wires etc). 2. If using vehicle ramps, ensure ramps load rating matches the vehicle, are placed on a hard level surface, cannot slide forward when mounting and that the handbrake is on and grounded wheels are chocked when in use. 3. Knock off large clods of mud, use a crowbar if required and sweep out the cabin. 4. Using the high-pressure spray gun, clean the outside of the vehicle/machinery, concentrating in areas outlined in the Machinery, Plant & Vehicle Clean-Down Checklist, pay special attention to the underside, radiators, spare tyres, and bumper bars and remove any guards, covers or plates as required. 5. Compressed air can be used to clean material of areas not suitable for water (e.g. engine bay). 6. Check the inside of the vehicle for dirt and plant material and clean floor mats, foot wells, pedals and seats using a vacuum or compressed air to remove material. 7. If required for the site, a disinfectant can then be applied with a hand pump spray gun or similar. 8. Complete a Machinery, Plant & Vehicle Clean-Down Checklist for each vehicle or piece of machinery. 9. Ensure the clean-down event is logged in the Machinery Plant & Vehicle Washdown Log for the clean-down station. 	
CLOTHING AND HAND TOOL DISINFECTION PROTOCOLS	
<ul style="list-style-type: none"> • Where it is unavoidable to enter affected areas, suitable disinfection protocols should be established in line with the <i>Weed and Disease Planning and Hygiene Guidelines</i> and the <i>Keeping It Clean - A Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens</i>. • For the disinfection of clothing, footwear and small hand tools: <ol style="list-style-type: none"> 1. Establish a disinfection station at the entry to the infected area or at the vehicle entry/exit point for the infected location. 2. Use a plastic tub or similar as a wash bath, part filled with clean water with a mix of detergent and/or disinfectant, as required. 3. Phytoclean (1:10 dilution) and F10 SC (1:125 dilution) are the two disinfectants recommended for use against the pathogens mentioned in this procedure for washdown of clothing, footwear and hand tools. 4. Remove all loose mud and dirt from the objects to be cleaned. 5. Use the recommended safety equipment if washing with a fungicide (e.g. safety gloves and glasses). 6. Clean boots, gaiters and equipment in the bath using a scrubbing brush. 	Contractor

PROCEDURE	RESPONSIBILITY
<p>7. A final rinse or wipe with fungicide or methylated spirits can be used as a final sterilisation step.</p> <ul style="list-style-type: none"> • Effluent from the wash bath containing registered products such as disinfectants must be disposed of in accordance with label recommendations. • Safety Data Sheets must be obtained and maintained in accordance with the Waste Management Procedure. 	

8. Developing a Plan for Weed, Pest & Disease Management

When planning weed, pest and disease management for a project site, there are number of project and site-specific factors that need to be taken into consideration. A **Weed, Pest and Disease Management Plan** may be required to be developed for TasWater PDG construction projects. The complexity and scale of the plan should be commensurate with size of the project and the environmental risks of the weeds, pests and diseases on site. The Guidelines provide a useful template for developing a plan.

PROCEDURE	RESPONSIBILITY
STEP 1: IDENTIFY THE PROJECT FOOTPRINT AND AREAS OF CONSTRUCTION	
<ul style="list-style-type: none"> • On a project site plan, firstly identify the project footprint and the location of all of its components. • Include all construction-related ancillary features such as footprints for laydown areas, stockpile locations and construction site offices. • Identify all entry and exit points for the project. 	Contractor
STEP 2: IDENTIFY THE NATURAL WATERWAYS AND DRAINAGE FEATURES OF THE SITE	
<ul style="list-style-type: none"> • Identify any waterways or drainage features of the site and surrounds, including the eventual receiving environment of the features if applicable. This will include rivers, creeks, dams, lakes, drainage lines, estuaries, oceans and intertidal areas. • Identify the topography of the site to identify any specific peaks and depressions in the landscape, identify these on the site plan with direction of drainage. • These areas should be avoided were possible at sites with the potential for freshwater diseases or pests to be present. 	Contractor
STEP 3: IDENTIFY WEED SPECIES AND LOCATIONS	
<ul style="list-style-type: none"> • The Site Environmental Plan will include the identification and mapping of all weeds on site (from the Natural Values Assessment). • Information on each of the weed species identified should be assessed, as outlined in this procedure in Section 1.2 Weed Management. • Environmental no-go zones should be established around areas of weed infestations in line with the Establishing and Managing Environmental No-Go Zones Procedure. 	Contractor
STEP 4: IDENTIFY PEST SPECIES OR DISEASES	
<ul style="list-style-type: none"> • The Site Environmental Plan may identify the presence of known pests or diseases (from the Natural Values Assessment). • Information on each of the pests or diseases identified should be assessed, as outlined in this procedure in Section 1.3 Pest and Disease Management. • Environmental no-go zones should be established around known areas affected by pests or disease in line with the Establishing and Managing Environmental No-Go Zones Procedure. 	Contractor
STEP 5: DEVELOP A WEED, PEST & DISEASE MANAGEMENT PLAN	

PROCEDURE	RESPONSIBILITY
<ul style="list-style-type: none"> Using the information in this procedure and the management plans and guidance documents mentioned throughout, develop a suitably scoped Weed, Pest and Disease Management Plan which is to be accepted by the TasWater Environmental Advisor. 	Contractor / TasWater EA

9. References

- Incident Management - Reporting and Investigation Procedure
- Environmental Management Plan (Standard)
- Flora and Fauna Management Procedure
- Establishing and Managing Environmental No-Go Zones Procedure
- Working in and Around Water Procedure
- Waste Management Procedure
- Weed and Disease Planning and Hygiene Guidelines: Preventing the spread of weeds and diseases in Tasmania. Department of Primary Industries, Parks, Water and Environment, March 2015
- Keeping It Clean a Tasmanian field hygiene manual to prevent the spread of freshwater pests and pathogens field hygiene manual, NRM South, March 2010.
- Herbicide and Pesticide Checklist
- Tasmanian Chytrid Management Plan, Biodiversity Conservation Branch, DPIPWE, Tasmania, June 2010
- Enter 'No-Go' Zone Permit
- Machinery, Plant & Vehicle Clean-down Checklist
- Machinery Plant & Vehicle Washdown Log