

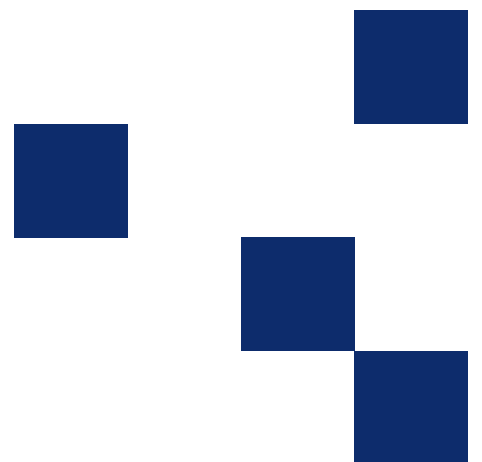


**Transport**  
Roads & Maritime  
Services

# **ENVIRONMENTAL DIRECTION**

## Management of Tannins from Vegetation Mulch

JANUARY 2012



# ABOUT THIS RELEASE

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## **1 PURPOSE**

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The purpose of this environmental direction is to set RMS's minimum management measures to minimise the generation and discharge of tannins from vegetation mulch on Roads and Maritime Services (RMS) construction projects. Additional background information on tannins and the use of mulch on construction sites is included in section 3 of this direction.

## **2 MANAGEMENT MEASURES**

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The primary focus must be to minimise tannin generation on construction sites.

### **2.1 General mulch management measures**

These general mulch management measures are to be followed for all RMS construction projects.

#### **2.1.1 Planning and works staging**

The first step in planning and works staging is to identify the amount of mulch to be generated. With this information, a strategy can be prepared to manage mulch on site. Staging of chipping, tub grinding and/or mulching activities should be planned to reduce the volume of mulch to be managed at any one time. The volume of excess mulch can then be assessed and plans made to dispose of this off site.

Other general considerations at the planning and works staging phase are as follows:

- Mulch stockpile sites should be established with appropriate controls in place before the main site clearing activities commence. Limited clearing may be required earlier for establishment of stockpile areas and access.
- Stage the mulching of cleared vegetation to ensure that mulch can be progressively moved to elevated, or otherwise suitable, stockpile locations. It is preferred that mulch should be transferred to a stockpile or reused on the day of mulching.
- Plan to efficiently reuse mulch in progressive works to reduce the time that mulch is concentrated in stockpile locations.
- Excess mulch can be managed by community giveaway. This takes considerable time and mulch needs to be suitably located and managed as this occurs. The conditions for community giveaway of mulch are included as Appendix 3.
- Any other form of bulk offsite mulch disposal (eg to Council parkland or a development site) must be assessed to ensure waste management provisions are adhered to for off site disposal.

#### **2.1.2 Stockpile location and management**

- Mulch stockpile sites should be established on elevated ground where possible.
- Stockpile sites with a duration of not more than 1 month should be constructed not less than 20 metres from a watercourse, including floodplains.
- Stockpile sites with a duration of more than 1 month should be constructed not less than 50 metres from a watercourse, including floodplains.
- Mulch stockpiles should be designed and constructed to divert upgradient water to prevent it from entering the stockpile site.

### **2.1.3 Management measures for the use of mulch on site**

- Do not use mulch for surface cover or sedimentation controls in any low lying areas of the site that remain consistently wet. Alternative controls such as geofabric (for surface protection) or sediment fence will be required in these areas.
- Do not spread surface mulch in thicker than 100mm layers. Mixing mulch with topsoil is encouraged for batters to prevent loss of topsoil during initial stabilisation. It should be noted that mulch will generally cause nitrogen draw down which may inhibit plant growth, unless mulch has been composted first.
- Care is to be taken to ensure that excessive mulch is not applied for sedimentation controls such as perimeter bunds or catch dams.

### **2.1.4 Monitoring and response**

- Monitor the site for generation of tannins. Tannin impacts can be readily identified visually as dark coloured ponded water. Site staff should be trained to identify and report potential impacts to the site project management or environment staff.
- Review management practices where required to prevent the generation of tannins in identified problem areas.

## **2.2 Mulch management methods for high risk sites**

### **2.2.1 High risk sites**

High risk sites, where additional management measures may be required, include:

- where large quantities of mulch will be generated and stockpiled.
- where high tannin generating vegetation types are to be mulched (see 3.1).
- where the receiving environment is identified as sensitive (eg Marine Park, threatened aquatic species habitat).
- where tannins have been observed to be generated or discharged from an operating site with standard management controls.

### **2.2.2 Stockpile management measures for high risk sites**

- Mulch stockpiles for high tannin generating vegetation types should incorporate an impermeable bund to capture stockpile leachate or tannin impacted water. Impervious bunds must be a minimum of 300 mm high, preferably higher to capture tannin impacted water. All bunded stockpiles that are in place for a period longer than one month must include a lined discharge point for overflow in extreme rainfall events.
- Stockpiles established on sloping sites must be designed to provide temporary stormwater containment equivalent to a 300 mm minimum height bund on a flat site.
- Tannin impacted water should be pumped out of bunded stockpiles within 5 days of the end of a rainfall event to maintain the storage capacity. This water should be used for on site purposes including dust suppression and landscape watering. These activities must be managed to prevent any pooling or runoff of tannin impacted water.
- Bunded stockpiles must be inspected within 24 hours of cessation of any rainfall event greater than 10mm to ensure tannin impacted water does not overflow.

## **2.3 Site management procedures**

Site management procedures must be prepared for all sites where tannins are identified as a potential issue. Site management procedures should be based on the management measures provided in this Environmental Direction.

## **3 BACKGROUND**

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### **3.1 Tannin generation from vegetation mulch**

See Plates 1 – 3 in Appendix 1.

Tannins are naturally occurring plant compounds. Tannin generation from vegetation mulch is likely to be highest from low-lying coastal floodplain areas. The species of vegetation (eg *Melaleuca*) will have a major impact on the likelihood of tannin generation.

Tannin generation is generally highest from mulched vegetation that is stockpiled in areas that are subject to inundation. Placement in wet areas will result in accelerated leaching of tannins into water, concentration of tannins in pooled water, and greater impacts on water quality.

### **3.2 Tannin impacts on water quality**

See Plates 4 – 5 in Appendix 1.

The main concern with the discharge of water that is high in tannins is that it may increase the biological oxygen demand (BOD) of the receiving environment. Increases in BOD may result in a decrease in available dissolved oxygen. A lack of dissolved oxygen is identified as the main cause of about 80 percent of fish kills in NSW rivers and estuaries.

Tannin impacts may result in dark coloured water discharge from construction sites. This impact can be obvious and may raise the concern of the community and other stakeholders including regulatory authorities. Once discharged to the environment, tannins may reduce visibility and light penetration and change the pH of receiving waters. These impacts may affect aquatic ecosystems in receiving environments.

Tannins cannot be readily treated with standard construction site water quality controls. Once water on site is impacted with tannins it is not possible to treat effectively with currently approved flocculants. Minimisation of tannin generation in the first place is the management strategy that must be applied.

### **3.3 Use of mulch on construction sites**

See Plates 10 – 16 in Appendix 2.

The RMS Biodiversity Guidelines provide guidance on the benefits of reusing various sizes of vegetation for different purposes. Mulch is a readily available and cheap source of material for temporary site stabilisation and sedimentation control. The re-use of mulch reduces the need to transport this material off-site and reduces handling and disposal costs for construction contracts.

Unprotected mulch sedimentation controls should not be placed in concentrated flow lines where mulch may be washed away. Mulch may be protected by wrapping it with geofabric or other materials to provide a stable control. All temporary catch dams constructed from mulch must have a stable outlet to minimise the washing away of mulch in high rainfall events, and the possible failure of the control.

## **4 ADDITIONAL RESOURCES**

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- RTA Biodiversity Guidelines- Protecting and Managing Biodiversity on RTA Projects, 2011
- Pacific Highway Mulch Protocol 2011

## **5 APPENDICES**

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## Appendix 1: Plates showing tannin generation & water quality impacts



**Plate 1:** Melaleuca vegetation community – mulch from this vegetation type will generally produce high amounts of tannins.



**Plate 2:** Vegetation mulching activity – mulch should be progressively moved into prepared stockpile areas.



**Plate 3:** Tannin generation from recently felled and partially mulched vegetation in an area subject to localised inundation. Mulched vegetation should be progressively moved to prepared stockpiles to manage tannin impacted water.



**Plate 4:** Tannin impact in stormwater at the discharge point from a road construction site. The discharge of impacted water may be obvious to community and other stakeholders.



**Plate 5:** Tannins in a drainage line generated from very thickly applied mulch on the batter above. Note that the sedimentation fence is not effective in treating the tannins.

## Appendix 2: Plates showing the use of mulch for erosion & sedimentation controls



**Plate 6:** Mulched vegetation stockpiled in a low-lying area subject to inundation. This is not an appropriate stockpile location and may increase the generation of tannins from stockpiled mulch.



**Plate 7:** Mulch being placed as batter erosion control. Mulch should not be applied in layers more than 100 mm thick for surface stabilisation.



**Plate 8:** Site showing recent application of a mulch/topsoil mix on batters (40% mulch to 60% topsoil). Mulch mixes are used to provide temporary stabilisation to prevent the loss of topsoil from batters in heavy rainfall events. Mulch use is also shown as a mounded sedimentation control to prevent sediment entering the median drain.



**Plate 9:** A mulch/topsoil mix used to provide temporary batter stabilisation and to assist cover crop establishment.



**Plate 10:** Successful establishment of cover crops on batters where mulch has been used with topsoil to assist temporary stabilisation.



**Plate 11:** Geofabric wrapped mulch bunds used for sedimentation control



**Plate 12:** Mulch used as a bund for a temporary sedimentation catch dam. Mulch is effective as it can provide both containment and filtering of site water. Mulch should not be used as a control in areas of concentrated flow where it may be washed away. Any mulch containment control should have a defined and lined outlet that allows discharge from the control without washing mulch away. Note that this control does not have a defined discharge outlet which should be installed to prevent failure of the control in heavy rainfall events.

### **Appendix 3: Minimum requirements for community mulch giveaways**

The purpose of community mulch giveaways is to provide mulch for residential landscaping purposes.

The activities of a community mulch giveaway are permissible under the *Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A* (the Raw Mulch Exemption 2008). However, the activities remain subject to other relevant environmental regulations within the Act and Regulations. The Raw Mulch Exemption 2008 is subject to the following conditions:

- The raw mulch can only be applied to land for the purposes of filtration or as a soil amendment material or used either singularly or in any combination as input material(s) to a composting process.
- The consumer must land apply the raw mulch within a reasonable period of time.

Further information can be found at: [www.environment.nsw.gov.au/resources/waste/ex08mulch.pdf](http://www.environment.nsw.gov.au/resources/waste/ex08mulch.pdf)

It is the mulch generators responsibility to ensure that the mulch is reused in an environmentally responsible manner.

A safe work method statement (SWMS) must be prepared that identifies potential OHS risks and all prevention and mitigation measures. The SWMS must apply to both the community and site workers involved in the mulch giveaway.

Each member of the community who participates in the mulch giveaway must read and understand a site specific information sheet. A template information sheet is attached as Appendix 4.

The site occupier must maintain written records for each load of mulch that is taken away and to ensure that each community participant understands the conditions of the community mulch giveaway information sheet. A suggested template to record this information is attached as Appendix 5.



## **Appendix 4: Community mulch giveaway information sheet**

The following community mulch giveaway information sheet must be populated with site specific information.

# Community Mulch Giveaway Information Sheet

Details of Mulch Supply	
<b>Site Occupier</b>	<insert name of contractor / alliance etc>
<b>Project Name</b>	<insert project name>
<b>Location</b>	<insert location of mulch stockpile>
<b>Mulch stockpile access directions</b>	<insert adequate directions for community members to find the stockpile location>

Background
<ul style="list-style-type: none"><li>• This information sheet supports the non-commercial giveaway of mulch for local residents.</li><li>• The product is raw vegetation mulch from &lt;insert project location / name&gt;.</li></ul>

Conditions
<ul style="list-style-type: none"><li>• Any one individual may only take a maximum of 5 trailer loads from this project.</li><li>• The mulch may only be used for residential landscaping purposes.</li><li>• Mulch must not be placed in or immediately adjacent to waterways.</li><li>• The raw mulch can only be applied to land for the purposes of filtration or as a soil amendment material or used either singularly or in any combination as input material(s) to a composting process.</li><li>• The consumer must apply the raw mulch to land within a reasonable period of time.</li></ul>

Community Safety Requirements
<ul style="list-style-type: none"><li>• &lt;add in any safety requirements or mitigation measures from the SWMS that apply to the community&gt;</li><li>• &lt;add in any safety requirements or mitigation measures from the SWMS that apply to the community&gt;</li><li>• &lt;add in any safety requirements or mitigation measures from the SWMS that apply to the community&gt;</li><li>• &lt;add in any safety requirements or mitigation measures from the SWMS that apply to the community&gt;</li></ul>

## **Appendix 5: Records template for community mulch giveaway**

The records in the following suggested template must be kept as a minimum.

