

Environmental Guidelines for Boat Repair and Maintenance

**Department of Environment, Parks, Heritage and the Arts
Environment Division**



Tasmania
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Environmental Guidelines

For

Boat Repair and Maintenance

Department of Environment, Parks, Heritage and the Arts
Environment Division



ENVIRONMENTAL GUIDELINES FOR BOAT REPAIR AND MAINTENANCE

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PART 1 INTRODUCTION

1.1 Purpose and scope of the guidelines

The purpose of these guidelines is to assist Tasmania's boat repair and maintenance industry to manage the environmental risks associated with its activities. The guidelines will also assist facility operators to meet the requirements of the *Environmental Management and Pollution Control Act 1994* (EMPCA) and other relevant legislation. Implementing the guidelines will improve the condition of Tasmania's coastal environment and ensure that the industry becomes environmentally sustainable.

The guidelines describe the major activities related to boat repair and maintenance, some of which may not be applicable to all facilities. Recommended management actions listed under each activity are based on methods used interstate and overseas, and reflect current best practice.

Planning, development application and construction requirements are not covered by the guidelines. Advice on these matters should, where applicable, be sought from local Councils, Crown Land Services in the Department of Primary Industries and Water, or the Environment Division of the Department of Environment, Parks, Heritage and the Arts (DEPHA). For example, the installation of waste containment facilities is likely to trigger Council and/or Crown Land assessment processes.

1.2 Who should use the guidelines

The guidelines cover activities at all private and commercial facilities where boat repairs and maintenance take place, including slipways and boat clubs. The guidelines also cover in-water vessel repair and maintenance.

The guidelines are for use by:

- Facility owners and operators;
- Boat owners and operators, and boat club members;
- Marine service contractors;
- Registered waste transporters;
- Environmental consultants; and
- State Government and Council officers involved in planning and regulation.

The guidelines may be used by planning authorities to guide decision making if new or upgraded slipways are proposed. They may also be used by regulatory authorities to address specific issues at an individual facility.

The guidelines **do not** apply to marine rails that are used for the sole purpose of boat storage. However, activities that may result in the release of contaminants should not be carried out on these structures. (Note that 'marine rails' are referred to as 'private slipways' in Crown Land Services' leasing documents).

1.3 How to use the guidelines

Part 2 of the guidelines gives a brief explanation of the environmental management issues which typically arise from boat repair and maintenance activities, and recommends that the industry adopt 10 environmental management goals to deal with these issues.

Part 3 recommends specific actions in each major area of activity that will improve work practices and assist operators to achieve the environmental management goals at their site. It also recommends that each site develop an Environmental Management Plan to document how this will be done.

Users of the guidelines should refer to Part 3 to identify the activities and practices that are relevant to their work. In particular, facility operators can check their current practices against each list of management actions and improve their activities where necessary.

Some recommendations are more applicable to boat owners who carry out boat maintenance themselves. Facility owners and operators, however, have a responsibility to ensure that all repair and maintenance activities at their facilities are carried out in a responsible manner, and in accordance with all relevant Acts, Regulations and Codes of Practice.

LIST OF ACRONYMS

The following acronyms are used in these Guidelines:

ANZECC	Australian and New Zealand Environment Conservation Council
APMF	Australian Paint Manufacturers' Federation
APVMA	Australian Pesticides and Veterinary Medicines Authority
AS	Australian Standard
DDT	dichlorodiphenyltrichloroethane
DEPHA	Department of Environment, Parks, Heritage and the Arts
DPIW	Department of Primary Industries and Water
EMP	Environmental Management Plan
EMPCA	<i>Environmental Management and Pollution Control Act 1994</i>
GAC	Granular Activated Carbon
HPLV	High Pressure Low Volume
TBT	tributyltin
TCLP	Toxicity Characteristic Leachate Procedure
MAST	Marine and Safety Tasmania
MSDS	Material Safety Data Sheet
NATA	National Association of Testing Authorities
UV	ultraviolet
VOCs	Volatile Organic Compounds

PART 2 WHY THE GUIDELINES ARE NEEDED

Fishing, marine farming and a host of tourism activities depend on the long-term sustainability of Tasmania's marine resources and the ecological health of their supporting ecosystems. The boat repair and maintenance industry is indirectly dependent on these resources. The industry services the commercial boats which harvest the sea and the recreational boats that cruise the Tasmanian coastal marine and estuarine environments.

Boat repair and maintenance facilities have long been a part of Tasmania's commercial and recreational boating service infrastructure, with several slipways in the State operating at their current locations for more than 100 years. Demand for the services offered and activities undertaken at boat repair and maintenance facilities in Tasmania will continue because:

- Tasmania has more boat owners per capita than any other Australian State;
- There are more than 13 boat clubs in the State and the number of small boat users increases annually;
- There are more than 560 commercial fishing boats operating in Tasmania;
- All boats registered through Marine and Safety Tasmania (MAST) require slipping over a two-year period; and
- It is conservatively estimated that more than 2700 boats are slipped each year in Tasmania.

Boat repair and maintenance facilities have the potential to affect the surrounding coastal environment. Facility operators are, however, often unaware of the environmental risks posed by their practices and the wastes that they generate, in particular the harm caused by toxic paint chips, paint residues and other solid and liquid wastes containing heavy metals, acids, oil, hydrocarbons and marine pest species.

2.1 Environmental management issues

The specific environmental management issues arising from boat repair and maintenance are described below. Most boat repair and maintenance activities have the potential to adversely affect aquatic plant and animal life. They may also threaten human health and environmental amenity. The greatest risk to the environment results from maintenance activities at facilities that do not have adequate waste containment structures.

Materials use and storage

Boat repair and maintenance facilities use and store a wide range of chemicals and other materials, many of which may be hazardous. Examples include fuels, oils, alkaline and acidic solutions, cleaning solvents, disinfectants, detergents, degreasers, rust inhibitors and antifouling paints. These materials need to be used carefully and stored securely to prevent leakage and spills, as well as vandalism and theft.

Emergency response procedures

Hazardous chemicals used onsite may cause serious injury or environmental harm in the event of an accidental leak or spill. It is important to have a clear and well understood emergency protocol to deal with such situations.

Boat haul-out, repair and maintenance area

Many of the activities and practices that take place at boat repair and maintenance facilities have the potential to cause environmental harm, as they often involve the use of hazardous chemicals or the production of toxic waste. In a poorly managed work environment this can lead to contamination of stormwater, groundwater, soil, air and the receiving estuarine/marine water and sediment.

Removal of antifouling paint

Antifouling coatings are applied to prevent or inhibit the settlement and attachment of marine biota on to boat hulls. This is primarily achieved by the application of paints that continuously leach chemicals such as copper and/or other biocides that are toxic to hull foulants. In the past, tributyltin (TBT) was used for this purpose. Due to the negative impact that TBT has been found to have on the marine environment, the use of TBT-based antifouling paints has been restricted in Australia since 1989. The International Maritime Organisation (IMO) later enforced a worldwide ban on the use of TBT based antifouling paints which came into effect in January 2008.

Non-toxic antifouling coatings, mostly based on silicone, have surface properties that reduce the strength of adhesion of antifoulants and ideally self-clean during vessel activity. Antifouling paints applied to boats before the 1970s may also contain hazardous chemicals such as arsenic, mercury and dichlorodiphenyltrichloroethane (DDT). Modern antifouling paints mostly contain copper, in the form of either copper oxide or copper thiocyanate, together with a secondary antifouling agent such as diuron.

The removal of antifouling paints results in paint debris, sludge, dust and other particles that may contribute to water, soil and air pollution and may be harmful to marine life.

Manual and mechanical scraping, scrubbing and cleaning

Hull and deck sanding and scraping produces a range of solid wastes, including paint chips and dust that can pollute and contaminate air, soil, surface waters and bottom sediments. Conducting these activities outdoors increases the potential for pollutants to be dispersed into the environment by wind, rain or runoff. The accumulation of paint chips and other residues in yard soils and sediments can also lead to contamination.

Pressure water blasting

Using water-based pressure cleaners to clean the exterior of boats has the potential to create an environmental nuisance and cause environmental harm. High-pressure water blasting also presents containment problems caused by the wide dispersion of biological and physical materials removed from the boat hull during the cleaning process.

Pollutants and contaminants originating from pressure water blasting activities include:

- Chemicals and additives, including detergents, solvents, caustic or acids, used in the cleaning solution;
- Materials removed from the cleaning surface including biological hull foulants, antifouling paint chips and sludge, dirt, oil and grease; and
- Compounds produced as a result of reactions between the cleaning solution and the materials removed from the boats.

Abrasive blast cleaning

Abrasive blast cleaning involves cleaning surfaces by using compressed air (dry blasting) or water (wet blasting) to propel hard granular particulate matter through a nozzle against the boat hull and/or other surfaces. Typical blast materials include siliceous sand, garnet, copper or zinc slag and steel grit or shot.

Wet abrasive blasting involves the use of a standard blast machine and compressed air to propel the abrasive with just enough water added before the abrasive leaves the nozzle to suppress the dust.

Vacuum blast cleaning methods apply a standard abrasive blast nozzle inside a shroud that is in close contact with the work surface, forming a tight seal. As the abrasive impinges on the surface, a vacuum is applied inside the shroud, removing the debris and piping it into a blast material collection and treatment chamber.

Abrasive blast cleaning practices result in emissions, which may cause air pollution, soil and water contamination. Performing these practices near public places may also result in visual annoyance, dust and noise nuisances.

Removal of biological foulants

Marine pests may be present on the hull of boats, in ballast tanks or in the internal plumbing of boats. Facilities that slip boats that have been in interstate and international waters risk introducing marine pests into the State's marine environment, while all facilities risk spreading marine pests between regions within the State.

Manual painting

Painting boat hulls and applying topside coatings may result in the concentrated release of harmful vapours and liquids. Wastes generated by painting activities are considered hazardous where they contain solvents and/or heavy metals.

Spray painting

Spray painting involves the application of liquid and solid formulations that consist of paints, powder coatings, surface preparation products, removers, finishers, solvents and thinners. Spray painting methods include the use of conventional air spray, airless atomisation and air assisted atomisation.

The environmental risks associated with spray painting include the release of volatile organic compounds (VOCs) and fine particles from overspray into the atmosphere and then onto soil and into water bodies.

Fibreglassing

Fibreglassing activities are a source of hazardous volatile emissions to the environment. Acetone (a solvent used to clean tools and other surfaces contaminated with resin) and styrene (the volatile component of the polyester resin) are the largest contributors of volatile emissions caused by fibreglassing activities. Fibreglass trimming, grinding, sanding and drilling activities may also give rise to air pollution in the form of dust and other particulate emissions.

Welding and metal fabrication

Welding activities may contribute towards air pollution and cause metal contamination of soil, stormwater and estuarine/coastal marine surface waters through the generation of airborne dusts and the emission of fumes and smoke. Performing welding activities near public places may also result in visual annoyance and dust nuisances.

Engine maintenance and repair

Engine maintenance and repair activities involve the use of oil, fuel and solvent that are potentially hazardous to human health and the surrounding environment.

Waste management

Boat repair and maintenance facilities may produce a wide range of solid and liquid wastes. Even 'general' waste such as plastic and used drink containers is unsightly and potentially dangerous to people and animals. Dangers to birds and animals include the potential for ingestion of debris mistaken for food and/or death from entanglement. Human dangers include injury from stepping on discarded items. Other general waste impacts include odour problems, blocking stormwater and other water intakes and drains and reduced visual appeal of our shorelines and waterways.

Coastal marine and estuarine surface water quality can also be affected by pollutants in stormwater runoff. These pollutants may include sediment, nutrients, oils, grease, hydrocarbons, metals, chemicals, particulates and solvents. The highest concentration of surface pollutants occurs in the runoff associated with the first 25mm of rainfall, normally called the "first flush" effect.

One objective of the State Policy on Water Quality Management 1997 is that pollutants discharged to the water environment are reduced to the maximum extent that is reasonable and practical, having regard to best practice environmental management. In addition, the Waste Management Regulations state that a person must not cause environmental harm or permit a controlled waste to be produced, stored or treated in such a manner that it is reasonably likely that the waste will leak, spill or escape into the environment or cause environmental harm or nuisance.

Air quality management

Boat repair and maintenance activities may affect local air quality and cause air pollution by generating dust, fumes, gases, smoke and other emissions.

Noise management

The emission of noise is considered to interfere with a person's enjoyment of the environment if it is unreasonable having regard to its volume, intensity or duration; and the time, place and other circumstances in which it is emitted. Premises causing ongoing noise problems may be required to introduce specific noise control measures and/or may be subject to restricted hours of operation. It needs to be recognised that noise carries long distances over water.

Excessive and/or unreasonable noise emissions from activities such as grinding, sanding, cutting and the revving of engines can be a major source of disruption and annoyance to surrounding areas.

Management of contaminated land

There is a high probability that past and current boat maintenance practices have resulted in soil and sediment contamination at some boat repair or maintenance facilities. Any onsite excavation or construction needs to be carefully managed to protect human health and prevent further dispersion of contaminants.

In-water cleaning

Many of the products used to clean boat hulls and decks contain toxic ingredients such as chlorine, phosphates and ammonia. In-water scrubbing of hulls coated in antifouling paints releases toxic chemicals which may contaminate the water and bottom sediments. In-water hull cleaning may also result in the introduction or translocation of introduced marine pests attached to the hull. Therefore, prior to undertaking in-water cleaning in Australia, approval from the relevant state and territory authorities must be granted and conditions may be imposed in line with the Australian and New Zealand Environment and Conservation Council (ANZECC) Code of Practice for Antifouling and In-Water Hull Cleaning and Maintenance (1997).

2.2 Environmental management goals

It is recommended that the industry and individual operators adopt the following environmental management goals to deal with the issues described in section 2.1:

1. Advise staff, contractors and other facility users of their role in reducing the environmental impact of boat repair and maintenance.
2. Minimise the production of solid and liquid waste.
3. Maximise the recycling and reuse of solid and liquid waste, in particular treated wastewater and non-hazardous general waste.
4. Prevent contaminated wastewater runoff and other liquid and solid pollutants from entering surface water, groundwater, soil and marine sediments.
5. Minimise the release of volatile vapours and other fumes produced during painting, fibreglassing and welding.
6. Minimise noise and odours generated on site.
7. Prevent existing contaminants in soil and sediment from being remobilised into the environment during construction or development works (for example excavation, land reclamation and associated activities).
8. Dispose of non-recyclable wastes and general wastes offsite in accordance with State and local government requirements.
9. Maintain sufficient documentation and records to define the site's environmental management program, monitor progress towards sustainability, and demonstrate compliance with Council and State government requirements.
10. Be prepared to respond effectively to emergency situations which threaten human and environmental health.

PART 3 RECOMMENDED SITE MANAGEMENT SYSTEM

3.1 Environmental management plan / record keeping

It is recommended that facility owners and operators keep up to date information and records relating to the environmental management of their site. This material should be stored in an easily accessible location; e.g. in the site office, and should include information on the points listed below. For large facilities or at sites where maintenance work is frequent or complex, it is recommended that the facility owner or operator prepare an Environmental Management Plan (EMP) for their site. An EMP is a practical reference document containing all the information needed to manage a facility in an environmentally sustainable fashion.

The EMP / record keeping should include:

- **A map of the site** showing the locations of significant features such as work areas, chemical and waste storage areas, the wastewater collection and treatment system, and any emergency equipment such as fire extinguishers and equipment to clean up chemical spills.
- **A description of the type of work undertaken at the facility**, such as hull cleaning, hull painting and engine maintenance.
- **A list of all chemical products** kept on the premises.
- **Copies of Material Safety Data Sheets (MSDSs)** for chemical products kept on the premises.
- **An Emergency Response Plan** describing environmental and personnel protection procedures in the event of fire, chemical spills and other pollution incidents.
- **Procedures for undertaking boat repair and maintenance work** according to the best practice recommendations given in Part 3 of these guidelines.
- **A Waste Management Plan** that describes how waste will be minimised, reused or recycled, where residual waste will be disposed of offsite, and what measures will be used to ensure that discharges from the facility meet relevant statutory and regulatory requirements. The plan should also cover management of wastewater runoff and 'clean' stormwater.
- **Copies of approvals granted by the Director of Environmental Management** for receiving, storing, treating and/or disposing of controlled waste on site.
- **Copies of other Government permits and approvals** relating to the construction and operation of the boat repair and maintenance facility. The relevant documentation may include land use planning permits and Crown Land lease or licence agreements.
- **A copy of the Trade Waste Agreement**, where relevant (liquid wastes may only be discharged to a sewer system under the conditions of a Trade Waste Agreement).
- **Copies of Keepers Licences** for any dangerous goods stored on site.

- **Other written records, including:**

A **Slipping Register** containing details on each boat slipped, including:

General information (name of the boat, distinctive numbers or letters, length, gross tonnage and recent voyage history i.e. whether from intrastate, interstate or overseas).

Record of engine maintenance.

Record of antifouling work (type of anti-fouling system used; dates of application of anti-fouling system; name of anti-fouling system; manufacturer, name and colour of anti-fouling system; type, name, colour and date of application of sealer coat of sealer coat, if applied).

Record of painting work (paint history, types of paint applied and application dates).

Test results (soil, water, air or noise sampling results and related reports) associated with:

Trade Waste Agreements.

Disposal of controlled waste e.g. Toxicity Characteristic Leachate Procedure (TCLP) results.

Excavation/removal of contaminated soil.

Maintenance of waste management system (e.g. wastewater quality).

Proof of proper disposal of controlled (hazardous) wastes, including abrasive blast media and sludge collected from sumps and other work areas.

3.2 Chemical storage and handling

Storage

- Provide a secure, bunded, covered area with a surface impervious to leaks or spills.
- Locate storage areas away from through-traffic, stormwater drains, pipes or any areas prone to flooding.
- Ensure that chemical storage complies with the requirements of the relevant legislation and Australian Standards.
- Provide adequate natural or mechanical ventilation according to the nature of the stored substances and their use.
- Display signage to identify chemical hazards and restrict access.
- Keep storage areas free of combustible waste materials. Store as little as possible of the chemicals, hazardous and dangerous liquid materials used on site.

- Store volatile and flammable solvents and other liquids in sealed containers away from heat, naked flames, direct sunlight, oil or other flammable liquids and fire hazards.
- Store incompatible chemicals separately (e.g., the fibre glassing catalyst methyl ethyl ketone peroxide should not be stored anywhere near flammable liquids or other dangerous goods).
- Seal and clearly label all storage containers and smaller decanting containers.
- Where possible, fit containers with taps or pump the liquid to minimise the potential for spills.
- Place chemically compatible trays under container taps to catch spills or drips.

Handling

- Refer to Material Safety Data Sheets for advice and information on handling all liquids and powder products used or stored on site.
- Ensure that all personnel responsible for handling chemicals are aware of the potential hazards of the materials they handle.
- Ensure that chemical handling complies with the relevant Australian Standards for hazardous chemicals.
- Provide required personal protective equipment (refer to MSDS) and train staff in the use of the equipment.
- Replace the lids on containers of solvent, resin, fibreglassing initiator and accelerator promptly after use, to reduce evaporative loss and contamination by dust.

3.3 Emergency response procedures

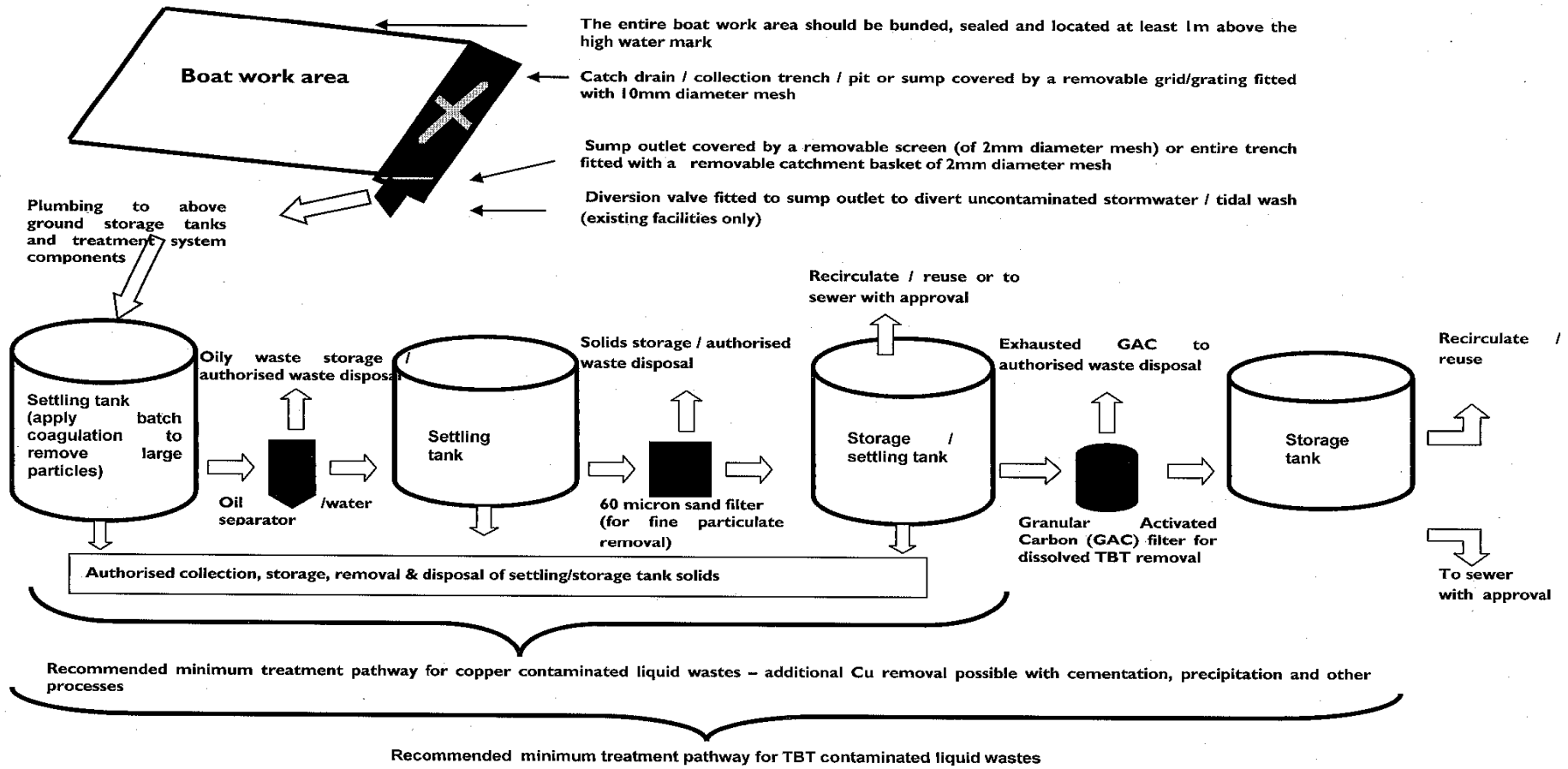
- Prepare an Emergency Response Plan that describes environmental safety provisions and emergency response procedures in the event of fire, chemical and other spills, damage to equipment and personal injury.
- Review the contents of the plan with facility staff at least once a year.
- Clearly display emergency spill and other incident response telephone numbers.
- Report all spills to DEPHA on ph: 1800 005 171 (24 hours, 7 days a week); **and** report all hydrocarbon and chemical spills to the Tasmania Fire Service on ph: 000.
- Keep and maintain spill clean-up equipment, such as absorbent materials, non-toxic dispersants booms (mechanical barriers for containing liquids). Sorbents can be made of peat, cotton, vermiculite, polypropylene fibre, wool or pine bark. Seek advice from DEPHA's Environment Division or the local Council where further information on decontamination procedures is required.
- Train staff in the use of spill clean-up equipment.

- Contain and clean up spills or leaks immediately if it is safe to do so. Do not hose the substances onto soil or into any inland, estuarine or coastal waters.
- Do not use sawdust or other readily combustible absorbents to clean up flammable liquid spills.
- Always refer to the relevant Material Safety Data Sheet (MSDS) and relevant manufacturers' instructions for guidance in dealing with the spilt substances. In an emergency, the MSDS is the most effective way of assessing risk.
- Dispose of contaminated clean-up materials in accordance with the Waste Management sections of these guidelines.
- Provide assistance to government agencies, where resources allow, in the event of a marine pest emergency situation. This may include providing access and boat information or facilitating hull cleaning of high risk boats.

3.4 Boat work area – general requirements

- Undertake all boat repair and maintenance activities on a bunded, sealed area (e.g. a concrete surfaced) to ensure that the wash-down wastewater and other facility liquid wastes can be fully contained on site (see Figure 1).
- Locate the work area at least 1m above the high tide mark to minimise the potential for waste materials to enter the surrounding estuarine/coastal marine waters. In the case of existing facilities where relocation of the work area is not feasible, other options such as undertaking work at low tide in a bunded area may achieve the same result (provided sumps and hardstands are cleaned before tidal inundation).
- Prepare a list of facility rules and environmental management conditions associated with the use of the slipway and boat repair and maintenance facilities, for clients and contractors to sign before slipping and working on their boats. Do not allow clients/contractors on the property if they have not signed the rules and conditions.
- Ensure contractors understand and know how to apply the required minimum environmental management measures before they use pressure water blasting (and other) equipment on the site.
- Erect signage to draw attention to environmental management requirements.
- Regularly clean and maintain the work area to minimise the potential for offsite impacts, especially where tidal inundation occurs.
- Establish a daily checklist to ensure that key work areas are kept clean and that appropriate storage, work and management procedures are being adhered to.
- Where relevant, assign different inspection responsibilities to specific facility staff or club members.
- Encourage boat owners who use the facility to fit oil filtration devices to their bilge pumps and to place commercial oil absorption materials in their bilges.
- Ensure that sumps, traps and filters operate with maximum efficiency.
- Collect and retain all waste material onsite until it can be disposed of appropriately.

Figure 1: Recommended System for Managing and Treating Liquid Wastes



3.5 Hull cleaning and stripping

General requirements

- Where possible, use mechanical or manual buffing and scraping methods in preference to pressure water blasting and abrasive sand blasting for hull cleaning, as solid wastes are less likely to escape and more of them can be swept or vacuumed up for disposal.
- Fit sanders, grinders and other power tools with dust extraction and collection systems.
- Use water-based or biodegradable strippers, cleaners and degreasers.
- Use phosphate-free detergents wherever possible and scrub with a soft brush to absorb the detergent. Use biodegradable spray-type cleaners that do not require rinsing.
- Read the manufacturer's MSDS before deciding on a chemical cleaner. Chemicals that are toxic to humans are likely to also be toxic to marine organisms.
- Wherever possible, use hot water, rags or a brush instead of chemicals.
- Dilute corrosion and rust removers to the correct concentration.
- Assume that any removed underwater coating is contaminated with biocides or other hazardous chemicals and therefore must be handled and stored as controlled waste (refer to section 3.15).
- Do not burn off antifouling coatings as this may generate highly toxic fumes, smoke and gases.

Pressure water blasting

- Ensure that pressure water blasting activities are sensitive to the surrounding land uses and amenities and that they do not result in visual annoyance or create an environmental nuisance, including noise.
- Prevent spray drift from escaping the work area by locating moveable waterproof screens alongside and behind the operator and avoiding pressure water blasting operations during windy conditions.
- If the surface to be cleaned contains paint with more than 0.5% lead content then the area being cleaned should be totally encapsulated with a waterproof membrane and operators working inside the encapsulating membrane should be completely protected from contact with all wastewater.
- Direct all wastewater runoff to a collection point (see section 3.13).

Abrasive blast cleaning

- Ensure that abrasive blasting activities are sensitive to the surrounding land-uses and amenities and that they do not result in visual annoyance or create an environmental nuisance, including noise. The relevant Council should be consulted for details of minimum buffer distances from adjoining land uses when conducting abrasive blasting.
- Remove zinc anodes before blasting.
- Wet abrasive blasting is preferable to dry blasting, as it creates less toxic dust.
- Vacuum blast cleaning is recommended over all other abrasive blasting methods and techniques for outdoor blast cleaning.
- Do not use dry abrasive blasting in strong winds where dust escape may pose a nuisance, and use water or a proprietary suppressant agent to control dust emissions from the work area.
- In the absence of vacuum blasting equipment, conduct abrasive blasting operations in one of the following:
 - An abrasive blasting chamber vented to atmosphere via an effective dust collector, preferably a fabric filter; or
 - Ensure that the screening material for outdoor/open-air blasting is tear-resistant, UV-resistant, fire retardant and of suitable material and construction (preferably fully enclosed) to prevent the escape of fine dust.
- Avoid the use of silica sands (e.g. river sand, beach sand or quartz rock) and avoid using copper slag, zinc slag or any other abrasives that contain toxic heavy metals.
- Use recyclable and more environmentally benign abrasives such as garnet, ilmenite, chilled iron grit, cast steel grit or cast iron shot.
- Where a boat's paint history is not known, arrange for testing of the paint on all painted structures to be blasted (refer the Surface Preparation and Cleaning section of these guidelines). Comply with Australian Standard AS2761 for the removal of lead-based surface coatings.

3.6 Application of anti-fouling paints

Manual painting

- Paint boat hulls and niche areas with an antifouling coating suitable to the boat type and the boat use (operating conditions and voyage profile) following the manufacturer's specifications, to prevent biofouling and reduce the risk of marine pest introduction or translocation.
- Where possible, manual painting using brushes and rollers is recommended in preference to spray painting methods. Take into account the manufacturer's directions when deciding on the application method.

- Before applying antifouling paints, consider using alternative technologies, particularly those that rely on the coating's physical properties rather than its toxicity to prevent fouling, if these technologies are appropriate for the vessel's speed and frequency of activity.
- Only use antifouling paints that have been registered for use in Australia by the Australian Pesticides and Veterinary Medicines Authority can be sold and/or applied in Australia and all registrations of tributyltin-based paints were revoked in March 2003. Further information is available at www.apvma.gov.au. 'Home-made' antifouling paints are illegal, as is adding any ingredient to, or otherwise modifying registered products.
- If a tributyltin-based antifouling coating is still present on the hull, it is recommended that the coating be completely removed with due regard to appropriate methods of removal and waste disposal, and replaced with a TBT-free antifouling system. Follow the antifouling paint manufacturer's specifications or seek technical advice from the manufacturer or the Australian Paint Manufacturers' Federation (APMF). The APMF website is at www.apmf.asn.au
- Deck paints and paints used in cabin areas of boats can usually be treated like normal household paints.
- Mix paints in drip trays under cover and in a sealed, bunded and well ventilated paint bay. Do not mix or prepare antifouling paints in locations that are subject to tidal influences.
- Clean up spilt paint (particularly water-based paint) and allow the remaining paint to dry rather than washing it into the wastewater collection system.
- After painting, wipe/squeeze as much paint as possible from the brushes, trays and rollers back into the paint tin for future use.
- Paint out excess paint onto an absorbent material such as an old rag or newspaper. Allow it to dry before disposal.
- When using containers filled with water to clean water-based paint from brushes and rollers, allow the paint solids to settle by leaving the container overnight. Pour the water out onto the garden or grassed area in the morning and use an old rag or newspaper to wipe out the solids from the bucket.
- Do not rinse paint containers into stormwater drains, gutters or sewers.
- Allow empty paint and thinner containers to air-dry before disposal.

Spray painting

- As for manual painting, consider using alternatives to antifouling paints, particularly those that rely on the coating's physical properties rather than its toxicity to prevent fouling.
- Follow the antifouling paint manufacturer's specifications or seek technical advice from the manufacturer or the APMF. The APMF website is at www.apmf.asn.au

- Ensure that spray painting activities are sensitive to the surrounding land-uses and amenities and that they do not result in visual annoyance or create an environmental nuisance, including noise.
- Spray paint large objects on a sealed and banded surface that is either fully enclosed (sides and top) with screening material or fully screened (sides only) to a height two metres above the structure.
- Spray paint only in calm conditions.
- Keep spray guns and lines clean and well maintained to reduce emissions; also spray perpendicular to the surface being sprayed and maintaining a uniform distance from the surface.
- Use efficient spray equipment (transfer efficiency > 65%) such as high volume low pressure (HVLP) spray guns for all outdoor/open-air spraying.
- Use corrosion inhibitors that are compatible with surface coating requirements, biodegradable and free from chromates, nitrates and nitrites. Corrosion inhibitors also commonly contain zinc that can contaminate stormwater and land.
- Use a wash station for cleaning spray equipment and scrape the paint cup free of any residual paint with a spatula before cleaning the equipment with solvent.

3.7 Fibreglassing

- Contain and control all spray emissions. The recommended method is to work inside a building, keeping the doors closed while using mechanical ventilation equipment.
- Where practical, hand lay-up methods are recommended over spray gun applications as hand lay-up releases less styrene.
- For spraying, use airless, air-assisted, or HVLP spray guns. Internal mix, airless spray guns result in lower styrene emissions than other types of spray guns.
- Ensure that the spray lay-up equipment is properly maintained and periodically cleaned. This will avoid glass jamming in the spray gun chopper mechanism and the generation of additional waste (resin and glass) when fixing it.
- Use a gun wash station or similar for the cleaning of spraying equipment.
- Reduce the amount of grinding and sanding as much as possible by trimming with a knife or mechanical cutter when articles have solidified but not yet hardened.
- Securely wrap all sanding and grinding dusts prior to disposal.

3.8 Welding and metal fabrication

- Establish an isolated, well-ventilated area for using oxy-acetylene torches and welders, away from combustible materials such as oils, grease and rubber.

- Conduct all metal cutting operations on a sealed surface inside a screened area to minimise the horizontal dispersion of metal fragments and allow the sweeping or vacuuming of metal scraps and filings.
- Securely wrap all dusts and other grinding wastes prior to disposal in an industrial bin.

3.9 Engine maintenance and repair

- Maintain engines regularly to prevent oil and fuel leaks to the bilge.
- Use a drip tray or groundsheet under the engine to collect oil, grease, solvents or detergents.
- Keep adequate supplies of rags and other absorbent materials for cleaning up small fuel and oil spills.
- Clean engine parts in a properly designated wash bath or over catch pans located in a covered, sealed and bunded area that is graded to a collection pit or sump.
- Where possible, clean engine parts with a brush rather than with solvents or aqueous degreasers such as alkaline or caustic soda.
- Use water-based or biodegradable strippers, cleaners or degreasers wherever possible.
- Use a funnel when pouring fuel into drums or tanks or use hand pumps to remove fuel from drums.
- Drain oil filters before disposal and never place any containers or boats containing residual oil, fuel or other fluids in industrial waste bins unless they have been drained and wiped clean.
- Use bilge pump/separation services at your facility.

3.10 Removal of biofouling

- Inspect hulls and niche areas (i.e. seachests, internal sea water systems, bow thrusters, anchor chests, bilge keels, dry-docking support strips, rope guards, propellers and rudders) and remove and collect all biofouling.
- Biofouling should be carefully removed to prevent contamination with paint chips and other hull coatings. It may be necessary to analyse residue samples to ensure that they are not contaminated with heavy metals and antifouling agents. Refer to sections 3.11 - 3.15 for detailed information on waste management options. Do not return collected biofouling to the sea or any waterway.
- Facilities, particularly those that slip boats that have been in international waters, should install waste treatment systems with technology to minimise the risk of introducing and/or translocating marine pests. This may include filtration technology, neutralisation or other chemical treatment processes.

- Clean and check seawater systems on boats as some marine pests can survive in the internal plumbing of boats.
- If it is suspected that an introduced marine pest has been found outside known existing locations during removal of biofouling from a vessel, report the finding to DPIW Marine Environment Section. Signs of a suspected pest could include unusually heavy biofouling, dominance of fouling by one species, or a 'new' species not seen before in your region. If possible, collect some specimens and keep them in a sealed plastic bag in a freezer until they can be taken for identification. Further information about introduced marine pests is available on the DPIW website (www.dpiw.tas.gov.au).

3.11 Waste management options and classification

Management options

There are five general options for managing solid and liquid waste:

1. Minimisation (e.g. minimising water and chemical use; using low-toxicity products)
2. Onsite containment and storage (prior to onsite reuse or transport offsite)
3. Onsite treatment and reuse (e.g. recirculating treated wash water)
4. Offsite recycling (e.g. used oils, cardboard, batteries, metal offcuts)
5. Offsite disposal (to an approved facility)

It is recommended that operators focus their efforts on the first four options. For environmental and economic reasons, offsite disposal should be seen as a last resort and should only be considered where none of the other environmental management options are available.

Waste classification

Boat repair and maintenance facilities typically produce both solid and liquid waste, which can be classified as either 'general' or 'controlled' (see Part 2 of the *Waste Management Regulations 2000* and Section 3 of EMPCA).

General waste includes uncontaminated debris and litter such as:

- Cardboard and paper;
- Food and garden waste;
- Plastics;
- Aluminium cans;
- Glass drinking bottles; and
- Steel cans and drums (clean).

Controlled (hazardous) waste includes waste that is capable of leaching, or is toxic, corrosive, poisonous, flammable or explosive, such as:

- Detergents, degreasers, brush cleaning fluids, solvents and acidic or alkaline solutions;
- Used oil, grease, dissolved hydrocarbons and other organics;
- Paint, paint scrapings, abrasive blast media, biofouling residues and antifouling paint residues containing metals such as copper, lead, zinc, tin and metalloids; or other substances such as tributyltin, diuron and diuron derivatives used in antifouling paints;
- Contaminated and spent solvents;
- Under-cured resin material from the cleaning tanks. This must be hardened by adding an appropriate amount of catalyst prior to disposal in an industrial bin, together with other fibreglassing wastes (including overspray resins, glass and any cardboard coverings);
- Mercury switches; and
- Marine biota (bio-hazardous) residues.

3.12 Solid waste management

- Separate solid wastes as soon as they are generated, to:
 - Minimise the time and effort involved in re-sorting wastes prior to disposal;
 - Maximise the volume of re-useable or recyclable wastes;
 - Minimise the volumes of controlled (hazardous) waste by ensuring that they are not mixed with, and thereby contaminate, general waste; and
 - Facilitate the disposal of compatible waste types.
- Establish a recycling station in a convenient location, with clearly labelled waste containers for individual types of solid waste, including under cover spill trays for battery storage.
- Collect and recycle* the following general wastes for disposal at a waste recycling and reprocessing facility:
 - Clean cardboard and paper;
 - Aluminium cans and glass drink bottles;
 - Plastics labelled 1, 2 or 3;
 - Clean empty steel drums and cans;
 - Scrap metal, including zinc anodes; and
 - Engine and dry cell batteries.

(*A list of recyclers is available in the *Tasmanian Waste Recovery and Recycling Directory*, which can be found at http://www.environment.tas.gov.au/wr_reuse_and_recycling.html)

- Establish a storage area or areas with separate bins or containers for other, non-recyclable solid wastes.
- Dispose of solid non-recyclable general waste at a licensed Council waste depot.
- Only put solid, inert general wastes into industrial skips as these will generally go to Council waste depots.
- Periodically check all waste containers and reorganise or remove large items from them to ensure that they do not block the containers. Also ensure that there are no obstacles to prevent access to the containers.
- Ensure that all bins, industrial skips and sealed containers are emptied regularly.
- Ensuring that all containers for waste oils, solvents and other chemicals or potential contaminants (paint, paint thinners or acids) are empty and have been dried out before disposing of them in waste bins.
- Store controlled (hazardous) solid waste onsite in sealed, clearly-labelled containers for collection by a registered waste transport contractor and transportation to an approved disposal, treatment or storage facility. The storage area should be secure, sealed and bunded.
- Where possible, separate abrasive material/grit from the waste and re-use it.
- Erect signs to describe facility waste disposal requirements and (where relevant) use pamphlets, newsletters and meetings to convey information.

3.13 Wastewater collection, treatment and disposal

Facility operators have four options for managing wastewater produced onsite:

1. Minimise the amount of wastewater produced;
2. Recirculate and re-use the wastewater on site;
3. Treat and discharge to the municipal sewer in accordance with the conditions of a Trade Waste Agreement; and
4. Remove for disposal at an appropriate liquid waste reception facility, using a registered waste transporter.

Regardless of which option or combination of options is used, a wastewater collection and treatment system is likely to be required. An example of such a system is shown in Figure 1. Each facility operator will need to design the system to suit their own specific needs.

The main aims of the system are to remove suspended solids, dissolved and undissolved contaminants, turbidity and discolouration so that the water can either be reused onsite, or discharged to the sewer (subject to a Trade Waste Agreement).

The system should include:

- A sealed, bunded work area;
- Catchment drains and trenches;
- A common sump for the catchment drains;
- Tanks with sufficient volume to store and treat the runoff water;
- A sand filter to remove fine particles from the water; and
- An oil/water separator.

Other treatment processes that may need to be included in the system are flocculation or aeration to separate solids, and lime stabilisation to precipitate heavy metals.

Specific recommendations for the various elements of the wastewater collection and treatment system are as follows:

- Construct a bund around the boat work area to contain wastewater runoff and minimise the amount of water requiring treatment. Placement of the system should take the tides, wave action and associated inundation into consideration. In the case of existing facilities where the work area is not above the high tide mark and relocation is not feasible, a diversion valve may need to be fitted to divert tidal water when it enters the pit or sump.
- Ensure that the wastewater collection system is separate from the stormwater collection system for other relatively clean areas of the site such as carparks and roofs.
- Regularly clean and maintain work areas and ensure that no particles or waste water from cleaning or maintenance work falls or drains into stormwater.
- Where possible, cover work areas to minimise the amount of contaminated runoff.
- Do not hose boats, hardstand areas, vehicles or machinery parts on to the surrounding soil and/or stormwater system.
- Cover catchment drains and trenches with removable gratings (10mm gap size).

- Regularly inspect the gratings and remove accumulated debris.
- Prevent oily wastes from being mixed with other runoff water that enters the collection system. Large amounts of oil may interfere with other treatment technology used for reducing metal concentrations in the liquid waste.
- Construct the waste collection sump so that the accumulated sludge/slurry can be removed by a registered waste transporter using a vacuum loading tanker, for treatment and disposal as a controlled waste.
- Fit the sump with removable catchment baskets or cover the sump outlets with a removable screen (2mm diameter mesh gaps).
- Regularly inspect and clean the sump and baskets/screens, especially before and after site and boat cleaning activities to ensure that they are clear of trapped solids.
- Use above ground polyethylene tanks or below ground concrete tanks for subsequent waste treatment. Above ground settling tanks are recommended as they are easier to maintain and manage.
- Ensure the capacity of the first holding tank is large enough to contain the wastewater runoff from at least one hour of continuous operation of a pressure cleaner (estimated at between 420 – 1260 litres), and the ‘first flush’ runoff from a storm event.
- Regularly monitor liquid levels in holding tanks to avoid any overflow and to detect leaks. Dipsticks can be used for this purpose.
- Ensure that the plumbing network allows recirculation of treated water for reuse, or disposal to the sewer if this is not possible.
- Construct the sand filter so that the surface layers of sand can be easily removed and replaced as contaminant levels increase.
- Clean and maintain oil/water separator as per the manufacturer’s specifications.
- Where necessary, install a granular activated carbon (GAC) filter to remove any dissolved tributyltin.
- Reuse the treated water onsite, wherever possible.
- Any wastewater discharged to the sewer system must meet the quality standards required by a Trade Waste Agreement. The Trade Waste Agreement sets out the acceptable pollutant discharge concentration limits. For advice on such agreements refer to the document *Guidelines for the Acceptance of Liquid Wastes to Sewers (Sewerage Management Program)* published by DEPHA (http://www.environment.tas.gov.au/em_eppps_sewerage_management_program.html)
- Spent abrasive blast media and the sludge/slurry and other solids collected by on-site liquid waste management systems (pits, trenches, sumps and/or holding/settling tanks) should be managed as controlled wastes and stored/disposed of accordingly unless waste analyses prove otherwise.

3.14 Management of other liquid wastes

- Establish a secure recycling station for used engine oil, lubricating oil, hydraulic and gearbox oil, volatile solvents, thinners and other hydrocarbons.
- Establish a separate area for liquid wastes that cannot be readily recycled, such as:
 - Oily bilge water;
 - Other contaminated water that cannot be treated in the wastewater system; and
 - Liquid paint residues, thinners and solvents.
- Display signs to show where the recycling station and storage area for non-recyclable liquids are located.
- Store unrecyclable liquid wastes in separate, sealed containers for disposal at an approved waste disposal facility by a registered waste transporter.
- Ensure there are sufficient drums and/or other containers for collecting and storing recyclable and non-recyclable liquids.
- Ensure that incompatible wastes, for example oxidising and explosive or combustible wastes, are stored separately and in suitable containers. See the MSDS for storage information of the chemical of concern in the waste products.
- Clearly label all liquid waste disposal drums with details of their contents and ensure that they are sealed prior to their disposal by a registered waste transporter.
- Store all liquid wastes undercover to minimise contamination of runoff water.

3.15 Controlled waste transport and disposal

- Clearly label all controlled waste disposal drums and containers with the details of their contents. Store the waste in accordance with Part 3.12 of these guidelines.
- Many controlled wastes are unsafe for Council waste depot disposal and all controlled waste must be disposed through a registered waste transporter at a waste disposal facility permitted to receive controlled waste. Contact DEPHA's Environment Division to obtain information regarding controlled waste transport businesses currently registered to collect and transport the particular waste type of concern.
- The controlled waste transporter may need to arrange for testing of the waste by a National Association of Testing Authorities (NATA) registered laboratory or other accepted accreditation body (see Yellow Pages) in order to determine which Council waste depot can accept the wastes.
- It may be necessary to apply for an Environmental Approval under *Regulation 12* of the *Waste Management Regulations 2000* if the disposal or treatment of a controlled waste is to occur at a facility not licensed to receive that controlled waste. Information Bulletin 105 (available at www.environment.tas.gov.au) describes how to seek approval from the Director of Environmental Management for the disposal of controlled wastes.

3.16 Air quality management

- Undertake all activities that have the potential to generate large volumes of dust and particulate emissions in an enclosed and ventilated work area.
- Where an enclosed and ventilated work area does not exist, use a tarpaulin or similar material to enclose the part of the boat being worked on and contain potential airborne wastes.
- Avoid burning coatings from hulls as this produces toxic gases.
- Wrap oily/greasy rags and paper, oil-soaked sawdust, plastics and rubber and place in an industrial bin (these materials should not be burnt).
- Fit power tools with dust extraction and collection systems.
- Where possible, avoid abrasive blasting as this can create toxic dust.
- Apply paints using rollers or brushes or airless spray guns in preference to compressed-air guns. Where spray painting cannot be avoided, use High Volume Low Pressure (HVLP) spray guns to reduce the amount of overspray, paint usage, the release of volatile organic compounds and subsequent odours.
- Regularly collect floor sweepings, dust, powder waste or absorbent clean up materials and place them in a sealed bag before disposing of them in a covered waste bin.
- Use wet/dry vacuum cleaners with dust filters for general cleaning of the work area floor surface rather than sweeping and hosing the surface down with water.
- Maintain air pollution control equipment and immediately replace or repair any emission control equipment that is blocked, frayed, leaking or not functioning within specifications.
- Control any exhaust emissions to prevent nuisance or objectionable odours/fumes off-site.
- Use mechanical ventilation systems and activated carbon filters or scrubbers to prevent the release of any uncontrolled and objectionable odours from buildings or rooms.

3.17 Noise management

- Incorporate acoustic barriers, damping and insulating materials in the facility's design and layout. Use the natural topography and consider landscaping improvements (fencing, mounds and structures) to serve as noise barriers.
- Maintain adequate separation distances between facilities and neighbours, and close windows and roller doors facing noise-sensitive premises.
- Fit mechanical ventilation systems (e.g. air conditioners and fans) with noise-proof ducting and acoustically designed intake and exhaust openings.

- Enclose or acoustically screen potentially noisy equipment and undertake noisy activities in areas where noise can be muffled.
- Fit silencers and/or exhaust mufflers to air compressors, pumps, fans, blowers and other noisy machinery.
- Reduce structural-borne noise and vibration by mounting equipment on isolating platforms or rubber mats.
- Specify noise-reduction options when purchasing new plant and equipment.
- Undertake external work in accordance with the hours and noise limits specified in the *Environmental Management and Pollution Control (Miscellaneous Noise) Regulations 2004*. The local council may impose further restrictions on operating hours in particular cases.
- Restrict internal work to similar hours unless there is effective sound-proofing of the building.
- Minimise engine idling and testing.
- Regularly maintain all equipment and vehicles by attending promptly to any loose parts, rattling covers, worn bearings and broken components.
- Display signs indicating noise restrictions and requirements (where relevant).

3.18 Contaminated land management

- Where land is potentially contaminated from past activities, earth works should only occur following an assessment of contamination levels by a qualified expert (see the Environment Division's Information Bulletin 107 entitled *Environmental Consultants with Experience in Contaminated Site Assessment* - available at www.environment.tas.gov.au) and a determination made of the management options for the soil. Soil assessment must be undertaken in accordance with the following standards:
 - Australian Standard AS 4482.1 Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds, 2005; and
 - Australian Standard AS 4482.2 Guide to the investigation and sampling of sites with potentially contaminated soil, Part 2: Volatile substances, 1999.
- Soil to be disposed of off-site or reused on-site as fill material must first be assessed by a qualified expert in accordance with Information Bulletin 105 to ensure its suitability for disposal or use as a fill material.
- During excavation works where soil contaminant levels have been confirmed as requiring off-site disposal or treatment, measures must be in place to prevent loss of soil in stormwater, machinery tyres etc.
- Anywhere heavy machinery operates and causes soil disturbance should be hardstand or the machinery use should be managed to ensure that these activities do

not result in environmental harm including environmental nuisance as a result of tracking potentially contaminated material to previously uncontaminated on or off-site areas.

- Marine sediment in the near vicinity of boat repair and maintenance facilities should not be disturbed unless it has been demonstrated that it is safe to do so through analysis of contaminant concentrations.

PART 4 IN-WATER VESSEL MAINTENANCE

4.1 General principles

In-water vessel maintenance should not occur unless all waste products and other contaminants are contained onboard for later disposal at an appropriate on-shore waste disposal facility.

Removal of biofouling may introduce or translocate marine pests and should not be undertaken without approval of the Marine Environment Section of DPIW.

The ANZECC Code of Practice for in-water hull cleaning specifies that any part of a boat's hull that has been treated with biocidal antifouling paint is not to be cleaned in Australian waters without the written permission of the relevant State/Territory authority. Permission will not normally be granted except under extraordinary circumstances. While in-water hull cleaning does not necessarily occur at slipways or other boat repair and maintenance facilities, the procedure relates to boat maintenance and guidelines for in-water hull cleaning are therefore included in this section. Under certain circumstances, exceptions to these recommended measures may be approved depending on the type of boat and antifouling treatment. These exceptions are outlined below.

4.2 In-water hull cleaning of commercial vessels

- Regularly inspect and de-slime areas of the hull not treated with antifouling paint (propeller, seachest, anodes, etc) to prevent biofouling. Regular de-slipping of the propeller will improve ship performance and minimise the risk of species translocation. Painting propellers and propeller shafts with silicone fouling release coatings can maintain efficiency and enable self-cleaning, reducing the need for regular polishing.
- Approval by the Marine Environment Section of the Department of Primary Industries and Water (DPIW) may be given to clean the propeller, sea chest or other area of the hull not treated with antifouling paint. Approval will only be granted if there is a low risk that the activity will introduce or translocate marine pests. A biological risk assessment or survey of the hull approved by DPIW will be necessary to determine the level of risk. Cleaning of non-toxic coatings may be performed provided the activity represents a low risk of introducing or translocating marine pests. Silicone-based coatings must be cleaned using a non-abrasive method. This activity must also be approved by the Marine Environment Section of DPIW.
- Any part of the hull treated with biocidal antifouling paint should not be cleaned in-water, except in emergency situations where approved by the Director of Environmental Management.

4.3 In-water hull cleaning of recreational vessels

- Recreational vessels treated with biocidal antifouling paint must not be cleaned in-water, except in emergency situations where approved by the Director of Environmental Management and the Marine Environment Section of DPIW.
- Slime, algal scum and filamentous weed at the wind and water line may be removed by wiping down with a soft cloth.
- Racing yachts with polished finishes may be wiped with a soft cloth to maintain these finishes and thus ensure the efficacy of the antifouling treatment.



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