

2.2 Maintenance practices

2.2.10 Stormwater management on industrial and commercial sites

Description

Industrial and commercial premises have significant potential to pollute stormwater. For example:

- commercial areas are known to generate large loads of litter;
- industrial premises can contaminate stormwater through poor control of industrial processes or the transport, handling and storage of goods and wastes; and
- food preparation businesses may have poor facilities for waste handling and disposal.

In Western Australia, small to medium-sized industrial premises have been identified as representing a significant cumulative risk to the health of water resources in Perth (WRC, 2000; EMRC, 2002). Improving practices that potentially impact on stormwater and groundwater at these premises is a priority for water resource protection.

As several detailed guidelines are currently available that provide guidance on this topic, including several comprehensive Western Australian guidelines (see Additional Information), this section will:

- reference these guidelines; and
- briefly summarise key aspects that relate to stormwater management.

Applicability

Pollution prevention and other management activities for stormwater management are applicable to most commercial and industrial sites. Site-specific risks should be identified and appropriate management practices should be designed for the site. Attending suitable training, such as the courses provided by the Cleaner Production Training Program for Industry in Perth and the industry-specific seminars and workshops provided by the Green Stamp Program, can help people gain the skills necessary to undertake this process.

Recommended Practices

The Light Industry Project, Green Stamp Programs and the Centre of Excellence in Cleaner Production can provide training, support, case studies and further information.

Preparing the workplace

- ✓ Identify and assess stormwater-related risks on the site (e.g. activities that may contaminate stormwater). Various checklists and surveys have been developed to help people identify these risks (e.g. see Motor Trade Association of WA's self-assessment guides; EMRC, 2002; VSC, 1999). In some circumstances, a survey or checklist can also be used to raise awareness among staff of the potential for contamination of stormwater (VSC, 1999). Staff who may undertake risk assessments should receive training to ensure they have the necessary skills.
- ✓ Develop management plans or procedures to manage the identified risks (e.g. a Stormwater Management Plan, Waste Management Plan, Emergency Response Plan, etc.). Again, professional training is recommended to help those people developing these documents to access necessary skills and resources. For guidance on the content of a 'Stormwater Management Plan' for larger industrial or commercial sites, see Chapter 5 of this Manual.

- ✓ Train all staff to be aware of stormwater pollution, to undertake their roles in related management plans/procedures, report incidents and safely manage incidents.
- ✓ All stormwater-related actions in relevant plans or procedures should be subject to regular audits to ensure they are occurring. These may result in recommendations for improvement (e.g. modified procedures, new training, new equipment, etc.).
- ✓ For large sites with many potential sources of stormwater pollution or sites with significant risks to stormwater, it is recommended that an environmental management system (EMS) be developed, implemented and maintained. See Section 2.5.1 for guidance on this issue.
- ✓ Look for opportunities to recycle stormwater/roof water on-site as a way of minimising the use of scheme water and the export of stormwater and stormwater pollutants from the site. This water may be used for irrigation, vehicle washing, toilet flushing or industrial processes. A cost saving may be generated from this activity if the consumption of mains water is reduced.
- ✓ Develop and implement a Waste Management Plan to ensure that solid and liquid wastes are minimised and stored correctly to reduce the risk of stormwater contamination. This plan would explore opportunities for waste minimisation (e.g. ensuring the correct amounts of raw materials are purchased to decrease the amount of excess materials that are discarded) and the reuse of wastes (either on the site or within the region). For information about waste acceptance criteria and determination of the appropriate type of landfill for disposal of waste material, refer to the *Guidelines for Acceptance of Solid Waste to Landfill* (DEP, 2002). The Department of Environment regulates the transportation of wastes that may cause environmental or health risks. It does so through the application of the Environmental Protection (Controlled Waste) Regulations 2004. Controlled waste is generally defined as all liquid waste, and any waste that does not meet the acceptance criteria for a Class I, II or III landfill site. The *Guideline for Controlled Waste Generators* (DoE, 2004) specifies that a generator is a person whose activities produce, or apparatus result in the production of controlled waste. Staff should be aware of the Environmental Protection (Unauthorised Discharge) Regulations 2004, which include an on-the-spot infringement notice system for *minor* pollution offences. These powers can be delegated to local government officers. The new on-the-spot fines currently carry a penalty of \$250 to \$500, which increases to \$5,000 if the matter proceeds to court. The fines apply to commercial and industrial premises and cover the discharge of substances to stormwater or groundwater. These substances include hydrocarbons, solvents, degreaser detergent, dust, engine coolant, food waste, laundry waste, pesticides, paint, dyes, acids, alkali, sediment, sewage and substances containing heavy metals (Raine, 2004).
- ✓ Ensure all containers holding wastes or hazardous materials are designed to minimise the risk of stormwater contamination. This includes having lids on solid waste containers to prevent wind-blown litter, covering storage areas, using bunds around areas where liquid materials are stored, etc. Waste containers should be stored in bunded, undercover areas, on an impermeable surface and away from stormwater drains.
- ✓ Large quantities of potentially hazardous material should be stored within a bunded compound that is impervious to infiltration, able to safely contain at least



Figure 1. Green Stamp automotive premises, Balcatta. Correct storage of fuel and other chemicals in a bunded area. (Photograph: Department of Environment.)

110% of the volume of the largest container in the bund and 25% of the combined volume of all other liquids held within the compound. If located outside, the storage area should be roofed to prevent the collection of rainwater inside the bunded area (see EMRC, 2002, for more details).

- ✓ For storage of chemicals, all floor areas should be sealed to prevent infiltration and assist with the clean up of spills.
- ✓ In areas where accidental spills may occur (e.g. loading/unloading areas), ensure that appropriate spill response equipment is available and readily accessible at all times.
- ✓ Designated material handling areas need to be kerbed and graded to contain spills, stormwater and the liquid generated from at least 1 hour of typical fire-fighting activities. Speed humps or irregular surfaces that may cause accidents with containers should not be permitted in handling areas.
- ✓ Ensure stormwater from relatively clean areas (e.g. roofs) is kept separate from stormwater from potentially contaminated areas (e.g. uncovered work areas of industrial sites) to minimise the volume of stormwater that requires a high level of treatment.
- ✓ Prevent contaminated wastewater from floors and covered work areas from entering stormwater systems by using surface grades, bunds, or diversion drains to an impervious sump or wastewater treatment system.
- ✓ Wash-down pads should be designed to collect all water and residue in impervious collection sumps and have impervious bunds. The captured wastewater should be discharged to wastewater treatment facilities or removed by licensed waste contractors.
- ✓ Ensure suitable structural stormwater treatment devices are in place, and are regularly inspected and maintained in accordance with a maintenance plan. See Chapter 9 for information on structural controls.
- ✓ Obtain specialist advice on whether stormwater from various locations around the site needs to be treated and whether the stormwater can be discharged to the stormwater system (e.g. drains), soakwells, a hazardous waste treatment facility (via a licensed waste transport contractor) or sewer (approved in some rare circumstances only). This advice should be confirmed in writing from the Department of Environment and the local government and then documented in the site's Stormwater Management Plan.
- ✓ Consider the quality and quantity of stormwater discharges from the site during the design of new buildings and surrounding areas. Apply water sensitive design features where possible.
- ✓ Look for opportunities to re-engineer or redesign processes to take advantage of newer, cleaner and more efficient equipment that has a reduced risk of stormwater contamination.
- ✓ Use alternative materials for cleaning, coating, lubrication, and other production processes to prevent the generation of hazardous wastes and minimise the risk of stormwater being contaminated by these wastes.
- ✓ Stormwater drains within and around the site should be stencilled with messages to alert all staff that they drain to watercourses or wetlands (e.g. 'Rainwater only - flows to the Swan River'). See Section 2.3.4 for information about education/participation campaigns for industrial and commercial sites.

Keeping the workplace clean

- ✓ Ensure surfaces that drain to stormwater are regularly cleaned using 'dry' methods.
- ✓ Only undertake washing, degreasing and cleaning activities in dedicated wash-down bays where the wastewater can be collected and prevented from mixing with stormwater. This includes vehicle washing using biodegradable detergents.
- ✓ Maintain machinery/vehicles to minimise the risk of leaks and store such machinery in cleaned areas so that regular inspections can quickly identify any discharges.
- ✓ Use spill trays under work areas where spills could occur.
- ✓ Control airborne sprays so those surfaces that generate or convey stormwater are not contaminated.
- ✓ Where possible, loading and unloading should take place in a covered area away from the vicinity of stormwater drains. Stormwater should be directed away from loading and unloading areas.
- ✓ For more information, see Section 2.2.8 Maintenance of vehicles, plant and equipment (including washing).

Minimising the risk of accident/incident

- ✓ Ensure staff training includes safe material handling and storage procedures to minimise the risk of a spill. For large spills, contact the Department of Environment's Emergency Pollution Response Unit on (08) 9222 7123 (after hours 1800 018 800). Further information about emergency response is available via <<http://emergency.environment.wa.gov.au>>.
- ✓ In consultation with staff, develop and communicate an Emergency Response Plan to manage spills. One of the primary objectives of this plan is to ensure that spills do not leave the site via stormwater drains. For guidance on the content of this plan, see EMRC (2002).
- ✓ Ensure the site is equipped with suitable emergency spill equipment and absorbents and train staff on their use. Spill materials vary according to the nature of the work being undertaken, the location of the business (e.g. next to water bodies) and the types of liquids being handled. At a minimum, spill kits should include gloves and/or other protective clothing, suitable absorbent pads/powders/granules, shovels, brooms and dustpans.
- ✓ Clean up of spills should be immediate, automatic and routine in industrial premises, no matter how small. Under no circumstances should spills be washed away with water or buried on-site.

Benefits and Effectiveness

Benefits associated with implementing these management practices may include:

- Reduced risks to, and impacts on, stormwater and groundwater quality.
- Improved workplace health and safety.
- Reduced risk of breaching environmental legislation and being prosecuted under this legislation.
- Cost savings as a result of cleaner production techniques.
- Reduced risk of complaints from stakeholders (e.g. neighbours, environmental groups).

- Enhanced corporate citizenry and public image.
- Reduced legal and financial liability with respect to issues such as site contamination.

In terms of the effectiveness of these practices, it is widely recognised that source control, cleaner production and pollution prevention techniques are cost-effective strategies for managing pollution on commercial and industrial premises. However, pollutant removal efficiency data for specific practices covered by this guideline are not available.

Challenges

The following challenges may need to be addressed to improve implementation:

- The development of a Site Management Plan with a focus on pollution prevention for commercial industrial sites will require an initial investment of time and money, which could be recouped over time through more efficient business practices.
- A low level of environment regulation or enforcement (particularly for small to medium-sized enterprises) creates little to no incentive to comply with environmental legislation.
- There are a limited number of positive incentives for commercial or industrial premises to improve their stormwater-related environmental performance (e.g. opportunities for the company to gain positive publicity, reduced licence fees, grants for environmental works, subsidies and rebates).
- Few commercial benefits with customers that do not consider a business' environmental practices in their purchasing decision.
- Implementing training to address resistance to changes in work practices.
- Lack of expertise and/or knowledge of how to address the issues.
- Planning restrictions and restrictive lease arrangements.

Cost

The cost required to identify, assess and manage stormwater-related risks will vary greatly depending on the activities being undertaken, the characteristics of the site, and the extent to which the stormwater-related management plans are implemented.

Additional Information

The guidelines provided in Sections 2.4.2 and 2.5.1 are relevant to commercial and industrial premises. Section 2.4.2 explains how regulation (with enforcement of these regulations) can provide an effective incentive for improved stormwater management on commercial and industrial premises, while Section 2.5.1 explains the benefits of environmental management systems.

Section 2.2.8 is relevant for maintenance of vehicles and equipment (including washing).

Section 2.3.4 has information about education and participation campaigns for industrial and commercial premises.

The following resources provide guidance on undertaking sound environmental management on commercial and industrial sites, including cleaner production techniques and stormwater management practices:

- The Light Industry Project is a network of industry, State and local government, community groups, education and training providers. The project aims to provide small to medium-sized businesses with on-ground support, positive incentives and resources. Different levels of training and support are available, depending on the needs of particular businesses and industry sectors. Further information is available by telephoning (08) 9374 3301 or via <www.environment.wa.gov.au> and <www.wastewise.wa.gov.au>. The Light Industry Project office is at the Swan Catchment Centre, 80 Great Northern Highway, Middle Swan WA 6056.
- Green Stamp is an industry-specific environmental accreditation and education program that assists small to medium businesses to implement environmental best management practices. The program provides environmental assessments, training and support, including simple environmental management plans and industry-specific case studies and environmental guidelines. Green Stamp Programs are currently available through the following industry associations:
 - Motor Trade Association (MTA) of Western Australia. Resources include the *Environmental Products and Services Directory* and environmental guidelines such as *Asbestos Use and Disposal*, *Building New Premises*, *Bunds and Bunding*, *Cleaning up Spills*, *Cleaning Vehicles*, *Coolant Management*, *Degreasers and Detergents*, *Environmental Policy*, *Mobile Mechanics*, *New Environmental Laws*, *Oil Separators*, *Parts Washers*, *Preventing Oil Pollution*, *Purchasing Spill Kits*, *Solvent Thinner Recycling Systems*, *Wastewater Management for Body Repairers*, *Environmental Assessments for Body Repairers* and *Environmental Assessments for Mechanical Repairers*. Refer to the Examples/Case Studies section, below. Further information is available by telephoning the Automotive Industry Green Stamp Officer on (08) 9345 3466 or via <www.greenstamp.com.au>. Their office is at MTA House, 224 Balcatta Road, Balcatta WA 6914.
 - The Printing Industry Association. Resources include *Managing and Monitoring Environmental Impacts – A Simple Environmental Management Plan for Printing Businesses*, *Accreditation Criteria for Printing Businesses*, *Baseline Audit for Printing Businesses* and information sheets on *Chemical and Ink Management*, *Environmental Law*, *Protecting Stormwater Drains*, *Solid Waste Management* and *Wastewater Management*. These resources are available by telephoning the Printing Industry Green Stamp Coordinator on (08) 9278 0300. Further information is available via <www.printnet.com.au>.
 - Building Service Contractors Association (formerly the Master Cleaners Guild). The Building Service Contractor’s Association Green Stamp Coordinator is available by telephoning (08) 9278 0300 for further information.
 - Other industry associations are working with the Department of Environment to extend the Green Stamp Program to their industry sectors.
- Centre of Excellence in Cleaner Production, Curtin University of Technology, Western Australia. Refer to <<http://cleanerproduction.curtin.edu.au>> or telephone (08) 9266 4520 for cleaner production resources including case studies, checklists, environmental guidelines, technical references, training materials, details of training opportunities and postgraduate courses. *The Western Australian Business and Environment Manual - A Guide to Reducing Your Costs and Impacts* (2003) is a recommended reference.
- Department of Environment and Swan River Trust (2004) *Environmental Management and Cleaner Production Directory for Small and Medium Businesses*, DoE and SRT, Perth, Western Australia. This Directory includes case studies, details of training opportunities and lists State, national and international environmental management and cleaner production guidelines for small and medium businesses. Local governments, industry associations, catchment groups and other State agencies are encouraged to use this Directory to assist businesses to implement cleaner production initiatives and

adopt practices that protect stormwater quality. The Directory is available via <www.environment.wa.gov.au> and <www.swanrivertrust.wa.gov.au> or by telephoning the Swan River Trust on (08) 9278 0900.

- Eastern Metropolitan Regional Council (2002). ‘Pollution Prevention/Cleaner Production Guidelines for Local Government’ in the *Local Government Natural Resource Management Policy Manual*, Eastern Metropolitan Regional Council, Perth, West Australia. The Manual is available at <www.emrc.org.au> under the Services/Environmental Services tab.
- WA Environmental Protection Authority (1999). *Guidance for the Assessment of Environmental Factors - Management of Surface Runoff from Industrial and Commercial Sites*, Draft guidance document No. 26. Environmental Protection Authority, Perth, Western Australia.
- Refer to relevant Water Quality Protection Notes, available from the Department of Environment via <www.environment.wa.gov.au>, or by telephoning (08) 9278 0300. For example:
 - *Mechanical Servicing and Workshops* (Water and Rivers Commission, 2002);
 - *Mobile Mechanical and Cleaning Services* (Draft) (DoE, 2004);
 - *Washdown of Mechanical Equipment* (WRC, 1998);
 - *Industrial Sites Near Sensitive Water Bodies* (WRC, 1999);
 - *Chemical Spills – Emergency Response Planning* (WRC, 2002);
 - *Stormwater Management at Industrial Sites* (WRC, 2002);
 - *Toxic and Hazardous Substances – Storage and Use* (WRC, 2002).
- WA Department of Minerals and Petroleum Resources - *Guidance Notes on Storage of Dangerous Goods – General Requirements for Premises Exempt from Licensing* (S305) (March 2003). These guidelines and further information about dangerous goods storage, handling and transport, relevant legislation and accredited training providers and consultants are available at <www.doir.wa.gov.au/safetyhealthandenvironment>.

Examples / Case Studies

Refer to the Light Industry Project and Green Stamp Programs, outlined in the Additional Information Section and Section 2.3.4.

The case study provided in Section 2.4.2 is relevant to this management practice, as it demonstrates the stormwater-related outcomes that can be achieved at vehicle service facilities *where there is a strong incentive to improve*. In the case study provided, positive and negative incentives were used by a regulator to promote behavioural change.

Other

Australian and international case studies are also available from:

- The Centre of Excellence in Cleaner Production, Curtin University of Technology, Western Australia. Refer to <<http://cleanerproduction.curtin.edu.au>> or telephone (08) 9266 4520.
- Section 1.6 – Case Studies in the *Environmental Management and Cleaner Production Directory for Small and Medium Businesses* (DoE and SRT, 2004). Available via <www.environment.wa.gov.au> and <www.swanrivertrust.wa.gov.au> or by telephoning the Swan River Trust on (08) 9278 0900.

References and Further Information

- Centre of Excellence in Cleaner Production 2003, *The Western Australian Business and Environment Manual - A Guide to Reducing Your Costs and Impacts*, Centre of Excellence in Cleaner Production, Perth, Western Australia. Cited at: <<http://cleanerproduction.curtin.edu.au>> (August, 2003).
- Department of Environmental Protection 2002, *Guidelines for Acceptance of Solid Waste to Landfill*, Department of Environmental Protection, Perth, Western Australia.
- Department of Environment 2004, *Guideline for Controlled Waste Generators, Controlled Waste Guideline Series: Guideline No. 1*, Department of Environment, Perth, Western Australia.
- Department of Environment and Swan River Trust 2004, *Environmental Management and Cleaner Production Directory for Small and Medium Businesses*, DoE and SRT, Perth, Western Australia. Available via <www.environment.wa.gov.au> and <www.swanrivertrust.wa.gov.au> or by telephoning the Swan River Trust on (08) 9278 0900.
- Eastern Metropolitan Regional Council (EMRC) 2002, 'Pollution Prevention/Cleaner Production Guidelines for Local Government', in *Local Government Natural Resource Management Policy Manual*, Eastern Metropolitan Regional Council, Perth, Western Australia.
- Green Stamp Program / Motor Trade Association of Western Australia, which includes Environmental Guidelines for automotive businesses and practices (<www.greenstamp.com.au>). Information about other Green Stamp Programs is available via <www.environment.wa.gov.au>.
- Raine, K. 2004, Ken Raine, Manager, Response and Audit, Department of Environment, Internal Department of Environment article (7 April 2004).
- Taylor, A.C. and Wong, T.H.F. 2002c, *Non-structural Stormwater Quality Best Management Practices - A Literature Review of Their Value and Life-cycle Costs*, Technical Report No. 02/13, Cooperative Research Centre for Catchment Hydrology, Melbourne, Victoria. Available via <www.catchment.crc.org.au> and <www.clearwater.asn.au/infoexchange.cfm>.
- United States Environmental Protection Agency (US EPA) 2001, *National Menu of Best Management Practices for Storm Water Phase II*. United States Environmental Protection Agency on-line guideline. Cited at: <www.epa.gov/npdes/menuofbmps/menu.htm>.
- Victorian Environmental Protection Authority (VEPA) 2003, *Preventing Stormwater Pollution - A Guide for Industry*, Stormwater-related fact sheet. Cited at <www.epa.vic.gov.au> (August 2003).
- Victorian Stormwater Committee (VSC) 1999, *Urban Stormwater - Best Practice Environmental Management Guidelines*, CSIRO Publishing, Melbourne, Victoria.
- WA Department of Minerals and Petroleum Resources 2003, *Guidance Notes on Storage of Dangerous Goods – General Requirements for Premises Exempt from Licensing (S305 REV 3)*.
- WA Environmental Protection Authority 1999, *Guidance for the Assessment of Environmental Factors - Management of Surface Runoff from Industrial and Commercial Sites*, Draft guidance document No. 26, Environmental Protection Authority, Perth, Western Australia.
- Water and Rivers Commission 1998, *Washdown of Mechanical Equipment*, Water Quality Protection Note, August 1998, Water and Rivers Commission, Perth, Western Australia.
- Water and Rivers Commission 1999, *Industrial Sites Near Sensitive Water Bodies*, Water Quality Protection Note, Water and Rivers Commission, Perth, Western Australia. Available via <www.environment.wa.gov.au> or by telephoning the Department of Environment on (08) 9278 0300.

Water and Rivers Commission (WRC) 2000, *Swan-Canning Industry Survey Report – Pilot Survey Findings*, Water and Rivers Commission, Perth, Western Australia.

Water and Rivers Commission 2002, *Chemical Spills – Emergency Response Planning*, Water Quality Protection Note, Water and Rivers Commission, Perth, Western Australia. Available via <www.environment.wa.gov.au> or by telephoning the Department of Environment on (08) 9278 0300.

Water and Rivers Commission 2002, *Mechanical Servicing and Workshops*, Water Quality Protection Note, Water and Rivers Commission, Perth, Western Australia. Available via <www.environment.wa.gov.au> or by telephoning the Department of Environment on (08) 9278 0300.

Water and Rivers Commission 2002, *Radiator Repairers and Reconditioners*, Water Quality Protection Note, Water and Rivers Commission, Perth, Western Australia. Available via <www.environment.wa.gov.au> or by telephoning the Department of Environment on (08) 9278 0300.

Water and Rivers Commission 2002, *Stormwater Management at Industrial Sites*, Water Quality Protection Note, Water and Rivers Commission, Perth, Western Australia. Available via <www.environment.wa.gov.au> or by telephoning the Department of Environment on (08) 9278 0300.

Water and Rivers Commission 2002, *Toxic and Hazardous Substances – Storage and Use*, Water Quality Protection Note, Water and Rivers Commission, Perth, Western Australia. Available via <www.environment.wa.gov.au> or by telephoning the Department of Environment on (08) 9278 0300.

THIS PAGE HAS BEEN LEFT BLANK INTENTIONALLY