

2.2 Maintenance practices

2.2.9 Building maintenance

Description

Buildings and their immediate surroundings can be the source of stormwater pollution during:

- building maintenance practices (e.g. removal of graffiti, washing of buildings and paved surfaces, sandblasting, painting, rendering, etc.); and
- the post-construction phase (e.g. contaminated runoff from roofed areas and paved surfaces may enter stormwater after every rainfall event).

Building maintenance practices can produce contaminated wastewater, which can:

- be acutely toxic to aquatic biota in the immediate vicinity (e.g. solvents or chlorinated wastewater from these maintenance activities may drain to receiving waters via the stormwater drainage system);
- lead to long-term chronic impacts on the health of aquatic biota (e.g. lead-based paint flakes from these maintenance activities may be washed into receiving waters via the stormwater drainage system); and
- cause aesthetic impacts (e.g. paint flakes from these maintenance activities may be washed into receiving waters via the stormwater drainage system).

Pollutants may enter stormwater from a building's roof (e.g. from flaking paint containing heavy metals, or atmospheric deposition of nitrogen), paved surfaces (e.g. litter from the building's footpaths, or hydrocarbons and heavy metals from the building's roadways and carparks), and during intense rainfall, from pervious areas (e.g. runoff from fertilised lawns and garden beds).

Management practices can be applied during building maintenance and post-construction stages to minimise the risk of stormwater and groundwater pollution and, to a lesser extent, minimise the volume of stormwater discharge.

Applicability

These management practices are applicable to building maintenance in all areas, particularly in catchments with:

- a high proportion of directly connected impervious surfaces (e.g. carparks draining directly to the street's drainage system);
- steep slopes;
- 'traditional' (piped or constructed channel) stormwater management systems; or
- sensitive receiving water bodies.

Recommended Practices

Building maintenance activities (e.g. painting, sandblasting and graffiti removal)

- ✓ A ‘waste management hierarchy’ should be adopted when undertaking building maintenance activities. For example, first explore options that do not generate wastewater (e.g. painting over graffiti rather than removing it); then ‘dry’ methods (e.g. paint scraping with debris being swept up); then methods that involve little risk of stormwater discharge (e.g. spot application of solvents to remove graffiti using an absorbent ground sheet); then options that generate large amounts of relatively innocuous wastewater (e.g. high-pressure hoses that wash a building but do not remove paints). Options that generate large amounts of relatively hazardous wastewater (e.g. chlorinated washwaters from washing buildings with moulds) should be used only when other options are not available.
- ✓ These types of maintenance activities should not be used in wet weather or when rainfall is imminent.
- ✓ Used solvents and excess paint should be managed as ‘hazardous waste’. Accordingly, liaise with local waste management firms and the operators of local waste management disposal/treatment facilities to identify opportunities for recycling and appropriate disposal options. 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).
- ✓ Where washing is necessary and wastewater contains only non-hazardous contaminants in particulate form, direct wastewater to an infiltration area. Where infiltration of wastewater is not possible, remove the suspended material by allowing sedimentation (e.g. building ‘check dams’ along the roadside channel using sandbags) and/or filtration (e.g. using filters made of geofabric on drainage inlets). Another filtration option is to build several ‘socks’ approximately 50 centimetres long, which are made of geofabric filled with crushed aggregate. These can be placed on hard surfaces between the source of the wastewater and the drainage inlet.
- ✓ Ensure spill clean-up kits are available and used for spills of solvents or paint. Site personnel should also be trained in their use.

The following maintenance practices are recommended for *painting activities*:

- ✓ Store materials undercover or in contained areas.
- ✓ Clean the work site daily. Use ‘dry’ methods for clean-up, where possible.
- ✓ Ensure paint or solvent leakages cannot enter the stormwater system. Treat a paint spill in the same manner as a ‘chemical spill’.
- ✓ Use a ground cloth/sheet to collect dust and paint residue during scraping, sanding and painting activities.
- ✓ Clean water-based paint equipment where residue cannot enter the stormwater system.
- ✓ Clean oil-based paint equipment where the liquid waste material can be collected and disposed of as hazardous waste.
- ✓ Avoid spray painting outdoors on windy days.

Sandblasting is sometimes undertaken to remove paint and dirt. A waste is produced from this process that consists of the blasting sand, paint and dirt. In some cases, these wastes can be hazardous, due to the presence of heavy metals from older types of paints. Such wastes should be contained, and it is recommended that a licensed waste management firm be engaged to test, transport and dispose of the material.

The following basic maintenance practices are recommended for *graffiti removal*:

- ✓ Ensure wastewater does not enter the stormwater system.
- ✓ Fit temporary geofabric filters on stormwater inlets, where required, to prevent pollutant entry.
- ✓ Sweep up the site immediately after works and dispose of waste materials appropriately.
- ✓ Use temporary bunding to contain potential pollutants.
- ✓ Undertake sound waste handling and disposal practices.
- ✓ For graffiti removal using wet sand blasting methods and where lead-based paint is not likely to be present in the wastewater, minimise the amount of water used. Then direct wastewater to landscaped areas where possible. If this is not possible, filter the wastewater to remove coarse sediment particles prior to its discharge to stormwater.
- ✓ For graffiti removal using high pressure washing and cleaning compounds, direct wastewater to landscaped areas where possible¹⁶, or pump the wastewater to sewer, (in accordance with an approved Industrial Waste Permit). Note that pre-treatment of wastewater may be necessary prior to its disposal to sewer if some types of cleaners have been used.

Guidelines for *surface cleaning activities* include:

- ✓ If wastewater should be connected and discharged to sewer, an Industrial Waste Permit is required. Further information is available from the Water Corporation via <www.watercorporation.com.au/indwaste> or by telephoning the Customer Service Centre on 13 13 95.
- ✓ Where painted buildings are being washed and there is the likelihood of lead or mercury additives in the paint, wastewater should be directed to sewer (in accordance with an approved Industrial Waste Permit) or taken to a hazardous waste treatment facility by a licensed contractor.
- ✓ Where an acid wash is being used to remove mineral deposits on masonry, rinse the treated area with an alkaline soap to neutralise the acid residue. Direct rinse water to a landscaped area. Collect the acidic wastewater, neutralise the pH to between 6 and 11, and pump the wastewater to sewer (in accordance with an approved Industrial Waste Permit).
- ✓ Where washing building walls with soap, either discharge wastewater to a landscaped area, to sewer (in accordance with an approved Industrial Waste Permit), or to a waste treatment facility via a licensed waste transport contractor.
- ✓ Where washing building walls without soap and where lead-based paint is not likely to be present in the wastewater, direct wastewater to landscaped areas where possible, or if this is not possible, filter the wastewater to remove coarse sediment particles prior to its discharge to stormwater. Dispose of collected solids as non-hazardous solid waste.

¹⁶ This guideline is not recommended in areas where cleaning compounds are used and groundwater contamination is likely (e.g. sandy soils on the Swan Coastal Plain).

Maintenance of gardens, carpark and paving

- ✓ Regularly sweep up contaminants from paved/carpark surfaces.
- ✓ Identify ‘hot spots’ where contaminants such as litter, leaves and sediment regularly accumulate. Program regular inspections and removal of these materials using ‘dry’ clean-up methods to minimise the potential for stormwater pollution.
- ✓ Provide suitable litter and recycling bins around the building, and ensure that an adequate inspection and maintenance program is in place for these bins, where appropriate. For more details on this practice, refer to Section 2.2.4.
- ✓ Ensure vehicles that are parked on-site do not leak fluids (e.g. oils). Undertake regular inspections, provide drip pans where necessary, and immediately clean up any identified leaks/spills.
- ✓ Seek to reduce the amount of impervious surfaces directly connected to the stormwater system by promoting infiltration and filtration, where site conditions are suitable.
- ✓ Implement opportunities to reuse roof water and other forms of stormwater from the site (e.g. for toilet flushing and garden irrigation).
- ✓ Implement water conservation and integrated pest management practices and reduce fertiliser use on lawn and garden areas. Refer to Section 2.2.7 for further information.
- ✓ Minimise the use of inorganic fertilisers on lawn and garden areas (e.g. via soil amendment practices and use of organic fertilisers). Refer to Section 2.2.7 for further information.
- ✓ Seek to ensure permeable areas (e.g. lawns and gardens) have features that promote infiltration of stormwater (e.g. uncompacted soils, contouring that causes temporary ponding during heavy rain and use of mulch on garden beds).
- ✓ Seek to implement permeable paving as an alternative to traditional paving, where practical and where site conditions are suitable (e.g. areas with permeable soils and where groundwater tables are not high). Refer to Chapter 9 for more information on permeable paving.

Maintenance of the building’s stormwater-related structures

- ✓ Regularly inspect and maintain all structural stormwater treatment, retention or infiltration devices. A maintenance and repair plan should be developed that clearly outlines inspection and maintenance frequencies, procedures for the disposal of wastes, equipment requirements, health and safety requirements. See Chapter 9 for more information.
- ✓ Inspect and, where necessary, maintain the site’s in-ground stormwater network (at least annually).
- ✓ Inspect and, where necessary, maintain the building’s drain inlets, spouting and downpipes (at least twice per year).

Benefits and Effectiveness

These measures are generally simple, low-cost pollution prevention and minimisation practices with a low risk of failure. They can be applied at the source of pollution, and are likely to be more cost-effective than trying to achieve the same stormwater management benefits at a point downstream, using alternative methods (e.g. regional stormwater treatment devices).

These management practices may:

- Minimise risks to the health of receiving water bodies by reducing loads of pollutants entering stormwater and shallow groundwater (particularly sediment, heavy metals, litter, hydrocarbons, organic matter, paint and solvents).
- Reduce aesthetic impacts (e.g. coloured paint flakes being washed from a building's roof under high pressure into the stormwater system and into a local wetland).
- Reduce the pressure on downstream, end-of-pipe, stormwater treatment devices.

Challenges

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

- Procedures and training materials must be regularly updated.
- Maintenance of a building's structural stormwater management devices may be limited by the absence of suitable maintenance plans that should have been developed when the devices were designed and installed.
- In some areas, local service providers may not be available for hazardous waste and recyclable material removal and processing.
- Implement training to address resistance to changes in work practices.
- Safety and localised flooding risks associated with placing geofabric filters over stormwater drain inlets when rainfall is imminent.

Cost

Generally the costs associated with management practices outlined in these guidelines are minimal, except where large volumes of wastewater need to be treated as 'hazardous waste'.

Additional Information

For information on maintenance of the site's drainage system, refer to the guidelines provided in Section 2.2.2.

For information on the placement and maintenance of the building's external litter and recycling bins, refer to the guidelines provided in Section 2.2.4.

This guideline has been developed assuming that maintenance is required. Taking a 'pollution prevention' approach, the need for maintenance may be reduced or eliminated through measures such as:

- incorporating maintenance considerations into the *design* of buildings; and
- multi-dimensional programs to minimise the occurrence of graffiti (e.g. ensuring quick removal of graffiti, installing sensor lighting in high risk areas, avoiding the creation of large surfaces that create a 'canvas' for graffiti attacks, creating partnerships with the community, providing areas where 'street art' is encouraged, using landscaping to make sites less accessible, etc).

Examples / Case Studies

No documented case studies were identified.

References and Further Information

- Department of Environmental Protection 2002, *Guidelines for Acceptance of Solid Waste to Landfill*, Department of Environmental Protection, Perth, Western Australia.
- Ecological Engineering Pty Ltd 2003, *Maintenance and Operations Procedures (MOP) Manual*, Manual prepared for the Hastings City Council, Ecological Engineering Pty Ltd, Port Macquarie, New South Wales.
- Housing Industry of Australia 2002-04, HIA Greensmart® Program (see <www.greensmart.com.au>) and the guideline titled: *Stormwater Management Guide for Residential Buildings*, Housing Industry of Australia (PATHE Program), Canberra, Australian Capital Territory.
- New South Wales Environmental Protection Authority (NSW EPA) 1998, *Managing Urban Stormwater - Source Controls*, Draft guidelines prepared for the State Stormwater Coordinating Committee, NSW EPA, Sydney, New South Wales.
- Stormwater Quality Management Committee (SQMC) 2003, *Best Management Practices – Surface Cleaning*. A community partnership sponsored by the Clarke County Regional Flood Control District, Nevada. Cited at <www.lvstormwater.com/bmps.html>.
- 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 Stormwater Committee (VSC) 1999, *Urban Stormwater - Best Practice Environmental Management Guidelines*, CSIRO Publishing, Melbourne, Victoria.