



Water quality protection note 52

May 2010

Looking after all our water needs

Stormwater management at industrial sites

Background and purpose

Industrial sites need effective management of stormwater run-off from roofs, pavements, exterior materials storage and process areas to avoid flooding or contamination of sensitive water resources (description in [Appendix A](#)). Contamination risks arise if stored or spilt process chemicals are flushed off-site or into the ground following rainfall.

Substances of concern include acids, alkalis, degradable organic residues, detergents, disinfectants, dyes, engine coolants, fertilisers, fuel, lubricants, metal solutions, pharmaceuticals, salts, poisons and solvents.

Risks can range from minor inconvenience to a major disaster involving harm to people, property and/or ecosystems. A small or repeated chemical discharge over an extended period may lead to contaminant accumulation in an aquifer, sediment or confined surface waters. Chemical spills (if poorly managed) can overwhelm the capacity of receiving water resources to assimilate or break down contaminants and result in degraded water values. Chronic problems also arise where small quantities of persistent contaminants are washed via drains into waterways or wetlands, causing sedimentation, algal blooms, aquatic fauna deaths and/or aesthetic damage. Pollution is an offence and severe penalties apply under the *Environmental Protection Act 1986* ([Appendix B](#)).

The Department of Water is responsible for managing and protecting Western Australian water resources. It is also a lead agency for water conservation and reuse. This note offers:

- our current views on stormwater management at industrial sites
- guidance on acceptable practices used to protect the quality of our water resources
- a basis for the development of a multi-agency environmental code or guidelines that considers the views of industry, government and the community, while sustaining a healthy environment.

This note provides a general guide on issues of environmental concern, and offers potential solutions based on professional judgement and precedent. Recommendations made in this note do not override any statutory obligation or government policy statement. Alternative practical environmental solutions suited to local conditions may be considered. This note shall not be used as this department's policy position on a specific matter, unless confirmed in writing. The note may be amended at our discretion, as new data becomes available.

Regulatory agencies should not use this note's recommendations in place of site-specific conditions based on a project's environmental risks. Any regulatory conditions should consider the values of the surrounding environment, the safeguards in place and take a precautionary approach.

Where a conflict arises between our recommendations and any proposed activity that may affect a sensitive water resource, this note may be used to assist negotiations with stakeholders. The negotiated outcome should not result in a greater risk to water quality than if our recommended protection measures were used.

Scope

This note applies to light, general and heavy industrial sites throughout Western Australia that could harm sensitive water resources ([Appendix A](#)).

It provides a list of recommendations related to stormwater management practices, including proposed environmental impact assessment, which should be addressed.

The note is not intended to cover residential or rural settings.

Advice and recommendations

- 1 Stormwater in industrial estates should be managed in accordance with relevant guidelines published in the *Stormwater management manual for Western Australia* ([reference 3d](#)).

Stormwater system design

- 2 Stormwater volumes may be estimated using the procedures given in *Australian rainfall and run-off* ([reference 4](#)) published by Engineers Australia. Factors to be considered include:
 - a Discharges off-site should be limited to pre-site development peak flows and volumes. If volume control is impractical during major rainfall events (exceeding a one-year average recurrence interval), system designers should assess the hydrological and ecological consequences to the downstream waterways and wetlands, and ensure protective measures are implemented. Appropriate statistical return periods for high intensity rainfall and the duration of storm events should be used when assessing the risk and potential impacts on receiving environments.
 - b Where practical, retention or detention storage systems should be used to manage peak stormwater flows within the on-site stormwater management system.
 - c Controlled release points should be built into any stormwater retention basin to avoid embankment failures or flooding under extreme rainfall conditions.

Stormwater management

- 3 Uncontaminated stormwater runoff from roofs, paths and the landscape should not be allowed to mix with process effluent, stored chemicals or stormwater runoff from areas susceptible to chemical spills. Where practical, processing areas involving the use of chemicals should be weatherproof or covered.
- 4 Areas where stormwater may become contaminated should drain to treatment facilities for removal of solids and chemical residues and testing prior to disposal. Diversion

banks, kerbing, surface grade changes, containment bunds and contained drains should be used to control stormwater runoff from large sites.

- 5 Chemical storage and handling areas should be located within sealed secondary containment areas that allow maximum recovery of any spilt chemicals.
- 6 Paved areas exposed to rainfall where dust, litter or spilt substances accumulate should be regularly cleaned using methods that prevent drainage or leaching of fluid into the surrounding environment. Gross pollutant (litter), oil and sand traps (appropriate to the site) are recommended at drain entry points. These traps require regular inspection and residue removal. First-flush water diversion for dusty outdoor areas should be considered to capture initial stormwater runoff after any extended dry period. These may incorporate flow-diversion valves and stormwater storage for later treatment.
- 7 Turbidity should be controlled by ensuring stormwater run-off is not directed towards or over areas cleared of vegetation, raw material stockpiles or earthworks vulnerable to erosion. Where practical, stormwater should be effectively treated then used preferentially as a process water source, irrigated onto well-vegetated areas or infiltrated to ground via soak pits.
- 8 Chemical solvents and non-degradable detergents used to clean equipment or pavements should not be released into stormwater systems. These chemicals are likely to cause environmental harm if they enter groundwater, wetlands, waterways or marine environments. Where cleaning chemical residues could cause downstream harm, alternative methods such as vacuum cleaning, mechanical scrubbers, high-pressure jetting or steam cleaners may be used to remove soil from machinery and floors.
- 9 Industry is encouraged to adopt the *cleaner production program* initiated by Curtin University in Perth, Western Australia. Additional information is given in Chapter 7 of our *Stormwater management manual for Western Australia* ([reference 3d](#)). Small to medium industries can obtain useful information from the Swan River Trust's *Environmental management and cleaner production directory for small to medium business* ([reference 9](#)).
- 10 Rainwater should not be released from chemical containment areas until tested and found to be uncontaminated. A notice warning of environmental contamination risks should be clearly visible at the compound. Clean rainwater should be released via a manually started pump, rather than via a valved (gravity) discharge. For additional information see our water quality protection note 61 ([reference 3b](#)).
- 11 If stormwater is likely to be contaminated by stored materials or waste dumps, such as sulphide materials yielding corrosive or metal-rich leachate, facilities should be in place to contain or neutralise the contaminants. After adequate settling followed by testing, clean water may be released into the environment.
- 12 Floodways and near-surface groundwater are likely to affect the design and performance of stormwater management systems. Site owners/operators should contact this department for information on the location of flood-prone land.
- 13 Where the groundwater table is within five metres of the surface or soil permeability is poor (less than one metre per day), alternatives to water infiltration may be needed to avoid harmful effects due to watertable mounding.

Stormwater treatment

- 14 Treatment options to limit suspended soil particles and turbidity include:
 - a sedimentation basins that provide retention periods of at least two hours
 - b bio-retention systems and constructed wetlands
 - c chemical coagulation, using metal salts or polymers, followed by settling
 - d sand or membrane filters, with periodic backwash into holding basins.
- 15 Fuel, oil and grease removal options include:
 - a petrol and oil traps
 - b inclined-plate separators
 - c chemical coagulation and launder systems
 - d dissolved air flotation units.
- 16 Litter reduction options include:
 - a employee waste awareness programs
 - b clearly marked recycle bins
 - c floor bucket traps (routinely maintained)
 - d trash racks/bar screens on process water drains
 - e centrifugal litter separators.
- 17 The *Stormwater management manual for Western Australia* ([reference 3d](#)) provides detailed information on the design and operation of most options listed in this section.
- 18 For low levels of non-toxic organic contaminants such as leaves and litter, consider the use of commercial gross pollutant traps or sediment trapping vessels in piped systems before releasing water into offsite drainage or infiltration. Any discharge to offsite waterways or wetlands should only occur during major rainfall events.
- 19 Designated personnel should be assigned to regularly inspect and maintain on-site stormwater systems. Litter, silt and plant matter should be removed, especially prior to the start of the wet season. Nothing should be stored over drain access points. Where necessary, accumulated solids should be removed from treatment systems before a build-up affects system performance or a major storm event flushes the solids downstream.

Stormwater disposal

- 20 Stormwater should be considered as a potential resource. This may have particular appeal in areas where water sources are limited and storage reservoirs can be constructed economically.
- 21 Options for stormwater use include:
 - a capture for process use, flushing, cooling water or dust suppression
 - b seasonal storage to supplement irrigation supplies.
- 22 The following options for discharge of excess stormwater, after it has been effectively treated should be considered in preferential order:
 - a on-site infiltration/soakage to recharge an underlying groundwater aquifer. The stormwater quality should be compatible with the water quality and environmental

values of the receiving environment. For further information, see our draft water quality protection note 3 *Managed aquifer recharge* ([reference 3b](#)).

- b discharge to a local government or Water Corporation main drainage system, where approved after consideration of flow capacity and water quality characteristics.
- c release to a local wetland or waterway. For discharge to surface water bodies, stormwater should be uncontaminated and compatible with the seasonal quality of the receiving water resources.

- 23 Erosion controls are likely to be needed for surface drainage systems excavated in steep land (slope greater than one in 15) or through disturbed land. Engineered drop structures or energy dissipation devices should be used where necessary. Gabions, riffles, grouted mattresses, screened rock walls, perennial grasses, cereal crops or surface mats used for erosion control should be an integral component of stormwater management. Where practical, vegetated soakage swales or overland flow waterways are preferred to engineered drains for clean stormwater management in urban and industrial estates.
- 24 Stormwater should not be discharged into sewer systems as it will overwhelm sewer design capacity and disrupt sewage treatment processes.
- 25 Stormwater system entry points should have signs indicating where they discharge and advising that the environment may be harmed by the release of contaminants. This helps to minimise the illicit disposal of contaminating liquids such as parts cleansers and floor wash-down.

Contingency plans

- 26 Site staff and contractors should be made aware of practices designed to minimise contaminant loss to stormwater management systems.
- 27 Site operators and designated staff should be trained to supervise the response to spill incidents and, if necessary, liaise with emergency response personnel such as the Fire and Emergency Services Authority (FESA).
- 28 Equipment such as absorbent litter should be available to clean up minor chemical spills. Hose-down of floor residues into drains should be avoided.
- 29 Drain systems should be designed so that they can be isolated in the event of large fluid spills, until the contaminant is removed. Drain plugs or sandbags should be labelled and located where they can be deployed quickly in an emergency.
- 30 If a chemical spill does escape into the off-site drainage system, the drainage service provider and the Department of Environment and Conservation's pollution response section should be informed immediately. Effective remedial action should be taken to limit any harmful effects downstream. A responsible approach to spills can lessen the risk of adverse publicity, legal action for damages or environmental contamination.
- 31 When chemicals have escaped into drains, water sampling should be arranged using the services of an analytical laboratory accredited by the National Association of Testing Authorities. Results should be compared against guideline criteria for local water values ([reference 1c or 1d](#)) and necessary recovery and remedial action taken without delay.

Appendix A - Key supporting information

Sensitive water resources

Water resources are used for drinking and sustaining ecological systems, industry and aesthetic values. Along with breathable air, uncontaminated water ranks as a most important need for viable communities. Natural water resources must remain within specific quality limits to retain their ecological, social and economic values. They therefore require stringent and conservative protection measures to minimise contamination.

Information on water quality parameters and processes to maintain water values are published in the Australian government's National water quality management strategy papers. These papers are available online at <www.environment.gov.au> select *water > water policy and programs > water quality*.

The Department of Water strives to improve community awareness of catchment protection measures (for both surface water and groundwater), as part of a multi-barrier protection approach to sustain acceptable water resource quality. Human activity and many land uses pose a risk to water quality if contaminants are washed or leached into sensitive water resources in significant quantities. Sensitive waters include estuaries, natural waterways, wetlands and unconfined groundwater.

Sensitive waters support one or more of the environmental values described below:

1 Public drinking water sources

Public drinking water source area (PDWSA) is the collective name given to any area proclaimed to manage and protect a source used for community drinking water supplies. PDWSA include *underground water pollution control areas, water reserves and catchment areas* administered under the provisions of the *Metropolitan Water Supply, Sewerage and Drainage Act (WA) 1909* or the *Country Areas Water Supply Act (WA) 1947*. For online information on the location of PDWSA, see <www.water.wa.gov.au> select *tools and data > maps and atlases > geographic data atlas*, then open interactive layers *environment > public drinking water source areas*.

For land planning and development purposes, three priority areas (P1, P2 and P3 areas) have been defined for use within PDWSA. They are assigned based on present land use, tenure and the vulnerability of the water body to harm. These areas are each managed with a different strategy to provide for effective water resource protection.

P1, P2 and P3 areas are assigned in *drinking water source protection plans* or *land use and water management strategies*. These documents are prepared by this department in consultation with other government agencies, landowners, industry and the community.

P1 areas are defined to ensure that there is *no degradation* of the water source. These areas are declared over land where the provision of the high quality drinking water for public use is the prime beneficial land value. P1 areas typically cover land under state agency control. P1 areas are managed in accordance with the principle of *risk avoidance* and so most land development and activity is normally opposed.

P2 areas are defined to ensure that there is *no increased risk of pollution* to the water source once a source protection plan has been published. These areas are declared over

land where low intensity development (such as rural use) already exists. Protection of public water supply sources is a high priority in these areas. P2 areas are managed in accordance with the principle of *risk minimisation*, and so restricted intensity development (with management conditions) and activities with a low contamination risk are accepted.

P3 areas are defined to *manage the risk of pollution* to the water source. These areas are declared over land where public water supply sources must coexist with other land uses such as residential, commercial and light industrial development. Protection of P3 areas is achieved through management measures defined via environmental guidelines (such as these notes) or via site-specific conditions that limit the contamination risk to water resources from the land use or activity. If, however, the water source becomes significantly contaminated, then water supplied from P3 sources may need to be treated or an alternative water source found.

Protection zones are also defined close to the point where drinking water is harvested or stored. These zones are known as *wellhead protection zones (WHPZ)* and *reservoir protection zones (RPZ)*. Additional constraints apply to activities in these zones to safeguard the area immediately surrounding these vulnerable water sources.

WHPZ are assigned within the immediate surrounds of water production wells and special land use restrictions apply. In these zones, groundwater moves rapidly towards wells due to aquifer depressurisation from pumping. Any contamination leaching from the ground surface could rapidly migrate into scheme water supplies (before effective remedial action can occur). In sedimentary basins, WHPZ are usually circular, with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. These zones do not extend outside PDWSA boundaries.

RPZ are defined over and around public water supply reservoirs or pipe-heads. Special access and land use restrictions apply. The aim is to restrict the likelihood of contaminants being deposited or washing into water sources following rainfall. RPZ within state controlled land cover an area of up to two kilometres from the reservoir top water level.

For additional explanatory information on PDWSA, see this department's water quality protection note 25 *Land use compatibility in public drinking water source areas* and note 36 *Protecting of public drinking water source areas*.

Buffers to water supply sources

Vegetation buffers should separate compatible land use operation areas from the full supply level of reservoirs, their primary feeder streams and production bores used as a source of drinking water. Advice is provided on buffer form and dimensions in our water quality protection note 6 *Vegetated buffers to sensitive water resources*.

Clearing control catchments

Special controls on vegetation clearing for salinity management purposes are provided under part IIA of the *Country Areas Water Supply Act (WA) 1947*. These controls apply in the Wellington Dam, Harris River Dam, Mundaring Weir and Denmark River catchment areas and the Kent River and Warren River water reserves.

Details on clearing controls may be obtained from our regional offices, see www.water.wa.gov.au, select *Contact us*.

Established activities in PDWSA

Many land use activities were approved and established before publication of a source protection plan or strategy. We encourage the operators of all land use activities to progressively improve their environmental management facilities and practices so the risk to water resources is minimised (factoring in practical and economic constraints).

New or expanded activities in PDWSA

Any proposed new or expanded activities that could affect drinking water sources should be referred to this department's regional office for assessment and written response. The development proposal may be approved (with or without conditions); additional relevant information sought prior to making a decision; or rejected due to a policy conflict or inadequate protective measures to safeguard the water source. To facilitate environmental approval, operators should demonstrate that under all operating conditions the materials and processes used on site do not pose a significant contamination risk to the local waters.

2 Private water supply sources

These water sources include:

- a human or stock (animal) drinking water sources
- b commercial or industrial water sources (requiring specific qualities that support activities such as aquaculture, cooling, food or mineral processing or crop irrigation)
- c urban or municipal irrigation sources (where water quality may affect vegetation performance or people's health or wellbeing).

3 Underground ecological functions

Important underground ecological functions that may be at risk include fauna and microorganisms in aquifers, sand, gravel and karst soils (such as cave fauna).

4 Waterway ecological and social values

- a Maintenance of waterways of high conservation significance described in the WA Environmental Protection Authority's guidance statement 33 *Environmental guidance for planning and development* (section B5.2.2). This statement is available online at www.epa.wa.gov.au select *EIA > guidance statements*.
- b Waterways managed by the Department of Water under the *Waterways Conservation Act (WA) 1976* (including the Avon River, Peel-Harvey Inlet, Leschenault Inlet, Wilson Inlet and Albany waterways), or Section 9 of the *Water Agencies (Powers) Act (WA) 1984*. For online advice, see www.water.wa.gov.au select *waterways health > looking after our waterways*.
- c Waterways managed by the Swan River Trust under the *Swan and Canning Rivers Management Act (WA) 2006*. For online advice, refer to www.swanrivertrust.wa.gov.au >.
- d Social values in natural waterways include their aesthetic appeal, use of watercraft, fishing, tourism, swimming and other aquatic activities.

Engineered drains and constructed water features are normally not assigned ecological values because their function and operational factors override these water values.

5 Wetland ecology

- a Ramsar wetlands are described online at <www.ramsar.org>.
- b Wetlands defined by the Australian government in the *Directory of important wetlands in Australia*, available online at <www.environment.gov.au> select *water > water topics > wetlands*.
- c Wetlands of high conservation significance described in the Environmental Protection Authority (WA) guidance statement 33 *Environmental guidance for planning and development (B4.2.2)*. This is available online at <www.epa.wa.gov.au> select *Environmental impact assessment > guidance statements*.
- d Wetlands identified for conservation value or for resource enhancement via:
 - *Geomorphic wetlands of the Swan coastal plain dataset*
 - *South coast significant wetlands dataset*
 - *Geomorphic wetlands Augusta to Walpole dataset*.

The *Geomorphic wetlands Augusta to Walpole* dataset awaits detailed evaluation.

The Department of Environment and Conservation (DEC) is the custodian of state wetland datasets, and is responsible for maintaining and updating the information. These datasets can be viewed online at <www.dec.wa.gov.au> search *maps wetlands*, or select *management and protection > wetlands > wetlands data*.

Guidance on viewing the wetlands is provided on the DEC website at <www.dec.wa.gov.au> select *water > wetlands > data* or by phoning their nature conservation division on 08 9334 0333.

Wetlands that are highly disturbed by rural land use, or have been landscaped to provide a social amenity or drainage control function in urban settings, may not have ecological conservation values unless they are being actively managed to restore these values.

Many aquifers, waterways and wetlands in Western Australia require detailed scientific evaluation and their values remain unclassified. Unless proven otherwise, any natural waters that are slightly disturbed by human activity are considered to have sensitive values.

Community support for water values, the setting of practical management objectives, providing sustainable protection strategies and effective implementation are vital to protecting or restoring our water resources for current needs and those of future generations.

Note interpretation

This note provides a general guide on issues of environmental concern, and offers solutions based on professional judgement and precedent. Recommendations made in this note do not override any statutory obligation or government policy statement. Alternative practical environmental solutions suited to local conditions may be considered.

This note shall not be used as this department's policy position on a specific matter, unless confirmed in writing. The note may be amended as needed, when new data is available.

Regulatory agencies should not use recommendations made in this note in place of site-specific conditions based on a project's environmental risks. Any regulatory conditions should consider the values of the surrounding environment, the safeguards in place and take a precautionary approach.

Where a conflict arises between recommendations made in this note and any proposed activity that may affect a sensitive water resource, this note may be used to assist negotiations with stakeholders. The negotiated outcome should not result in a greater risk to water quality than would apply if our recommended protection measures were used.

This note will be updated as new information is received or industry/activity standards change. The currently approved version is available online at <www.water.wa.gov.au> select *publications* > *find a publication* > *series browse* > *water quality protection notes*.

Appendix B - Statutory approvals relevant to this note include:

What is regulated?	Statute	Regulatory agency(s)
Development approval	<i>Planning and Development Act 2005</i>	WA Planning Commission www.planning.wa.gov.au Local government (council)
Impact on the values and ecology of the environment	<i>Environmental Protection Act 1986</i> - Part III Environmental Protection Policy - Part IV Environmental Impact Assessment	Minister for the Environment advised by the Environmental Protection Authority; www.epa.wa.gov.au
Environmental protection policies		
Materials that must not be discharged into the environment	Environmental Protection (Unauthorised Discharges) Regulations 2004	Department of Environment and Conservation www.dec.wa.gov.au
Soil sediment and water contamination	<i>Contaminated Sites Act 2006</i>	
Licence to use surface water and groundwater	<i>Rights in Water and Irrigation Act 1914</i>	Department of Water-regional office www.water.wa.gov.au
Development in declared Waterways Management Areas	<i>Waterways Conservation Act 1976</i>	
Development and operations in Public Drinking Water Source Areas	<i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i> <i>Country Areas Water Supply Act 1947</i>	
Drainage into the Swan or Canning River Estuary	<i>Swan and Canning Rivers Management Act 2006</i>	Swan River Trust www.swanrivertrust.wa.gov.au
Management of human wastes Community health issues	<i>Health Act 1911</i>	Local government; Department of Health www.health.wa.gov.au
Connection to main drains in a declared drainage district	<i>Metropolitan Water Authority Act 1982</i> ; <i>Land Drainage Act 1925</i>	Water Corporation of WA www.watercorporation.com.au
Connection to sewer	<i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i> <i>Country Towns Sewerage Act 1948</i>	
Dangerous goods storage, transport and handling	<i>Dangerous Goods Safety Act 2004</i>	Department of Mines and Petroleum www.dmp.wa.gov.au
Emergency response planning	<i>Fire and Emergency Services Authority of WA Act 1998</i>	Fire and Emergency Services Authority of WA www.fesa.wa.gov.au

Relevant statutes are available from the *state law publisher* at <www.slp.wa.gov.au>.

References and further reading

- 1 Australian Government Department of Environment, Water, Heritage and the Arts, National water quality management strategy papers available online at <www.environment.gov.au> select *water > water policy and programs > water quality > national water quality management strategy*
 - a Paper 2 *Policies and principles*, 1994
 - b Paper 3 *Implementation guidelines*, 1998
 - c Paper 4 *Australian and New Zealand guidelines for fresh and marine water quality*, 2000
 - d Paper 6 *Australian drinking water guidelines*, 2004
 - e Paper 7 *Australian guidelines for water quality monitoring and reporting*, 2000
 - Paper 8 Guidelines for groundwater protection in Australia*, 1995
- 2 Department of Environment and Conservation (WA)
 - a Wetlands policy and guidelines available online at <www.dec.wa.gov.au> select *management and protection > wetlands > publications*
Position statement: wetlands, 2001
 - b Contaminated sites guidelines available online at <www.dec.wa.gov.au> select *pollution prevention > contaminated sites > guidelines*
Assessment levels for soil, sediment and water November 2003.
- 3 Department of Water (WA)
 - a Policy available online at <www.water.wa.gov.au> search *policies*
 - Foreshore policy 1 *Identifying the foreshore area* 2002
 - State-wide policy 2 *Pesticide use in public drinking water source areas* 2000.
 - b Water quality protection notes available online at <www.water.wa.gov.au> select *publications > find a publication > series browse > water quality protection notes*
 - WQPN 03 *Managed aquifer recharge*
 - WQPN 06 *Vegetated buffers to sensitive waters*
 - WQPN 07 *Chemical blending*
 - WQPN 10 *Contaminant spills - emergency response*
 - WQPN 13 *Dewatering of soils at construction sites*
 - WQPN 20 *Industry – general and heavy*
 - WQPN 22 *Irrigation with nutrient-rich wastewater*
 - WQPN 25 *Land use compatibility in public drinking water source areas*
 - WQPN 27 *Liners for containing pollutants, using engineered soils*
 - WQPN 28 *Mechanical servicing and workshops*
 - WQPN 33 *Nutrient and irrigation management plans*
 - WQPN 39 *Ponds for stabilising organic matter*
 - WQPN 61 *Tanks for ground-level chemical storage*
 - WQPN 65 *Toxic and hazardous substances - storage and use*

- WQPN 83 *Infrastructure corridors near sensitive water resources*
 - WQPN 93 *Light industry near sensitive waters*
- c Environmental guidelines available online at <www.water.wa.gov.au> select *water publications* > *find a publication* > *series browse* > *water quality protection guidelines*
Environmental guidelines for mining and mineral processing, 2000.
- d Stormwater management publication available online at <www.water.wa.gov.au> select *waterways health* > *stormwater and drainage* > *management manual*
Stormwater management manual for Western Australia, (current edition).
- e Waterways guidelines available online at <www.water.wa.gov.au> select *publications* > *find a publication* > *series browse* > *water notes*
- WN 11 *Identifying the riparian zone*
 - WN 23 *Determining foreshore reserves*.
- 4 Engineers Australia publication available for purchase at <www.engineersmedia.com.au> search *EA books*
Australian rainfall and runoff (current edition).
- 5 Department of Environment and Climate change (New South Wales) online publications available at <www.environment.nsw.gov.au> select *environmental issues* > *water* > *stormwater* > *publications*.
- 6 Environmental Protection Authority (South Australia) online publications at <www.epa.sa.gov.au> select *publications* > *guidelines* > *stormwater management series*.
- 7 Environmental Protection Authority (WA)
- a Guidance statements available online at <www.epa.wa.gov.au> select *environmental impact assessment* > *guidance statements*
Guidance statement 33 - *Environmental guidance for planning and development*, May 2008.
- b *Environmental protection policies* available online at <www.epa.wa.gov.au>
- *Revised draft Environmental protection (Swan Coastal Plain wetlands) policy and regulations 2004*
 - *Environmental protection (Gnangara mound crown land) policy 1992*
 - *Environmental protection (Swan coastal plain lakes) policy 1992*
 - *Environmental protection (South west agriculture zone wetlands) policy 1998*
 - *Environmental protection (Swan and Canning Rivers) policy 1998*
 - *Environmental protection (Western swamp tortoise habitat) policy 2002*.
- c *State environmental policies*, available online at <www.epa.wa.gov.au> select *State environmental policies*
- *An explanatory document 2004*
 - *State environmental (Cockburn Sound) policy 2005*.

d *Position statements* available online at <www.epa.wa.gov.au> select position statements

- PS 4 *Environmental protection of wetlands*, November 2004
- PS 7 *Principles of environmental protection*, August 2004
- PS 8 *Environmental protection in natural resource management*, 2005
- PS 9 *Environmental offsets*, January 2006.

Standards Australia publication available for purchase at <www.saiglobal.com> select publications > Australian standards

AS 5667 Water quality – sampling

8 Swan River Trust publications see <www.swanrivertrust.wa.gov.au> select *resources and publications*> *Swan- Canning cleanup program*.

Environmental management and cleaner production directory for small and medium business 2005.

More information

We welcome your views on this note. All feedback is retained on our file number 15656.

To comment on this note or for more information, please contact our water source protection branch as shown below, citing the note topic and version.

Manager, Water source Protection
Department of Water
168 St Georges Terrace
Perth, Western Australia 6000

PO Box K822
Perth Western Australia 6842

Telephone +61 8 6364 7600
Facsimile +61 8 6364 7601
Email waterquality@water.wa.gov.au