



WQPN 23, July 2006

Laboratories

Purpose

Photographic and analytical laboratories provide essential services to the Western Australian community. The chemicals used in these facilities however pose a significant contamination risk to water resources should they escape into the environment. Many laboratories fully contain and recycle chemicals, or effectively treat liquid wastes before discharge into a sewer, which minimises the environmental contamination risk.

Uncontrolled discharge of wastes from sinks or discarded chemicals can damage the value of water resources if released into soakage or allowed to drain to surface waters. This note has been prepared to advise on the water resource impacts that may arise from the inappropriate disposal of laboratory liquid wastes, and to recommend acceptable control measures.

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

- the Department's current views on laboratories near sensitive water resources;
- guidance on acceptable practices used to protect the quality of Western Australian water resources; and
- a basis for the development of a multi-agency code or guideline designed to balance 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. The recommendations made do not override any statutory obligation or Government policy statement. Alternative practical environmental solutions suited to local conditions may be considered. Regulatory agencies should not use this note's recommendations without a site-specific assessment of any project's environmental risks. Any conditions set should consider the values of the surrounding environment, the safeguards in place, and take a precautionary approach. The note shall not be used as this Department's policy position on a specific matter, unless confirmed in writing.

Scope

This note applies to chemical management and waste disposal at all laboratories. It is intended to cover laboratories serving educational institutions; industrial, pathological, and pharmaceutical facilities; photographic processing and commercial analytical laboratories.

Recommendations

Site selection

1. Laboratories should be located on sites approved for this activity in the relevant local government planning scheme. They will normally require development approval from local government.

Within Public Drinking Water Source Protection Areas

2. Laboratory facilities are incompatible with this Department's water resource protection objectives in Priority 1 and 2 source protection areas, and Well-head or Reservoir Protection Zones. The Department of Water will oppose the establishment and expansion of laboratories in these areas. For more information see this Department's Water Quality Protection Note *Land Use Compatibility in Public Drinking Water Source Areas*.
3. The location of public drinking water source areas is shown on our web site www.water.wa.gov.au, then select *Tools, system and Data>Geographic Data Atlas>Environment>Public Drinking Water Source Areas*.

Near waterways, within Waterways Management Areas or the Swan River Trust Area

4. Adequate vegetated buffers should be maintained between any laboratory facility and waterways or estuaries to minimise the risk of degradation of water quality due to waste discharges and chemical spills or leakage. If a laboratory proposes to discharge any waste into the environment within a Waterways Management Area, approval must be sought from the Department of Environment and Conservation under the *Waterways and Conservation Act 1976*. These declared Management areas include the Albany Waterways, Avon River, Leschenault Inlet, Peel-Harvey Estuary, Wilson Inlet and their surrounds.
5. If a laboratory is located where wastewater discharge could affect the Swan–Canning River system, approval must be sought from the Swan River Trust under the *Swan River Trust Act 1988*.
6. Laboratory wastewater discharges should have buffers to waterways determined on the basis of scientific evaluation of local biophysical criteria. A minimum separation distance of 100 metres from any treated process wastewater disposal point to the banks of any waterway is recommended. Discharges should not occur within riparian vegetation or on land subject to flooding, unless approved in writing by the appropriate regulatory agency.

Near conservation valued wetlands

7. Any laboratory wastewater discharge into the environment near recognised conservation and resource enhancement category wetlands should have an adequate separation buffer to the wetland and its dependant vegetation to ensure that ecological values are preserved. These buffers should be determined by scientific evaluation of the local biophysical criteria.

Clearance to groundwater

8. Laboratory discharges should be located at least two metres above the maximum wet season groundwater table.

Laboratory construction

9. Laboratory operators should construct their facilities so that waste generation is minimal and, where practical, waste chemicals are recovered for reuse. Chemical and waste storage areas should conform to the recommendations made in this Department's Water Quality Protection Note *Toxic and hazardous substances, storage and use*.
10. Where practical and if safe to do so, laboratory wastewater should be disposed of into a reticulated sewerage scheme, provided it meets the needs of the relevant water services provider. For more information see the *Statutory requirements* section overleaf and [Appendix A, reference 5](#).
11. Pre-treatment of wastewater may be needed to conform to the sewerage service provider's industrial wastewater permit requirements.

Statutory requirements

12. Any wastewater discharges into sewerage schemes operated by the Water Corporation require an Industrial Waste Permit (issued by the Corporation) in accordance with the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Towns Sewerage Act 1948*.

Effluent management where a sewer connection is unavailable

13. Wastewater discharge into the environment may be approved, subject to appropriate treatment and solids recovery. Criteria to protect water resource quality values are described in the national water quality guidelines, see [Appendix A, reference 1](#).
14. Any laboratory wastewater, likely to contain chemical residues, that will be discharged into the environment (either directly or indirectly) should pass through an effective treatment system appropriate to the monitored wastewater quality and tailored to protect the values of the receiving water resources. Treatment may include pH correction, biological stabilisation, filtration, chemical coagulation and settling, adsorption such as ion exchange, and/or disinfection.
15. Clean laboratory effluent should be discharged into a dilution pit, which holds at least one cubic metre of liquid, or the maximum daily liquid waste discharge volume (whichever is greater). The pit should be constructed of, or lined with, materials resistant to the chemicals used in the laboratory (eg fibreglass, rigid plastic, coated concrete or masonry). The pit should have removable baffle plates and the outlet point located away from the entry point at the top water level to encourage mixing of pit contents. It should have a secure, removable lid to permit extraction of any sludges and surface scums, and be vented to release gases. It should also be secure and sign posted to indicate that the contents might be hazardous.
16. The contents of the dilution pit may be discharged into a soak pit, leach drain or evaporation bed, depending on the soil properties at the site. Discharge should not occur into onsite sewage management systems, such as septic tanks, because of the potential for accidental chemical discharge to disrupt the biological waste treatment within these systems. Discharge into stormwater drains leaving the site or entering surface water bodies should not occur.

17. Any wastewater discharge location should comply with the recommendations made in this Department's Water Quality Protection Note *Vegetation buffers to sensitive water resources*.

Operation and Management

18. Waste chemicals, precipitates and other potentially contaminating materials should be temporarily stored in secure impervious containers pending recycling, destruction or disposal at a site acceptable to the Department of Environment and Conservation's Waste Management Branch. Care should be exercised to ensure reactive chemicals are held in separate, labelled containers.

19. The only wastes discharged via laboratory drainage systems should be:

- cooling waters;
- emergency flushing water (eyes and skin wash); and
- equipment wash water.

20. The laboratory operator should train staff on the operation of the waste disposal system. Staff should be informed about disposal practices for substances that may threaten the environment. Caution notices should be maintained above sinks to prevent disposal of chemical residues into the environment.

21. The operator should inspect and test water treatment facilities at regular intervals, and maintain them in accordance with the equipment supplier's recommendations. Accumulated solids should be recovered for recycling, reuse or disposal at an approved landfill.

22. Regular checks, eg weekly, should be made of the dilution pit to assess the build up of solids, which would cause loss of dilution or blockage.

23. Periodic chemical testing of dilution pit waters (at least monthly) is recommended to confirm that the effluent does not pose a threat to the local environment. Test results should be recorded and made available for inspection by the regulatory agencies.

24. Site operators should be trained and equipped to minimise chemical spills, and should they occur be prepared to implement procedures to recover the chemicals and prevent contamination of the environment.

More Information

Your views on this note are welcomed. Feedback provided on this topic is held on the Department of Water's file **13197**. To comment on this note or for more information, please contact the Water Source Protection Branch at our Atrium offices in Perth, phone: (08) 6364 7600 (business hours); fax: 6364 6524 or via E-mail at our web page <http://drinkingwater.water.wa.gov.au>, select *Contact us*, citing the topic and version.

This note will be updated periodically as new information is received or industry/activity standards change. Updates are placed on our web page: <http://drinkingwater.water.wa.gov.au>, select *Publications > Water Quality Protection Notes*. For our regional office contact details, visit the Department's Internet site at www.water.wa.gov.au, see regional offices under *Contact us*, use the phone book or contact our head office (details below).

In October 2005, the State Government announced the formation of the Department of Water. From January 2006, the Department of Water assumed primary responsibility for managing the State's water resources. Once the Department of Water is legally constituted, it will replace many of the functions of the Water and Rivers Commission and operate in parallel (with separate powers) to the Department of Environment and Conservation. The custodian and recommendations made in this note will then change to match the assigned responsibilities of the departments of Environment and Conservation or Water.



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Appendices

Appendix A - References and further reading

1. Australian Government - National Water Quality Management Strategy
 - a. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000;
 - b. *Australian Guidelines for Water Quality Monitoring and Reporting*, 2000;
see web page www.deh.gov.au/water/quality/nwqms/index.html.
 - c. *Australian Drinking Water Guidelines*, 2004;
see web page www.health.gov.au/nhmrc/publications/synopses/eh19syn.htm.
2. Standards Australia
AS 5667 Water Quality-Sampling
see web page www.standards.com.au/catalogue/script/search.asp
3. Department of Water (WA)
Water Quality Protection Notes:
 - a. *Industrial sites near sensitive environments*;
 - b. *Land use compatibility in Public Drinking Water Source Areas*;
 - c. *Toxic and hazardous substances, storage and use*; and
 - d. *Vegetation buffers to sensitive water resources*;see web page <http://drinkingwater.water.wa.gov.au>, select *Publications > Water Quality Protection notes*.

4. Department of Environment and Conservation (WA)

a. Stormwater:

Stormwater Management Manual for Western Australia;

see web page <http://stormwater.environment.wa.gov.au>, select *Publications*> *Guidelines*.

b. Waste management:

- *Guidelines for acceptance of solid waste to landfill*, January 2001;
- *DrumMuster 2002*;
- *Landfill Waste Classification and Waste Definitions*, 2001;
- *Western Australian Waste Reduction and Recycling Policy 1997*;

see web page <http://wastemanagement.environment.wa.gov.au>, select *Publications*.

5. Water Corporation (WA)

Industrial Waste Information Brochures:

a. IW PUB27 *Photographic waste*

b. IW PUB28 *Laboratory chemical wastes*

see internet site www.watercorporation.com.au, select *wastewater*> *industrial waste*>*commercial and light industrial customers*.

6. Waste Management Board (WA)

Zero waste web site provides information on waste reuse and recycling opportunities and facilities in WA; see www.wastewise.wa.gov.au/pages/hazardous.asp.

7. Environmental Protection Authority (WA)

Guidance for Assessment of Environmental Factors No 3 – Separation Distances between Industrial and Sensitive Land Uses, June 2005, see Internet site www.epa.wa.gov.au, then select *Guidance statements*.

8. Wetland information

a. For RAMSAR wetlands, see Internet site www.ramsar.org.

b. Department of the Environment and Heritage (Australia)

A Directory of important wetlands in Australia, see web page

www.deh.gov.au/water/wetlands/databases.html, or

the Department of Conservation and Land Management (WA) web page

www.naturebase.net/national_parks/wetlands/wa_wetlands.html.

c. *Geomorphic wetlands of the Swan Coastal Plain* dataset, which displays wetland locations, boundaries, geomorphic classification (wetland type) and management categories. The dataset and maps are available from the following sources:

- WA Land Information System at Internet site www.walis.wa.gov.au. This site should be used in conjunction with “a guide to viewing the WALIS dataset” available at <http://wetlands.environment.wa.gov.au/>, select *Data*>*Wetland mapping*.

- *Perth Groundwater Atlas*, see Internet site www.water.wa.gov.au select *Tools, System & Data*. For additional information contact the Water Information section.
 - Publication *Wetlands of the Swan Coastal Plain*, volume 2B *Wetland mapping, classification and evaluation - wetlands atlas* (Hill, Semeniuk, Del Marco 1996). Reference copies are available from the Department of Environment and Conservation library in Perth.
- d. *Geomorphic wetlands Augusta to Walpole* available from the following sources:
- Publication *Mapping and Classification of Wetlands from Augusta to Walpole in the South West of Western Australia* (V & C Semeniuk Research Group for the Water and Rivers Commission 1997). Reference copies are available from the Department of Environment and Conservation's library in Perth.
 - Dataset is available from the *Information Services Branch – GIS support analyst* at the Department of the Environment and Conservation (WA), phone 6364 6500.
- e. *South Coast Significant Wetlands* dataset, which supports the South Coast Natural Resource Management Strategy. This is available from the *Information Services Branch – GIS support analyst* at the Department of the Environment and Conservation (WA) phone 6364 6500.

Appendix B - Statutory requirements and approvals relevant to this note include:

What's regulated	Statute	Regulatory body/ agency
Subdivision of land	<i>Planning and Development Act 2005</i>	WA Planning Commission
Land zoning and development approval		Department for Planning and Infrastructure
		Local Government (Council)
		Department for Planning and Infrastructure
Impact of significant development proposals on the values and ecology of land or natural waters	<i>Environmental Protection Act 1986, Part IV - Environmental Impact Assessment</i>	Minister for the Environment advised by the EPA
Licensing of prescribed premises that pollute	<i>Environmental Protection Act 1986, Part V - Environmental Regulation</i>	Department of Environment and Conservation– regional office
Discharge of acids, alkalis, metal solutions, detergents, organic solvents and sediment	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>	
Transport of scheduled wastes including acidic or alkaline solutions, metal solutions, cyanide, pharmaceutical and photographic wastes, brines, detergents, organic solvents and sediment	<i>Environmental Protection (Controlled Waste) Regulations 2004</i>	
Licence to discharge waters into managed waterways.	<i>Waterways Conservation Act 1976</i>	
Licence to take surface water and groundwater	<i>Rights in Water and Irrigation Act 1914</i>	Department of Water– regional office
Industrial sites in existing public drinking water source areas	<i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i>	
	<i>Country Areas Water Supply Act 1947</i>	
Discharges into the Swan-Canning Estuary	<i>Swan River Trust Act 1988</i>	Swan River Trust
Storage of fuels, solvent, explosive and dangerous goods	<i>Explosive and Dangerous Goods Act 1961</i> and it's associated Regulations	Department of Consumer and Employment Protection
Management of human wastes, Community health issues	<i>Health Act 1911</i>	Local Government
		Department of Health
Emergency response planning	<i>Fire and Emergency Services Authority of WA Act 1998</i>	Fire and Emergency Services Authority
Discharge to sewer (industrial waste permit) or to main drain	<i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i>	Water Corporation; or other designated water services provider
	<i>Country Towns Sewerage Act 1948</i>	