



Water quality protection note no. 56

December 2018

Tanks for fuel and chemical storage near sensitive water resources

Scope

This water quality protection note (WQPN) provides best management practices for liquid chemical and fuel storage tanks in and near sensitive water resources (see WQPN no. 4: [Sensitive water resources](#) for a definition). It applies to tanks, drums and intermediate bulk containers – including pipework fittings and filling and dispensing apparatus – that are:

- 250 litres and above in capacity
- permanent and temporary
- above-ground and underground
- outside or within another structure (e.g. shipping container, shed, trailer).

It replaces:

- WQPN 56: Tanks for elevated chemical storage (2006)
- WQPN 58: Tanks for temporary elevated chemical storage (2009)
- WQPN 60: Tanks for mobile fuel storage in public drinking water source areas (2013)
- WQPN 61: Tanks for ground level chemical storage (2008)
- WQPN 62: Tanks for underground chemical storage (2013)
- WQPN 64: Tanks – closure of underground storage (2013).

This note does not apply to solids, gas, water or wastewater storage. Transport and handling of chemicals and fuels are addressed in WQPN no. 65: [Toxic and hazardous substances](#). Standard information to be read in conjunction with this note is in WQPN no. 3: [Using water quality protection notes](#).

Relevant legislation

Fuel and chemical storage in Western Australia (WA) is regulated via the following legislation:

- *Occupational Safety and Health Act 1984*
- Environmental Protection (Controlled Waste) Regulations 2004 (managed by Department of Water and Environmental Regulation)

- *Dangerous Goods Safety Act 2004* and Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007 (managed by Department of Mines, Industry Regulation and Safety).

Fuel and chemical storage in public drinking water source areas (PDWSAs) is covered by the *Metropolitan Water Supply Sewerage and Drainage Act 1909* and associated 1981 by-laws, and the *Country Areas Water Supply Act 1947* and associated 1957 by-laws. For consistency, and because updated legislation is planned, some of the requirements of the metropolitan act and by-laws are extended to all PDWSAs in WA as best management practices to help protect drinking water quality and public health.

Water quality contamination risks

Tanks can cause contamination if the fuels and chemicals they contain escape into the environment, posing risks to ecosystems in waterways and groundwater, and to public health if they enter stormwater or recreational waters.

Chemicals and fuels that enter a drinking water source can be harmful to the health of people and animals consuming the water. Some contaminants may pose a risk even at very low concentrations, and water treatment processes cannot be guaranteed to remove all contaminants. Some chemicals, at certain concentrations, can affect people's health, causing illness, hospitalisation and even death. For example, benzene (a petroleum hydrocarbon) is carcinogenic (NHMRC & NRMCC 2011). For these reasons, systems need to be developed, established and followed to ensure fuel and chemicals are correctly stored and used.

For general information about protecting water quality, see WQPN no. 8: [Further reading](#).

Recommendations

Before installing fuel and chemical storage tanks, we recommend that you:

- consider alternative energy sources (such as solar or gas) that pose a lower risk to sensitive water resources before deciding to store fuel
- consider alternatives to using chemicals, such as using steam for weed control, to avoid the need to store chemicals.

If a tank is required, we recommend the following best management practices to protect sensitive water resources.

Location

Within public drinking water source areas

- To avoid the risk of contamination, consider locations outside of PDWSAs for fuel and chemical storage and handling. For example, can vehicles and machinery be transported outside the PDWSA to be refuelled?
- If tanks must be placed within PDWSAs, see Table 1 for requirements.

To find out what PDWSAs are and how the department manages them, see Strategic policy: [Protecting public drinking water sources in Western Australia](#) and WQPN no. 25: [Land use compatibility tables for public drinking water source areas](#).

Table 1: Requirements for fuel and chemical tanks in PDWSAs

Type of tank	P1	P2	P3
Above-ground tanks (no portion of the tank is on or below the ground)	Incompatible ¹	Compatible with conditions: <ul style="list-style-type: none"> • Outside wellhead protection zones (WHPZs)² • Capacity of 5000 L or less³ • Outside reservoir protection zones (RPZs). If this is not possible then 100 m away from centreline of waterways and less than 250 L capacity • Best management practices as outlined in the rest of this note 	Compatible with conditions: <ul style="list-style-type: none"> • Outside WHPZs and RPZs. If this is not possible, then 100 m away from bore or centreline of waterway and less than 250 L capacity • Best management practices as outlined in the rest of this note
Underground tanks (the whole tank or a portion of it is on or below the ground)	Incompatible ⁴	Incompatible ⁴	Compatible with conditions: <ul style="list-style-type: none"> • Outside RPZs⁵ • 100 m away from bores and the centreline of waterways⁵ • Outside WHPZs; if not possible, then less than 250 L capacity • 2 m separation to maximum seasonal groundwater table • Best management practices as outlined in the rest of this note

¹ This land use is incompatible unless special circumstances apply (see 'Special circumstances' on page 8 of WQPN no. 25: [Land use compatibility tables for public drinking water source areas](#)). Subject to confirmation of these special circumstances, this land use may be considered to be compatible with conditions if it is directly associated with a primary land use that is compatible with conditions or acceptable with the applicable priority area. If these circumstances apply and management practices are acceptable, tanks must be located outside WHPZs² and RPZs and be 5000 L or less in capacity³.

² Under the Metropolitan Water Supply, Sewerage and Drainage By-laws 1981 ('the by-laws') (5.6.2), above ground tanks are prohibited in P1 and P2 WHPZs.

³ Under the by-laws (5.6.5), above ground tanks over 5000 L require Minister for Water approval.

⁴ Under the by-laws (5.6.2), underground tanks are prohibited in P1 and P2 areas of an underground water pollution control area (UWPCA).

⁵ Under the by-laws (4.6.5.1 and 5.5.4), underground tanks are prohibited in RPZs and within 100 m of a bore or centreline of a waterway.

Waterways

- Tanks should be located above the 1 per cent annual exceedance probability (AEP) flood level. To find out flood areas within Western Australia, visit www.data.wa.gov.au.
- Areas subject to seasonal inundation or waterlogging should be avoided.
- Maintain an adequate buffer to help prevent contamination in the event of a fuel or chemical spill, between the tank and any waterways (including their foreshore areas). Refer to Appendix C: *Is a foreshore area sufficient to protect water quality in the waterway?* of [Operational policy 4.3: Identifying and establishing waterways foreshore areas](#).
- For any land- or water-based developments or activities near the Swan, Canning, Helena or Southern rivers, please contact the [Department of Biodiversity, Conservation and Attractions](#) for special requirements.

Wetlands

- To find out the locations of wetlands, visit www.data.wa.gov.au.
- For advice on wetland management requirements, contact your local government in the first instance, or the [Department of Biodiversity, Conservation and Attractions](#).

Landscape

- Rocky slopes, steep slopes and land prone to erosion are not suitable for fuel and chemical storage tanks.

Other land uses

- Separation distances between your proposed land use or activity and sensitive land uses – such as urban areas – may apply, as per the Environmental Protection Authority's Guidance statement no. 3: [Separation distances between industrial and sensitive land uses](#).

Approvals

- Please refer to WQPN no. 14: [Statutory approvals](#) for a list of approvals that you may need to obtain before commencing your proposed development or activity, and which agency is responsible for them.
- WQPN no. 18: [Information the department requires to assess a proposed development or activity](#) provides a list of what you may need to submit to our department.

Design

- Tanks should be designed in accordance with the appropriate [Australian Standards](#), such as:
 - AS 1692:2006 *Steel tanks for flammable and combustible liquids*
 - AS 1940:2017 *The storage and handling of flammable and combustible liquids*
 - AS 3735:2001 *Concrete structures retaining liquids*
 - AS/NZS 4766:2006 *Polyethylene storage tanks for water and chemicals*

- AS 4897:2008 *The design, installation and operation of underground petroleum storage systems*
- AS 4944:2008 *Petroleum products – Pipeline, road tanker compartment and underground tank identification.*
- In addition, if the tank is in a PDWSA:
 - Effective secondary barriers need to be installed to contain the system. For example, double-containment tanks (including pipework) with engineering controls such as sensors and shutdown devices will help to minimise the risk to drinking water quality. See [Department of Mines, Industry Regulation and Safety's Storage and handling of dangerous goods – code of practice \(2010\)](#) and [Australian Standard 1940:2017 The storage and handling of flammable and combustible liquids](#) for more information.
 - An adequate containment system or bunding must prevent the escape of contaminants into the environment, including capacity for contingencies such as malfunctions, firefighting water, storms and floods. Bunding is to be maintained in a good state of repair at all times. Consider installing enclosures or roofing to reduce the capacity required.
 - Manage fuel and chemical quantities so that only the required amounts are stored onsite.
 - A spill prevention kit should be readily accessible at all times.
 - Operators should be adequately trained and aware of the risks in PDWSAs.

Operation and management

Toxic and hazardous substances

- Handling and use of chemicals and fuels should be in accordance with WQPN no. 65: [Toxic and hazardous substances](#), and the following [Australian Standards](#):
 - AS 1940: 2017 *Storage and handling of flammable and combustible liquids*
 - AS 3780:2008 *Storage and handling of corrosive substances*
 - AS/NZS 4081:2001 *The storage and handling of liquid and liquefied polyfunctional isocyanates*
 - AS 4326:2008 *Storage and handling of oxidizing agents*
 - AS/NZS 4452:1997 *Storage and handling of toxic substances*
 - AS 4681:2000 *The storage and handling of Class 9 (miscellaneous) dangerous goods and articles*
 - others as appropriate.
- If a tank's contents are dangerous goods, ensure that tank placarding is consistent with Dangerous Goods Safety (General) Regulations 2007. If the contents are not dangerous goods, it is advisable to identify the contents for occupational health and safety purposes. This may include using a label or sign.

Stormwater

- Uncontaminated stormwater from roofs and clean hardstand areas should be directed away from potentially contaminated areas and bunding capture zones, and managed as recommended in our [Stormwater management manual for Western Australia](#) (generally infiltrated onsite).
- Stormwater that may be contaminated should be treated and reused in the operations if appropriate, or appropriately disposed of (outside PDWSAs).
- See WQPN no. 52: [Stormwater management at industrial sites](#) for more information.

Vehicles

- Any vehicle or machinery servicing and repairs should be in accordance with WQPN no. 28: [Mechanical servicing and workshops](#).
- Wash down of vehicles and any mechanical equipment should be undertaken as outlined in WQPN no. 68: [Mechanical equipment wash down](#).
- All contaminated wash down water should be directed to an appropriate wastewater treatment system or disposed of appropriately (outside PDWSAs).

Monitoring and maintenance

- The tank system should be maintained in a good state of repair at all times to reduce the risk of leaks to the environment. This can be achieved via a regular inspection, testing and maintenance program. Refer to Australian Standard [AS 4971:2008 Inspection and integrity monitoring of large steel vertical petroleum storage tanks](#).
- Administrative controls should be in place to ensure that the risk of contamination is managed, such as regular housekeeping and good operating procedures (Department of Mines and Petroleum 2010).
- There should be a system in place for immediately reporting and addressing leaks and spills. See *Incident response* heading for more information.
- Adequate security should be in place to deter unauthorised entry and possible vandalism, which could lead to damage of tanks and leaks to the environment.

Personnel

- If operating within a PDWSA, staff should be aware of this and how important it is to protect that drinking water source, and understand the incident response procedures. See our brochure [Living and working in PDWSAs](#), and make this available to your staff.
- Staff should be trained so that they are able to follow required procedures in a safe manner. Training should include reference to the relevant *safety data sheets*.

Incident response

- Fuel or chemical spills or leaks that escape containment should immediately be reported to the department's Pollution Watch Hotline (1300 784 782) and if in a PDWSA, the [Water Corporation](#) (13 13 75).

- Dangerous goods incidents should be reported to the Department of Mines, Industry Regulation and Safety, see [Reporting dangerous goods incidents – Guideline](#) (Department of Mines and Petroleum 2011).
- A contingency plan should be available to address emergency situations such as accidents, fires, spills, leaks and vandalism that could impact on the drinking water source. See [WQPN no. 10: Contaminant spills – emergency response](#) for more information.

Decommissioning tanks

- Careful management is required when emptying and disposing of the contents of tanks (and pipework) to ensure none escapes to the environment. Tanks and pipework need to be fully emptied into suitable storage vessels and transported off-site for correct disposal. Please contact the department for suitable disposal locations and methods.
- Contact the [Department of Mines, Industry Regulation and Safety](#) for guidance for decommissioning tanks.
- For closure of underground fuel tanks, refer to Australian Standard [AS 4976:2008 The removal and disposal of underground petroleum storage tanks](#).

Contaminated sites

- Leaks or spills from fuel or chemical storage tanks can cause a site to become contaminated. Please contact the department's contaminated sites branch for more information about reporting and managing contaminated sites.

References

Further reading is available in WQPN no. 8: [Further reading](#). References cited in this note are as follows:

Department of Health 2017, *A compilation of Australian Standards on water holding tanks*, Government of Western Australia, Perth.

Department of Mines and Petroleum (now known as Department of Mines, Industry Regulation and Safety) 2010, *Storage and handling of dangerous goods – code of practice*, Government of Western Australia, Perth, available www.dmirs.wa.gov.au.

—2011, *Reporting dangerous goods incidents – Guideline*, Government of Western Australia, Perth, available www.dmirs.wa.gov.au.

Department of Water (now known as Department of Water and Environmental Regulation) various dates, *Water quality protection notes (WQPNs)*, Government of Western Australia, Perth, available www.dwer.wa.gov.au.

- WQPN no. 3: *Using water quality protection notes*
- WQPN no. 4: *Sensitive water resources*
- WQPN no. 8: *Further reading*
- WQPN no. 10: *Contaminant spills – emergency response*
- WQPN no. 14: *Statutory approvals*
- WQPN no. 25: *Land use compatibility tables for public drinking water source areas*
- WQPN no. 28: *Mechanical servicing and workshops*

- WQPN no. 65: *Toxic and hazardous substances*
 - WQPN no. 68: *Mechanical equipment wash down*
- 2011, *Living and working in PDWSAs*, Government of Western Australia, Perth, available www.dwer.wa.gov.au.
- 2012, Operational policy 4.3: *Identifying and establishing waterways foreshore areas*, Government of Western Australia, Perth, available www.dwer.wa.gov.au.
- 2016, Strategic policy: *Protecting public drinking water sources in Western Australia*, Government of Western Australia, Perth, available www.dwer.wa.gov.au.
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- 2004, *Dangerous Goods Safety Act*, Government of Western Australia, Perth, available www.slp.wa.gov.au.
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- National Health and Medical Research Council (NHMRC) & Natural Resource Management Ministerial Council (NRMMC) 2011, *National water quality management strategy: Australian drinking water guidelines*, Australian Government, Canberra, available <https://www.nhmrc.gov.au/guidelines/publications/eh52>.
- Standards Australia 1997, *AS/NZS 4452:1997 Storage and handling of toxic substances*, SAI Global, Sydney, available www.standards.org.au.
- 2000, *AS 4681:2000 The storage and handling of Class 9 (miscellaneous) dangerous goods and articles*, SAI Global, Sydney, available www.standards.org.au.
- 2001, *AS 3735:2001 Concrete structures retaining liquids*, SAI Global, Sydney, available www.standards.org.au.
- 2001, *AS/NZS 4081:2001 The storage and handling of liquid and liquefied polyfunctional isocyanates* SAI Global, Sydney, available www.standards.org.au.

- 2006, *AS 1692:2006 Steel tanks for flammable and combustible liquids*, SAI Global, Sydney, available www.standards.org.au.
- 2006, *AS/NZS 4766:2006 Polyethylene storage tanks for water and chemicals*, SAI Global, Sydney, available www.standards.org.au.
- 2008, *AS 3780:2008 Storage and handling of corrosive substances* SAI Global, Sydney, available www.standards.org.au.
- 2008 *AS 4326:2008 Storage and handling of oxidizing agents* SAI Global, Sydney, available www.standards.org.au.
- 2008, *AS 4897:2008 The design, installation and operation of underground petroleum storage systems*, SAI Global, Sydney, available www.standards.org.au.
- 2008, *AS 4944:2008 Petroleum products – Pipeline, road tanker compartment and underground tank identification*, SAI Global, Sydney, available www.standards.org.au.
- 2008, *AS 4971:2008 Inspection and integrity monitoring of large steel vertical petroleum storage tanks*, SAI Global, Sydney, available www.standards.org.au
- 2008, *AS 4976:2008 The removal and disposal of underground petroleum storage tanks*, SAI Global, Sydney, available www.standards.org.au.
- 2017, *AS 1940:2017 The storage and handling of flammable and combustible liquids*, SAI Global, Sydney, available www.standards.org.au.

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Water quality protection note 49

September 2013

Looking after all our water needs

Service stations

Purpose

Service stations are considered an essential community facility in any developed society. They meet the fuel and basic vehicle maintenance needs of motorists. However they can pose contamination risks to water resources through:

- leakage of fuels from storage facilities, especially those located within single-walled underground tank systems
- spillage of engine coolant, fuel, hydraulic fluid, lubricants or solvents on the forecourt areas
- inappropriate containment or disposal of wastes such as car parts, batteries, tyres and fluids derived from mechanical servicing
- wastewater disposal from vehicle wash facilities.

This note is intended to inform industry operators, government officers, environmental consultants and community members on water quality protection aspects of service stations including initial planning, design, construction, operation and possible eventual closure.

Appendices provide additional background and technical advice as follows:

- A. Information on sensitive water resources, note limitations and updates
- B. Relevant statutes and administering agencies
- C. Data needed for assessing developments, followed by references and further reading, note disclaimer and how to provide feedback.

Scope

This note applies to the establishment and upgrade of service stations, fuel dispensing outlets and associated mechanical repair and vehicle wash facilities. The recommendations aim to cover the life cycle of these facilities.

The note is not intended to cover fuel storage depots, restaurants, roadhouses or convenience stores that sell food, drinks and household goods to service station customers.

Advice and recommendations

Location

- 1 Service stations and associated facilities should be established on land with the following attributes:
 - a zoned for a service station in the current local planning scheme
 - b accessible to essential services including water, communications, drainage, waste treatment and recycling facilities
 - c having sufficient onsite area to provide for the safe and effective management of any vehicle servicing materials and waste products
 - d adequate land area available for any intended future expansion of the premises
 - e located outside sensitive environments where service stations are excluded by statute, government plan or policy
 - f where the site owner has demonstrated that the risk contamination to the local environment is minimal
 - g appropriate separation (buffer) distances are provided to sensitive water resources (Appendix A).

Within proclaimed public drinking water source areas

- 2 Within priority 1 (P1) and priority 2 (P2) areas of public drinking water source areas (PDWSAs), wellhead protection zones and reservoir protection zones, the establishment or expansion of service stations is incompatible with source protection objectives. The Department of Water will oppose development or expansion of service station facilities in these areas or zones.
- 3 Within priority 3 (P3) areas service stations are considered 'compatible with conditions', provided best practice environmental management is employed. Guidance on acceptable environmental management practice is given in this note or defined in project-specific conditions set by regulatory agencies with advice from the department. Under the water source protection by-laws, written approval from the department is needed before establishing any works within an underground water pollution control area. Our regional offices can provide PDWSA location information and approval procedures (see online information at <www.water.wa.gov.au> select *Contact us*).
- 4 Service stations should have a vegetated separation distance of at least 100 m to the full supply level of surface catchment reservoirs, enduring flow feeder streams and production bores providing public drinking water.

Near natural waterways

Waterways managed by this department include all natural creeks, streams, brooks, rivers, inlets, estuaries and surface drainage systems.

- 5 Facilities should not be established on land subject to seasonal flooding, within defined flood plains or within waterway foreshore areas.

- 6 An adequate separation distance should be maintained between service stations and waterways (including foreshore areas) to protect the ecological and social values of the waterways and prevent degradation of water quality.
- 7 Foreshore areas are determined on the basis of the waterway values, vulnerability to threats and biophysical criteria as described in our Foreshore policy 1 – *Identifying the foreshore area*. Our Water note 23 and River restoration report 16, both titled *Determining foreshore reserves*, provide supporting information on defining foreshore areas (reference 5).
- 8 Natural vegetation buffers can improve water quality by filtering contaminated water before it enters a water body. Vegetation density and landform are important considerations when determining appropriate separation distances between land uses and waterways. For advice on buffer selection, see our Water quality protection note (WQPN) 6 *Vegetated buffers to sensitive water resources* (reference 5b).
- 9 Information on the location of sensitive water resources and waterway values is available from our local regional office (see <www.water.wa.gov.au> select *Contact us*). For location information online, see <www.water.wa.gov.au> select *Tools and data > Maps and atlases > Geographic data atlas*. These interactive maps show proclaimed *waterways management areas* in the southwest of Western Australia by opening the *Environment* layer. For general online information on waterways and guidance on best management practice select *Managing our water > Managing our rivers and estuaries*.
- 10 To seek development approval near natural waterways or any waters in a proclaimed management area, project details (Appendix C) should be provided and advice sought from the department's local regional office.

Within proclaimed waterways management areas

Five management areas have been declared under the *Waterways Conservation Act 1976* to provide special protection to some rivers, inlets and estuaries. These areas are considered especially vulnerable to degradation. They are the Albany Waterways, Avon River, Leschenault Inlet, Peel-Harvey Estuary and Wilson Inlet management areas.

- 11 Development approval from the department is required in proclaimed management areas. Proponents should contact our local regional office and provide projects details for assessment (Appendix C). To discuss any technical aspects, contact our Drainage and Waterways Branch in Perth by phone on 6364 6700.

Disturbance to bed or banks of a waterway

- 12 A permit from the department under the *Rights in Water and Irrigation Act 1914* may be required to undertake any works that will alter the bed or banks of a waterway within a proclaimed river, surface water management area or irrigation district. Permits, if granted, may contain conditions such as a requirement to stabilise waterway banks or restore waterway vegetation.

Within the Swan River Trust management area

- 13 The Swan River Trust is responsible for the management and protection of the Swan-Canning river system. Activities and development close to the Swan, Canning, Helena or Southern rivers are likely to have an effect on the waters of the river system. Any proposals within or abutting the trust's development control area (DCA) should be referred to the trust for assessment and response. For more detail, see online information at <www.swanrivertrust.wa.gov.au> or phone the Trust on 9278 0900 or email planning@swanrivertrust.wa.gov.au.

Near conservation valued wetlands

The Department of Environment Regulation regulates chemical management and contaminated sites to prevent harm to sensitive environments such as wetlands. Certain waters have been given a conservation status under Ramsar, *A directory of important wetlands in Australia* or state environmental protection policy provisions (Appendix A).

- 14 Wetlands require an adequate buffer to protect them from the potential harm associated with nutrients and other chemicals to maintain ecological processes and functions within the wetland. Buffer distances should be negotiated based on wetland values, local biophysical factors and protective management techniques used to maintain or restore the values of the wetland. Recommended buffer distances are provided in the *Position statement wetlands WRC 2001* (reference 3) and Water note 4 *Wetland buffers* (reference 5c).

Additional information on identifying wetland buffers is contained in Chapter B4 of the Environmental Protection Authority's Guidance statement 33 *Environmental guidance for planning and development* (reference 6).

- 15 The Department of Parks and Wildlife is the lead agency for the management and conservation of wetlands. Any development proposed within 200 m of a wetland (including lakes, sump-lands, damp-lands and palusplain) should be forwarded to their regional office for assessment, with supporting information addressing the environmental risks. For online advice see <www.dpaw.wa.gov.au>.

Private water supply sources

- 16 Scientific studies should be used to define site-specific separation buffers. However the following recommendation should be used where these studies are not practical (such as for small scale developments or where a potential buffer zone is severely disturbed).
- 17 For surface domestic or stock water supply points, their primary feeder streams, production bores/wells and aquaculture ponds (excluding above ground tanks), the separation distance from the external boundary of operational areas should be a minimum of 100 m. For other water supply uses, the minimum separation distance should be 50 m.

Other location constraints

- 18 Any land subject to periodic flooding is incompatible with service stations unless earthworks approved by regulatory agencies is used to raise the site above the statistical average flood level with a recurrence interval of 100 years (reference 6).

19 Steep land (slopes exceeding 1 in 10) should be avoided unless engineering measures prevent soil movement and provide for effective drainage management.

Project assessment and regulation

20 Owners and/or developers of service stations in sensitive environments should:

- a follow the recommendations given in the Australian Standard 4897 *The design, installation and operation of underground petroleum storage systems* (reference 9)
- b send a notice of intent with details of their proposal to the local government and the resources safety division of the Department of Mines and Petroleum for assessment.

21 Within sensitive water resource areas (see Appendix A), the notice of intent for any proposed or upgraded service station should be sent to this department for assessment and written response prior to any commitment to development of the project. It should include an environmental management plan with the following details (in addition to those recommended in Appendix C):

- a a layout plan showing all key infrastructure including:
 - underground fuel storage and associated pipe-work and venting
 - paved forecourts and fuel dispenser areas
 - tank fill point sites
 - other paved areas such as car parks, wash down areas and driveway facilities
 - any unpaved areas with poorly draining soils
 - any vehicle wash facilities or cafe facilities
 - all goods and waste holding and/or treatment facilities
 - structural measures to protect the environment
 - the stormwater management system for the site.
- b a detailed description of how site stormwater will be managed, including the installation of petrol and oil separators, any fuel or chemical containment and treatment facilities proposed
- c details of any nearby environmental features, such as bores, waterways or wetlands, likely to be affected by discharges from the site
- d a proposal for the interim storage and disposal of workshop wastes
- e detailed description of the wastewater management system for any mechanical equipment wash down facilities, see WQPN 68 (reference 5b)
- f a contingency plan for chemical spills and emergencies. For more information see our WQPN 10 *Contaminant spills - emergency response* (reference 5b).

Design of infrastructure

22 Designers should use industry best practice measures to minimise any fuel or other contaminant access to stormwater drains or soakage (references 4, 5 and 9).

Additional information is provided in the stormwater management section below.

- 23 Recommended best practice measures include the connection of site washrooms and toilets to reticulated sewerage (if practicable), the use of double-contained fuel storage tank systems with an interstitial leak monitoring space, fuel tanks established in stable compacted soils and a waste materials recycling plan implemented..
- 24 All pipe-work containing petroleum products should be double-contained, with the outer annulus where practical draining to a fire-resistant spill box that facilitates monitoring and fuel recovery. Pipe-work that only briefly contains petroleum products, such as tank fill and vent pipes, may be of single walled construction.

Forecourts and fuel dispenser areas

- 25 The fuel dispenser area and forecourt should be covered, paved and graded to contain polluted runoff. This runoff should drain via collection sumps and then to an appropriate contaminated stormwater treatment system as described later under *Stormwater management*.
- 26 Measures should be taken to prevent uncontaminated external surface water from entering the forecourt. These include:
- a kerbing or grade changes for paved areas
 - b installing and maintaining stormwater collection systems, such as grated diversion drains or soak wells, to intercept runoff that would otherwise enter the forecourt
 - c establishing soaks that collect and permit infiltration of stormwater.

Fuel tanks

- 27 Information on fuel tanks is provided in our WQPN 56 *Tanks for above ground chemical storage* and WQPN 62 *Tanks for underground chemical storage* (reference 5b).
- 28 The area around tank fill boxes should be graded to collect fuel spills within a containment sump area and should be designed to prevent external surface water from entering the sump area. Pipe-work should direct overflow from the sump to the contaminated stormwater treatment system.
- 29 Any fill box containment sumps should be covered, protected and ventilated to control fire risk and prevent the entry of stormwater when tanks are not being refilled.
- 30 Fuel or hazardous chemical storage may require a licence from the Department of Mines and Petroleum, see online information at <www.dmp.wa.gov.au> select *Resources safety > Dangerous goods*.

Stormwater management

- 31 Stormwater that may be contaminated should pass through a well-maintained litter and silt trap, then an appropriately designed and regularly maintained fuel and oil trap (such as a coalescing plate separator or treatment unit providing equivalent performance).
- 32 Waste solids from the water treatment process should be collected and disposed of outside any sensitive environment, in accordance with the requirements of the local government.

- 33 Treated stormwater should meet the following criteria:
- a for sewer disposal, with the written approval of the sewerage service provider
 - b for on-site soakage disposal, guided by the national guideline criteria for the protection of water resource values and considering local environmental characteristics. Guideline criteria to protect the quality of water resources are given in the *Australian and New Zealand guidelines for fresh and marine water quality* and the *Australian drinking water guidelines* (reference 2).
- 34 Clean wastewater, that has been effectively treated and tested, may be discharged to:
- a on-site soak wells
 - b on-site leach drains
 - c a reticulated sewer, where available and accepted by the system service provider such as the Water Corporation.
- Otherwise wastewater should be contained, then transported offsite for approved disposal or consigned to impervious evaporation basins.
- 35 All uncontaminated stormwater runoff, such as from the roof or paved parking areas, should be directed towards soak wells, soakage/evaporation basins or an offsite drainage system (if approved by the drain service provider).
- 36 Additional guidance on stormwater management in urban areas is provided in the *Stormwater management manual for WA*, Chapter 7, Section 2.2.8 *Maintenance of vehicles, plant and equipment (including washing)* (reference 5e).

Vehicle service bays

- 37 These bays should be located in secure weatherproof buildings with reinforced concrete flooring that is seal coated to contain spilt fluids. All discharged fluids should drain to a purpose built containment system, pending treatment, recycling or disposal to an approved facility.
- 38 Batteries and tyres (new or used) should be stored in a secure weatherproof area. This is to ensure they are protected from hazards such as vandalism, fire and chemical spillage. Used batteries and tyres should be disposed of off-site at an approved facility.
- 39 Any solid wastes, such as oil filters, brake pads or motor parts, should be placed in weatherproof bins before recycling or off-site disposal at an approved facility.

Vehicle wash facilities

- 40 These facilities should be located in weatherproof areas and on hardstand flooring to prevent the loss of wash water and waxes to the environment and to prevent dilution of wastewater by rainfall.
- 41 The wash down area should drain to a holding tank where solids and oils can be treated and removed prior to effluent recycle or disposal.

- 42 Treatment facilities may include sedimentation, facilities to break oily emulsions (typically chemical coagulation or dissolved air flotation) and the recovery of petroleum hydrocarbons (such as oil, grease, tar and detergents) for recycle or disposal.
- 43 Any treated wastewaters released into the environment via soakage or drains should be compatible with the values of local water resources. Information on the water quality criteria to protect environmental waters is given in the National water quality management strategy papers 4 and 6 (reference 2).

Site operation

Management and monitoring

- 44 A written maintenance and servicing schedule should be available for all wastewater management installations to ensure they function both continuously and effectively.
- 45 Operators should regularly inspect and record (at least monthly) the operation of onsite waste holding and treatment systems including fuel and oil traps, sediment basins, and fuel leakage detection systems. Any deficiencies should be corrected without delay.
- 46 Where waste matter has accumulated in management systems, it should be removed immediately and disposed of at sites approved by local government. For more advice on monitoring underground tanks, see our WQPN 62 *Tanks for underground chemical storage* (reference 5b).

Spill incident response

- 47 Equipment should be installed onsite to use in the cleanup of any fuel, oil or chemical spills. Such equipment could include absorbent material, such as 'kitty litter', and waste storage skips. Any spill should be fully contained to avoid any harm to the surrounding environment.
- 48 All fuel or lubricant spills should be immediately cleaned up using absorbent materials. Used absorbent material should be placed in weatherproof containers and disposed of by an approved waste contractor.
- 49 Dispersants, such as detergents, may be needed to remove residues from a spill on paved surfaces. Effluent containing dispersants should be treated to break hydrocarbon emulsions before being released into the contaminated water treatment system.
- 50 Site operators should assign trained personnel and maintain a call roster to effectively handle incidents such as fuel and oil spills.
- 51 If significant environmental contamination occurs, details should be provided on detection to the Department of Environment Regulation, phone 1300 784 782 (24 hours). For incidents posing a fire or explosion risk to life or property phone 000 or the Department of Fire and Emergency Services communication centre on 9323 9333 (24 hours). For additional guidance, see our WQPN 10 *Contaminant spills - emergency response* (reference 5b).

52 Incident details and the associated response should be entered in a site incident log, which should then be retained for at least two years for scrutiny by regulatory authorities.

Decommissioning of facilities

53 When service stations are decommissioned or fuel tanks are replaced, a site contamination evaluation should be conducted by a competent and experienced environmental consultant. This evaluation should include testing for petroleum residuals near underground tanks, pipe-work and waste treatment facilities. A technical report should be prepared and copies retained for scrutiny by the Department of Environment Regulation's contaminated sites branch and future site owners. Additional information on this topic is contained in our WQPN 64 *Tanks - closure of underground chemical storage* (reference 5b).

Appendix A: Information on sensitive water resources, note limitations and updates

Sensitive water resources

Our water resources sustain ecosystems, aquatic recreation and aesthetic values as well as providing drinking, industry and irrigation supplies. Along with breathable air, uncontaminated water is essential for viable communities. Natural water resources should remain within defined quality limits to retain their ecological, social and economic values. Hence they require appropriate protection measures to minimise contamination risks.

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 in significant quantities are washed or leached into water resources.

Sensitive waters include estuaries, natural waterways, wetlands and groundwater. These waters support one or more of the environmental values described below.

Public drinking water sources

Overview

Public drinking water source area (PDWSA) is the collective name given to any area proclaimed to manage and protect a community drinking water source. PDWSA include underground water pollution control areas, water reserves and catchment areas administered by the Department of Water under the provisions of the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 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 *environment > public drinking water source areas*.

Within PDWSA, priority areas are defined (P1, P2 or P3) via publicly consulted drinking water source protection plans or land use and water management strategies. Priority areas are used to guide land planning, rezoning and development approval processes. Priority areas are assigned considering the current local planning scheme zoning, land tenure, the water source's strategic value and its vulnerability to harm. Each priority area is managed using a specific risk-based strategy to provide for effective water resource protection. The Department of Water develops these documents in consultation with other government agencies, landowners, industry and the community.

P1 areas are defined to ensure human activity does not degrade a water source. These areas are declared over land where the provision of high-quality drinking water for public use is the primary beneficial land value. P1 areas typically cover land controlled by the state government or one of its agencies. These areas are managed under the principle of *risk avoidance*, so most land development and human activity is normally opposed.

P2 areas are defined to ensure 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 exists (involving rural usage such as dry land grazing or cropping). Protection of public water supply sources is a high priority in P2 areas. These areas are managed in accordance with the principle of *risk minimisation*, and so the intensity of development should be restricted (via management conditions) and activities with a low water contamination risk are normally considered acceptable.

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 co-exist with other land uses such as residential, commercial and/or light industrial development. Protection of P3 areas is mainly achieved through land use management measures e.g. contamination barriers. Environmental guidance (such as these notes) or site-specific development approval conditions are used to limit the water resources contamination risk from the land use or activity. If, however, the water source becomes contaminated, then water supplied from P3 sources may need to be more intensively treated or an alternative water supply source commissioned.

Additional protection zones are defined close to the point where drinking water is extracted or stored. These zones are called *wellhead protection zones (WHPZ)* and *reservoir protection zones (RPZ)*. Statutory land use constraints apply to activities within these zones surrounding sources to safeguard these waters most vulnerable to contamination.

WHPZ are assigned around water production wells based on hydrological factors. Statutory land use restrictions apply within these zones as groundwater moves rapidly towards wells due to aquifer depressurisation by pumping. Any contaminants leaching from the ground surface in a WHPZ 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 storage or pipe-head reservoirs. Statutory access and land use restrictions apply in RPZ. The aim is to restrict the likelihood of contaminants being deposited or washing into water sources in any runoff. RPZ are normally within state-controlled areas encompassing land up to two kilometres measured outward from the reservoir top water-level and include the inundated area when the reservoir is full.

For additional explanatory information on PDWSA, see our Water quality protection note (WQPN) 25 *Land use compatibility in public drinking water source areas*, WQPN 36 *Protecting public drinking water source areas*, WQPN 75 *Proclaimed public drinking water source areas*, note 76 *Land use planning in PDWSA* and WQPN 77 *Risk assessment in PDWSA*. These notes are available online at <www.water.wa.gov.au> select *publications* > *find a publication* > *series browse*.

Established activities within PDWSAs

Many land use activities were approved and established before publication of a source protection plan or land use and water management strategy.

Activity operators should ensure that modern environmental facilities and practices are progressively implemented and maintained so that the water resource contamination risk is minimised (within practicable and economic constraints).

New or expanded activities in PDWSA

Any development proposals that could affect a drinking water source should be referred to this department's local regional office with detailed supporting information for an assessment and written response.

The development proposal may be:

- approved (with or without conditions)
- delayed pending receipt of additional information before a decision is made; or
- opposed due to a statutory or policy conflict or inadequate protective measures provided to safeguard the water source.

To assist the assessment, operators should demonstrate that under all operating conditions the facilities and processes used on-site do not pose a significant water contamination risk.

Buffers to water supply sources

Native vegetation buffers should be used to separate compatible land use areas from the sources of drinking water including the full supply margins of reservoirs, their primary feeder streams and/or production bores. Advice on suitable buffer forms and dimensions is provided in our WQPN 6 *Vegetated buffers to sensitive water resources*.

Within clearing control catchments

Controls on vegetation clearing for salinity management in country areas are provided under part IIA of the *Country Areas Water Supply Act 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 of clearing controls may be obtained from our regional offices, see online information at <www.water.wa.gov.au>, select *Contact us*.

Private water supply sources

Private water sources vulnerable to contamination include:

- drinking water sources for people or domesticated animals
- commercial or industrial water supply sources (requiring specific qualities that support activities such as aquaculture, cooling, food and mineral processing or crop irrigation)
- urban or municipal irrigation sources (where water quality may affect vegetation performance or people's health and wellbeing).

Underground ecosystems

Important underground ecological functions that may be at risk of contamination include groundwater- and cave-dwelling animals and microorganisms (generally located within soils that have open pore spaces such as sand, gravel and limestone).

Waterway ecological and social values

Waterways that have high social and conservation significance are described in the Western Australian Environmental Protection Authority (EPA) 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 *policies and guidelines > environmental assessment guidelines > guidance statements*.

The Department of Water manages natural waterways under Section 9 of the *Water Agencies (Powers) Act 1984* and the *Rights in Water and Irrigation Act 1914*. For online information, see <www.water.wa.gov.au> and select *managing water*. Apart from aquatic ecosystems and water sources, waterways provide social values including aesthetic appeal, drainage pathways and recreational opportunities for watercraft use, fishing, tourism, swimming and related aquatic activities. Engineered drains and constructed water features are normally not assigned ecological values because their primary function and operational factors outweigh their ecological value.

This department also administers the *Waterways Conservation Act 1976* which defines Western Australian waterways subject to specific regulatory controls. Currently proclaimed waterways include the Avon River, Peel-Harvey Inlet, Leschenault Inlet, Wilson Inlet and Albany waterways management areas.

Within the Swan-Canning Estuary catchment

The Swan River Trust is responsible for the protection and management of the Swan-Canning River system. The trust safeguards ecological and social values under the *Swan and Canning Rivers Management Act 2006*. Written approval is needed for any land- or water-based development within the Swan, Canning, Helena or Southern rivers and their

associated foreshore areas within the *Swan River Trust development control area (DCA)*. Human activity and development close to these areas are likely to have an effect on the waters of the river system. Development proposals within or abutting the DCA should be referred to the trust for assessment.

Developments outside the DCA, but near river tributaries or drainage systems should also be referred to the trust for assessment and advice. This is because water quality within the area may be affected by chemicals leached into groundwater flow. For detailed information, see online advice at <www.swanrivertrust.wa.gov.au>, phone 9278 0900 or email: planning@swanrivertrust.wa.gov.au .

Wetland ecology

Many important wetlands have been given conservation status under the Ramsar convention (described online at <www.ramsar.org>), Japan and Australia migratory bird agreement (JAMBA), China and Australia migratory bird agreement (CAMBA), and Republic of Korea and Australia migratory bird agreement (ROKAMBA).

Wetlands are also protected under various national and Western Australian government policies. Conservation wetland data to guide land planning and development activities is provided via the following publications:

- *Directory of important wetlands in Australia* defines wetlands scheduled by the Australian Government. It is available online at <www.environment.gov.au> select *water > water topics > wetlands*.
- Wetlands with defined high conservation significance are described in the EPA (WA) guidance statement 33 *Environmental guidance for planning and development* (section B4.2.2). This statement is available online at <www.epa.wa.gov.au> select *policies and guidelines > environmental assessment guidelines > guidance statements*.

The Department of Parks and Wildlife is the custodian of the state wetland datasets, and is responsible for maintaining and updating relevant information. These datasets are available online at <www.dpaw.wa.gov.au>.

Wetlands datasets identified for conservation value or for resource enhancement include:

- *Geomorphic wetlands of the Swan Coastal Plain*
- *South coast significant wetlands*
- *Geomorphic wetlands Augusta to Walpole* (this dataset awaits detailed evaluation).

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

Note limitations

Many Western Australian aquifers, waterways and wetlands await detailed scientific evaluation, present data on their quality is sparse and their values remain unclassified. Unless demonstrated otherwise, any natural waters that are slightly disturbed by human activity are considered to have sensitive environmental values. Community support for these water values, the setting of practical management objectives, provision of

sustainable protection services and effective implementation are vital to protecting or restoring water resources for both current needs and those of future generations.

This note provides a general guide on environmental issues, and offers solutions based on data searches, professional judgement and precedents. 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's recommendations shall not be used as this department's policy position on a specific matter, unless confirmed in writing. In addition, regulatory agencies should not use this note's recommendations in place of site-specific development conditions based on a project's assessed environmental risks. Any regulatory conditions should consider local environmental values, the safeguards in place and take a precautionary approach.

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

Water quality protection note updates

This note will be updated as new information is received, industry/activity standards change and resources permit. 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's regulated?	Western Australian statutes	Regulatory agency
Impact on the values and ecology of land or waters Contaminated sites	<i>Environmental Protection Act 1986 - Part V</i> Environmental regulation <i>Contaminated Sites Act 2003 and regulations 2004</i>	Department of Environment Regulation < www.der.wa.gov.au >
Transport, storage and handling of fuels, solvents, explosive and other dangerous goods	<i>Dangerous Goods Safety Act 2004</i> Dangerous goods safety regulations 2007	Department of Mines and Petroleum – Resources Safety Division < www.dmp.wa.gov.au >
Licence to take surface water and groundwater	<i>Rights in Water and Irrigation Act 1914</i>	Department of Water – regional office < www.water.wa.gov.au >
Service stations and tank systems 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>	
Licence to discharge into managed waterways.	<i>Waterways Conservation Act 1976</i>	
Environmental protection policies Environmental impact assessment	<i>Environmental Protection Act 1986 -Parts III Policy or IV Environmental impact assessment</i>	Minister for the Environment with advice from the Environmental Protection Authority < www.epa.wa.gov.au >
Approval for developments affecting the Swan estuary	<i>Swan and Canning Rivers Management Act 2006</i>	Swan River Trust < www.swanrivertrust.wa.gov.au >
Discharge to sewer requires an industrial waste permit	<i>Metropolitan Water Supply, Sewerage and Drainage Act 1909;Country Towns Sewerage Act 1948</i>	Water Corporation < www.watercorporation.com.au > other sewer service provider
Subdivision of land Land zoning and development approval	<i>Planning and Development Act 2005</i>	Western Australian Planning Commission Department of Planning www.planning.wa.gov.au Local government

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

Appendix C: Data needed to assess development proposals

Where facilities near sensitive waters are to be constructed or upgraded, the following data should be supplied with the development proposal:

- 1 Site owner/ operating tenant's name and contact details.
- 2 A site plan showing the location of the project facilities relative to tenements, leases, lots and roads. The plan should show the topography, any remnant vegetation cover, existing and proposed development areas and onsite water features and sources.

- 3 Details of site investigation of soil strata, depth to water table (if applicable) and data on the location, extent, hydrology, quality and dependencies on local water resources (including any seasonal variations) that could be affected by site facilities or operations.
- 4 The present local government land use zoning (where applicable). Current land use description, any site contamination history and its remediation.
- 5 Full description and scale of the activities planned for the project site, (site amenities, infrastructure, earthworks and chemical applications), construction and operating workforce and planned project operational life.
- 6 Describe intended commissioning date, operating hours and any expansion options.
- 7 Details of any proposed vegetation clearing, environmental buffers, site earthworks and services, including water supply, sewerage and drainage provisions.
- 8 Description of all materials/ chemicals to be stored or handled on site in commercial quantities, including a water use budget.
- 9 Description of the types, quantities and quality of solid and liquid waste (if applicable) that will be generated or disposed from the facility.
- 10 Description of planned material containment, waste management (treatment and disposal); with an environmental management plan and nutrient and irrigation management plan (where applicable)
- 11 Details of any environmental modelling conducted or planned monitoring system to demonstrate the effects of the project on local water resources
- 12 Planned operational and equipment maintenance procedures.
- 13 Details of any contingency measures proposed to minimise the impacts of chemical spills and safely dispose of contaminated waters that may result from storms, fire, flood, equipment malfunction or vandalism. Information should include workforce training, site monitoring and emergency response facilities.
- 14 Any project contractual agreements or regulatory approvals received.

For significant projects, development proponents should engage the services of a qualified and experienced consultant to professionally prepare their development proposal. This should ensure that government agencies can efficiently assess and respond to the proposal without delays caused by inadequate or poorly defined information.

References and further reading

- 1 Australian Institute of Petroleum publications (withdrawn) available online at <www.aip.com.au>Select *Industry accreditation and standards > withdrawn AIP publications*
- 2 Australian Government - national water quality management strategy papers, available online at <www.environment.gov.au> select *water > water policy and programs > water quality:*
 - a Paper 4 *Australian and New Zealand guidelines for fresh and marine water quality, 2000*
 - b Paper 6 *Australian drinking water guidelines 2011*

- c Paper 7 *Australian guidelines for water quality monitoring and reporting, 2000.*
- 3 The previous Department of Environment and Conservation (WA) publication available online at <www.dpaw.wa.gov.au>
- Position statement - wetlands, WRC 2001.*
- 4 Department of Mines and Petroleum (WA) publication, for online information see <www.dmp.wa.gov.au> select *resources safety > dangerous goods .storage and handling*
- Design, installation and operation of UG petroleum storage.*
- 5 Department of Water (WA) publications available online at < www.water.wa.gov.au >
- a Policy documents select *policies*
- Foreshore policy 1 *Identifying the foreshore area 2002.*
- b Water quality protection notes (WQPN), select *publications > find a publication > series browse > water quality protection notes*
- WQPN 06 *Vegetated buffers to sensitive water resources*
 - WQPN 10 *Contaminant spills - emergency response*
 - WQPN 25 *Land use compatibility in public drinking water source areas*
 - WQPN 36 *Protecting public drinking water source areas - an overview*
 - WQPN 28 *Mechanical servicing and workshops*
 - WQPN 56 *Tanks for above ground chemical storage*
 - WQPN 62 *Tanks for underground chemical storage*
 - WQPN 64 *Tanks - closure of underground chemical storage*
 - WQPN 65 *Toxic and hazardous substances - storage and use*
 - WQPN 68 *Wash-down of mechanical equipment.*
- c Water notes (WN) select *publications > find a publication > series browse*
- WN 4 *Wetland buffers*
 - WN 11 *Identifying the riparian zone*
 - WN 23 *Determining foreshore reserves.*
- d River restoration report 16 *Determining foreshore reserves 2001* select *publications > find a publication > series browse.*
- e *Stormwater management manual for Western Australia 2008* select *publications > find a publication > series browse > management manual.*
- 6 Engineers Australia publication available for purchase at < www.engineersmedia.com.au > search *EA books*
- Australian rainfall and runoff* (current edition).
- 7 Environmental Protection Authority (WA) publication available online at <www.epa.wa.gov.au> select *guidance statements*
- Guidance statement 33 *Environmental guidance for planning and development.*

- 8 Motor trade association of Western Australia publications, online information available at <www.mtawa.com.au> select the quick link *find about green stamp*
- a *Environmental assessments*
 - b *Environmental product and services directory*
 - c *Environmental guidelines and case studies*
 - d *Green stamp accreditation.*
- 9 Standards Australia - Australian standards available for purchase at <www.saiglobal.com/shop/script/search.asp>
- AS 4360 *Risk management*
 - AS 4897 *The design, installation and operation of underground petroleum storage systems*
 - AS 5667 *Water quality – sampling.*
- 10 Swan River Trust (WA), for online information see <www.swanrivertrust.wa.gov.au> *Environmental management and cleaner production directory for small to medium businesses.*

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Feedback

We welcome your thoughts on this note. Feedback will help us prepare future versions.

To comment on this note or seek any clarification, please contact our water source protection planning branch (details below), citing the note topic and version.

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