

Environmental management of dewatering during construction activities

Issued September 2016

EPA 1093/16: This guideline advises on the environmental management of dewatering during construction activities under the Environment Protection Act 1993 and relevant Environment Protection Policies. It is intended for proponents of dewatering during construction activities and includes engineers, architects and builders.

Introduction

Purpose of this guideline

This document guides proponents in terms of their obligations under the *Environment Protection Act 1993* (EP Act) and the *Environment Protection (Water Quality) Policy 2015* (Water Quality Policy), with respect to environmental management of dewatering during construction activities. This guideline relates specifically to temporary dewatering activities for construction sites.

For the purpose of this guideline, dewatering is the process of removal of any water that accumulates in earthwork excavations or below ground structures at or below the existing water table as a result of intersecting aquifers, seepage of soil water/groundwater or storm events. Each dewatering project will require environmental management that is site and project specific.

Engineers, architects and builders must ensure that that dewatering likely to involve polluted water should not be discharged to watercourses (including stormwater) or marine waters as a routine practice and are required to consider all reasonable and practicable alternatives to environmental discharge. The guideline emphasises the importance of the initial planning phase, and the need to carry out risk and hydrogeological assessments.

This document should be read in conjunction with the soon to be released EPA guideline for construction environmental management plans (CEMP) which describe how activities undertaken during the construction phase of development will be managed to avoid or mitigate negative environmental impacts on site and how those environmental management requirements will be implemented. Planning for dewatering activities can inform site design, decrease costs associated with dewatering and ensure proponents avoid prosecution from failure to fulfil legal requirements under the *Environment Protection Act 1993* and *Environment Protection (Water Quality) Policy 2015*.

Mining dewatering is not covered in this guideline. All mine dewatering projects are processed by the Department of State Development (DSD).

Legislative requirements

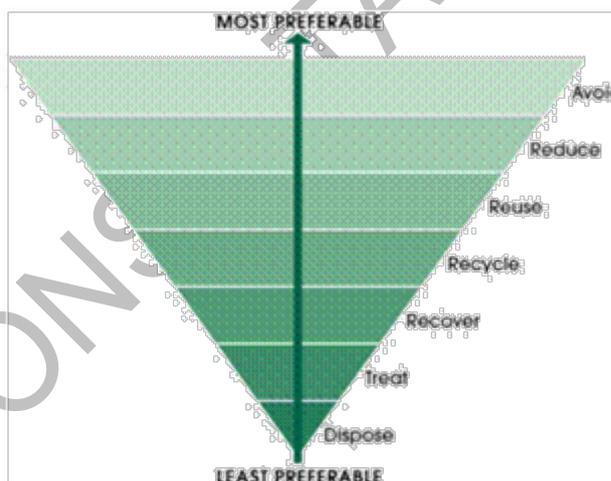
The EP Act and the associated Water Quality Policy require dewatering to be carried out in a manner that does not cause environmental harm. The policy is subordinate legislation, developed to secure the objects of the Act with respect to water.

The EP Act provides for the protection of the environment and promotes the principles of ecologically sustainable development. Section 25 of the Act imposes the general environmental duty on all persons undertaking an activity that may pollute, to take all reasonable and practicable measures to prevent or minimise any resulting environmental harm. Environmental harm is defined in section 5 of the Act and further specified for waters in clause 5 of the Water Quality Policy.

The Water Quality Policy makes clear via clauses 4 and 9 that the *waste management hierarchy* is an order of priority for the management of waste which includes dewatering discharge.

The hierarchy is as follows:

- 1 avoidance of the production of waste
- 2 minimisation of the production of waste
- 3 reuse of waste
- 4 recycling of waste
- 5 recovery of energy and other resources from waste
- 6 treatment of waste to reduce potentially degrading impacts
- 7 disposal of waste in an environmentally sound manner,



are pursued in order with, first, avoidance of the production of waste, and second, to the extent that avoidance is not reasonably practicable, minimisation of the production of waste, and third, to the extent that minimisation is not reasonably practicable, reuse of waste, and so on.

A person who pollutes or *might* pollute waters must follow this hierarchy and it must be applied in the case of dewatering projects to minimise dewatering extraction and the need for disposal. The hierarchy is regarded in [South Australia's Waste Strategy 2015–2020](#) as a key element for guiding waste management practices, while still recognising the need for flexibility based on local and regional economic, social and environmental conditions.

The Water Quality Policy also includes mandatory provisions to prevent negligent or deliberate acts of water pollution (clauses 10 and 11). Clause 10 is most relevant and makes clear that it is an offence to discharge a Class 1 pollutant¹ into any waters or onto land in a place from which it is reasonably likely to enter any waters. Clause 11 similarly states that is an offence to discharge a Class 2 pollutant² into any waters.

Large earthworks activities that involve dewatering may require an authorisation in the form of a licence. The threshold for an 'earthworks drainage' licence is stated in Schedule 1 of the EP Act:

the conduct of earthworks operations in the course of which more than 100 kL of waste water containing suspended solids in a concentration exceeding 25 mg/L is discharged directly or indirectly to marine waters or inland waters.

¹ Appendix 3 Schedule 2 – Class 1 pollutants extracted from the Water Quality Policy

² Appendix 4 Schedule 3 – Class 2 pollutants extract from the Water Quality Policy

If a project is likely to require an earthworks drainage licence, it is important to consult the EPA. Proponents will also need to follow the waste management hierarchy and prepare a plan on how they will manage the activity.

Some dewatering situations may encounter groundwater that has been contaminated³ by a previous activity. Appropriate preparation and planning should be done to prevent dewatering activities intersecting known site contamination. If groundwater quality assessment is done which confirms site contamination exists at a site, the owner/occupier of the site must notify the EPA as soon as reasonably practicable. This is a legal requirement under section 83A⁴ of the EP Act with an associated penalty of \$120,000 if the offender is a body corporate and a Division 1 fine for a natural person.

Planning to dewater

Development Application Process

The South Australian planning system is regulated through the *Development Act 1993* and the *Development Regulations 2008* and development requires an authorisation before it is undertaken. Within this framework the EPA assesses referred development applications.

The draft 'Site contamination framework for the South Australian planning system' is being prepared by Department of Planning, Transport and Infrastructure and the EPA. The framework describes the staged approach for addressing site contamination—to ensure site contamination is appropriately addressed when land is being developed for a more sensitive use. The applicability of the framework will depend on the existing and proposed land uses. For example, if the site was previously a retail fuel outlet then the framework could be applied and the proposal may be referred to the EPA.

The EPA's involvement in assessment matters related to building construction is limited and much of the work is undertaken by the relevant planning authority (local government or Development Assessment Commission). The following information will assist planning authorities when assessing development applications in which dewatering activities are likely to occur.

This guideline will also provide further information for preparing a dewatering management plan to be included as a section of the CEMP or as a separate document.

Desktop risk assessment

Underground waters may be contaminated by a wide range of pollutants. Dewatering these polluted waters and then discharging them to surface waters, such as a watercourse, marine waters or a stormwater system, may result in environmental harm.

Therefore, prior to any construction or dewatering activities, a desktop risk assessment should be carried out to highlight potential environmental risks. As a minimum this will identify Groundwater Prohibition Areas or known site contamination at the site and within a 500-m buffer zone.

Options for dewatering (source), discharge procedures (pathway) and discharge-receiving environment (receptor) should also be investigated at this stage. If pollutants in the dewatering discharge have the potential to cause impacts to a receiving environment, management strategies should be designed to reduce those risks as far as reasonably practicable.

As a minimum, the EPA recommends searching the following resources which are publicly available via the EPA or other government websites:

- 1 Public Register (http://www.epa.sa.gov.au/our_work/public_register)
- 2 Groundwater Prohibition Areas (http://www.epa.sa.gov.au/environmental_info/site_contamination/groundwater)

³ Site contamination is defined in section 5B of the EP Act.

⁴ http://www.epa.sa.gov.au/files/47722_notification_sc_27nov08.pdf

- 3 Site Contamination Index (http://www.epa.sa.gov.au/data_and_publications/site_contamination_index)
- 4 Groundwater information (<https://www.waterconnect.sa.gov.au/Systems/GD/Pages/Default.aspx>)
- 5 Other mapping systems (<http://location.sa.gov.au/viewer/> and <https://data.environment.sa.gov.au/NatureMaps/Pages/default.aspx>)

If a more detailed risk assessment is required, the EPA can advise on the appropriateness and level of details required and may request a preliminary or detailed site investigation be carried out in accordance with the *National Environment Protection Measure (Assessment Site Contamination) 2013* (ASC NEPM 2013).

Hydro-geotechnical assessment

Geotechnical and hydrological characterisation of the site will provide the necessary information to determine the likelihood of dewatering during construction. It would be beneficial to obtain the following information:

- 1 Depth and quality of water to be discharged (see Appendix 1 for analytical suite). Proponents should be aware of their requirement to notify the EPA if site contamination of groundwater is identified (section 83A Notification⁵). Further guidance is available from the EPA.
- 2 Details of dewatering volume, rate, duration.
- 3 Classification of the water to be discharged as groundwater, soil pore water, or surface pooling/stormwater.
- 4 If groundwater is to be sampled prior to construction commencing, seasonal changes in depth to groundwater at the site, caused by variability from the winter season or heavy rainfall, should be taken into account,
- 5 Effects on hydrogeology of the surrounding area—impact on coastal/estuarine and other groundwater users. This can be considered in greater detail if necessary, in the dewatering management plan (DMP).

If the hydrogeological assessment indicates that there could be potential for ongoing dewatering then it should be brought to the EPA's attention. The hydro-geotechnical assessment together with the desktop risk assessment will identify any significant hazards upfront, eg highly contaminated groundwater that would need to be disposed of via specialised hazardous liquid waste removal on an ongoing basis. Such a situation along with its associated costs may trigger a re-design of the site, eg reconsidering basement carparks.

Additional planning for stormwater pollution prevention

In planning for dewatering additional guidance is available relating to stormwater pollution prevention and soil and erosion management through the CEMP guideline and the Code of practice for the building and construction industry⁶. This includes considering the surface water drainage on and around the site prior to commencing dewatering. Proponents should consider whether surface water drainage is likely to be directed towards the area of dewatering or whether there is already ponding of above ground water (ie stormwater collected in depressions on the site) that needs to be disposed of prior to the commencement of dewatering. If so, then this ponded water cannot be disposed of directly to the stormwater system.

When to refer to EPA

Groundwater prohibition and/or restriction areas (GPA)

The EPA, through the provisions of section 103S of the EP Act, can establish a prohibition and/or restriction on taking water affected by site contamination. If it is satisfied that there is site contamination that affects or threatens water; and action is necessary under this section to prevent actual or potential harm to human health or safety, the EPA may, by

⁵ http://www.epa.sa.gov.au/files/47722_notification_sc_27nov08.pdf

⁶ http://www.epa.sa.gov.au/environmental_info/water_quality/programs/stormwater/pollution_prevention_for_building_and_construction_activities

notice in the Gazette, prohibit or restrict the taking of the water. If the site of dewatering is in an established GPA then the proponent should contact the EPA.

Known or suspected site contamination

Dewatering activities on a site, or in the vicinity of a site, with known site contamination or a potentially contaminating activity (PCA) should have their risks adequately addressed through a DMP. In the case of a PCA or the indication of site contamination on or in vicinity of the site, proponents may be required by the EPA to test groundwater before dewatering activities commence.

Potential for disturbance of acid sulfate soils (ASS)

It is not within the scope of this guideline to advise on the environmental management of ASS. Further guidance can be obtained from the EPA⁷.

Earthworks drainage

Schedule 1 of the EP Act states earthwork's operations is a prescribed activity of environmental significance when more than 100 kL of waste water containing suspended solids in concentration exceeding 25 mg/L is discharged directly or indirectly to marine waters or inland waters. An environmental authorisation or licence is required. Earthworks drainage is also listed in Schedule 22 of the *Development Regulations 2008* as an activity that is to be referred to the EPA for assessment and direction. If the proposal does not meet the criteria for referral then assessment will be undertaken by the relevant planning authority.

Activation of trigger values

If pollutants in dewatering discharge exceed (activate) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000* trigger values⁸ (ANZECC), there is an increased level of risk to a receiving water environment. That is, there is potential for environmental harm if the dewatering is discharged to an aquatic ecosystem and is a breach of the Water Quality Policy. The matter should be referred to the EPA for consideration. Trigger value exceedence does not, in and of itself, preclude dewatering and all dewatering activities will be considered on a case-by-case basis.

Foreseen long-term and ongoing dewatering

If dewatering is foreseen to be required for the lifetime of the building, then this should be brought to the EPA's attention. It may be reasonable and practicable for ongoing dewatering to be discharged to stormwater, although any proposal that incorporates ongoing discharge must be presented to the EPA with evidence demonstrating no potential for environmental harm. If discharge has to be ongoing, disposal costs may be prohibitive especially if specialized disposal is required. This situation needs special early consideration at the design stage for the site.

Dewatering management plan

A dewatering management plan (DMP) is a useful tool to ensure that any dewatering activities are carried out with appropriate planning in place which should ensure compliance with the EP Act and Water Quality Policy. A DMP should be prepared by a suitably qualified hydrogeologist for the proponent responsible for the dewatering activity or if applicable it should be submitted with a Development Application. In this way the DMP can form part of the Construction Environmental Management Plan (CEMP). The DMP is not required to be submitted to the EPA unless a potential risk to the environment has been identified. However, the EPA can request that a DMP be provided for review.

The DMP should take into consideration information obtained through the risk and geotechnical assessments. Relevant hydrogeological information should be used to decide upfront the expected duration of the dewatering project (short or long term) and, for a long-term project, whether dewatering can be completed in a specified time or will be ongoing. The DMP should clearly follow the principles of the waste management hierarchy. Failure to anticipate dewatering

⁷ http://www.epa.sa.gov.au/environmental_info/water_quality/programs/acid_sulfate_soils

⁸ Water quality values that 'trigger' the potential for environmental harm and require more detailed evaluation. Trigger values are protective of aquatic ecosystem and primary industry environmental values, as declared in the Water Quality Policy. They are not used as mandatory compliance criteria.

requirements and subsequent intersection of groundwater during excavation can lead to costly construction delays, while approvals for dewatering are sought. This highlights the need for dewatering to be considered during the design stage.

Suggested issues to be addressed in DMP

- 1 Purpose of dewatering (an explanation of why dewatering is necessary).
- 2 Description of dewatering technique to be employed.
- 3 Anticipated dewatering flow rate, duration and total volume.
- 4 Assessment of water quality (minimal or more extensive chemical analysis of groundwater may be required depending on presence of PCAs on site or in the vicinity and to inform water re-use and disposal options). It is strongly recommended that water testing be done prior. Refer to Appendices 1 and 2 for analytes.
- 5 Water collection and storage options (if applicable).
- 6 Water re-use options.
- 7 Water treatment options.
- 8 Proposed discharge disposal options.

Other considerations (if applicable)

- 1 Noise (eg pumping noise) and odour (eg dewatering of sulfate soils) considerations.
- 2 People, property, water bodies that could be affected by the dewatering activity.
- 3 Contingency plans.
- 4 Maintenance plans for equipment, and mitigation plans if equipment fails.

Monitoring and reporting (if applicable)

- 1 What is to be monitored (or analysed)?
- 2 How often will monitoring be done and over what time frame?

Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

Further information

Legislation

[Online legislation](#) is freely available. Copies of legislation are available for purchase from:

Service SA Government Legislation Outlet
Adelaide Service SA Centre
108 North Terrace
Adelaide SA 5000

Telephone: 13 23 24
Facsimile: (08) 8204 1909

Website: <shop.service.sa.gov.au>

Email: <ServiceSAcustomerservice@sa.gov.au>

General information

Environment Protection Authority

GPO Box 2607

Adelaide SA 5001

Telephone: (08) 8204 2004

Facsimile: (08) 8124 4670

Freecall: 1800 623 445 (country)

Website: <www.epa.sa.gov.au>

Email: <epainfo@epa.sa.gov.au>

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Appendix 1 Dewatering discharge water quality trigger values for (i) inland surface waters and (ii) marine waters

Notes:

- All inland surface waters and marine waters are aquatic ecosystems as declared by the Water Quality Policy
- > means greater than
- < means less than
- LOR means the laboratory limit of reporting

Trigger	Units	Freshwater (inland)	Marine
Turbidity	NTU	50	10
pH	mg/L	>6.5 and <9	>8.0 and <8.5
Ammonia (total)	mg/L	0.1	0.05
Dissolved oxygen	% saturation	90	90
Nitrate	mg/L	0.1	0.05
Salinity	mg/L	1,000	n/a
Total petroleum hydrocarbons (TPH)		>LOR	>LOR
Copper	mg/L	0.0014	0.0013
Lead	mg/L	0.0034	0.0044
Zinc	mg/L	0.008	0.015
Chromium (VI)	mg/L	0.001	0.0044

Appendix 2 Additional chemicals

Additional chemicals that can be **considered** for screening of dewatering discharge if there is a clear reason (eg if in the vicinity of an industrialised area, a specific PCA, known site contamination or an agricultural setting).

- Volatile chemicals – including monocyclic aromatic hydrocarbons, oxygenated compounds, sulfonated compounds, fumigants, halogenated aliphatic compounds, halogenated aromatic compounds, trihalomethanes and naphthalene.
- Semi-volatile chemicals – including phenolic compounds, polycyclic aromatic hydrocarbons, phthalate esters, nitrosamines, nitroaromatics & ketones, haloethers, chlorinated hydrocarbons, analines and benzidines, organochlorine pesticides and organophosphorus pesticides.

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Appendix 3 Schedule 2 – Class 1 pollutants extracted from the Water Quality Policy

Agricultural chemicals

Asbestos

Biosolids and wastewater treatment sludge

Brick, bitumen or concrete cutting wastewater

Building washwater

Carpet or upholstery cleaning waste

Chemicals designed for human or animal therapeutic use

Chemicals listed in Schedule A of the *National Strategy for the Management of Scheduled Wastes 1992*, prepared by ANZECC, as in force from time to time

Cleaning agents

Concrete waste

Condensate from compressors

Construction and demolition waste (whether or not inert)

Detergents and their byproducts

Domestic waste (being waste produced in the course of a domestic activity)

Engine coolant

Food or beverage waste

Fuel dispensing area washwater

Hard waste (for example, vehicles, tyres, batteries, metal parts, piping, electronic equipment and municipal solid waste)

Hazardous waste

Human waste

High pressure water blasting waste

Liquid waste

Medical waste

Motor vehicle servicing or repairs waste

Oil, grease or lubricants

Paint and paint scrapings

Painting washwater

Paint stripping waste

Petroleum products

Photographic chemicals

Plaster, plaster waste and plaster wastewater

Pool backwash water

Pool chemicals

Putrescible waste (for example, food scraps and dead animals that are putrid or likely to become putrid)

Quarantine waste (waste that is subject to quarantine under the *Quarantine Act 1908* of the Commonwealth)

Radioactive waste (being waste, the management or disposal of which is regulated under the *Radiation Protection and Control Act 1982* or a law of the Commonwealth)

Roof cleaning waste

Rubbish and litter (for example, bottles, cans, cartons, cigarette butts, food scraps, packaging and paper, glass or plastic items or materials)

Sawdust

Sewage

Solvents

Stain or varnish

Steam cleaning waste

Street cleaning waste

Timber preservatives

Trade waste

Washdown water from cleaning animals or animal enclosures

Washdown water from cleaning vehicles, plant or equipment

Washdown water from commercial or industrial premises or wharves

Waste from grease traps

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Appendix 4 Schedule 3–Class 2 pollutants extracted from the Water Quality Policy

Air conditioning or cooling system wastewater

Animal faeces

Fertilisers

Green waste (for example, lawn clippings, leaves and prunings)

Soil, clay, gravel or sand

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