



Acid sulfate soils fact sheet 4

Managing urban development in acid sulfate soil areas

October 2024

Development in areas of high to moderate acid sulfate soil (ASS) risk must be managed appropriately to minimise disturbance of ASS and potential damage to the environment.

Disturbance of ASS should be avoided where possible as soil acidification could cause infrastructure damage or environmental harm which would require costly remediation.

Site characteristics and local knowledge may indicate the presence of ASS and developers should also consult ASS risk maps, which are available at [Department of Water and Environmental Regulation](#) (the department).

Planning

If you are applying to develop land within an ASS risk area, the applicable conditional approval may attract a condition requiring the investigation and management of ASS. It is recommended that proponents seek further advice about this issue from the Department of Planning, Lands and Heritage (DPLH).

Regardless of whether a development or subdivisional approval is subject to an ASS condition, an ASS site investigation and management plan may be required if a development proposal includes:

- any dewatering or drainage works
- the excavation of more than 100 cubic metres of soil.

Acid sulfate soil investigation

Investigating ASS sites can be a complex process requiring the assistance of a suitably experienced environmental professional.

Advice on how to engage a qualified consultant can be found in Fact Sheet 3 on the department's website.

A four-step process is recommended for ASS investigations:

Step 1: Desktop assessment and site inspection – identifies the likelihood of ASS in a proposed development area and pinpoints locations for soil sampling.

Step 2: Soil sampling – determines ASS presence based on site characteristics and soil lithology from bore holes or test pits.

Step 3: Laboratory analysis – confirms field screening tests and determines required neutralising rates.

Step 4: Reporting – summarises field observations, screening tests and assessment of laboratory results. An ASS Management Plan (ASSMP) is required when the proposed development has the potential to disturb ASS.

Your ASS investigation should follow methods and procedures outlined in Water Quality Australia's National Acid Sulfate Soils Guidance. Key documents are:

- National acid sulfate soils sampling and identification methods manual (Water Quality Australia, June 2018)
- National acid sulfate soils identification and laboratory methods manual (Water Quality Australia, June 2018).

Acid sulfate soil management plan

Your ASSMP must address the following issues:

- potential environmental impacts – groundwater drawdown, disruption to existing bore users, vegetation stress, reduction in water quality, noise and air impacts
- earthworks strategy – soil extraction methods, stockpile management, soil treatment/neutralisation, calculated liming rate and disposal techniques
- dewatering strategy – procedure and control measures, treatment and disposal options, contingency measures if acidification of groundwater occurs
- monitoring program – soil, groundwater, vegetation, noise and air.

ASS disturbing works should not be commenced until the ASSMP has been prepared.

Preferred ASS management strategies:

- **avoidance** – planning to avoid disturbing ASS in high to moderate risk areas.

If disturbance is unavoidable, preferred strategies are:

- **minimise disturbance** – redesign earthworks, drainage and sewer layout to avoid ASS disturbance
- **neutralise** – add neutralising agents such as ‘aglime’ or other approved neutralising materials
- **hydraulic separation** – pyrite can be removed by hydraulic separation followed by appropriate treatment and management
- **strategic reburial** – certain potential ASS (PASS) can be replaced in an anoxic (devoid of oxygen) environment
- **consider onsite and offsite management** of disturbed ASS and potential contaminated waters.

At the completion of works, an ASS closure report should be prepared. Your closure report must detail the program of works, monitoring, treatment and validation undertaken at the site.

Dewatering management

When construction projects include dewatering to lower the watertable, a dewatering management plan may be required to manage acidification of PASS. This may form part of a combined ASS and dewatering management plan (ASSDMP).

Preferred management strategies are like those relating to soils:

- **avoidance** – planning to avoid lowering the watertable in high to moderate risk areas.

If disturbance is unavoidable, preferred strategies are:

- **minimise the lateral and vertical extent of drawdown** – using physical barriers such as caissons or diaphragm walls
- **minimise the duration and magnitude of dewatering** – to limit the amount of time that ASS are exposed to the atmosphere
- **neutralise** – treat abstracted groundwater to lower the pH and reduce concentrations of dissolved metals and sulfate, then re-inject or re-infiltrate the treated water on site.

Dewatering should not be commenced until the dewatering management plan has been prepared.

Detailed national guidance on dewatering management in ASS risk environments is provided at [Water Quality Australia](#). See *Guidance for the dewatering of acid sulfate soils in shallow groundwater environments* (Water Quality Australia, June 2018).



More information

For advice on ASS, or related matters, please contact your Local Government Authority. Additional resources, including National Guidelines on the investigation and management of ASS, can be found at [Water Quality Australia](#).

This document is available in alternative formats and other languages on request.

Related documents

Related fact sheets and further technical documents about ASS are available from the [Department of Water and Environmental Regulation](#) (the department).

Legislation

This document is provided for guidance only. It should not be relied upon to address every aspect of relevant legislation. Please refer to the [Department of Justice](#) for copies of the relevant legislation.

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Legal advice

The information provided to you by the department in relation to this matter does not constitute legal advice. Due to the range of legal issues potentially involved in this matter, the department recommends that you obtain independent legal advice.