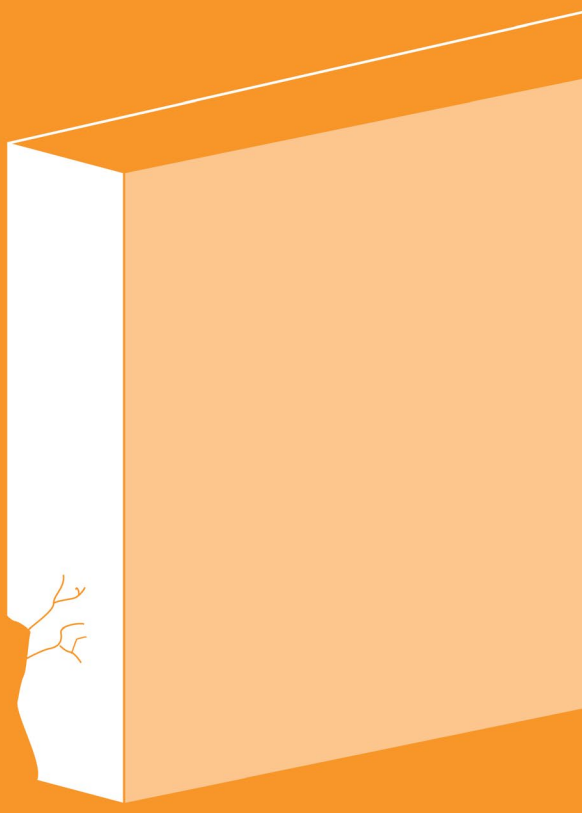
2.23

GENERIC PROVISIONS
ACID SULFATE SOILS



MARRICKVILLE council

Contents

2.23 Acid Sulfate Soils

Acid sulfate soils occur in about 40,000km^2 of Australia's coastal zone, including parts of every State and the Northern Territory.

Iron sulfide formation and oxidation

During the last major sea level rise new coastal landscapes formed through rapid sedimentation. Bacteria in those organically rich, waterlogged sediments converted sulfate from tidal waters, and iron from the sediments, to iron disulfide (iron pyrite). When exposed to air, iron sulfides oxidise and produce sulfuric acid, hence the name acid sulfate soils.

Potential acid sulfate soils

Iron sulfides are contained in a layer of waterlogged soil. This layer can be clay, loam or sand and is usually dark grey and soft. Water prevents oxygen in the air reacting with the iron sulfides. This layer is commonly known as potential acid sulfate soil (PASS) because it has the potential to oxidise to sulfuric acid.

Actual acid sulfate soils

When iron sulfides are exposed to air and produce sulfuric acid, they are known as actual acid sulfate soils (acid sulfate soils). The soil itself can neutralise some of the sulfuric acid. The remaining acid moves through the soil, acidifying soil water, groundwater and, eventually, surface waters.

2.23.1 Impacts of acid sulfate soils

The acid produced by oxidation of iron sulfides affects both soil and water and can damage the environment.

As sulfuric acid moves through the soil, it strips iron, aluminium and sometimes manganese from the soil. In some cases it also dissolves heavy metals such as cadmium. This mixture can make the soil so acidic and toxic that few plants can survive.

Sulfuric acid produced by acid sulfate soils corrodes concrete, iron, steel and certain aluminium alloys. It can weaken concrete structures and corrode concrete slabs, steel fence posts, building foundations and underground concrete water and sewerage pipes.

Massive fish kills and destruction of aquatic life can occur when sulfuric acid is washed into waterways.

2.23.2 Application of this section

This section applies to the land specified in Inner West Local Environmental Plan 2022 (Inner West LEP 2022) Acid Sulfate Soils Maps.

2.23.3 Objectives

O1 To identify all areas affected by acid sulfate soils.

O2 To guide landowners, applicants and the general community on the procedures involved in the management of activities within areas affected by acid sulfate soils.

O3 To undertake a preliminary acid sulfate soil assessment to determine the extent of risk.

O4 To require, where necessary, an acid sulfate soil management plan to be prepared where the nature of development poses an acid sulfate soil risk.

2.23.4 Procedure for development applications in potential acid sulfate soils area

The Inner West LEP 2022 Acid Sulfate Soils Maps are based on the data supplied by the NSW Department of Environment, Climate Change and Water (DECCW) under the title of "Acid Sulfate Soil Risk Mapping Version 2.1 (September 2007)". Based on the data provided by DECCW, potential acid sulfate soils within the Inner West Local Government Area are classified into five land classes with each land class indicating the depth where potential acid sulfate soils may occur.

Under the provisions of Clause 6.2 of Inner West LEP 2022, development consent is required for works in those five land classes.

Table 1: Types of work that may expose potential acid sulfate soils

Class of land	Works
1	Any works.
2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.
3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1m below the natural ground surface.
4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2m below the natural ground surface.
5	Works within 500m of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum (AHD) by which the watertable is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land.

NB *Refer to Clause 6.2 of Inner West LEP 2022 for circumstances when a development consent may not be required.*

C1 The proponent of any development must identify which class of acid sulfate soils their land falls on and whether a preliminary soil investigation or acid sulfate soils management plan is required by reviewing the Inner West LEP 2022 Acid Sulfate Soils Map.

NB *Development within Class 4 land which does not involve any basement, swimming pools or excavation works deeper than 2 metres below natural ground surface may not require any preliminary soil investigation or acid sulfate soils management plan.*

C2 Development within an area identified on the Inner West LEP 2022 Acid Sulfate Soils Map must follow the following steps:

i. Step 1

If the proposed development, by virtue of its location on the Inner West LEP 2022 Acid Sulfate Soils Map, is likely to disturb or expose potential acid sulfate soils (based on extent of works like excavation for foundations, ramps, basements or drainage works) a preliminary soil assessment report must be submitted with the development application.

ii. Step 2

If Step 1 applies, either:

a. carry out a preliminary soil assessment in accordance with the *Acid Sulfate Soil Manual* to determine the specific extent of acid sulfate soils and submit with the development application; or

b. assume that the soils within the site of the proposal contain acid sulfate soil and by-pass this step and carry out Step 3.

iii. Step 3

Prepare an acid sulfate soils management plan in accordance with the *Acid Sulfate Soil Manual* and submit with the development application.

NB *Under the provisions of Clause 6.2 of Inner West LEP 2022, consent is required for works within identified acid sulfate soils areas, even if the development is otherwise an exempt development under Inner West LEP 2022.*

C3 The proponent must liaise with officers of relevant authorities during the preparation of the preliminary soil assessment or acid sulfate soils management plan.

Relevant authorities to liaise with regarding preparation of preliminary soils assessment or soils management plans are:

- *NSW Department of Environment, Climate Change and Water (DECCW)*
- *NSW Department of Primary Industries*
- *Any other relevant authority*

2.23.5 Preliminary soils assessment

The preliminary soils assessment determines whether acid sulfate soils are present and whether the proposed works are likely to disturb or oxidise those soils or lower the water table.

C4 A preliminary soils assessment must be undertaken by a suitably qualified person and include the matters outlined in the *Acid Sulfate Soil Manual*. The preliminary assessment will primarily:

i. Establish the nature of the proposed works;

ii. Determine whether acid sulfate soils are present on the site;

iii. Determine the possible impacts on ground water;

iv. Establish whether the proposal triggers the preparation of an acid sulfate soil management plan; and

v. Provide information to assist in decision making.

2.23.6 Acid sulfate soils management plans

All development applications for proposals which will disturb acid sulfate soils must include a soils management plan prepared in accordance with the *Acid Sulfate Soil Manual*.

C5 As a minimum, the acid sulfate soils management plan must contain the following, where relevant:

i. An overview of environmental attributes of the site and surrounds;

ii. An overview of any proposed works;

iii. A description of the acid sulfate soils mitigation strategies incorporating a schedule of construction and operational phases to minimise impacts from:

   a. Any disturbance due to excavated soils; and

   b. Any acid leachate produced;

iv. A monitoring program for soils and the surface and subsurface water quality outlining:

   a. What parameters will be monitored (pH, Fe, Al, total titratable acidity);

   b. Monitoring locations (preferable at the source);

   c. Monitoring frequency;

   d. Analyses to be conducted;

   e. Laboratory conducting analyses must be accredited by the National Association of Testing Authorities (NATA);

   f. Procedures to be undertaken if monitoring indicates that thresholds are being exceeded; and

   g. Reporting procedures to relevant authorities and the community;

v. A description of a pilot project or field trial (for high risk proposals) to:

   a. Prove the effectiveness and feasibility of the selected management procedures to deal with the acid sulfate soil and other environmental impacts;

   b. Demonstrate that the proponent has the capability to implement those management procedures effectively; and

   c. Demonstrate the ability to comply with agreed standards and performance targets;

vi. A description of the contingency procedures to be implemented at the site to deal with unexpected events or in the event of failure of management procedures including a remedial action and restoration action plan related to:

   a. Any failure to implement any proposed acid sulfate soils management strategies; and

   b. any mitigation strategies being ineffective so that the project fails to meet agreed standards or performance levels.