PS ACID SULPHATE MATERIALS

PURPOSE AND SCOPE

The purpose of this primary standard is to eliminate or minimise risk of environmental harm caused by acid sulphate materials including acid sulphate soils and acid sulphate rock. Acid sulphate materials can cause severe environmental harm to ecosystems and cause damage to structures and permanent works.

DEFINITIONS

Acid Sulphate Rock (ASR) - Geological units that contain sulphide or sulphate minerals (commonly pyrite) which have the potential to oxidise when exposed to oxygen and/or water and produce acid that can affect structural integrity or environmental conditions.

Acid Sulphate Soil (ASS) - Soil or soil horizon contains acid sulphides or an acid soil horizon affected by oxidation of sulphides. When sulphides are exposed to air, oxidation takes place and sulphuric acid is produced which can move through the soil, acidifying soil, groundwater and surface water.

IDENTIFYING ACID SULPHATE MATERIALS

An assessment must be conducted to determine the risk of encountering acid sulphate material during works. This includes assessing whether soils contain Potential Acid Sulphate Soil (PASS) or Actual Acid Sulphate Soil (AASS). Environmental assessment documents are to be reviewed as part of the assessment. The assessment must also be completed in accordance with the planning approval conditions.

The following applies to the identification of acid sulphate materials:

- Trained and competent personnel (appropriately qualified consultants) to undertake site investigations and determine extent of potential and actual acid sulphate material prior to commencement of intrusive works
- Sampling, analysis and classification of contaminated material is undertaken by qualified personnel
- A suitably qualified person (preferably contaminated land consultant) must be engaged to undertake the necessary sampling and analysis of potentially contaminated material. Analysis must be undertaken by a NATA accredited laboratory.

All areas where intrusive activities are taking place in suspected or confirmed acid sulfate material areas must be mapped and documented.
MANAGEMENT OF ACID SULPHATE MATERIALS

The management of ASS is to be detailed in Environmental Management Plans (EMP). Where there is the potential for ASS, as determined through the project environmental risk assessment, an ASS Management Plan is to be developed, communicated and implemented. It should include:

- Quality verification records and validation sampling for remediation activities
- Identification/demarcation of acid sulphate soil areas on site
- Establishing environmental controls to prevent site runoff from leaving the site
- Establishment of acid sulphate soils treatment area(s) that include containment measures to prevent surface or groundwater contaminant measures
- Requirement to develop a work method plan for activities associated with ASS material
- Sampling and testing regime that will be adopted to validate acid sulfate material before (and if required) during the work activity
- Procedures for investigating, handling, treating and managing potential or actual acid sulfate soils

If a new acid sulphate soils area is identified during the works, it should be clearly demarcated and sign posted. It must be reported to the site Supervisor and Environmental Management Representative immediately. An assessment of the material is to be undertaken.

TREATMENT AND DISPOSAL OF ACID SULPHATE MATERIALS

Where possible acid sulphate material found on site should be treated and reused depending on the level of contamination and environmental planning conditions. Treatment, disposal or relocation is to be completed as per relevant state/territory legislation including verification that any offsite facilities and locations can lawfully receive the material.

Disposal records are to be generated including quantities, truck counts, laboratory results, reports and disposal locations. Spoil from known PASS/ASS areas will require assessment/treatment prior to disposal.

The following controls must be included for ASS treatment areas:

- ASS treatment areas are to be established away from waterways and drains
- The area needs to be bunded to contain the design rainfall event and an impermeable pad established beneath the stockpile
- Field pH tests on suspected ASS must be undertaken by a person qualified and experienced in ASS testing
- Air exposure must be minimised with preference for:
  - Burying either underwater or completely underground within 24 hours of excavation
  - Transport off site to a licenced PASS/AASS disposal site
  - Commencement of PASS/AASS treatment based on the dosing rates provided with the material analysis

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ACID SULPHATE MATERIAL STOCKPILES AND TREATMENT AREAS

Where excavated ASS is treated and or stockpiled onsite, the following actions are to be undertaken:

- Spoil to be tested for pHF and pHFOX as it is excavated to classify the PASS content. Stockpiling of the spoil to be categorised by the difference in pH. Laboratory testing as required by the relevant guidelines, specification of planning conditions will be undertaken by a NATA accredited laboratory.

- Bunding to be constructed around the perimeter of the designated ASS treatment area to intercept and contain run-off from the area during soil treatment operations. The bund will be constructed from non-ASS material or lime treated ASS material.

- All excavated spoil to be stored and treated within this bunded area as soon as possible after being excavated.

- The base of the ASS treatment area to be limed prior to placement of each layer of ASS. Respreading of agricultural lime prior to placement of each new layer of soil, and at the conclusion of all treatment is required. The base of the treatment pad must have a minimum agricultural lime application rate of 5 kg/m².

- The treatment area must retain enough storage capacity to hold any potentially acidic waters/run-off from the ASS. This is to collect drainage water from the treatment area in the event seepage or rainfall occurs during and between treatment.

- The treatment area bund must be built to a height of 400mm.

- Soil treatment must be undertaken as soon as possible after the material has been excavated to limit the opportunity for the accumulation or release of acidic pollutants.

- Soil to be treated must be placed in layers not exceeding 300mm and be thoroughly mixed with the lime. The liming rate is to be determined by testing.

- The amount of excavated material to be minimised, wherever possible, to allow for treatment of manageable quantities of AASS/PASS material.

- A covered stockpile(s) of agricultural lime and hydrated lime is to be kept inside the site boundary in volumes sufficient for the treatment of potential acid runoff as a result of ground water or rainfall events.

- A covered stockpile(s) of agricultural lime, equivalent to the quantity for 1.5 days treatment, is to be maintained at the treatment facility. This is to allow all treatment to occur in a timely manner. The stockpile(s) to be replenished on an as required basis throughout excavation activities.

- The effectiveness of the treatment process must be confirmed by verification samples at a rate of 1 per 500m³ or other revised sampling rate to ensure that representative samples of the material are obtained. Sampling and analysis must be completed by a NATA accredited laboratory in accordance with the relevant guideline or contract requirement.

- Where treatment has not been successful, the material must be retreated.

The following controls apply to onsite stockpiles of contaminated material:

- Be clearly identifiable and must have signage in place.

- Have a record of source location noted in on-site log book/site diary.
• Stockpiles and treatment should be located in a secure part of the site, away from water bodies or drains and outside of flood prone areas
• Erosion and sediment controls shall be implemented to prevent the material leaving site
• Treatment and stockpile areas are to be demarcated, secured and signposted to prevent inadvertent contamination

**OFF-SITE DISPOSAL**

The following applies to the disposal of acid sulphate material:

• Disposal must be in accordance with State/Territory Environmental Authority Requirements
• Contaminated material must be characterised/classified according to environmental authority guidelines and disposed at an appropriately licensed facility
• Analysis of material for disposal must be provided to the waste transporter/landfill operator to ensure it meets the licence/site conditions of the waste receiver
• Any materials being transported interstate are required to assess transport certification of both the originating and receiving locations

Certain contaminated and hazardous materials are required to be transported by appropriately licensed trucks accompanied by a waste transport certificates or records in accordance with environmental authority regulations.

**REGULATORY REQUIREMENTS**

• Guidelines for the Management of Acid Sulfate materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulphidic Black Ooze (Roads and Maritime, 2005)
• Acid Sulfate Soils Assessment Guidelines (Acid Sulfate Soil Management Advisory Committee, 1998)
• Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998)
• Acid Sulfate Soil and Rock Publication 655.1 (Environment Protection Authority Victoria (EPA Victoria), July 2009)
• Waste Classification Guidelines Part 4: Acid Sulfate Soils (EPA, 2014)
• State Planning Policy 2/02 Guideline: Planning and Managing Development Involving Acid Sulfate Soil (Queensland Government, 2002).
• Sulfate Specification for Structural Backfills (Reid, J M, Czerewko, M A & Cripps, J C, 2001)
• State Planning Policy 2/02 Guideline – Planning and Managing Development Involving Acid Sulfate Soil (Queensland Government, 2002).

PLANS AND FORMS
• Construction Environmental Management Plan
• Acid Sulphate Soils Management Plan
• Site Environmental Inspection Form

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