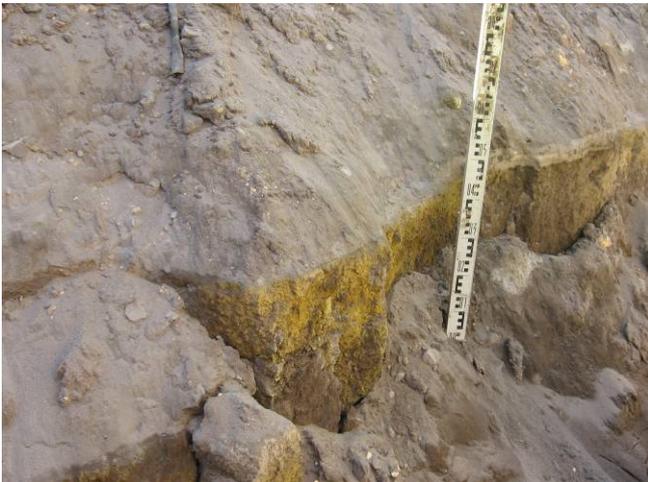


# Acid Sulfate Soils and Acid Rock Drainage Management



Acid sulfate soils (ASS) have the potential to cause considerable environmental damage. They contain metal sulfides (especially pyrite) that oxidise to generate sulfuric acid when exposed to the atmosphere and subsequently rainfall, runoff water or rising groundwater. The acid runoff can have a damaging effect on aquatic life, agriculture and on engineering structures.

Where it is necessary to disturb (or dewater) these soils during site development, e.g. sewer installation or basement excavation, ATC Williams will undertake the appropriate investigation and develop a Management Plan in accordance with regulatory requirements.

Typically, the process involves:

- site investigation including recovery of continuous soil samples to at least 1 m below the anticipated depth of disturbance. Field assessment of potential acidity is generally undertaken at 0.25 m depth intervals. Groundwater monitoring bores are usually installed at this stage.
- laboratory analysis by the SPOCAS or  $S_{CR}$  suite of tests, typically on soil samples at 0.5 m depth intervals.
- assessment of the investigation and laboratory results with respect to published guidelines and action criteria to determine whether an Acid Sulfate Soil Management Plan is required.
- preparation of an Acid Sulfate Soil and Dewatering Management Plan. As a rule, these plans include

provisions for treatment of ASS by neutralisation with limesand, crushed limestone or proprietary neutralising agents. Management of dewatering effluent usually includes construction of a lined sedimentation pond and frequently an on-site discharge sump, together with a neutralising (pH adjustment) facility, which may comprise a lime baffled inflow trench or a mobile water treatment plant.

- implementation of monitoring and testing during excavation/dewatering in accordance with the management plan.
- ongoing post construction monitoring (up to 12 months) and completion of closure report.

The effect of oxidation of iron sulfides has long been recognised in the mining industry and is known as acid rock drainage (ARD).

ATC Williams will assess whether mine spoil is potentially acid forming (PAF) or non-acid forming (NAF) by carrying out geochemical analyses on samples of crushed material. Where PAF materials are identified, we will recommend specific management procedures to minimise the likelihood of oxidation which could potentially have long-term adverse environmental impacts.

In general, drainage control and leachate collection facilities are developed for stockpiled material and long-term management may comprise subaqueous disposal or treatment (neutralisation) and burial in decommissioned pits or underground workings.