



ACID SULFATE SOILS PROSERPINE AREA

Scale 1:25 000



Projection: Universal Transverse Mercator (MGA Zone 55)
Horizontal Datum: Geocentric Datum of Australia (GDA94)

REFERENCE

ACID SULFATE SOILS (ASS) ¹ ON RELATIVELY UNDISTURBED LAND				
Depth	Depth Code	Depth to Actual Sulfate Soil ² (pH <4.0)	Depth to Strongly Acidic Soil layer ² (pH <4.0 to <5.0)	Depth to Potential Acid Sulfate Soil ³
0 - 0.5m	0	A0	a0	S0
0.5 - 1m	1	A1	a1	S1
1 - 2m	2	A2	a2	S2
2 - 3m	3	A3	a3	S3
3 - 4m	4	A4	a4	S4
4 - 5m	5	A5	a5	S5
>5m	5+	A5+	a5+	S5+

NOTE:

- The depth codes above imply that a predominance of profiles in the map unit fall within the nominated depth range.
- Actual acid sulfate soil layers (designated with an A code) often overlie potential acid sulfate soil layers (designated with an S code). Where this occurs, the map unit is coloured according to the layer of the upper surface of the actual layer (A0) and overlaid with yellow dots. An 'a' preceding the soil depth code indicates a strongly acid soil layer with field pH ranging from <4.0 to <5.0. This may or may not be a result of sulfide oxidation. While 'a' depth codes do show on the map, no colour is assigned to it.
- Areas where there is varying depth to an ASS layer that cannot be separately mapped at the operative scale, a forward slash is used e.g. S1/S2. The areas are coloured according to the shallowest depth of the occurrence.
- 'S' as a subscript indicates areas associated with Mollusca shells, wetlands and occasionally Casuarina glaucus communities. Oxidizable sulfur % in surface layers may be highly variable and often exceeds the Action Criteria. This may include sulfur from organic compounds and modern accretion of sulfides in a wet organic rich environment. ASS typically occur at depth. Where this occurs e.g. S₁₀₀ or S₂₀ or A₁₀, the map is coloured as per the actual or potential depth category and is overlaid with 'S' pattern.
- 'NA' as a subscript indicates areas with oxidizable sulfur values that exceed the action criteria⁴ but contain varying amounts of carbonate materials that may compensate for the potential acidity. Commonly the carbonate materials are naturally occurring shell fragments, coral fragments or Forams. Depth codes are as above e.g. a potential acid sulfate soil (rich in carbonate) at 1 to 2m depth is designated S₁. The map unit is coloured as S₂ and overlaid with green dots.

- S** Land mapped at 1:100 000 scale where ASS occurs within 5m of the surface.
- S_{LA}** Limited field assessment but occurs in a landscape position where there is a reasonable probability of ASS occurrence. This is usually land where the present use precludes any disturbance e.g. National Parks, Reserves etc., or land where accessibility is severely restricted.
- LAND WITH A LOW PROBABILITY OF ACID SULFATE SOIL OCCURRENCE**
- LP** Land between the outer limit of Holocene, estuarine ASS deposition (i.e., land below 5m AHD⁵) and surrounding hills or arbitrarily defined boundary on the floodplain as mapped at this scale, with low probability of ASS occurrence⁶. Limited field investigation.
- LAND NOT ASSESSED**
- NA** Land not assessed for ASS as part of this survey. It may include non-ASS land beyond the boundary established as the limit of Holocene, estuarine, sulfidic sediments⁷ but insufficient or no field testing was carried out⁸.
- 7P** Borehole locations where profiles were described in detail and samples taken for analysis.
- CD** Digital Cadastral Database.
- GS** Groundwater monitoring site locations.

¹ Acid sulfate soil is the generic term used to define soils derived from estuarine sediments containing iron sulfides (pyrite) or containing the acidic products of the oxidation of sulfides. The term includes actual and potential acid sulfate soils. Unless used with the superscript P, the code 'S' implies sulfidic sediments of Holocene age.

² An 'A' preceding the soil depth code indicates the probable depth to an Actual Acid Sulfate Soil (AASS) layer or horizon which has mobile acidity in the form of iron hydrogen, aluminium, iron or acid sulfate. ASS soils where yellow jarosite nodules occur and/or a field pH <4.0 extends beyond the Action Criteria. Extensive areas with high actual acidity derived from sulfide oxidation may constitute significant environmental hazard. An 'a' preceding the depth code indicates the probable depth to a soil layer or horizon with field pH ranging from <4.0 to <5.0. This may or may not be a result of sulfide oxidation as some soils with high organic matter may have low pH from organic acids. Further analysis for existing acidity is usually required to determine if the Action Criteria is exceeded.

³ An 'S' preceding the soil depth code indicates the probable depth to a Potential Acid Sulfate Soil (PASS) layer or horizon. PASS are soils where the oxidizable sulfur percentage or titratable sulfidic acidity or net acidity exceeds the prescribed Action Criteria⁴. Testing for oxidizable sulfur is conducted by the Chromium Reducible Sulfur (CrS) method or the Suspension Peroxide Oxidation Combined Acidity and Sulfur (SPOCAS) method.

⁴ Net acidity or oxidizable sulfur Action Criteria that trigger treatment are currently: Sands, 18 mol H⁺ (0.03 %S); Loams to light clays, 36 mol H⁺ (0.06 %S); Medium to heavy clays, 62 mol H⁺ (0.1 %S). When deciding whether treatment is required, net acidity should be calculated as defined in the Acid Sulfate Soils Laboratory Methods Guidelines (Murray et al 2004) and compared to the Action Criteria above. NOTE: for disturbances >1000 tonnes, the action criteria is 18 mol H⁺ (0.03 %S) regardless of soil texture.

⁵ AHD refers to Australian Height Datum.

⁶ CAUTION: It is not possible to accurately map the distribution of ASS adjacent to rivers and streams at the current mapping scale. ASS may also be buried below alluvium of past and present stream channels some distance upstream of mapped areas.

⁷ The outer boundary of Holocene estuarine ASS commonly occurs at the intersection with hard rock or other materials of non estuarine origin. In this area acid sulfate soils can occur above 5m AHD, but generally occur below this elevation. This boundary is established using field checking at and above the boundary itself, together with the use of landscape interpretation. It should be noted, however, that certain lithologies on land above 5m AHD may contain sulfidic material of non estuarine/Holocene origin. Additionally, much older, estuarine, sulfidic sediments may occur at depth on land >5m AHD, as discussed in footnote 8 below.

⁸ The primary focus of ASS investigation in this study are the sulfidic sediments that were deposited in the Holocene epoch, that is, during the last 10 000 years. Experience in coastal stratigraphic mapping shows that similar, but much older sulfidic sediments of Pleistocene age can occur, still in a reduced (preserved) state, being buried under either cemented sands or clay consolidated alluvium. They are far less common than the Holocene equivalents, and have been found beneath land whose surface is both above and below 5m AHD. Generally, Pleistocene sediments will be found at greater depths below the surface than equivalent Holocene sediments.

⁹ The distinction between AASS and PASS is sometimes not clear and it is not uncommon for a soil layer or horizon to contain both AASS and PASS. Likewise the severity of AASS or PASS can vary in their distribution vertically or spatially. Mapping codes only reflect the dominant category based on this sampling. In most cases detailed sampling and analysis is usually required under the State Planning Policy 332 'Planning and Managing Development Involving Acid Sulfate Soils'.

NOTE: This map should be used in conjunction with the accompanying report covering this area.

SURVEY by P.G. Muller, Natural Resource Sciences, Department of Natural Resources and Water, Central West Region, Mackay.

CARTOGRAPHY by L.E. Nouvens and C.J. Thomson, Central West Geographic Information Systems Group, Natural Resource Information, Department of Natural Resources and Water, Rockhampton.

LABORATORY ANALYSIS by Natural Resource Sciences Laboratories, Department of Natural Resources and Water, Indooroopilly Science Centre, Brisbane.

Produced by the Central West Geographic Information Systems Group, Natural Resource Information, Department of Natural Resources and Water, Rockhampton.

Base map compiled from the Queensland Digital Cadastral Database April 2007, Department of Natural Resources and Water, Brisbane.

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