

SUNSHINE COAST AIRPORT – AIRPORT NORTH PRECINCT MASTER PLAN

Acid Sulfate Soil Management Plan



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EXECUTIVE SUMMARY

Overview

The Sunshine Coast Airport (SCA), operated and managed by Sunshine Coast Airport Pty Ltd (SCAPL), is the gateway to the Sunshine Coast region and a pivotal point of access to southeast Queensland. The Airport North Precinct (the site) is one of six functional zones within the SCA Priority Development Area, designated for a diverse range of land uses intended to be compatible with airport operations and the surrounding Maroolia community. The Airport North Precinct is a ~32.5 hectare (ha) area of land situated within in the north-east portion of the airport and is a key part of the Priority Development Area of the airport which comprises ~460 hectares (ha). The airport is identified as major enabling infrastructure to support the northern gateway regional economic cluster and contributes to the continued economic growth of the Sunshine Coast (EDQ, 2024).

This report forms an overarching framework for the management of ASS at the Airport North Precinct and presents the findings of ASS investigations that have been completed. This framework details the controls and monitoring procedures for which development/project-specific ASSMPs are to be developed, outlining soil excavation, dewatering and discharge activities that will be prepared for each development application. Such development/project specific ASSMPs are required to be submitted to and endorsed by the Economic Development Queensland (EDQ). Each development/project specific ASSMP must be endorsed prior to soil / groundwater disturbance activities commencing, to ensure appropriate management of cumulative impact of disturbing soils across the precinct;

The management and performance indicators set out in this overarching management plan, and to be developed within development/project specific ASSMPs, are set specifically in relation to ASS risks and apply in addition to other water quality limits and indicators outlined as part of other management plans, including the SCA PFAS Management Plan (RPS, 2024).

The management and performance indicators set out in this overarching management plan (and to be developed within development/project specific ASSMPs) are set specifically in relation to ASS risks and apply in addition to other water quality limits and indicators outlined as part of other management plans, including the SCA PFAS Management Plan (RPS, 2024).

ASS summary

The available data reviewed from the vicinity of the site supports a conclusion that ASS is likely present across the precinct. ASS has been identified typically the silty topsoils and dark grey coffee sands that extend from the seasonal groundwater interface to the base of each soil profile (maximum 2.5 mbgl).

Based on the available data collected from the vicinity of the site, soils exceed the management criteria and thus will require management and lime-neutralisation during construction to manage the risk of acidification where these soils are disturbed.

Groundwater summary

No groundwater quality data for bores that have been installed within the Airport North Precinct has been provided.

Groundwater across the wider airport has been found to be slightly acidic and generally contains total acidity at levels that exceed the dewatering treatment criteria. Groundwater also contains low levels of acid buffering capacity (alkalinity) and as such is prone to further acidification should the surrounding ASS be exposed.

Based on these results, groundwater that is abstracted as part of dewatering during construction will require management and treatment prior to be recharged to ground.

Management strategy / framework

The outcomes of the previous ASS investigations prepared for the SCA have been assessed, and management strategies prepared for soil, surface water and groundwater. The strategies provide a framework and requirements to be used in preparing development/project-specific ASSMPs and include:

- Management measurements for excavating, handling, stockpiling and treating (neutralising) ASS
- Managing surface water/dewatering effluent and contain relevant monitoring requirements for dewatering effluent, groundwater and surface water (where required)
- Monitoring frequencies and requirements, and
- Reporting commitments.

1 INTRODUCTION

1.1 Overview

The Sunshine Coast Airport (SCA), operated and managed by Sunshine Coast Airport Pty Ltd (SCAPL), is the gateway to the Sunshine Coast region and a pivotal point of access to southeast Queensland. The Airport North Precinct (the site) is one of six functional zones within the SCA Priority Development Area, designated for a diverse range of land uses intended to be compatible with airport operations and the surrounding Maroolia community. The Airport North Precinct is a ~32.5 hectare (ha) area of land situated within in the north-east portion of the airport and is a key part of the Priority Development Area of the airport which comprises ~460 hectares (ha). The airport is identified as major enabling infrastructure to support the northern gateway regional economic cluster and contributes to the continued economic growth of the Sunshine Coast (EDQ, 2024).

The Airport North Precinct preferred Structure Plan as presented in Airport North Precinct Master Plan is presented in Figure 1 on the following page.

1.1.1 Airport North precinct

The Airport North Precinct (~32.5 ha) is positioned adjacent to a residential precinct and Maroolia Village, and the beach that supports tourism. To best utilise the region's environmental / ecological attributes, cultural identity, and economic potential a pedestrian-orientated mixed land use will assist to diversify the airport's economic capacity beyond aviation with a focus on tourism. Activation of this area will improve community connection, lifestyle amenity, and commercial opportunities.

The precinct is separated into three primary land use areas as described below and shown in Figure 1 on the following page:

- North – Tourism & Accommodation
- Central – Mixed Use
- South – Employment.

These are deemed to be consistent with the precinct intent that the development will provide for a “diverse mix of land uses compatible with wider airport operations which capitalises on its location to surrounding residential and tourist areas. It will provide a level of economic activity and diversification to serve passengers and visitors, in addition to employment opportunities which are compatible with the wider community”.

Further detail on the land uses with reference to Airport North Precinct preferred Structure Plan (Figure 1) are provided in Table 1.

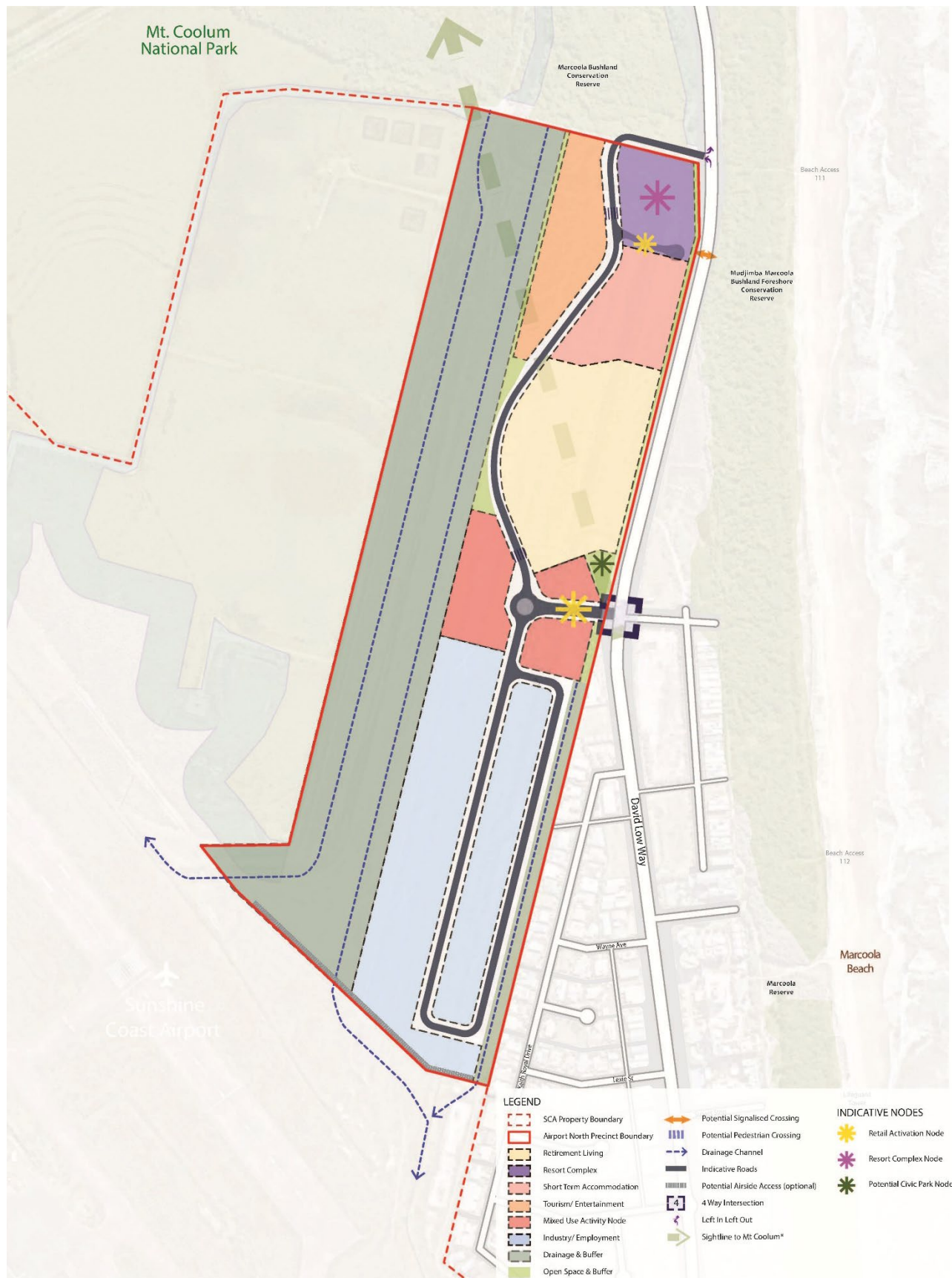


Figure 1: Airport North Precinct Concept Master Plan

Table 1: Precinct Master Plan land use summary

Sub-precinct / land use	Description	Site reference (refer Figure 1)
North – Tourism & Accommodation		
Resort Complex	Resort Hotel, Conference & Events	A1
Retail (F&B)	F&B/ Restaurant	
Short Term Accommodation	STA	A2
Retail (F&B)	F&B / Restaurant	
Tourism Retail	Retail	A3
Entertainment / Catering	F&B, Hotel, Function Facility	
Multi Dwelling	Retirement Living	A4
Central – Mixed Use		
Entertainment/ Catering	Retail	B1
Commercial Business Uses	Commercial Office	
Open Space	Civic Plaza	
Entertainment/ Catering	F&B/ Restaurant	B2
Commercial Business Uses	Retail Showroom	
Indoor Sports & Recreation	Indoor Sports & Recreation	B3
Entertainment/ Catering	F&B/ Restaurant	
Commercial Business Uses	Retail Showroom	
South – Employment		
Employment (low impact industry)	Commercial Office, Low Impact Industry, Research and Technology, Service Industry, Warehouse, Air Services, Aviation, Indoor Sport and Recreation	C1
		C2
		C3

1.1.2 SCA PDA development scheme

To facilitate development the SCA Priority Development Area (PDA), was declared by regulation in 2023, and covers ~460 hectares (ha) in the suburb of Marcoola on the Sunshine Coast. The SCA is identified in the South East Queensland Regional Plan (SoQ, 2023) as major enabling infrastructure to support the northern gateway regional economic cluster and contributes to the continued economic growth of the Sunshine Coast (Economic Development Queensland (EDQ), 2024). As part of the PDA, a Precinct Master Plan (PMP) must be lodged and approved prior to any development being permitted in that precinct and any development application approved for that precinct.

The PDA indicates that, prior to development, an Acid Sulfate Soils (ASS) Management Plan (ASSMP) is to be prepared for each precinct PMP. Each ASSMP is to be submitted and endorsed by EDQ to ensure appropriate management of the cumulative impact of disturbing soils across the PDA (EDQ, 2024).

The ASSMPs are required as ASS were identified as a key community safety and development constraint within the PDA. The development scheme (EDQ, 2024) indicates that:

1. Development is managed to avoid or minimise the release of acid and metal contaminants, where disturbance of ASS is unavoidable.
2. Development that may disturb potential or actual ASS:
 - a. is supported by an ASS investigation report in accordance with current best practice in Queensland and include an assessment of the source of acidity
 - b. is in accordance with an ASS management plan
 - c. ensures ASS is treated in accordance with current best practice in Queensland, to avoid impacts to surface water and groundwater

- d. ensures the disturbance of ASS is avoided to the greatest extent practical, and where avoidance is not reasonably possible, managed to reduce risks posed to the natural environment, and
 - e. manages any neutralisation of ASS and potential ASS to ensure no adverse, cumulative impacts on wetlands either on site or adjoining the PDA, so that the natural acidity of wetlands is maintained.
3. Development involving filling or excavation:
- a. does not adversely impact the natural environment, including waterways, or adjoining land
 - b. avoids or minimises and manages environmental harm and the environmental values of water and retained significant vegetation are protected, and
 - c. is in accordance with an ASS management plan.

1.1.3 ASS environmental framework

The Development Scheme was based upon the findings of an ASS Detailed Summary Report completed by Core Consultants (CC, 2024) for the Sunshine Coast Airport. The report was prepared to detail the current status of ASS at the airport and outline a recommended process to be implemented by the SCA and the associated concerned parties in relation to the management of ASS.

The ASS Detailed Summary Report (CC, 2024) outlines an environmental management framework which provides guidance on how ASS is to be managed within the precincts, including potential impacts on surface and groundwater quality. The framework outlines the scope, management objectives, actions and performance management information for the management of ASS to be included in each precinct-specific ASSMP, including the following:

- Stockpiling, handling and transport of ASS
- Treatment and validation of excavated ASS
- Monitoring of (surface) water quality
- Groundwater quality monitoring.

This overarching ASSMP presents the findings of ASS investigations across the Airport North Precinct and surrounding land. This report details the proposed management framework and the controls and monitoring procedures for which development/project-specific ASSMPs are to be developed, outlining soil excavation, dewatering and discharge activities that will be prepared for each development application. Such development/project specific ASSMPs are required to be submitted to and endorsed by EDQ, prior to works, to ensure appropriate management of cumulative impact of disturbing soils across the precinct.

The management and performance indicators set out in this overarching management plan, and to be developed within development/project specific ASSMPs, are set specifically in relation to ASS risks and apply in addition to other water quality limits and indicators outlined as part of other management plans, including the SCA PFAS Management Plan (RPS, 2024).

1.2 Acid sulfate soils – definition

ASS are formed naturally under waterlogged, iron and sulfate-rich conditions, being typical of coastal lowlands where the land has been subject to inundation by sea water. Such soils contain iron sulfide minerals (most commonly pyrite) or their oxidation products and remain stable under anaerobic conditions. Upon exposure to air, they may be oxidised, resulting in the formation of sulfuric acid and subsequent release of iron, aluminium and other heavy metals and nutrients from soils into surface water bodies and groundwater.

Acid sulfate soils often contain a mixture of the different forms of acidity (e.g., inorganic sulfur, organic and or metal speciated acidity), and their relative proportions may change during periods of wetting, drying and aeration. This can occur as a natural process related to climatic cycles. Extended periods of drought can lead to a drop in the watertable, allowing near-surface potential ASS (PASS) to oxidise. The return of rainfall and the subsequent rise of the watertable allows acid and iron generated during the dry period to be exported into ground- and surface-waters. In natural environments, this situation is generally not problematic, as the oxidation period is short, temporary and relatively small volumes of ASS are affected (Dear et al., 2024).

Around 35,000 years ago, the sea level in Queensland was higher, and large swamps along the coast. Sea levels have since declined and soils from the hills have migrated toward the coast, covering these former swamps. As such, many coastal plains ASS beneath the topsoil. Coastal areas lower than 5m Australian Height Datum have a high potential for containing materials characteristic of ASS (QG, 2025) as found on the Sunshine Coast.

Development of land containing ASS introduces a risk of environmental harm that requires management. Earthmoving and drainage works can result in exposure of these soils to oxidation either directly, i.e. excavation, or indirectly through the lowering of water tables.

1.3 Documentation

1.3.1 Guidance literature

Preparation of this ASSMP was undertaken with reference to the following key guidance documents on ASS and water quality:

- Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines, Version 5.1 (Dear et. al., 2024)
- National Acid Sulfate Soils Guidance. Guidelines for the dewatering of acid sulfate soils in shallow groundwater environments (Water Quality Australia, June 2018a).
- National Acid Sulfate Soils Guidance. National acid sulfate soils identification and laboratory methods manual (Water Quality Australia, June 2018b).
- National Acid Sulfate Soils Guidance. National acid sulfate soils sampling and identification methods manual (Water Quality Australia, June 2018c).
- National Acid Sulfate Soils Guidance. Overview of management of monosulfidic black ooze (MBO) accumulations in waterways and wetland (Water Quality Australia, June 2018d).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Water Quality Australia, 2018e)
- State Planning Policy, July 2017.
- State Planning Policy – State Interest Guideline Water Quality, April 2016 (Policy 9).
- Environmental Protection Act, 1994.
- Environmental Protection Policy (Water), 2009.

1.3.2 Airport documentation

A summary of the reports relevant to the to the Airport North Precinct are detailed below:

- Sunshine Coast Airport Priority Development Area Development Scheme (EDQ, 2024)
- Sunshine Coast Airport Master Plan 2040 (SCAPL, 2019)
- Sunshine Coast Airport Environmental Management Plan (BMT, 2023)
- PFAS Management Plan Sunshine Coast Airport, Qld (RPS, 2024).

1.3.3 Previous investigations and reports

A summary of the previous ASS investigations relevant to the airport are detailed below:

- Acid Sulfate Soils Detailed Summary Report Sunshine Coast Airport, Marcoola (Core Consultants, 2024).
- Report on Geotechnical Review Gateway South Precinct – Fill Assessment Sunshine Coast Airport (CC, 2023a).
- Report on Geotechnical Review Gateway South Precinct Sunshine Coast Airport (CC, 2023b).

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- Acid Sulfate Soils Investigation Report Gateway South Precinct Sunshine Coast Airport Friendship Road, Marcoola (CC, 2023c).
- Acid Sulfate Soil Investigation Proposed Carparks Part of Lot 98 SP176239 and Existing “Readybays” Sunshine Coast Airport, Marcoola (CC, 2022).
- Geotechnical & Acid Sulfate Soils Investigation Report Sunshine Coast Airport Terminal Expansion Project (CC, 2022).
- Soil Characterisation Assessment Proposed Lots 4 to 8 Concept Master Plan, Gateway Precinct, Sunshine Coast Airport (CC, 2021).
- Acid Sulfate Soil Management Plan Sunshine Coast Airport Fill Stockpile for Light Industrial Development (Golder, 2013).
- Geotechnical and Acid Sulfate Soil Investigation Sunshine Coast Airport, Southern Precinct (Golder, 2009).

2 MANAGEMENT OBJECTIVES

2.1 ASS environmental management framework

The environmental management framework (EMF) for ASS at the airport (CC, 2024), outlines the following management objectives:

1. To avoid any potentially adverse impacts on the surrounding receiving environment (i.e. Maroochy River, sections of the Mt Coolum National Park and local vulnerable flora and fauna) that may result from the disturbance, treatment and transportation and placement of ASS/PASS material, through the effective management of all works involving ASS at the site.
2. To minimise any potentially adverse impacts resulting from:
 - a. Disturbance of ASS or potential ASS (PASS) via excavation or filling activities
 - b. Treatment and reuse of ASS/PASS spoil from excavations on site
 - c. The construction and operation of the new drainage system or Water Sensitive Urban Design (where required)
 - d. Over treatment of lime on disturbed ASS impacting the surrounding naturally acidic environments (i.e., acid frog habitat areas).
3. To comply with conditions of licences, permits or other approvals issued for the PDA Development Scheme

2.2 ASSMP

To achieve the above objectives, active management of earthworks and dewatering operations is required to minimise potential impacts on the environment and other groundwater users.

At a precinct planning level, this ASSMP presents the framework for managing any proposed earthworking and or dewatering of ASS within the Airport North Precinct. Development/project specific ASSMP must be developed, based upon this ASSMP framework, and endorsed by the EDQ prior to construction works commencing, as part of any future DA application.

This ASSMP framework specifically addresses the following measures:

- Assessment of available groundwater quality data
- Management of soil/sediment (including monosulfidic black ooze; MBOs) during excavation, handling and stockpiling operations, including the neutralisation of acidity associated with ASS
- Surface water and groundwater monitoring and soil/sediment validation to confirm works are undertaken in accordance with the performance objectives detailed herein.

Incorporated within the ASSMP are the findings of various assessments for ASS across or within the vicinity of the precinct. This work provides an assessment of the presence, distribution and magnitude of PASS and actual ASS (AASS) within those areas of the precinct which may be subject to earthworks and dewatering.

2.3 Development/project specific ASSMPs

The development/project specific ASSMPs will be required to specifically address the following measures:

- Water table management to mitigate on and off-site environmental impacts; includes management of dewatering effluent and implementation of monitoring programs (if required).
- Establishing environmental water quality trigger levels based upon the assessment of baseline groundwater and surface water quality data against applicable guidelines (if required).
- Contingency measures and corrective actions that will be implemented to rectify any breaches of the nominated triggers and management measures (specific to each phase of work).

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- Management of soil/sediment excavation, handling and stockpiling operations, including the neutralisation of acidity associated with ASS.
- Groundwater and surface water monitoring and soil/sediment validation to confirm works are undertaken in accordance with the performance objectives.

3 SITE DESCRIPTION

3.1 Site summary

A site summary is provided in Table 2 below:

Table 2: Site summary

Reference name	SCA Airport North Precinct	
Address	Friendship Avenue, Marcoola, Qld 4564	
Titles	Lot 699 on SP296245	
Current owner	Sunshine Coast Council	
Local government authority	Sunshine Coast Council	
Regulatory Authority	Economic Development Queensland	
Area and elevation	Area	Elevation
	~32.5 ha	2-3 mAH ²

1. Sunshine Coast Council Planning Scheme 2014, *mAH² – metres Australian Height Datum, Qld globe (<https://qldglobe.information.qld.gov.au/>).

3.2 Geology and ASS risk

3.2.1 Geology

The 1:100,000 Series Nambour Special Geological Map (Sheet 9444 & Part 9544, First Edition 1999) (Figure 2) indicates that the majority of the SCA is underlain by Quaternary (Pleistocene) age ‘undifferentiated coastal plains’ comprising ‘sands and mud’ that is known to also contain “clay/silt (active stream channel and low terraces)”. The Quaternary deposits are inferred to be underlain by the older Landsborough Sandstone and/or Nambour Formation (CC, 2024).

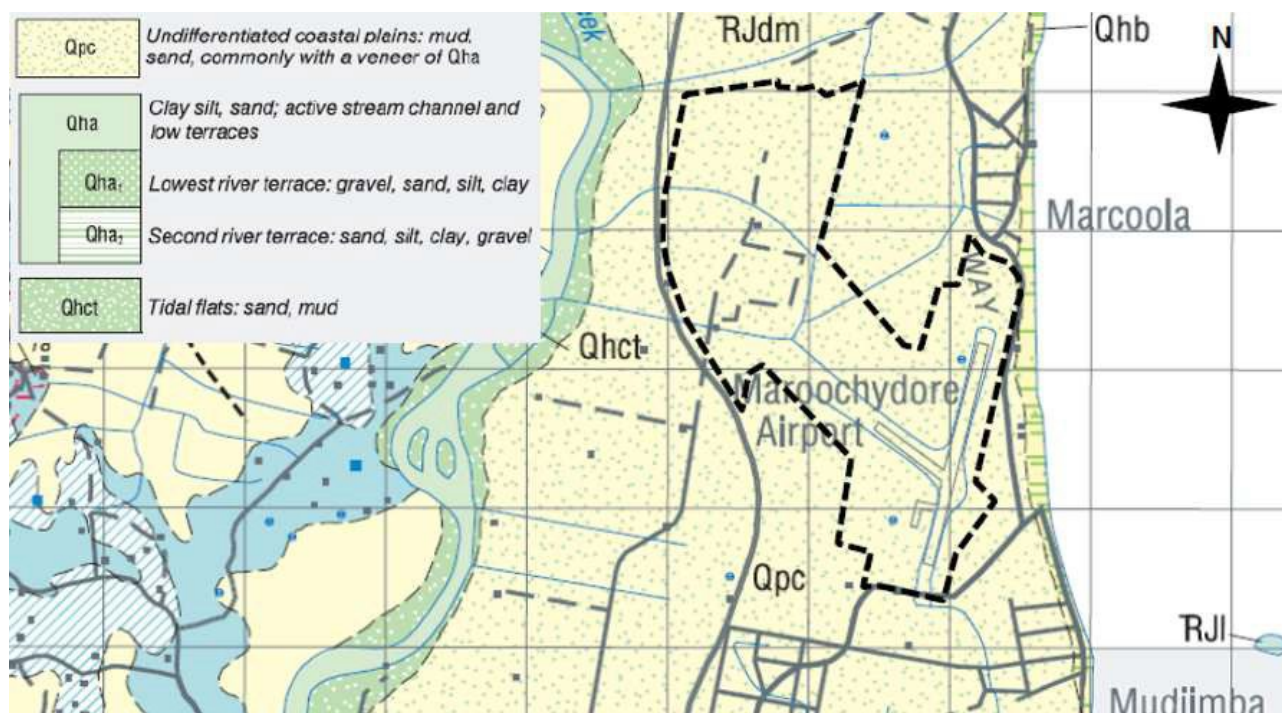


Figure 2: Geological mapping

Natural soils within the SCA are predominantly Podzols, which are soils with a B horizon that is dominated by compounds of organic matter, aluminium and/or iron and is generally highly sandy and acidic. The soil profile (in lithological sequence) based on previous investigations generally consists of:

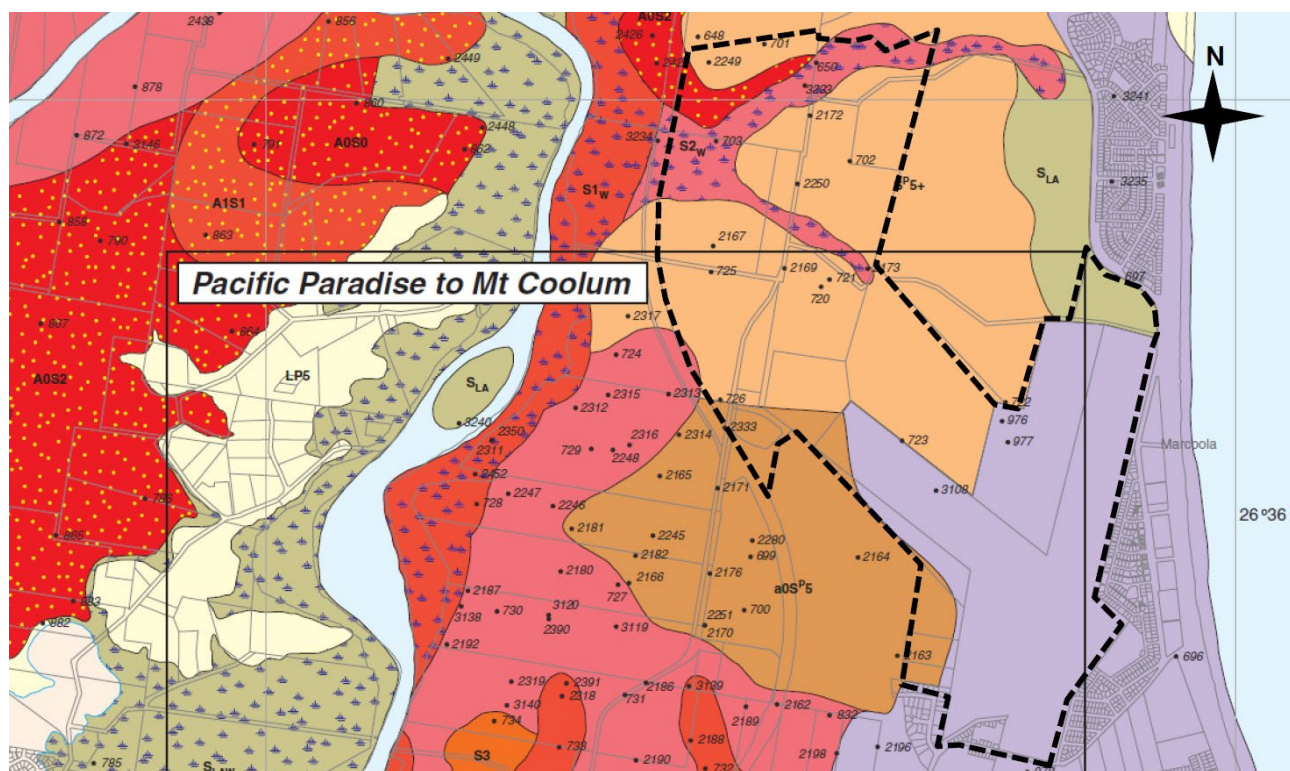
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- A thin layer of topsoil.
- Loose to dense sand with varying silt and/or clay content to depths between 0.15 m below ground level (mbgl) to 3.5 mbgl.
- Dense to very dense indurated sand from depths between 0.5 mbgl and 6.1 mbgl.
- Medium to very dense sand to depths of 2.6 mbgl to 14.0 mbgl, with interlayered silt and clay lenses.
- Stiff to hard silty and/or sandy clay to 26.5 mbgl (maximum depth of testing) (CC, 2024).

The indurated sands (referred to as coffee rock) are recognised to influence groundwater resources due to reduced hydraulic conductivity (both vertical and horizontal), porosity, flow velocities, and forming perched water tables. Indurated sand is a distinctive podsol B horizon, characterised by accumulated humus, low iron content and frequent hard cementation, formed at the water table in quartz sands on coastal plains in sub-tropical and tropical climates (Farmer et al. 1983).

3.2.2 Acid sulfate soil mapping

The Queensland NRM&E 1999 1:100 000 scale ASS - Map 2 “Maroochy - Caloundra” map (Figure 3) highlights the majority of SCA as SDL (purple shaded area), being “Disturbed land, e.g. Canal Estate, Marina, Aquaculture, Quarry, Urban, Industrial likely to contain ASS (in some cases partial or full treatment may have been undertaken) - limited field investigation (CC, 2024).



ACID SULFATE ON DISTURBED LAND⁵



Disturbed land, eg. Canal estate, Marina, Aquaculture, Quarry, Urban, Industrial likely to contain ASS. (In some cases partial or full treatment may have been undertaken). Limited field investigation.

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 e.g. **A0S0** the map unit is coloured according to the depth of the upper surface of the 'actual' layer (A0) and overlaid with yellow dots. An 'a' preceding the soil depth code e.g. **a0S0** indicates a strong 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 code is shown on the map, no colour is assigned to it.

• In areas where there is varying depth to an ASS layer that cannot be separately mapped at the operative scale, two colours are used to designate the dominant depths. This appears as equal width striped colours. e.g. **S1S2**

• S^P - Indicates sediments of Pleistocene age¹, so that S^P5+ indicates sulfidic sediments (of Pleistocene age) deeper than 5m.

Figure 3: ASS risk mapping

3.3 Hydrogeology and hydrology

3.3.1 Drainage lines and hydrology

Surface water at the airport is managed via a series of open drainage lines, with the main drainage lines being the Eastern and Southern Perimeter Drains. The pre-development drainage and catchment is presented in Figure 4.

The Eastern Perimeter Drains traverses the Airport North Precinct, which is the principal drainage channel within the Maroochy North Shore catchment. This drain conveys runoff southwards to its outfall into the Maroochy River via the Twin Waters Canal system (BMT, 2024) and ultimately Twin Waters and the Maroochy River.

On the western portion of the Airport North Precinct, runoff is directed to a minor drain that connects to the Northern Perimeter Drain.

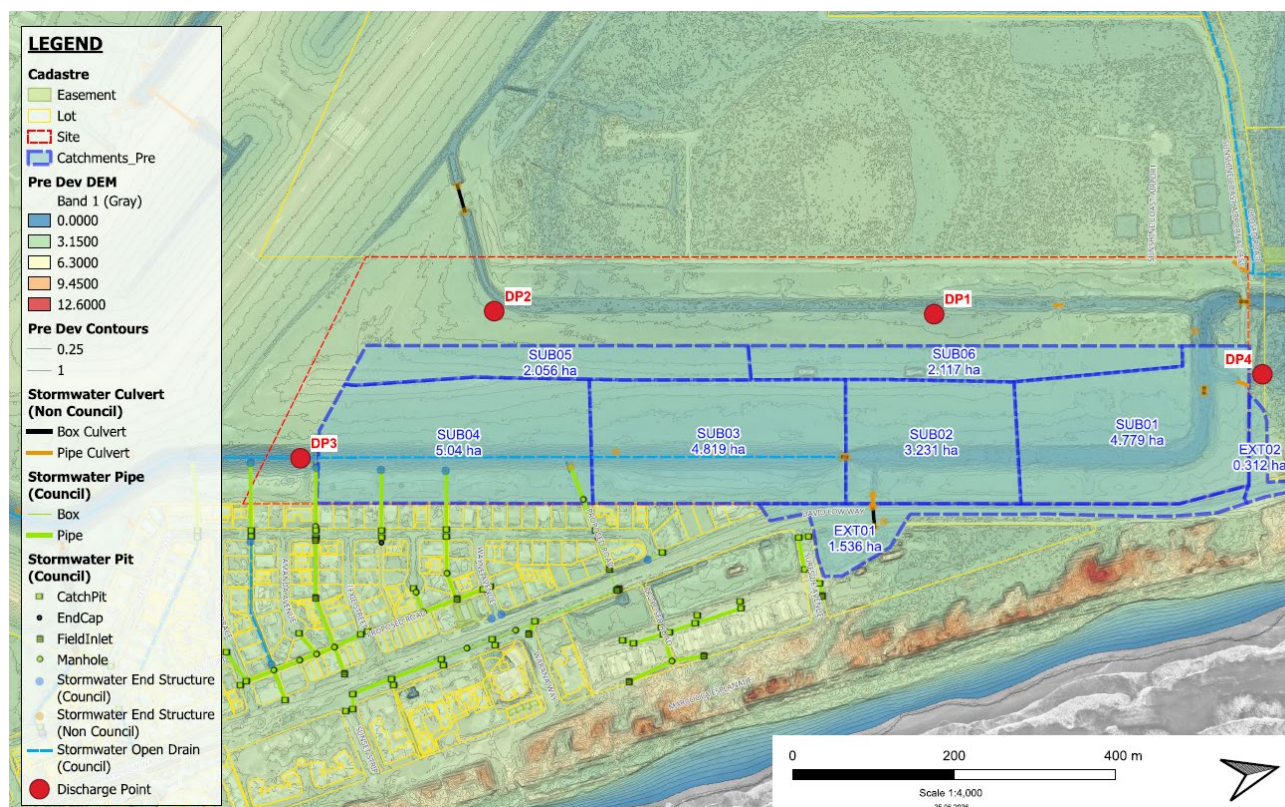


Figure 4: Pre-development Airport North Precinct catchment and stormwater

The proposed development exceeds the 2,500 m² threshold under the Queensland Government's State Planning Policy (SPP) (Queensland Government 2017) and is therefore subject to the stormwater quality as detailed in *Sunshine Coast Airport North Precinct Stormwater Management Plan* (Premise, 2026).

The proposed drainage strategy aims to convey post-development stormwater flows to the identified lawful discharge points, while limiting increases in peak discharge to predevelopment conditions;

- The existing open drain traversing the site will be removed.
- A larger open drain is proposed on the western side of the precinct to direct catchment flows southward into the existing downstream drainage system.
- A network of underground pipes is proposed to capture flows that are presently being released from existing pipe outlets into the open drain.
- Existing piped flows which discharge into the site are proposed to be picked up in a pit and pipe system and outlet at the southern side of the site (DP3).

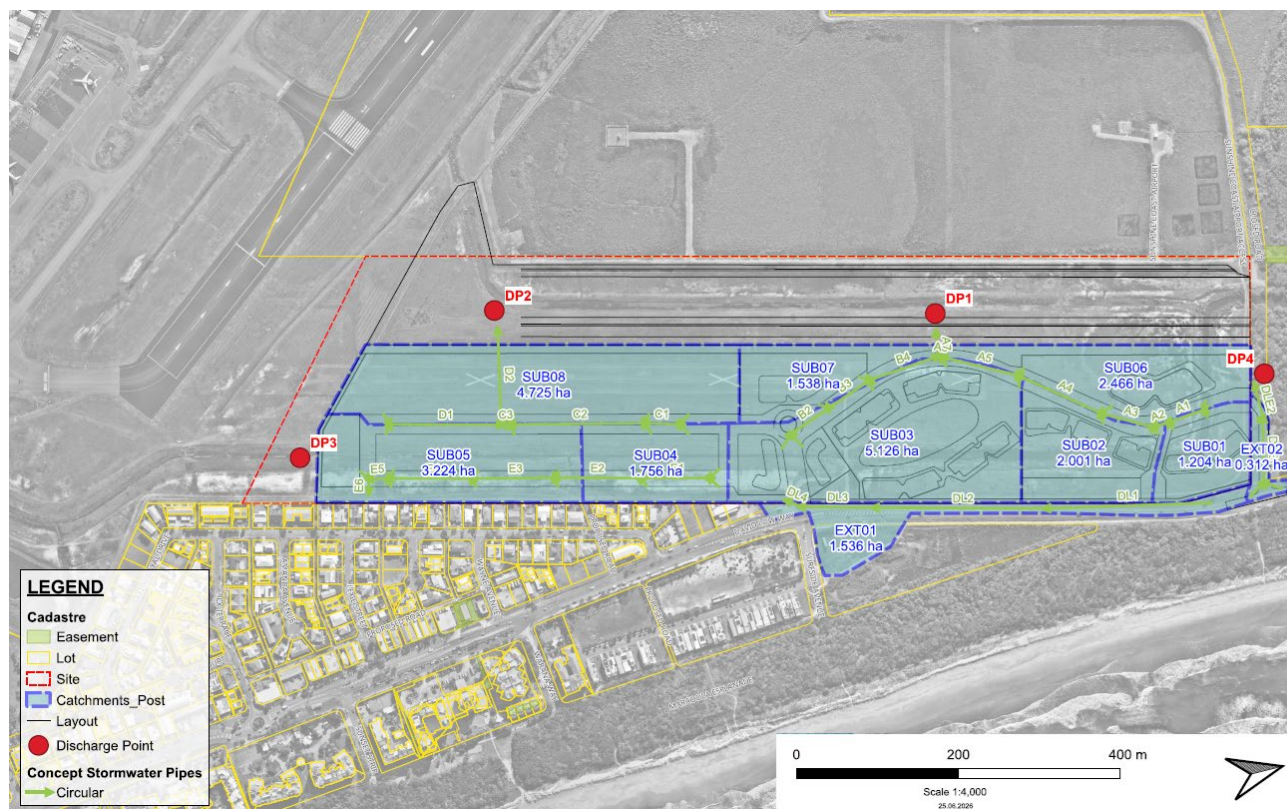


Figure 5: Proposed post-development Airport North Precinct catchment and stormwater

As part of the development, the East Perimeter Drain is proposed to be realigned as shown in Figure 6 below as detailed by BMT (2026)..



Figure 6: Proposed Airport North, East Perimeter Drain realignment

3.3.2 Underlying aquifer

The SCA is mapped as having a surficial aquifer consisting of two layers, unconsolidated alluvial sediments and indurated sand (coffee rock). The unconsolidated alluvial sediments comprise a predominantly sandy unit

with intermixed sand and silt lenses, or laterally discontinuous layers. The sediments do not have distinct strata and generally act as one hydrostratigraphic unit due to the laterally discontinuous nature of the sediments. The coffee rock layers encountered within the shallow aquifer are expected to have a relatively low permeability compared to the overlying and underlying alluvial sands and clays (SCRC, 2014).

3.3.3 Groundwater depth and flow

Observed groundwater levels across the airport typically range from 0.2 to 3.4 mbgl, with a geometric mean of 0.9 mbgl (SCRC, 2014). Groundwater beneath the site flows in a southerly direction towards the Twin Waters tidal canal system (CC, 2024).

Given the Airport North Precinct's proximity to the Pacific Ocean / Coral Sea, located ~200 m east of the northern boundary, this will likely influence local flows to the east which may be coupled with tidal influence. Tidal fluctuations from the coastline to the east and Maroochy River to the west propagate into the groundwater system (Golder, 2019), however have limited influence on groundwater levels (generally less than 0.1 m).

Groundwater levels can rise to, or close to, the surface in response to large rainfall events. Natural water ponding on the surface is mostly due to the groundwater table rising to the surface.

3.3.4 Groundwater quality

Groundwater within the airport is naturally acidic (pH 4.5 to 6.0) and is fresh to saline (90 $\mu\text{S}/\text{cm}$ to 22,100 $\mu\text{S}/\text{cm}$, average 791 $\mu\text{S}/\text{cm}$) (CC, 2024).

Given the Airport North Precinct's proximity to the Pacific Ocean / Coral Sea, located ~200 m east of the northern boundary, this will likely influence groundwater salinity.

3.3.5 Surface water

Excluding marine waters (Section 3.3.6) the nearest surface water bodies include;

- Twin Waters located ~3 km south of the Airport North Precinct's southern boundary
- Maroochy River located ~2 km north of the Airport North Precinct's northern boundary.

The river is protected by the Water Environmental Protection (Water) Policy (EPP) 2009 (SoQ, 2014) and Maroochy River Environmental Values and Water Quality Objectives (SoQ, 2022). The SCA lies within the Lower Maroochy Estuary sub-catchment. The following environmental values were identified by Core (2024):

- Aquatic ecosystems
- Seagrass
- Aquaculture
- Human consumer
- Oystering
- Primary and secondary recreation
- Visual recreation
- Cultural and spiritual values.

3.3.6 Marine waters

The Pacific Ocean / Coral Sea is located ~200 m east of the northern boundary, and ~500 m east of the southern boundary of the Airport North Precinct.

Twin Waters and the Maroochy River / Estuary are positioned ~2.5 km south of the SCA.

3.4 Protected areas

3.4.1 Wetlands

The Airport North Precinct is positioned adjacent to significant environmental features, including Matters of State Environmental Significance (MSES) wetlands and associated habitats.

Adjacent to the site, the wetlands support Wallum Sedgefrog (*Litoria olongburensis*) breeding habitat that have shown evidence of impacts as a result of construction works (SCC, 2023).

3.4.2 Areas of environmental significance

The Airport North Precinct lies adjacent to the Wallum Heath Management Area which is a 27 ha for vulnerable the Eastern Ground Parrot. Development activities following construction of the airport in 1961 have resulted in a reduction in the extent of heathland habitats and substantial habitat fragmentation.

Other areas of specific environmental significance (Figure 7) around the SCA consist of:

- Retained Mt Emu She-oak population
- Mt Emu She-oak revegetation area
- Conservation corridor
- Vegetation management areas.

The Airport North Precinct is positioned ~200 m from the Mount Coolool National Park which contains approximately 50% of all plant species found on the Sunshine Coast. This is a vegetation management area with portions surrounding the airport, and includes Coolool Creek and Lower Maroochy River Wetlands, which are listed as nationally important wetlands (BMT, 2025).

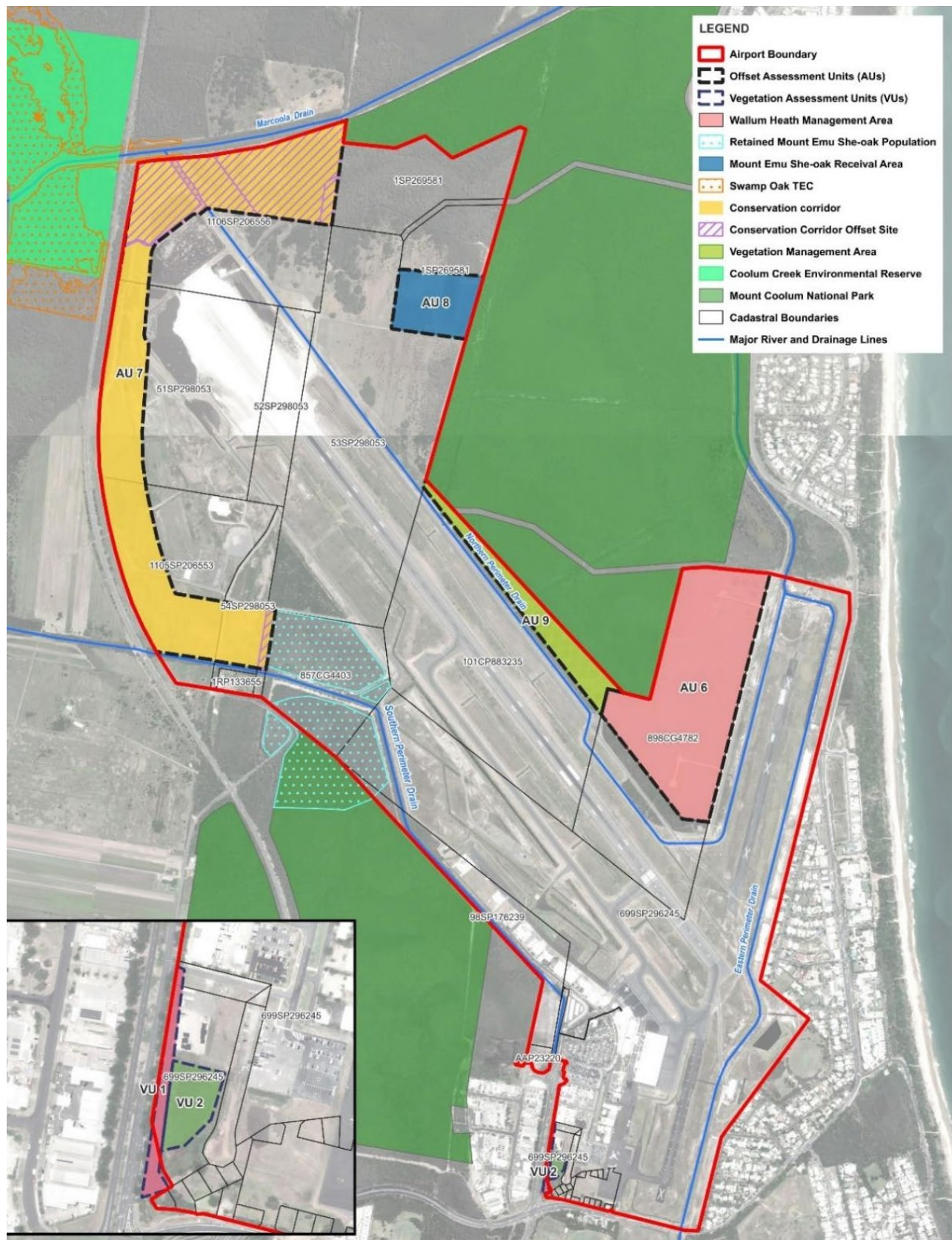


Figure 7: Areas of environmental significance

4 OVERARCHING EARTHWORKS AND DEWATERING PROGRAM

4.1 Earthworks and dewatering program

4.1.1 Approach

A summary of the earthworks and dewatering program for excavation and development of the building envelopes is outlined below (based upon common construction methods), providing context for the subsequent sections detailing ASS, groundwater and surface water management.

Development/project specific ASSDMPs are required to provide more detailed information pertaining to construction. Details pertaining to the minimising ASS, groundwater and surface water impacts should be addressed to the satisfaction of the EDQ.

4.1.2 Potential construction methodology

The major components of the earthworks and potential dewatering programs are outlined in Table 3, providing context for the subsequent sections detailing ASS, groundwater and surface water management. This ASSDMP contains generic management strategies for the Airport North Precinct. These earthwork components are to be reviewed and amended as required.

Table 3: Major earthwork components

Component	Description
Drainage works	- Flood mitigation for the Airport North Precinct is necessary as identified in the Hydraulics Report (BMT, 2025). Based on the most recent information available (BMT, 2026) a scenario has been investigated that involves; - Realign the Eastern Perimeter Drain (EPD) to run in a southerly direction alongside the western boundary of the Airport North Precinct - A 1km section of the EPD is proposed to be moved 130 m to the west, where it will border the northern Airport North Precinct development fill (refer Lot elevation – filling below). - The width of the EPD will vary from ~40 m in the north, to ~25 m at the west to east crossing, prior to entering the existing location of the EPD. - These modifications will require extension of the Marcoola Bund to the south along the western side of the realigned EPD, joining the southern section of the Airport North Precinct development fill (refer Lot elevation – filling below). - The Northern Perimeter Drain (NPD) will require widening to ~40 m along the Marcoola Bund extension to facilitate conveyance of flood waters and increase flood storage to the west of the bund. - Construction of a ~10 m wide table drain will be necessary on the eastern edge of the development fill. - These modifications may require upgrades or construction of new culverts.
Lot elevation - filling	- Fill sands will be required to increase lot levels to assist in drainage and flood mitigation, and based on the most recent information available (BMT, 2026) it has been proposed that the Airport North development fill could be separated into two sections; - The northern 15.2 ha portion will extend from David Low Way 170m west, covering the current Eastern Perimeter Drain alignment - The southern 3.5 ha portion is separated from the northern portion by the realigned Eastern Perimeter Drain crossing from west to east - Geotechnically unsuitable material may require removal as part of the proposed works and the area filled to required levels.
Sewer	Sewer servicing is proposed to connect to the existing gravity sewer network along the eastern boundary of the Sunshine Coast Airport precinct. Flows will be conveyed south prior to transfer through the wider Finland Road catchment.
Underground services	Underground services, e.g., power, water, communications, etc, will be installed through the precinct at relatively shallow (i.e., <2 m) depths.

	Water supply is proposed via connection to the existing reticulated water network servicing the precinct within the North Shore Pressure Management Area.
Lots / developable areas	Areas for development will be filled to comply with relevant flood mitigation measures and may require removal of natural soils for geotechnical reasons.
Building/car park construction	- Buildings and car parks will be constructed on developable lots, predominantly positioned in the southern portion of the precinct. - Construction of footings, basements or lift shafts may require excavations into insitu soils. - Underground services, e.g., stormwater, may require installation in shallow soils for car parks and building hard stand areas.

The aforementioned earthwork activities have the potential to disturb ASS, and may potentially require dewatering and or management of surface water.

4.2 Surface water/dewatering management and disposal

4.2.1 Overview

It is anticipated that dewatering will be required during various aspects of the precinct's construction activities. The requirement for dewatering is in part dependent on the depth of excavation and the groundwater levels at the time of construction and hence will vary seasonally with rainfall.

4.2.2 Dewatering disposal hierarchy

Based upon the proposed works, the hierarchy for handling of dewatering effluent disposal is as follows:

- Recharge to the superficial aquifer.
- Dust suppression.
- Discharge to a surface water body (drainage line).

Where dewatering effluent from open excavations, 'check dams' or the treatment area is being discharged/infiltrated to land, runoff cannot enter waterways or drains.

Based upon groundwater conditions beneath the Airport North Precinct, dewatering effluent may potentially require treatment in accordance with soil management guidelines (Dear et. al., 2024). Dewatering effluent would be required to be maintained on site following treatment to facilitate the decrease in acidity and increase pH (if required), and settlement of sediment, prior to being preferentially recharged (infiltrated) back into the superficial aquifer.

4.2.3 Dewatering treatment materials

Where dewatering effluent/water in/from excavations requires treatment, the water shall be treated by the addition of hydrated lime and/or liquid caustic¹ to meet the established performance indicators (refer Section 9.5).

A supply of hydrated lime and/or liquid caustic shall be kept on site at all times for the treatment of acidic waters. The supply shall be at least 0.5 tonne of hydrated lime and/or 20L of liquid caustic. Neutralising agents shall be stored in a covered and bunded area to prevent accidental release to waters.

¹ Hydrated lime or calcium based neutralising agents are the preferred dewatering effluent treatment product.

5 SOILS

5.1 Previous investigations

Previous investigations undertaken with respect to ASS at the airport are presented below:

- Acid Sulfate Soils Detailed Summary Report Sunshine Coast Airport, Marcoola (CC, 2024)
- Acid Sulfate Soils Investigation Report Gateway South Precinct Sunshine Coast Airport Friendship Road, Marcoola (CC, 2023c)
- Acid Sulfate Soil Investigation Proposed Carparks Part of Lot 98 SP176239 and Existing “Readybays” Sunshine Coast Airport, Marcoola (CC, 2022)
- Geotechnical & Acid Sulfate Soils Investigation Report Sunshine Coast Airport Terminal Expansion Project (CC, 2022)
- Broadscale Geotechnical Investigation; Gateway South Precinct, Sunshine Coast Airport, David Low Way, Mudjimba (BP, 2021)
- Geotechnical and Acid Sulfate Soil Investigation Sunshine Coast Airport, Southern Precinct (Golder, 2009).

A summary of the investigations is presented in the following section, with sampling locations and results presented in Appendix A.

5.2 Assessment criteria

Assessment criteria for ASS were adopted from Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines Version 5.1 (Dear, et. al., 2024) where applicable.

Table 4 below presents the texture-based ASS action criteria for management which previous results have been screened against, assuming >1,000 tonne of material is being disturbed as part of the precinct works.

Table 4: ASS management action criteria

Soil Type		Action criteria (>1,000 tonnes) Existing + Potential acidity	
Texture	Approx. clay content (%<0.002 mm)	Equivalent sulfur (%S)	Equivalent acidity (H+/tonne)
Coarse texture (sands to loamy sands)	≤5	0.03	18
Medium texture (sandy loams to light clays)	5–40		
Fine texture (medium to heavy clays and silty clays)	≥40		

5.3 Summary of previous investigations

Investigations within the Airport North Precinct are limited. However, the review completed provides an overview of the soils present in the vicinity of the site, noting that precinct-specific investigations will be required to determine the nature of extent of ASS in the materials present, liming rates, and specific management requirements.

Table 5: Acid Sulfate Soils Detailed Summary Report, Sunshine Coast Airport, Marcoola (Core, 2024)

Element	Comment					
Sampling locations	13 soil cores (BH51 to BH58 and BH145 to BH149)					
Maximum depth	2.5 mbgl					
Soil description	The soil geology was found to be consistent across the sampling locations; - SILTY SAND – topsoil, dark grey; 0.0 to 0.25 m, overlying - SAND – alluvium, grey; to a depth of 1.0 to 1.5 m, overlying. - SAND – coffee rock, dark grey; to a extent of sampling (i.e., minimum 2.5 mbgl).					
Groundwater	Groundwater was encountered at depths ranging between 0.9 to 1.8 mbgl, with the coffee rock sands typically found at the groundwater interface.					
Results summary	- Samples exceeding the management criteria were observed within both the alluvial and coffee rock sands, with the majority of acidity present as existing acidity. - Negligible concentrations of inorganic sulfur (CRS) were observed. - Soil will require active management when disturbed, i.e., lime treatment.					
Analyte	Unit	Management criteria	Number of samples	Minimum result	Maximum result	Samples exceeding management criteria (%)
Net acidity	%S	>0.03	30	0.02	0.40	18 (60%)
Chromium reducible sulfur (CRS)	%S		30	<0.005	<0.005	0 (0%)
Titrateable actual acidity (TAA)	%S		30	<0.003	0.40	18 (60%)
pH _{KCl}	pH units	Not defined	30	3.8	5.7	n/a
Net acid soluble sulfur (S _{NAS})	%S	>0.03	6	<0.02	<0.02	0 (0%)
ANC	%S	Not defined	0	n/a	n/a	n/a

Indicates an exceedance of the management criteria per Table 4.

5.4 Soil summary

The data supports a conclusion that ASS is likely present across the precinct. ASS has been identified typically associated with the silty topsoils and dark grey coffee sands that extend from the seasonal groundwater interface to the base of each soil profile (maximum 2.5 mbgl). Minimal acidity in the form of inorganic sulfur, i.e., potential acidity, is present within the soil profile.

Soils exceed the management criteria and thus will require management and lime-neutralisation during construction to manage the risk of acidification where these soils are disturbed.

6 GROUNDWATER

6.1 Previous investigations

No groundwater quality data for bores that have been installed within the Airport North Precinct has been provided. Previous investigations undertaken for groundwater with respect to ASS within the broader area are presented below:

- Geotechnical and Acid Sulfate Soil Investigation Sunshine Coast Airport, Southern Precinct (Golder, 2009)
- Acid Sulfate Soils Investigation Report Gateway South Precinct Sunshine Coast Airport Friendship Road, Marcoola (CC, 2023c)

A summary of the investigations is presented below, with sampling locations and results are presented in Appendix A.

6.2 Geotechnical and Acid Sulfate Soil Investigation Sunshine Coast Airport, Southern Precinct (Golder, 2009)

A summary of the investigation is presented below:

- Two groundwater bores (BH2 and BH3) were installed to depth of 3 mbgl.
- The depth to groundwater ranged between 0.85-1.35 mbgl (March 2009)

A summary of key ASS parameters from the investigation are provided in Table 6 below.

Table 6: Groundwater quality summary (Golder, 2009)

Parameter	Unit	BH2	BH3
pH	pH units	4.6	4.4
EC	µS/cm	467	292
Chloride	mg/L	—	75
Sulfate	mg/L	—	19
Alkalinity	mg/L	—	<1
Dissolved aluminium	mg/L	—	2.4
Dissolved iron	mg/L	—	7.0
Total iron	mg/L	—	20

Indicates an exceedance of the dewater management criteria per Table 11Table 4.

The low pH and alkalinity of groundwater indicate that dewatering effluent will require active management prior to discharge, i.e., increase pH and alkalinity, preferably through re-infiltration into the superficial aquifer.

6.3 Acid Sulfate Soils Investigation Report Gateway South Precinct Sunshine Coast Airport Friendship Road, Marcoola (CC, 2023c)

A summary of the investigation is presented below:

- Two groundwater bores (MW1 and MW2) were installed to a maximum depth of 2.2 mbgl.
- An existing bore (MW3) in the southwestern corner of the precinct (potentially BH2 installed by Golder in 2009) was also sampled during the investigation.
- The depth to groundwater ranged between 0.75-1.2 mbgl (July)

A summary of key ASS parameters from the investigation is provided in Table 7 below.

Table 7: Groundwater quality summary (CC, 2023c)

Parameter	Unit	MW1	MW2	MW3
pH	pH units	4.7	5.3	5.3
EC	µS/cm	170	130	150
Chloride	mg/L	13	20	23
Sulfate	mg/L	20	5.4	6.2
Chloride:Sulfate ratio	n/a	0.65	3.7	3.7
Acidity	mg/L	140	100	110
Alkalinity	mg/L	<20	47	64
Dissolved aluminium	mg/L	<0.5	0.77	1.1
Dissolved iron	mg/L	0.23	<0.5	<0.5
Total iron	mg/L	500	1.0	9.0

Indicates an exceedance of the dewater management criteria per Table 11Table 4.

The low pH and alkalinity, and high acidity and metal concentrations of groundwater indicates dewatering effluent will require active management, i.e. increase pH and alkalinity, prior to discharge, preferably through re-infiltration.

6.4 Groundwater summary

Groundwater in across the airport has been found to be slightly acidic and generally contains appreciable levels of measurable total acidity, both of which exceed the dewatering treatment criteria (refer Section 9.5) and require management.

Groundwater contains low levels of acid buffering capacity (alkalinity) and as such is prone to further acidification should the surrounding PASS be exposed.

7 ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

The identified potential environmental impacts associated with earth working of ASS for the various proposed construction activities is detailed in the Table 8.

Potential impacts requiring management are addressed in detail within the ASS, surface water and groundwater management strategies, Sections 8 to 10, respectively, which are based upon the ASS EMF detailed in Acid Sulfate Soils Detailed Summary Report Sunshine Coast Airport, Marcoola (CC, 2024c).

Table 8: Potential environmental impacts

Potential impact	Description	Predictions	Management measure
Groundwater drawdown			
Impact on surface water bodies	Groundwater level drop leading to a reduction in water levels in adjacent wetlands/rivers, with associated reduction in water quality.	Groundwater drawdown has the potential to impact water levels within surface water drains, however these are not considered sensitive receptors. No other surface water body in the vicinity of the Airport North Precinct is likely to be impacted from the works, as a result of groundwater drawdown.	Groundwater quality and level monitoring and groundwater and surface water quality monitoring per; • Surface water management strategy (Section 9) • Groundwater management strategy (Section 10).
Vegetation stress	Disturbance to water-dependent vegetation (phreatophytes) via a lowering of groundwater below the root zone.	Lateral extent of drawdown is not anticipated to impact water dependent vegetation, except potentially toward the northern and western boundaries. The vegetation management area may be affected on the southern most portion of the western boundary.	Groundwater quality and level monitoring and groundwater and surface water quality monitoring per; • Groundwater management strategy (Section 10). Vegetation monitoring and or irrigation of areas may potentially be required depending on the potential impacts and lengths of dewatering. Consideration to the selective placement of recharge infrastructure to reduce the radius of influence to sensitive receptors.
Residential users (bores)	Disruption to residential bores through lowering the water table below the intake level.	The radius of influence is not anticipated to extend to off-site residences and or impact off-site bores.	None required.
Oxidation of ASS			
Soils/sediments (excavated)	Problems caused through the inappropriate handling, treatment or disposal of excavated soils.	Not applicable.	Per the ASS management strategy (Section 8).
Soils/sediments (in situ)	ASS oxidation effects caused through exposure of the soils to air via open excavation.	The drawdown, if required, will be limited, temporary and localised.	
Groundwater	Potential for acid and metal leaching through groundwater from oxidised ASS.	The drawdown, if required, will be limited, temporary and localised.	Groundwater level and quality monitoring per the groundwater management strategy.
Surface water	Potential for acid and metal mobilisation into surface water from oxidised ASS.	The drawdown, if required, will be limited, temporary and localised.	Surface water quality monitoring per the surface water management strategy (Section 9)
Dewater disposal			
Poor water quality	Ineffective treatment and or disposal resulting in environmental impacts to soils and or surface waters.	Not applicable.	Per the surface water management strategy (Section 9).

8 ACID SULFATE SOIL MANAGEMENT

8.1 Additional investigations

Following detailed engineering and earthworks design for each development/project, the existing data set will be required to be reviewed, i.e., spatial extent and depth, and supplementary detailed assessment and characterisation of the ASS conditions completed. Work will be completed in accordance with the sampling and analysis requirements indicated in the National ASS guidelines (WQA, 2018b and 2018c), carried out prior to any earthworks. The findings of additional investigation(s) are required to be included in the development/project specific ASSMPs.

Additional sediment (including MBOs²) investigations, in line with National ASS guidelines (WQA, 2018b and 2018c), will also be required where drainage lines are to be disturbed or altered during the construction works.

8.2 Soil / sediment excavation and handling

8.2.1 Overview

Construction activities (including earthworks), once confirmed based upon finalisation of a detailed design, are to be undertaken in accordance with the management procedures outlined below. The management procedures will be reviewed and updated for each development/project specific ASSMPs.

8.2.2 Objectives

The objectives of soil/sediment excavation and handling are to:

- Appropriately manage the stockpiling, handling and transport of confirmed and suspected ASS materials
- Comply with conditions of licences, permits or other approvals issued for the project.

8.2.3 Soil requiring management

Soils within the precinct are characterised as silty topsoils, overlying grey alluvial sands, that overly dark grey sand 'coffee rock' in the vicinity of the seasonal groundwater interface.

The data supports a conclusion that ASS are likely present across the precinct, through the depth of investigated soil profile (maximum 2.5 mbgl). Minimal acidity in the form of inorganic sulfur, i.e., potential acidity, is present within the soil profile. Soils exceed the management criteria and thus will require management and lime-neutralisation during construction to manage the risk of acidification where disturbed.

Based upon the available information the silty topsoil and dark grey sands present from around 1.0 to 1.25 mbgl, exceed the management criteria and will therefore require management and lime neutralisation upon disturbance.

8.2.4 Management principles

The management measures for excavation and trenching activities as outlined in this procedure will be revised and refined following further ASS investigations. All investigations are to be completed in accordance with the sampling and analysis requirements indicated in the National ASS Guidelines (WQA, 2018b and 2018c) following finalisation of precinct designs and construction methodologies.

² The National Acid Sulfate Soils Guidance, Overview of management of monosulfidic black ooze (MBO) accumulations in waterways and wetlands (WQA, June 2018d) describe MBOs as typically black gel-like materials (moisture contents often greater than 70% by weight), frequently "oily" appearance, enriched in acid volatile sulfur (AVS) ($\geq 0.01\%$ S), high in organic matter (typically greater than 10% organic carbon) and can form thick (that is greater than 1 m) accumulations in waters within ASS landscapes.

8.2.4.1 Excavation and trenching

The following management principles are to be implemented to limit the potential impact of oxidation of ASS and subsequent acid leaching of on-site soils.

It is proposed to transport excavated ASS materials to an ASS treatment area located on the development/project site as soon as practicable. The project Site Supervisor or their delegated representative will be responsible for the day-to-day operations and management of the treatment area and for ensuring that the excavated ASS is treated and verified in accordance with the relevant development/project specific ASSMP.

As a general practice in excavation and trenching operations, stockpiles of excavated material should be left exposed for the minimum practical time before being treated (refer Section 8.2.4.1.6).

During earthworks any trenches left exposed at the end of shift must have a lime guard layer applied to prevent the oxidation of any pyritic sediment and mitigation of leachate. Specific rates for lime guard layers for different soil types and ASS regimes will be formulated from current available data and following any additional investigations (refer Section 8.1). This is consistent with the sampling and analysis requirements indicated in the National ASS guidelines (WQA, 2018b and 2018c).

8.2.4.1.1 Lime guard layers

Lime guard layers should be applied to the exposed surfaces during trenching activities as follows;

- Excavate proposed trenches to design, removing all material to treatment pads.
- Spread a lime guard layer over the base, batter and 5 m edge of the excavation at a rate yet to be formulated (minimum rate of 5 kg/m²).
- Mix the lime guard layer to a depth of 200 mm.
- The lime guard layer rates will also take into account the acid tolerant nature of some species in the immediate receiving environment (where applicable).

A guard layer of lime shall be placed within sections of any proposed drains to intercept and neutralise any acidity mobilised from normally unsaturated actual ASS that settles beneath the water table. Liming rates will be established once further assessment has been completed. The lime neutralisation rates will also accommodate the acid tolerant nature of some species in the immediate receiving environment

8.2.4.1.2 Minor trenching

For minor trenching excavations the following backfilling techniques shall be adopted;

- A guard layer (minimum 5 kg/m²) shall be applied adjacent to, and on the up-side gradient of, the proposed trench excavation works prior to placement of excavated materials.
- Excavated materials shall be stockpiled for the shortest possible time prior to lime treatment and backfilling to limit exposure. Lime shall be applied to the base of the excavation prior to further works and backfilling with limed materials.
- Lime shall be applied to excavated material at the nominated rate (refer Section 8.4.2) during backfilling to achieve adequate mixing. The highest liming rate as determined by laboratory analysis within each location shall be adopted for backfilling of representative materials for a 50 m length.
- Excess material that cannot be backfilled into the trench to below ground level shall be transported to the designated banded stockpile/treatment area for lime treatment.
- Where practicable, stockpiling and liming should not be conducted in areas directly adjacent to watercourses or drainage channels.

8.2.4.1.3 Excess treatment prevention

Measures should be undertaken to prevent over liming of ASS material and the potential release of neutral/alkaline leachate (e.g., establishing temporary bunds during in-situ neutralisation treatment).

8.2.4.1.4 Over excavation

Any excavated material retrieved from excavations extending below the depth of investigation and from a new soil horizon must be sampled and analysed at a rate of 1 test per 250 m³ (minimum two tests) for the verification and formulation of lime neutralisation rates (if required).

8.2.4.1.5 Groundwater and surface water management

All waters collected from groundwater and surface water inflow into excavations via seepage and runoff must be retained, monitored and appropriately treated in accordance with the surface water management strategy (refer Section 9) to comply with the appropriate discharge criteria prior to discharge off site or re-use on site.

8.2.4.1.6 Stockpiling, handling and transport of ASS

Wherever practical the earthworks handling should involve transport of ASS directly to treatment areas. Stockpiling of untreated soils with existing or potential acidity should be avoided. The recommended maximum period for which soils can be temporarily stockpiled without treatment is 18 hours (overnight) for coarse sandy material and three days, (e.g. a weekend, 66 hours) for fine textured silty clay material.

All confirmed and suspected ASS materials encountered during excavations will be transported by truck to the designated ASS treatment facility, except for during minor trenching activities. Accurate details of material movements must be kept by the Site Supervisor or their delegated representative with respect to volumes, origin, material type and destination. Materials shall be transported in suitable trucks to prevent spillage of soil and leakage of water.

Due care is to be taken when transporting saturated / supersaturated soils and sediments (e.g., wet, silty/sandy material). Where practicable filling of trucks with wet materials shall be modified to avoid spillage, use of covers and lined trucks should be considered.

The Site Supervisor will be responsible for maintaining the site and ensure that the transport route remains free of spilled and sloughed ASS sediments. All such spilled sediments are to be regularly (daily) collected and transported to the designated treatment area for neutralisation.

Any ASS materials that cannot be transported in the time frame detailed above must be stockpiled on site on a suitably prepared storage area and the following additional management measures should be followed:

- Stockpiles are to be contained by bunds with stormwater runoff directed to a collection sump. Bunds are to be constructed from low permeability materials that are not ASS.
- A guard layer of neutralising agent should be spread across the soil surface prior to placement of the stockpile. The rate of neutralising agent applied should be based on 0.3 times the average total potential plus existing acidity for every 1 m height of soil in the stockpile.
- The surface area of the stockpile is to be minimised by shaping and possibly capping or covering to prevent moisture loss and rainfall entry.

8.3 Treatment and validation of excavated ASS

8.3.1 Overview

The following procedure outlines the requirements for the on-site treatment and validation of ASS.

8.3.2 Objectives

The objectives of soil/sediment excavation and handling are:

- Appropriately treat and manage ASS materials to minimise adverse effects on the natural and built environment (including infrastructure).
- Comply with conditions of licences, permits or other approvals issued for the project.

8.3.3 Management principals

8.3.3.1 Earthworks strategy

An earthworks strategy shall be developed to plan and track movement, treatment and verification of ASS materials for each development/project.

8.3.3.2 ASS treatment facility

A treatment facility shall be constructed (Figure 8) in general accordance with the requirements detailed in Soil Management Guidelines (Dear et. al., 2024) and in conjunction with the following additional requirements:

- The treatment area shall be prepared by stripping vegetation, topsoil and soil containing significant amounts of organic material and compacting the surface with a smooth drum roller. If sandy materials are exposed in the stripped surface, a layer of low permeability material shall be placed over the stripped surface. An area of at least 2 m width shall be left between the treatment areas and bunds to allow collection of runoff and direction to sumps. Refer to Section 9 for monitoring and treatment requirements applicable for collected waters.
- The treatment area should be located within a suitable area of each development/project or potential for the broader precinct.
- Bund walls shall be constructed with clean material (i.e., not ASS or acidic soils). The bunded area shall be designed to retain a 100-year average recurrence interval (ARI) 24-hour rainfall event.
- The treatment area will be divided into five or six cells, each able to hold up to approximately one day's excavated spoil.
- A guard layer of fine ground agricultural lime shall be applied to the treatment areas prior to placement of soils at a rate to be formulated based on data from additional investigations.

The treatment facility and bund walls shall be inspected on a daily basis and maintained to prevent release of soils or water from the treatment facility.

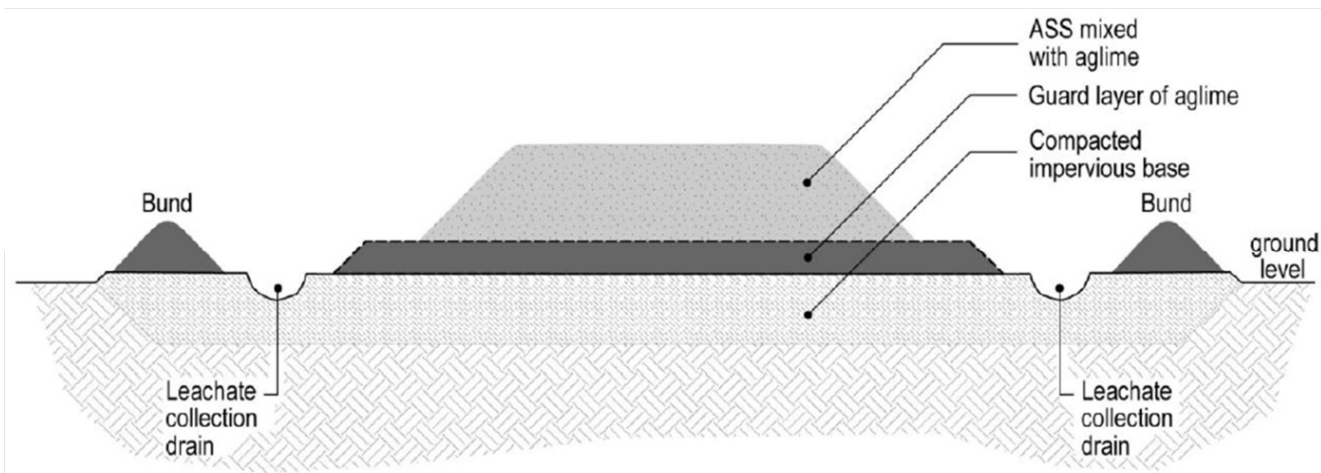


Figure 8: Schematic cross-section of a treatment pad (Dear et. al., 2024)

8.3.3.3 ASS treatment

Lime neutralisation is to be undertaken in accordance with the following:

- ASS materials shall be placed into identified treatment lots (equivalent of one day's excavated spoil) at the treatment facility where the material shall be spread in layers and allowed to dry (if required).
- Spread excavated spoil in layers with a maximum thickness of approximately 300 mm.
- Mechanically turn the spoil to promote thorough mixing through the full depth of the layer.

- Maintain spoil moisture through;
 - controlled irrigation, or
 - covering with plastic to reduce evaporation or
 - application of lime soon after excavation of moist soils.
 - these measures will improve the dispersion of lime throughout the spoil profile.
- Add lime at the required calculated treatment rate and thoroughly mix with the spoil using appropriate mechanical means e.g., a disk plough or harrows.

8.4 Liming rate and material

8.4.1 Lime material

The preferred agent for treating ASS is fine agricultural lime, CaCO_3 with a neutralising value of 97%.

8.4.2 Liming rates

The liming rate for the identified soils at the precinct, based upon current information, has been determined using the maximum net acidity³ (Table 9). Additional assumptions include bulk density of 1.8 tonne/m³, a safety factor of 1.5, and neutralising value (NV) of 97%, per the following calculation;

$$LR = \%S * \rho_{\text{soil}} * CF * SF * \frac{100}{ENV}$$

Where:

- LR = liming rate
- %S = percentage sulfur
- ρ_{soil} = bulk density of soil (tonne/m³) assumed at 1.6 tonne/m³
- CF = conversion factor (%S to kg pure CaCO_3 /tonne) = 31.202
- SF = safety factor of 1.5 as per DWER (2015b) guidelines
- ENV = effective neutralising value.

Table 9: Liming rates

Soils type	Depth	Net acidity (%S)	Liming rate (kg aglime/m ³)
SILTY SANDS; dark grey	Topsoils	0.07	4
SAND; alluvial grey	Above groundwater level	<0.02	0
SAND; coffee sands, dark grey	Where encountered	0.40	34

These liming rates are to be used as a guide only, and require further information relating to the soils located within the Airport North Precinct.

Upon confirmation of the neutralising agent to be used, the liming rate will be adjusted accordingly based on the specific NV of the aglime.

Specific liming rates (following further investigations) shall be formulated for the effective management of ASS during the various proposed precinct development activities providing more certainty in the liming rates and avoiding potential over treatment.

³ The net acidity is to be determined from the Chromium Suite of tests - pH_{KCl} , Chromium Reducible Sulfur (S_{CR}), Total Actual Acidity (TAA) and Retained Acidity (S_{NAS} , if pH_{KCl} is below 4.5) and Acid Neutralising Capacity (ANC, if pH_{KCl} is above 6.5).

8.4.3 Validation sampling

8.4.3.1 Sampling protocol

Validation samples shall be collected for each treated lot (1 per 250 m³). The samples shall be formed by compositing materials from three randomly selected locations across each treated lot. Samples shall be collected over the full thickness of the treated lot. The Chromium suite shall be conducted on each sample to confirm net acidity by Acid Base Accounting.

8.4.3.2 Validation criteria

The treated soils should be well mixed and meet the following conditions to confirm adequate neutralisation of Net Acidity in the treated ASS materials:

- Potential Acidity (SCR) + Existing Acidity (TAA + SNAS) - ANC $\leq$ 0
- pHKCl $\geq$ 6.5

8.4.3.3 Quality control and assurance

A minimum of one field duplicate sample will be collected per 20 primary samples.

8.4.3.4 Contingency measures

Where treated soils do not meet the specified validation criteria (Section 8.4.3.2), additional lime treatment and further validation testing shall be conducted.

8.5 Responsibilities

During stockpiling, handling and transport the following levels of responsibility shall exist:

- The Site Supervisor or delegate is responsible for ensuring
 - that the requirements of the ASSMP are communicated to site staff.
 - the management strategies and procedures prescribed in the ASSMP are implemented at the site.
- All other site personnel are responsible for implementing and undertaking the management strategies and procedures prescribed in the ASSMP, as applicable to their work activities.

8.6 Monitoring and reporting

8.6.1 Soil / sediment excavation and handling

Records shall be kept by the Site Supervisor or delegate to:

- Track soil movements around the site including diagrams, photographs, volumes and soil descriptions for stockpiles in temporary storage areas as well as final placement sites.
- Inspect the condition of stockpile batters, drains, open trenches and structure excavations.
- Maintain records to verify volumes of soils excavated and transported for treatment at the designated ASS treatment facility in conjunction with records of lime dosing and quantities of lime brought onsite.
- Ensure that the data collection format follows the format of currently collected soil data, recorded in SCA ESDAT platform.

Should an additional or temporary ASS treatment facility be constructed, the following should be maintained by the Site Supervisor

- Records regarding the construction, including photos should be maintained by the Site Supervisor or their delegated representative.
- Details regarding volumes, origin, material type and destination should also be maintained by the Site Supervisor or delegate.
- Lime neutralisation rates and methodologies should also take into account the acid tolerant nature of some species in the immediate receiving environment.

The Site Supervisor or delegate shall be responsible for ensuring that the ASS materials are managed in accordance with details provided above.

8.6.2 Treatment and validation of excavated ASS

The Site Supervisor or delegate shall;

- Conduct an inspection of the transport route between the excavation sites and treatment facility on a daily basis.
- Maintain records tracking soil movements around the site including diagrams, photographs, volumes and soil descriptions for stockpiles in temporary storage areas as well as final fill placements.
- Maintain records to verify volumes of lime used in ASS treatment and balanced against quantities of lime brought onsite.
- Be responsible for ensuring verification tests are completed for each 250 m³.
- Conduct an inspection of the treatment areas including bunds and sumps on a weekly basis.
- Maintain a register of testing results and a record of inspections.

Prepare a summary report of all test results and inspections each week for submission to the development / project Environmental Manager.

9 SURFACE WATER MANAGEMENT STRATEGY

9.1 General

The procedures outlined below are provided to monitor and manage surface water quality in open excavations, sumps/check dams and run-off collection in treatment areas. Contingency measures are also provided for treatment and discharge of water.

9.2 Objectives

The following objectives apply to the surface water monitoring program:

- Appropriately monitor waters entering open excavations.
- Appropriately manage waters to be discharged from open excavations.
- Appropriately monitor and treat (if required) run-off collected in treatment areas.
- Comply with conditions of licences, permits or other approvals issued for the project.
- Confirm that surface water quality is consistent with existing data, the monitoring network is maintained throughout the monitoring period, and data is recorded in SCA ESDAT platform.

9.3 Dewatering drawdown

Dewatering drawdown resulting from construction and dewatering activities shall be controlled to minimise the time and extent of draining ASS materials outside the extraction footprint.

For excavations where dewatering of ASS materials will occur over extended periods (>7 days) and/or extensive drawdown of the groundwater table is expected, additional procedures for managing groundwater drawdown shall be developed and the development/project specific ASSMPs revised.

Additional procedures/management may include:

- Engineering solutions to minimise dewatering, e.g., sheet piling, diaphragm wall, shoring boxes
- Strategically placed infiltration basins/trenches.

The potential extent of dewatering drawdown should be modelled using available hydrological information to determine the radius of influence and rate and volume of dewatering anticipated, per the Soil management guidelines (Dear et al., 2024).

9.4 Dewatering management

9.4.1 Dewatering disposal hierarchy

Based upon the proposed works, the hierarchy for handling of dewatering effluent disposal is as follows:

- Recharge to superficial aquifer
- Dust suppression
- Discharge to surface water body (drainage line).

Where dewatering effluent from open excavations, 'check dams' or the treatment area is being discharged/infiltrated to land, runoff cannot enter waterways or drains.

Based upon groundwater conditions beneath the site, dewatering effluent may potentially require treatment in accordance with soil management guidelines (Dear et. al., 2024). Dewatering effluent would be required to be maintained on site following treatment to facilitate the decrease in acidity and increase pH (if required), and settlement of sediment, prior to being preferentially recharged (infiltrated) back into the superficial aquifer.

9.4.2 Monitoring of water in open excavations

Where possible, excavations below the groundwater standing water level (SWL) should remain open for as minimal time as possible, and pH monitoring on water accumulated in excavations undertaken. The following will occur:

- pH monitoring with a calibrated meter undertaken daily on each excavation where accumulated water is present.
- Where pH of <5 is detected, the water shall be treated by addition of hydrated lime and/or liquid caustic. Neutralising agents shall be stored in a covered bunded area to prevent accidental release to waters.

9.4.3 Discharge to land / infiltration

When water from open excavations, 'check dams' or the treatment area is being discharged to land, runoff cannot enter waterways or drains, and the following procedures shall apply:

- The pH of seepage waters monitored daily
- Where pH of <5 is detected, the water shall be directed to a holding pond or tank where treatment by addition of hydrated lime and/or liquid caustic⁴ shall be conducted to meet the established performance indicators (Section 9.5).

9.4.4 Discharge to surface water bodies

The following surface water monitoring (Table 10) is to be undertaken where water from open excavations or the soil treatment area is being discharged to surface water bodies, i.e., drainage lines.

Table 10: Surface water monitoring – discharge to surface water bodies

Monitoring Activity	Parameters
Open excavations and the treatment area	
Prior to discharge	Field analysis: pH, dissolved oxygen (DO), ferrous iron, aluminium
Monthly	Laboratory: total acidity, total alkalinity, chloride, sulfate, total and dissolved aluminium and iron
Discharge effluent, 5 m upstream and 20 m downstream of discharge point	
Every two hours	Field analysis: pH, DO, ferrous iron, aluminium
Monthly	Laboratory: total acidity, total alkalinity, chloride, sulfate, total and dissolved aluminium and iron

When water from open excavations or the treatment area is being discharged to surface water bodies the following procedures shall apply:

- Prior to the commencement of discharge to a surface water body:
 - Waters not meeting the required performance indicators (to be established, refer Section 9.5) shall be directed to a holding pond or tank where treatment shall be conducted until performance indicators are met.
 - If ferrous iron is detected, then a water sample shall be collected and laboratory analysed for titratable acidity to confirm total acidity risk and treatment requirements.
- Treatment shall not be permitted as part of direct discharge to an external surface water body. Treatment shall occur in a holding pond or tank.
- When discharge to surface water bodies is proposed, a supply of hydrated lime and/or liquid caustic shall be kept on site at all times for the treatment of acidic waters. The supply shall be at least 0.5 tonne of

⁴ Hydrated lime or calcium based neutralising agents are the preferred dewatering effluent treatment product.

hydrated lime and/or 20L of liquid caustic. Neutralising agents shall be stored in a covered and bunded area to prevent accidental release.

- Discharge to surface water bodies shall be ceased immediately upon discovery of a non-conformance with the performance indicators (refer Section 9.5).

All monitoring of water quality shall be carried out by a suitably qualified person, using calibrated equipment on samples that are representative of the discharge or background.

It should be noted that these performance indicators have been set specifically in relation to ASS risks and apply in addition to other water quality limits and indicators outlined as part of other management plans, including the SCA PFAS Management Plan (RPS, 2024). Any discharge of water shall take into consideration the requirements of all applicable management plans for the PDA Development Scheme.

9.5 Performance indicators

9.5.1 General

To be established for each development/project specific ASSMP and should be based on the Soil management guidelines (Dear et. al. 2024 and the Maroochy River Environmental Values and Water Quality Objectives (SoQ, 2022), where applicable.

9.5.2 Infiltration / dust suppression use of dewatering effluent

Presented in Table 11 is a summary of the recommended dewatering discharge criteria for groundwater dewatering effluent being recharged to the superficial aquifer or for dust suppression, as specified in Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DWER, June 2015), as per Dear et al, (2024).

Table 11: Dewatering effluent discharge quality (infiltration or dust suppression)

Analyte	Discharge criteria
Acidity	<40 mg/L (CaCO ₃ equivalents)
pH	6.5 to 8.5 pH units
Alkalinity	>30 mg/L (CaCO ₃ equivalents)

9.6 Contingency measures

The contingency responses provided below are examples of operating measures that can be applied where water quality/levels in the receiving environment are compromised. The approach to determining a contingency response is based upon identifying, managing and addressing the specific cause of the water quality impact.

If additional measures to those indicated below are required, these will be agreed in consultation with SCA and DESTI.

9.6.1 Surface water

Where the performance indicators are exceeded, the following contingency measures may be implemented in consultation with the development/project environmental manager/SCA/DESTI:

- Dewatering operations to cease immediately should monitoring results show any declining trends, e.g. decreases in pH and increase in acidity, in surface water quality.

9.6.2 Dewatering discharge

Where the performance indicators are exceeded, the following contingency measures may be implemented in consultation with the development/project environmental manager/SCA/DESTI:

- Increased liming of dewater, and or adjustment/enhancement of existing infrastructure

- Pumping rates decreased.
- Reducing the area under abstraction
- Modifications to the settlement infrastructure to promote improved settling and precipitation of metals.

9.6.3 Dewatering management

The dewatering settlement and discharge infrastructure should be maintained in such a state to ensure the integrity of the infrastructure, and all dewater is contained within the infrastructure.

Where the integrity of the infrastructure is compromised and/or effluent is not contained within the infrastructure, the development/project environmental manager is to be notified immediately, and the following measures may be implemented:

- Reduce pump rates or cease all dewatering.
- Reduce the area under abstraction.
- Modifications to the settlement infrastructure to ensure all dewater is contained. This may include the addition of extra storage capacity.

9.7 Monitoring and reporting

Additional procedures shall be developed as required and the development/project specific ASSMP revised for specific excavations requiring dewatering.

- The Site Supervisor or delegate shall:
- Be responsible for ensuring monitoring is conducted at the required frequency.
- Ensure that the data collection format follows the format of currently collected surface water and recorded in SCA ESDAT platform.
- Maintain a register of testing results and a record of inspections.
- A summary report of all test results and inspections shall be compiled by the Site Supervisor or delegate each week and submitted to the project/site Environmental Manager and/or the Superintendent.
- Shall inform the development/project Environmental Manager and/or the Superintendent of any non-compliance. The development/project Environmental Manager and/or the Superintendent shall inform SCA of such non-compliances as soon as practicable and instigate an assessment of the impact.

10 GROUNDWATER MANAGEMENT STRATEGY

10.1 General

The procedures outlined below are provided to monitor, manage and mitigate potential transport and export of acidic groundwater and associated heavy metal contaminants due to construction and earthworks activities. Contingency measures are also provided for the mitigation and management of acidic groundwater exportation (if required).

10.2 Objectives

The following objectives apply to the groundwater monitoring program:

- Appropriately monitor down gradient groundwater quality and compare against pre-construction baseline levels (to be established prior to construction).
- Appropriately monitor and treat (if required) acidic groundwater via contingency measures such as the installation of lime trenches or lime slots in suitable down gradient locations and within identified groundwater flow paths.
- Comply with the conditions of licences, permits or other approvals issued for the development/project.
- Confirm that groundwater quality is consistent with existing data, the monitoring network is maintained throughout the monitoring period, and data is recorded in SCA ESDAT platform.

10.3 Groundwater quality monitoring

10.3.1 Baseline

Baseline groundwater parameters shall be established via a groundwater monitoring program of a network of existing and proposed (to be installed) monitoring locations prior to the commencement of earthworks. Previous groundwater monitoring data shall be used in conjunction with the baseline data to establish the baseline criteria.

The locations of the monitoring wells will be confirmed prior to commencement of monitoring and will be located at suitable locations upgradient, down gradient and within each precinct.

It should be noted that the installation of a groundwater monitoring wells within the boundary of any National Park will require the prior approval of the relevant State agency.

Baseline groundwater quality parameters will be established for the following;

- Groundwater levels, pH (field based), electrical conductivity (EC) (field based), chloride, sulfate, total alkalinity, total acidity, dissolved iron and dissolved aluminium.

The groundwater quality objectives for any proposed monitoring location within the National Park (given the high ecological value) would further include total dissolved solids (TDS), total anions and total cations as in accordance with the Water EPP 2009 (SoQ, 2014).

10.3.2 During construction

Monitoring requirements will be confirmed following receipt and review of detained designs and construction/earthworks programs for each development/project and included in the development/project-specific ASSMP.

Water quality parameters to be monitored and the monitoring frequencies are to be based on Appendix 3 of the Soil management guidelines (Dear et al. 2024).

10.3.3 Post construction

Post construction groundwater monitoring will be conducted on a monthly basis for a period of twelve months (then on-going as required by SCA) for the following parameters and compared against the performance criteria (Section 10.4).

- Groundwater levels, pH, EC, chloride, sulfate, total alkalinity, total acidity, dissolved iron and dissolved aluminium.

10.4 Performance criteria

To be set in each precinct-specific ASSMP prior to commencement of during construction groundwater quality monitoring based upon the following:

- Baseline and historical monitoring data
- Australia Water Quality guidelines (2018)
 - Freshwater - 95%
 - Marine water - 95%.

It should be noted that the groundwater quality objectives for any proposed groundwater monitoring location within the National Park (given the high ecological value) would be established to maintain existing water quality (at 20th, 50th and 80th percentiles) and would further include: total dissolved solids (TDS), EC, total anions and total cations as in accordance with the Water Environmental Protection (Water) Policy (EPP) 2009 (SoQ, 2014) for the Maroochy River.

10.5 Contingency measures

The contingency responses provided below are operating measures that can be applied where water quality/levels in the receiving environment are compromised. The approach to determining a contingency response is based upon identifying, managing and addressing the specific cause of the water quality impact. If additional measures to those indicated above are required, these will be agreed in consultation with DESTI.

1. Should groundwater quality fall below established baseline conditions or other nominated performance indicator for any downgradient groundwater monitoring locations over three (3) consecutive monitoring events other management measures such as, localised lime slots or lime trenches shall be discussed with the Environmental Manager for the project and DESTI prior to implementation.
2. During the groundwater monitoring periods should any groundwater monitoring wells be damaged or destroyed they are to be re-instated before the next monitoring round or as soon as practicable. Replacement bores are to be installed to the same depth as the destroyed/damaged bore, by a licensed driller, in accordance with the Minimum Construction Requirements for Water Bores in Australia (NUDLC, 2020).
3. For the any groundwater well adjacent a National Park area, where an exceedance of performance limits (based on baseline data collection) is detected as part of monitoring over two (2) consecutive monitoring events, an investigation will be carried out to the likely cause of the exceedance and if the effects of the exceedance are likely to have any measurable impact on the environmental values present. These findings including corrective actions will be presented and discussed with DESTI.

10.6 Monitoring and reporting

The Site Supervisor or delegate shall:

- Ensure the groundwater monitoring (Section 10.3) is conducted at the required frequency.
- Ensure that the data collection format follows the format of currently collected groundwater and recorded in SCA ESDAT platform.
- Maintain a register of testing results and a record of inspections.

REPORT

- Compile a summary report of all test results and inspections weekly and submit to the development/project Environmental Manager and/or Superintendent.
- Inform the development/project Environmental Manager and/or Superintendent of non-compliance with the performance indicators in down gradient groundwater monitoring locations upon detection. The development/project Environmental Manager and/or Superintendent shall inform SCA of such non-compliances as soon as practicable and instigate an assessment of impact.

11 ASS ENVIRONMENTAL REPORTING

11.1 Auditing

The development/project Environmental Manager will be responsible for ensuring that an auditing program is implemented for construction and treatment works. The audit program shall aim to ensure compliance with the precinct specific ASSMPs and relevant statutory requirements.

The development/project Environmental Manager shall appoint an experienced ASS practitioner to conduct regular auditing of activities and ASS management measures. Given the expected construction period a weekly, auditing schedule is recommended. The frequency of these audits may be revised and reduced should a high level of compliance with the development/project-specific ASSMPs is evident.

The audit shall take the form of a visual inspection of the works and treatment sites and associated control measures and a review of monitoring data. A written record of auditing undertaken shall be maintained, including details on the date of the audit, activities undertaken, observations made, and any non-conformances identified.

A copy of the audit report shall be forwarded to the development/project Environmental Manager and to the SCA Environmental Advisor within two days of the audit.

11.2 Training

All equipment operators, supervisors and subcontractors engaged in excavation works shall participate in induction training for ASS. This training will include basic recognition and identification of ASS, plus an outline of the requirements of the precinct specific ASSMPs.

The Site Foreman shall verify attendance at induction training prior to commencement of site works.

11.3 Closure report

Per the soil management guidelines (Dear et., al, 2024), a closure report must be completed for all developments/activities conditioned for an ASS management closure report under the relevant provisions of the Planning Act 2016, the Environmental Protection Act 1994, and/or the State Development and Public Works Organisation Act 1971.

As such, at the completion of each development/project, a closure report must be completed, at the completion of ground disturbing/dewatering works and submitted to EDQ to demonstrate that site management has complied with the requirements outlined in the soil management guidelines (Dear et., al, 2024).

The closure report, per the soil management guidelines (Dear et., al, 2024), should include as a minimum the following:

- Total volumes and dimensions of disturbed ASS
- Details of soil management strategies undertaken at the site (including evidence of specific management measures such as waste tracking, photographic evidence of neutralisation of bunded treatment pads, liming rates and tonnes of neutralising agent used). Include a discussion of the effectiveness of management strategies employed at the site
- Where dewatering was involved, final location, extent and duration of dewatering. Include details of groundwater management strategies applied to ensure that the rate duration of dewatering variables were optimised to minimise risk to water quality, the receiving environment and neighbouring infrastructure
- Photographic evidence of management and monitoring undertaken
- Details of surface water management strategies undertaken
- Summary of monitoring results for surface water and groundwater (with an emphasis on trends in water quality)
- Location of any off-Airport treatment and/or disposal of ASS and evidence of treatment off-Airport

- Summary of verification testing results for material treated either on- or off-Airport
- Details of any incidence of nonconformity with the ASSMP and corrective actions taken
- A discussion of any potential risks to the water quality, the receiving environment, neighbouring infrastructure or human health
- Proposed future monitoring and/or reporting programs
- Proposed remediation measures if required
- A statement that a suitably skilled and experienced person in ASS science (refer Section 3.2 of Dear et., al, 2024) considers the subject site to have been adequately managed, suitable for the proposed final uses, with minimal impact on water quality, the receiving environment, neighbouring infrastructure and/or human health
- A statement that the suitably qualified engineer considers the site to be geotechnically suitable for its intended end purpose.

The closure report is required to be completed by a suitably skilled and experienced person in ASS science (refer Section 3.2 of Dear et., al, 2024) who was responsible for the ASS management during site works.

11.4 Post construction groundwater monitoring closure report

A post construction groundwater monitoring closure report by a suitably skilled and experienced person in ASS science (refer Section 3.2 of Dear et., al, 2024) and issued to the EDQ at the cessation of the post construction groundwater monitoring period (if required).

The report will contain:

- Summary of construction works
- Findings of the groundwater post-construction monitoring.
- Proposed remediation measures if required.

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Appendix A: **Previous investigation results and figures**

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- Legend**
- Blue circle with cross: Acid Sulphate Soil Borehole Location (2012)
 - Red circle with cross: Proposed Acid Sulphate Soil Borehole Location (No Access)
 - Green circle with cross: Completed Acid Sulphate Soil Borehole Location
 - Black line with triangle: Denotes Cross Sections (Refer to Figures 2a - 6b)

Base plan supplied by Sunshine Coast Council

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CLIENT SUNSHINE COAST AIRPORT		PROJECT SUNSHINE COAST AIRPORT EXPANSION	
DRAWN BY BH	DATE 11.04.2017	DRAWING TITLE ACID SULFATE SOILS INVESTIGATION SITE PLAN (JANUARY 2017)	
CHECKED BY JM	DATE 20/09/2017		
SCALE 1:10,000	SHEET SIZE A3	PROJECT No J000996	DOC No 039
		DOC TYPE R	FIGURE No 002
		REVISION 0	SHEET 1 OF 1

Plot Date: 28 September 2017 Time: 1:12:55 PM By: CAD Path: J:\2015 - J1 to J181\Environmental\J000030 - SCC-SCA Expansion-ASSMP\TASK 9000 - Detailed ASS Investigation\Figures Drawings - File Name: Figure 1 Rev6 ASS Boreholes.dwg

Acid sulfate soil results

Definitions:

- (No Guideline), --- not tested, LOR (Limit of Reporting), mht (mol H+/tonne)
Actual Acid Sulfate Soil (AASS) likelihood is indicated by Low (L)(pHF > 5), Medium (M)(pHF 5 ≤ pHF < 4), and High (H)(pHF ≤ 4).
Potential Acid Sulfate Soil (PASS) likelihood is indicated by Low (L)(Δ pH from pHF to pHFOX is < 2 pH units), Medium (M)(Δ pH from pHF to pHFOX is ≥ 2 pH units OR pHFOX is <3), and High (H)(Δ pH from pHF to pHFOX is ≥ 2 pH units AND pHFOX is <3)
Reaction L = Low strength, M = Medium strength, H = High strength, X = Extreme strength.
Required Lime Rate is calculated from the net Acid-Base Account with a factor of safety = 1.5 and bulk density of 1.8 t/m³

Notes:

This table utilises colour coding to aid data interpretation, avoid black and white reproduction
* indicates that the duplicate concentration has been used
Units are as shown

	Denotes less than LOR
	Field test value indicative of AASS
	Field test value indicative of PASS
	Denotes sample exceeds QASSIT Action Criteria of 0.03 (%S), for excavations of >1,000 tonnes
	Denotes sample collected from below groundwater level

Location	Depth (m)	Sample Description	Trigger	Field Tests					Acidity Trail					Retained and Net Acidity			ANC	Treatment	
					AASS likelihood	PASS likelihood	Reaction Vigour												
				pH _F	pH _{FOX}			pH _{KCl}	pH _{ox}	S _{TAA}	S _{TPA}	S _{CR}	S _{NAS}	SCR + S _{TAA}	STPA + STAA	ANC		Liming rate	Liming rate
				Units	-	-	-	pH	pH	%S	%S	%S	%S	%S	%S	%S	kg CaCO3/t	kg CaCO3/m3	
				AASS	<4.0	-	<4.0	<4.0	<4.0	0.03	0.03	0.03	0.03	0.03	0.03	-	-	-	
BH51	0.0_0.25	Silty SAND, dark grey		LOR	0.1	-	0.1	0.1	0.1	0.003	0.01	0.005	0.02	0.02	0.005	0.01	1	1	
	0.25_0.5	SAND, grey			3.9	H	2.5	4.5	---	0.045	---	< 0.005	< 0.02	0.040	---	n/a	2.1	4.0	
	0.5_0.75				4.7	M	3.0	---	---	---	---	---	---	---	---	---	---	---	
	0.75_1.0	Becoming dark grey			4.4	M	3.5	---	---	---	---	---	---	---	---	---	---	---	
	1.0_1.25				4.5	M	4.1	---	---	---	---	---	---	---	---	---	---	---	
	1.25_1.5				4.5	M	2.6	---	---	---	---	---	---	---	---	---	---	---	
	1.5_1.75				4.9	M	2.7	---	---	0.257	---	< 0.005	< 0.02	0.260	---	n/a	12.0	22.0	
	1.75_2.0				4.7	M	2.8	---	---	---	---	---	---	---	---	---	---	---	
	2.0_2.25				4.7	M	2.9	---	---	---	---	---	---	---	---	---	---	---	
BH52	2.25_2.5				4.8	M	3.1	4.4	---	0.120	---	< 0.005	< 0.02	0.120	---	n/a	5.6	10.0	
	0.0_0.25	Silty SAND, dark grey			4.6	M	3.1	---	---	---	---	---	---	---	---	---	---	---	
	0.25_0.5	SAND, grey			4.4	M	3.5	---	---	---	---	---	---	---	---	---	---	---	
	0.5_0.75				4.9	M	3.7	---	---	---	---	---	---	---	---	---	---	---	
	0.75_1.0				4.7	M	2.9	5.7	---	<0.003	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0	
	1.0_1.25				4.6	M	2.9	---	---	---	---	---	---	---	---	---	---	---	
	1.25_1.5	Becoming dark grey			4.7	M	2.9	4.2	---	0.077	---	< 0.005	< 0.02	0.080	---	n/a	3.6	6.0	
	1.5_1.75	SAND, dark grey			4.9	M	2.9	---	---	---	---	---	---	---	---	---	---	---	
	1.75_2.0				4.9	M	3.0	---	---	---	---	---	---	---	---	---	---	---	
BH53	2.0_2.25				4.9	M	3.2	---	---	---	---	---	---	---	---	---	---	---	
	2.25_2.5				4.9	M	3.2	---	---	---	---	---	---	---	---	---	---	---	
	0.0_0.25	Silty SAND, dark grey			5.2	L	3.6	4.5	---	0.115	---	< 0.005	< 0.02	0.120	---	n/a	5.4	10.0	
	0.25_0.5	SAND, grey			4.6	M	2.8	---	---	---	---	---	---	---	---	---	---	---	
	0.5_0.75				4.7	M	2.9	---	---	---	---	---	---	---	---	---	---	---	
	0.75_1.0				5.0	L	3.4	---	---	---	---	---	---	---	---	---	---	---	
	1.0_1.25				4.7	M	2.9	5.7	---	<0.003	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0	
	1.25_1.5	SAND, dark grey			5.0	L	3.0	---	---	---	---	---	---	---	---	---	---	---	
	1.5_1.75				4.9	M	3.1	---	---	---	---	---	---	---	---	---	---	---	
BH53	1.75_2.0				5.1	L	3.0	---	---	---	---	---	---	---	---	---	---	---	
	2.0_2.25				5.2	L	2.9	4.0	---	0.192	---	< 0.005	< 0.02	0.190	---	n/a	8.8	16.0	
	2.25_2.5				5.0	M	3.0	---	---	---	---	---	---	---	---	---	---	---	
					5.1	L	3.0	4.4	---	0.095	---	< 0.005	< 0.02	0.090	---	n/a	4.4	8.0	

Location	Depth (m)	Sample Description	Trigger	Field Tests					Acidity Trail					Retained and Net Acidity			ANC	Treatment	
				pH _F	AASS likelihood	pH _{FOX}	PASS likelihood	Reaction Vigour	pH _{KCl}	pH _{OX}	S _{TAA}	S _{TPA}	S _{CR}	S _{NAS}	SCR + S _{TAA}	STPA + STAA	ANC	Liming rate	Liming rate
Units	pH	-	pH	-	-	pH	pH	%S	%S	%S	%S	%S	%S	%S	%S	kg CaCO3/t	kg CaCO3/m3		
ASS	<4.0	-	<4.0	-	-	<4.0	<4.0	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-	-	-		
LOR	0.1	-	0.1	-	-	0.1	0.1	0.003	0.01	0.005	0.02	0.02	0.005	0.01	-	1	1		
BH54	0.0_0.25	Silty SAND, grey		4.2	M	2.1	H	M	---	---	---	---	---	---	---	---	---	---	
	0.25_0.5	SAND, pale grey		4.6	M	2.1	H	L	---	---	---	---	---	---	---	---	---	---	
	0.5_0.75			4.8	M	2.4	H	L	---	---	---	---	---	---	---	---	---		
	0.75_1.0			Becoming dark grey	4.5	M	1.9	H	M	5.3	---	0.004	---	< 0.005	n/a	< 0.02	---	n/a	< 1
	1.0_1.25	SAND, dark grey		5.1	L	1.9	H	L	---	---	---	---	---	---	---	---	---	---	---
	1.25_1.5			5.4	L	2.9	H	L	---	---	---	---	---	---	---	---	---	---	
	1.5_1.75			5.4	L	2.3	H	M	4.2	---	0.160	---	< 0.005	< 0.02	0.160	---	n/a	7.6	14.0
	1.75_2.0			5.6	L	2.4	H	M	---	---	---	---	---	---	---	---	---	---	
	2.0_2.25			5.3	L	2.6	H	L	4.6	---	0.067	---	< 0.005	n/a	0.070	---	n/a	3.2	6.0
2.25_2.5	5.2		L	2.6	H	L	---	---	---	---	---	---	---	---	---	---			
BH55	0.0_0.25	SAND, grey and pale grey		5.5	L	1.9	H	H	4.2	---	0.075	---	< 0.005	< 0.02	0.070	---	n/a	3.5	6.0
	0.25_0.5	SAND, grey and pale grey		5.6	M	2.0	H	L	---	---	---	---	---	---	---	---	---	---	
	0.5_0.75			5.7	M	2.2	H	L	---	---	---	---	---	---	---	---	---		
	0.75_1.0			5.7	L	2.2	H	L	---	---	---	---	---	---	---	---	---		
	1.0_1.25			5.6	M	2.3	H	L	---	---	---	---	---	---	---	---			
	1.25_1.5	SAND, dark grey		5.6	M	2.4	H	L	---	---	---	---	---	---	---	---	---		
	1.5_1.75			5.6	L	2.4	H	L	4.2	---	0.154	---	< 0.005	< 0.02	0.150	---	n/a	7.2	13.0
	1.75_2.0			5.6	M	2.5	H	L	---	---	---	---	---	---	---	---	---		
BH56	0.0_0.25	Silty SAND, dark grey		5.0	L	2.1	H	H	4.9	---	0.018	---	< 0.005	n/a	0.020	---	n/a	< 1	1.0
	0.25_0.5	SAND, grey		4.6	M	2.3	H	L	---	---	---	---	---	---	---	---	---	---	
	0.5_0.75			4.6	M	2.3	H	L	---	---	---	---	---	---	---	---	---		
	0.75_1.0	Becoming dark grey		4.6	M	3.0	M	L	---	---	---	---	---	---	---	---	---	---	
	1.0_1.25	SAND, dark grey		4.6	M	2.7	M	L	---	---	---	---	---	---	---	---	---	---	
	1.25_1.5			5.1	L	2.4	H	M	4.2	---	0.208	---	< 0.005	< 0.02	0.210	---	n/a	9.6	17.0
	1.5_1.75			5.1	L	2.5	H	L	---	---	---	---	---	---	---	---	---	---	
	1.75_2.0			4.9	M	3.8	L	L	---	---	---	---	---	---	---	---	---		
BH57	0.0_0.25	Silty SAND, dark grey		4.0	H	2.2	M	M	---	---	---	---	---	---	---	---	---	---	
	0.25_0.5	SAND, grey		3.7	H	1.9	M	L	5.5	---	<0.003	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	0.5_0.75			4.5	M	2.9	M	L	---	---	---	---	---	---	---	---	---		
	0.75_1.0			4.8	M	2.4	H	M	---	---	---	---	---	---	---	---	---		
	1.0_1.25	SAND, dark grey		5.4	L	2.5	H	M	---	---	---	---	---	---	---	---	---	---	
	1.25_1.5			5.6	L	2.9	H	H	---	---	---	---	---	---	---	---	---		
	1.5_1.75			5.0	M	2.5	H	M	4.0	---	0.401	---	< 0.005	< 0.02	0.400	---	n/a	19.0	34.0
	1.75_2.0			5.1	L	2.2	H	L	---	---	---	---	---	---	---	---	---		
BH58	0.0_0.25	Silty SAND, dark grey		4.1	M	1.8	H	H	---	---	---	---	---	---	---	---	---	---	
	0.25_0.5	SAND, grey		4.3	M	2.0	H	L	---	---	---	---	---	---	---	---	---	---	
	0.5_0.75			4.2	M	1.8	H	L	5.5	---	<0.003	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	0.75_1.0			4.6	M	1.8	H	L	---	---	---	---	---	---	---	---	---	---	
	1.0_1.25	SAND, dark grey		4.7	M	2.1	H	M	---	---	---	---	---	---	---	---	---	---	
	1.25_1.5			5.0	L	2.1	H	M	---	---	---	---	---	---	---	---	---		
	1.5_1.75			5.3	L	2.1	H	M	4.4	---	0.125	---	< 0.005	< 0.02	0.130	---	n/a	5.9	11.0
	1.75_2.0			4.8	M	2.2	H	M	---	---	---	---	---	---	---	---	---	---	

Location	Depth (m)	Sample Description	Trigger	Field Tests					Acidity Trail					Retained and Net Acidity			ANC	Treatment	
				pH _F	AASS likelihood	pH _{FOX}	PASS likelihood	Reaction Vigour	pH _{KCl}	pH _{ox}	S _{TAA}	S _{TPA}	S _{CR}	S _{NAS}	SCR + S _{TAA}	STPA + STAA	ANC	Liming rate	Liming rate
				Units	pH	-	pH	-	-	pH	pH	%S	%S	%S	%S	%S	%S	kg CaCO3/t	kg CaCO3/m3
				ASS	<4.0	-	<4.0	-	-	<4.0	<4.0	0.03	0.03	0.03	0.03	0.03	0.03	-	-
LOR	0.1	-	0.1	-	-	0.1	0.1	0.003	0.01	0.005	0.02	0.02	0.005	0.01	1	1			
BH145	0.0_0.25	Silty SAND		4.7	M	2.4	H	M	---	---	---	---	---	---	---	---	---	---	---
	0.25_0.5	SAND		4.5	M	3.1	L	L	5.4	---	<0.003	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	0.5_0.75			4.8	M	3.9	L	L	---	---	---	---	---	---	---	---	---	---	
	0.75_1.0			4.8	M	3.5	L	L	---	---	---	---	---	---	---	---	---	---	
	1.0_1.25			4.9	M	2.9	H	L	4.4	---	0.067	---	< 0.005	< 0.02	0.070	---	n/a	3.1	6.0
	1.25_1.5			5.1	L	2.7	H	M	---	---	---	---	---	---	---	---	---	---	---
	1.5_1.75			4.4	M	2.6	M	M	---	---	---	---	---	---	---	---	---	---	---
1.75_2.0		5.1	L	2.7	H	M	---	---	---	---	---	---	---	---	---	---	---		
BH146	0.0_0.25	Silty SAND		5.0	L	2.2	H	M	---	---	---	---	---	---	---	---	---	---	---
	0.25_0.5	SAND		5.3	L	3.9	L	L	---	---	---	---	---	---	---	---	---	---	---
	0.5_0.75			4.6	M	3.1	L	L	---	---	---	---	---	---	---	---	---	---	---
	0.75_1.0			5.1	L	2.8	H	L	5.1	---	0.008	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	1.0_1.25			4.9	M	3.0	M	L	---	---	---	---	---	---	---	---	---	---	---
	1.25_1.5			5.1	L	3.0	H	L	---	---	---	---	---	---	---	---	---	---	---
	1.5_1.75			5.0	M	2.7	H	L	4.3	---	0.095	---	< 0.005	< 0.02	0.090	---	n/a	4.4	8.0
1.75_2.0		5.1	L	3.1	M	L	---	---	---	---	---	---	---	---	---	---	---		
BH147	0.0_0.25	Silty SAND, dark grey		5.4	L	2.6	H	L	5.1	---	0.010	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	0.25_0.5	SAND, grey		5.4	L	3.4	M	L	---	---	---	---	---	---	---	---	---	---	---
	0.5_0.75			5.2	L	3.0	M	L	---	---	---	---	---	---	---	---	---	---	---
	0.75_1.0			5.3	L	3.2	M	L	---	---	---	---	---	---	---	---	---	---	---
	1.0_1.25			5.2	L	3.0	H	L	5.2	---	0.012	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	1.25_1.5			5.3	L	2.9	H	L	---	---	---	---	---	---	---	---	---	---	---
	1.5_1.75			5.2	L	3.0	M	L	---	---	---	---	---	---	---	---	---	---	---
1.75_2.0		5.4	L	3.2	M	L	---	---	---	---	---	---	---	---	---	---	---		
BH148	0.0_0.25	Silty SAND, dark grey		4.0	H	2.4	M	M	---	---	---	---	---	---	---	---	---	---	---
	0.25_0.5	SAND, grey		4.4	M	2.1	H	L	5.5	---	<0.003	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	0.5_0.75			4.2	M	2.5	M	L	---	---	---	---	---	---	---	---	---	---	---
	0.75_1.0			5.3	L	3.0	M	L	---	---	---	---	---	---	---	---	---	---	---
	1.0_1.25			5.2	L	3.0	M	L	---	---	---	---	---	---	---	---	---	---	---
	1.25_1.5			5.2	L	3.0	H	L	---	---	---	---	---	---	---	---	---	---	---
	1.5_1.75			5.4	L	3.0	M	L	4.4	---	0.117	---	< 0.005	< 0.02	0.120	---	n/a	5.5	10.0
1.75_2.0		5.4	L	3.1	M	L	---	---	---	---	---	---	---	---	---	---	---		
BH149	0.0_0.25	Silty SAND, dark grey		3.6	H	2.3	M	L	---	---	---	---	---	---	---	---	---	---	---
	0.25_0.5	SAND, grey		4.3	M	2.9	M	L	---	---	---	---	---	---	---	---	---	---	---
	0.5_0.75			4.7	M	3.0	M	L	---	---	---	---	---	---	---	---	---	---	
	0.75_1.0			4.0	M	2.4	M	L	5.6	---	<0.003	---	< 0.005	n/a	< 0.02	---	n/a	< 1	1.0
	1.0_1.25			5.2	L	3.3	L	L	---	---	---	---	---	---	---	---	---	---	
	1.25_1.5	Becoming dark grey		5.0	M	3.4	L	L	---	---	---	---	---	---	---	---	---	---	
	1.5_1.75		5.1	L	3.5	L	L	---	---	---	---	---	---	---	---	---	---	---	
1.75_2.0	SAND, dark grey		5.2	L	3.6	L	L	4.4	---	0.088	---	< 0.005	< 0.02	0.090	---	n/a	4.1	7.0	

REPORT OF BOREHOLE: BH 51

CLIENT: Sunshine Coast Council
PROJECT: Sunshine Coast Airport - Expansion
LOCATION: David Low Way
JOB NO: J000030

EAST: 509008.2 m
NORTH: 7057981.4 m
SURFACE RL: 1.50 m
CONTRACTOR: Contract Drilling
DRILL RIG: Edson CP1
INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
LOGGED: SR
LOGGED DATE: 04/05/17
CHECKED: CK
CHECKED DATE: 25/08/17

Drilling				Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT			0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth		SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets	M	
			0.20	1.30			SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt		
			0.5							
			1.0							
			1.10	0.40				Becoming indurated		
			1.30	0.20			SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt	W	
			1.5							
			2.0							
			2.5	2.50				END OF BOREHOLE @ 2.50 m TARGET DEPTH BACKFILLED		
			3.0							

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 52

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 509047.1 m
 NORTH: 7057963.6 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 04/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT		Water inflow at 1.3 m depth	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets			
			0.30	1.20			SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt				
			0.5							M		
			1.0									
			1.30	0.20					Dark grey and becoming indurated	M - W		
	1.40	0.10				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt	W				
			2.0									
			2.5	2.50					END OF BOREHOLE @ 2.50 m TARGET DEPTH BACKFILLED			

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 53

CLIENT: Sunshine Coast Council
PROJECT: Sunshine Coast Airport - Expansion
LOCATION: David Low Way
JOB NO: J000030

EAST: 509093.2 m
NORTH: 7057952.1 m
SURFACE RL: 1.50 m
CONTRACTOR: Contract Drilling
DRILL RIG: Edson CP1
INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
LOGGED: SR
LOGGED DATE: 04/05/17
CHECKED: CK
CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT			0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets			
			0.20	1.30				SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt		M	
			0.5									
			1.0									
			1.20	0.30					Becoming indurated		M - W	
			1.30	0.20				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt		W	
			1.5									
			2.0									
			2.5	2.50					END OF BOREHOLE @ 2.50 m TARGET DEPTH BACKFILLED			

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 54

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 509139.5 m
 NORTH: 7057940.4 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 04/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
ADT			0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, grey, with some rootlets				
			0.30	1.20				SP	SAND (ALLUVIUM): fine to medium grained, pale grey				M
			0.5										
			0.90	0.60					Dark grey and becoming indurated	M - W			
			1.40	0.10				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt	W			
			2.0										
			2.5	2.50					END OF BOREHOLE @ 2.50 m TARGET DEPTH BACKFILLED				

Water inflow below 1.8 m

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 55

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 509003.3 m
 NORTH: 7057842.7 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 04/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
ADT		Water inflow at 1.3 m depth 	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth		SM	SILTY SAND (TOPSOIL): fine to medium grained, grey, with some rootlets				
			0.30	1.20				SP				SAND (ALLUVIUM): fine to medium grained, grey and pale grey, trace silt
			0.5						M			
			1.0									
			1.10	0.40				Becoming indurated	M - W			
			1.30	0.20				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt	W		
			1.5									
			2.0	2.00								
										END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED		

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 56

CLIENT: Sunshine Coast Council
PROJECT: Sunshine Coast Airport - Expansion
LOCATION: David Low Way
JOB NO: J000030

EAST: 508974.8 m
NORTH: 7057881.4 m
SURFACE RL: 1.50 m
CONTRACTOR: Contract Drilling
DRILL RIG: Edson CP1
INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
LOGGED: SR
LOGGED DATE: 04/05/17
CHECKED: CK
CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
ADT		Water inflow at 1.2 m depth	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth		SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets				
			0.20	1.30			SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt				
			0.5						M			
			1.0	1.00				Dark grey and becoming indurated				M - W
			1.20	0.30			SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt				
			1.5						W			
			2.0	2.00				END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED				
			2.5									
			3.0									
			3.5									
4.0												

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REPORT OF BOREHOLE: BH 57

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 508943.8 m
 NORTH: 7057921.3 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 04/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT		Water inflow at 1.1 m depth ▽	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets		M		
			0.30	1.20				SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt				
			0.5										
			0.90	0.60					Becoming indurated		M - W		
			1.10	0.40				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt		W		
			1.5										
			2.0	2.00					END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED				
			2.5										
			3.0										

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 58

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 508914.9 m
 NORTH: 7057960.9 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 04/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS		
ADT		Water inflow at 0.9 m depth	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets		M				
			0.30	1.20			SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt							
			0.5												
			0.90	0.60					Becoming indurated		M - W				
			1.10	0.40				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt		W				
			1.5												
			2.0	2.00					END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED						
			2.5												

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 145

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 508877.6 m
 NORTH: 7057841.7 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 05/05/16
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT			0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth		SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets	M		
			0.30	1.20			SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt			
			0.5								
			1.0								
			1.10	0.40				Becoming indurated			
			1.20	0.30			SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt	W		
			1.5								
			2.0	2.00				END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED			
			2.5								
			3.0								

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 146

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 508908.9 m
 NORTH: 7057801.6 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 05/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT		Water inflow at 1.2 m depth	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, with some rootlets		MD	
			0.30	1.20				SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt		M	
			0.5							MD		
			1.0									
			1.10	0.40				Becoming indurated	M - W	MD		
			1.20	0.30				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt		W	
			1.5									
			2.0	2.00				END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED				
			2.5									
			3.0									

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 147

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 508938.1 m
 NORTH: 7057763.4 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 05/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT		Water inflow at 1.1 m depth ▽	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, trace rootlets	M			
			0.30	1.20				SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt				
			0.5										
			1.0										
			1.30	0.20				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt	W			
			2.0	2.00					END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED				
			2.5										

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 148

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 508967.7 m
 NORTH: 7057723.6 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 05/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling				Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT		Water inflow at 1.0 m depth ▽	0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, trace rootlets	M			
			0.20	1.30				SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt				
			0.60	0.90					Becoming indurated	M - W			
			1.00	0.50				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey, trace silt	W			
			2.0	2.00					END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED				
			2.5										
			3.0										

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

REPORT OF BOREHOLE: BH 149

CLIENT: Sunshine Coast Council
 PROJECT: Sunshine Coast Airport - Expansion
 LOCATION: David Low Way
 JOB NO: J000030

EAST: 508999.6 m
 NORTH: 7057684.2 m
 SURFACE RL: 1.50 m
 CONTRACTOR: Contract Drilling
 DRILL RIG: Edson CP1
 INCLINATION: -90° HOLE DIA. 100 mm

SHEET 1 OF 1
 LOGGED: SR
 LOGGED DATE: 05/05/17
 CHECKED: CK
 CHECKED DATE: 25/08/17

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
ADT			0.0	1.50	0.00 m ASS samples taken at 0.25 m intervals to 2 m depth			SM	SILTY SAND (TOPSOIL): fine to medium grained, dark grey, trace rootlets			
			0.30	1.20				SP	SAND (ALLUVIUM): fine to medium grained, grey, trace silt		M	
			0.5									
			1.0									
			1.10	0.40					Becoming indurated		M - W	
			1.30	0.20				SP	SAND (COFFEE ROCK): fine to medium grained, dark grey		W	
			1.5									
			2.0	2.00					END OF BOREHOLE @ 2.00 m TARGET DEPTH BACKFILLED			
			2.5									
			3.0									

This report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.