

MEMORANDUM

TO	Scott Hayes-Stanley	COMPANY	Wulguru Technical Services Pty Ltd
FROM	Nick Brown / Matt Johnson	OFFICE	Sunshine Coast
EMAIL	nickb@atcwilliams.com.au	PHONE	07 5406 7000
PROJECT TITLE	Wirralie Gold Mine		
SUBJECT	Flood Hazard Overlay Assessment		
DATE	1 March 2022	OUR REF	121130-01M001.rev0

1 INTRODUCTION

1.1 Background

Australian Solomons Gold Pty Ltd (Solomons) owns and operates the Wirralie Gold Mine (WGM) site under EPML00772413 and took over the site in late 2013. The mine has had several operating owners over the years, including multiple owner changes from 1987 to 1993 before a break in operations. The mine operated again from 1999 to 2001, before being placed into care and maintenance in 2002. Rehabilitation efforts were initiated in 1993 and again in 2001 to targeted areas within the site, such as the waste rock dumps, final voids, the Tailings Storage Facility (TSF), process and ancillary areas. Operations by Solomons plan to process up to 400,000 tonnes of ore per annum over a minimum 10 year life of mine. This volume of processing is on a significantly reduced scale when compared to past mining campaigns. Refer **Attachment A** which illustrates the mine site layout plan.

Solomons have commissioned Wulguru Technical Services (WTS) to provide assistance with the completion of the Progressive Rehabilitation Closure Plan (PRCP) and Estimated Rehabilitation Cost (ERC) submitted (reference no. 101/0008112). As part of the PRCP and ERC requirements, ATC Williams (ATCW) have been engaged by WTS to develop a Flood Hazard Overlay assessment as a Technical Memorandum. This memorandum outlines conceptual findings based on the limited background information and site data available at the time of reporting. Therefore, this memorandum requires revision following further site investigations to confirm the outcomes stated in this memorandum meet DES requirements.

1.2 Project Site and Legal Requirements

Under the Environmental Protection Act (EPA) 1994 [4], a PRCP is required for the site. Item 126C 1(j) of the EPA requests that the PRCP is to *include any 'other' information the administering authority reasonably considers necessary to decide whether to approve the PRCP schedule for the plan*. This flood overlay assessment forms part of the 'other' information required and has been addressed in accordance with Section 3.4 of the PRCP guidelines [3]. This states that any voids that are wholly or partly within the floodplain must be rehabilitated to provide safe and stable land. The WGM site generally sits along a ridgeline towards the southern extent of disturbance, and has four pits that are proposed to be left as residual voids for the post-closure phase. The majority of runoff from the site initially discharges to surrounding localised flow paths of first order streams, before flowing north-west into Rosetta Creek approximately 2 km downstream. Rosetta Creek is a significant watercourse with an estimated 700 km² upstream catchment and is expected to have a large floodplain. Small areas of the WGM also flow to the south and discharge to Bungobine Creek, that has an estimated upstream catchment of 100 km² and is approximately 3.5 km downstream of the site.



A desktop assessment of the regional flood extents was therefore conducted to determine if the voids are in the regional floodplain (for events up to and including the 0.1% AEP Event).

2 REGIONAL FLOOD OVERLAY

2.1 Queensland FloodCheck Mapping

Queensland Government's FloodCheck mapping service [1] was used to estimate the regional flood extents adjacent to the WGM site. The flood mapping overlay includes regional flood data for the 1% AEP and Probable Maximum Flood (PMF) events. The data adopts Shuttle Radar Topography Mission (SRTM) elevation information which is quite coarse (~30 m grid), due to the lack of elevation data in rural areas [2]. The accuracy of the available flood mapping is considered suitable for the purposes of this memorandum, as detailed hydraulic (flood velocities/depths etc.) information is not required. However, detailed site survey should be undertaken for the site to confirm the outcomes stated in this memorandum meet DES requirements.

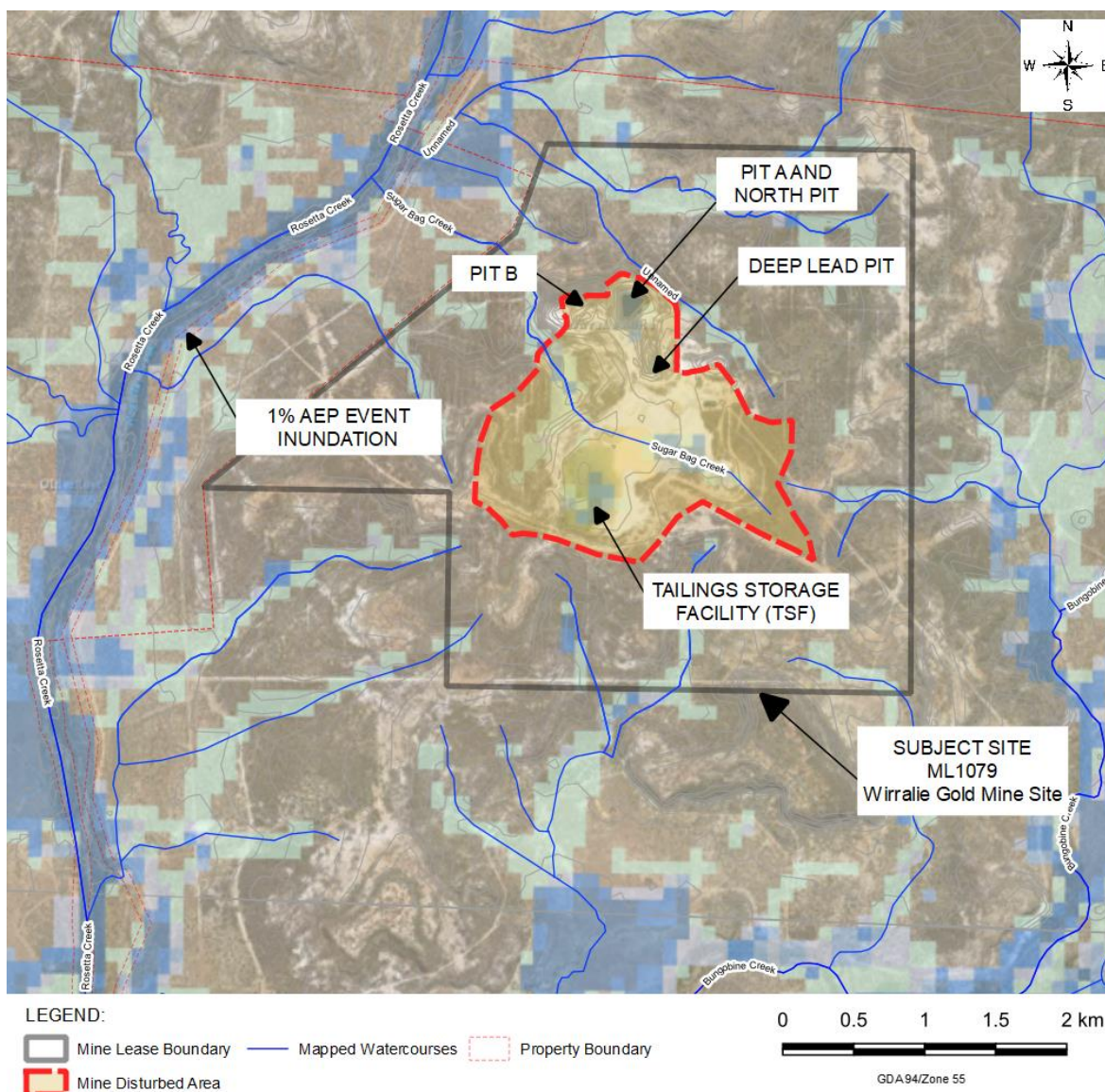
The intent of this memorandum is to define the 'floodplain' of the adjacent watercourse/s and compare the flood extent to the void locations. **Map 1** and **Map 2** illustrate outputs from the FloodCheck mapping with the 1% AEP Event and PMF (Extreme Event) outlines, respectively. Noting that this represents a rain-on-grid model conducted by Kellogg Brown & Root (2015) [2], and therefore includes flood mapping for local watercourses that are not considered part of the regional floodplain (refer **Map 1** and **2**).

Figure 001 attached to this memorandum illustrates the assumed 1% AEP and PMF flood extent and indicated levels.

Attachment B also illustrates the FloodCheck estimated floodplain extent, and further confirms that the WGM is outside of the regional floodplain.



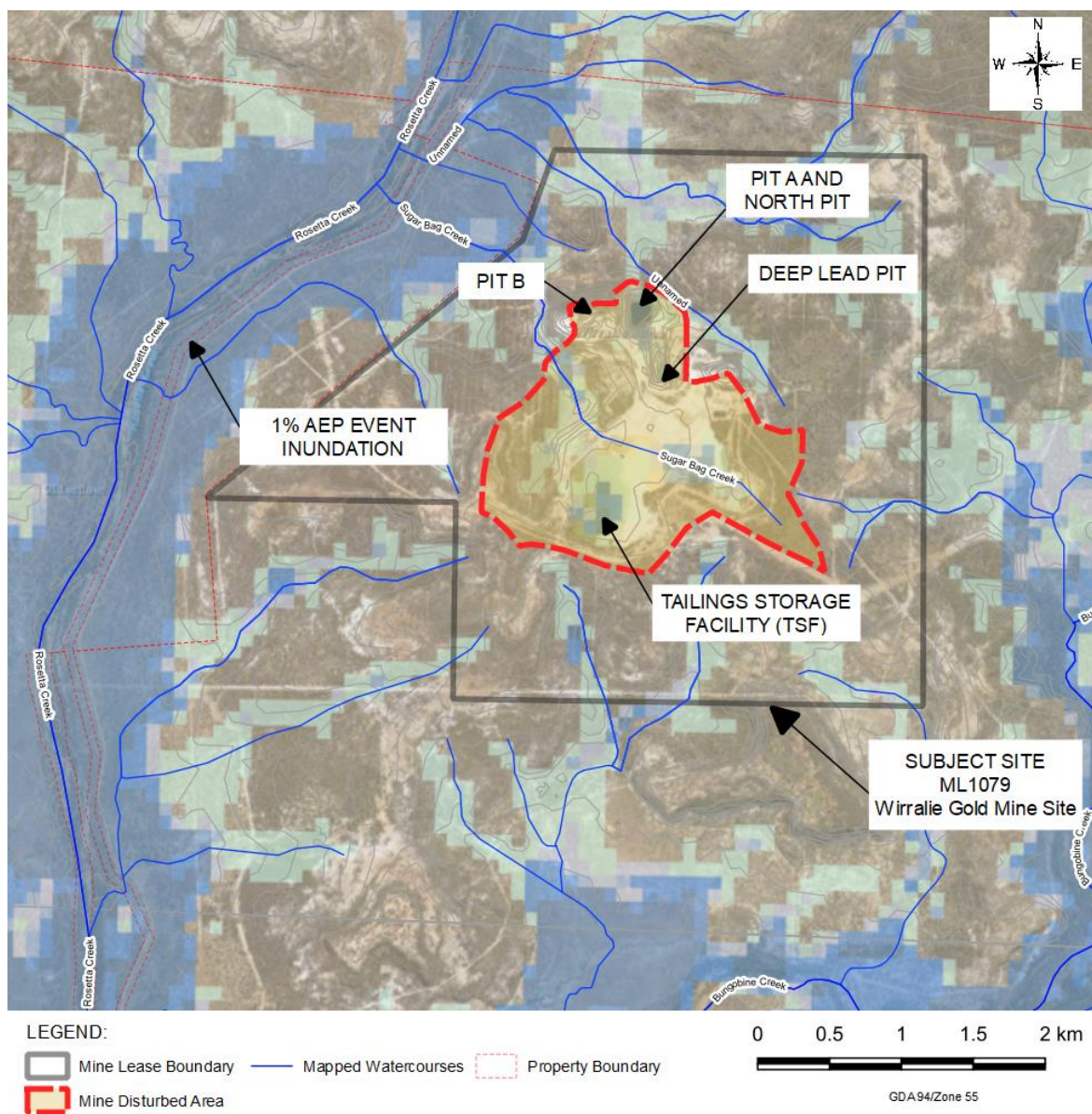
Map 1 – 1% AEP Event Inundation



FloodCheck [1]



Map 2 –PMF Event Inundation



FloodCheck [1]



Figure 001 attached to this memorandum illustrates that the WGM voids are well above Rosetta Creek flood levels (~20 m from the PMF level to Pit A's spillway level), and well above Bungobine Creek PMF levels (~30 m from the PMF level to the southern mine extent). No other watercourses nearby to the mine site are considered major flow paths, and any other local watercourses such as the unnamed flow path to the north of the site are considered minor and not part of the regional floodplain. The WGM voids are therefore considered outside of the regional floodplain for all events up to and including the PMF event.

Flow diversion measures such as bunding along the void edge(s) must be maintained as part of the rehabilitation and post-closure scenario to prevent minor external catchments entering the site pits. A stability and capacity assessment of the existing bunding along the void(s) edges should be undertaken to ensure the existing bunding remains suitable, stable and vegetated for the WGM operational phase. As part of the rehabilitation requirements for the WGM closure the bunds should again be assessed, and any maintenance actioned as part of the WGM rehabilitation works.

CONCLUSIONS AND RECOMMENDATIONS

The WGM site voids are not considered wholly or partly within the regional floodplain, and are therefore not required to meet the requirements of Section 3.4 of the PRCP [3]. That is, no rehabilitation of the voids as a result of regional flooding is warranted. It is recommended that a stability and capacity assessment of the existing bunding along the void(s) edges should be undertaken to ensure the existing bunding remains suitable, stable and vegetated for the WGM operational phase. As part of the rehabilitation requirements for the WGM closure the bunds should again be assessed, and any maintenance actioned as part of the WGM rehabilitation works.

This technical memorandum should also be read in conjunction with the Closure Methodology and Water Balance Model report by ATCW (with reference 121130-01R001.rev0)

CLOSURE

Should you have any queries please contact the undersigned.

MATT JOHNSON

Senior Engineer

ATC Williams Pty Ltd

Attachments:

Attachment A – Mine Site Layout Plans

Attachment B – FloodCheck Regional Flood Map

Figures

Figure 001 –Estimated 1% AEP and PMF Event Flood Extents

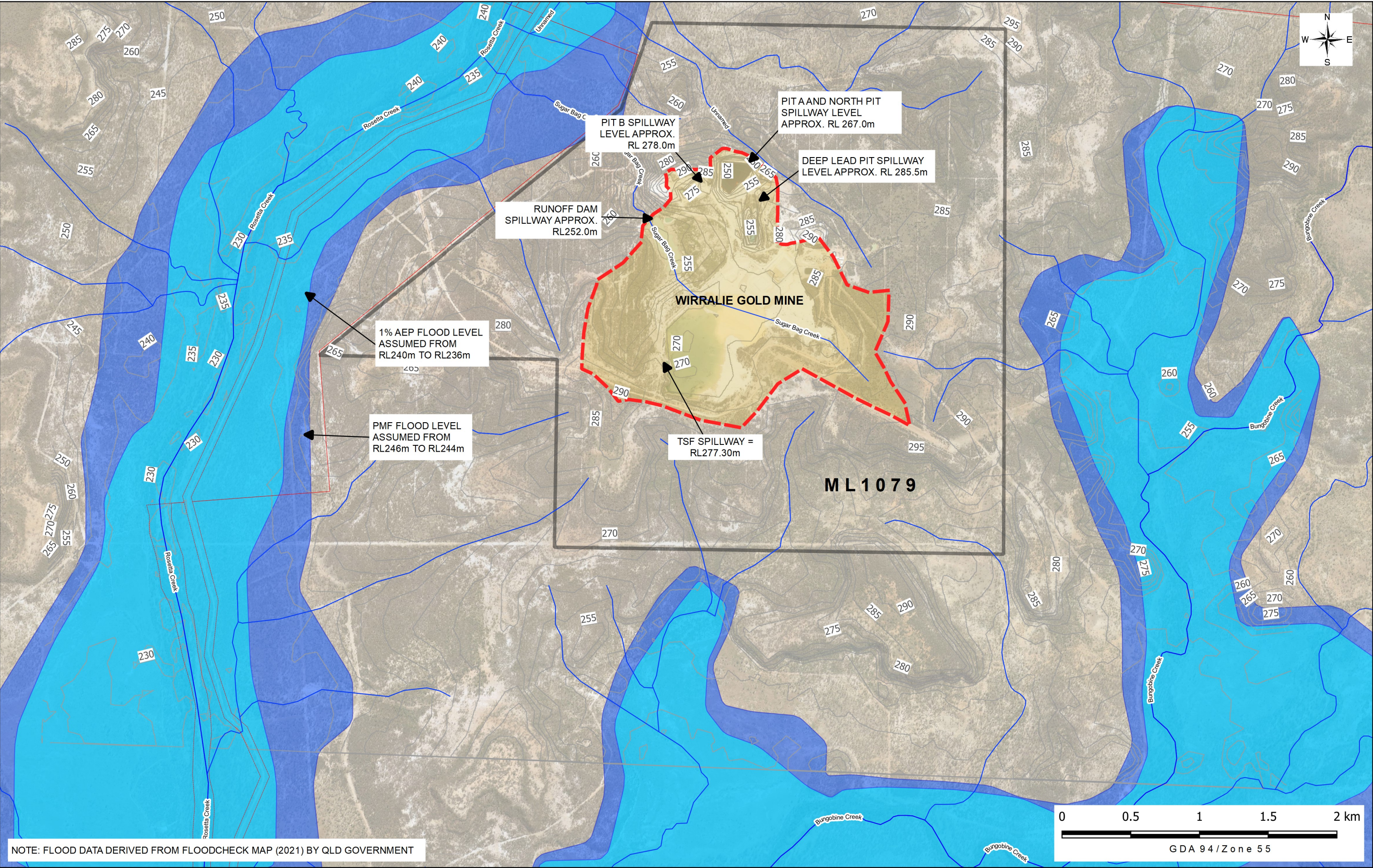


REFERENCES

- [1] Department of Natural Resources and Mines (2021), FloodCheck Mapping, available from:
<https://floodcheck.information.qld.gov.au/>
- [2] Kellogg Brown & Root Pty Ltd (2015), 'Flood Mapping for the Burdekin River Basin',
Department of Natural Resources and Mines
- [3] Queensland Government (2021), 'Progressive rehabilitation and closure plans (PRC plans)',
Department of Environment and Science
- [4] Queensland Government (1994), 'Environmental Protection Act'



FIGURES



LEGEND:

 1% Flood Extents	 Mine Disturbed Area	 Satellite Contours (5m)
 Extreme Flood Extent (PMF)	 Mine Lease Boundary	 Mapped Watercourses

WIRRALIE GOLD MINE

REGIONAL FLOOD EXTENTS



FIGURE 001

121130-01

DATE: 2021-09-29



ATTACHMENTS



ATTACHMENT A – MINE SITE LAYOUT PLANS



SOLOMONS GOLD

WIRRALIE
GOLD MINE
MOUNT
COOLON

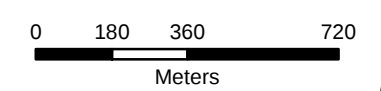
CADASTRE

Legend

-  Wirralie Mining Lease
-  Cadastre Whitsunday Shire

Credits:
Mine Lease boundary and
QLD Cadastre
© State of Queensland
(Department of Natural
Resources and Mines) 2016.

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 22-Sep-16



Scale: 1:18,000 at A3



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SOLOMONS GOLD

WIRRALIE GOLD MINE MOUNT COOLON

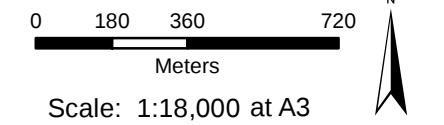
REHABILITATION
OCTOBER 2001

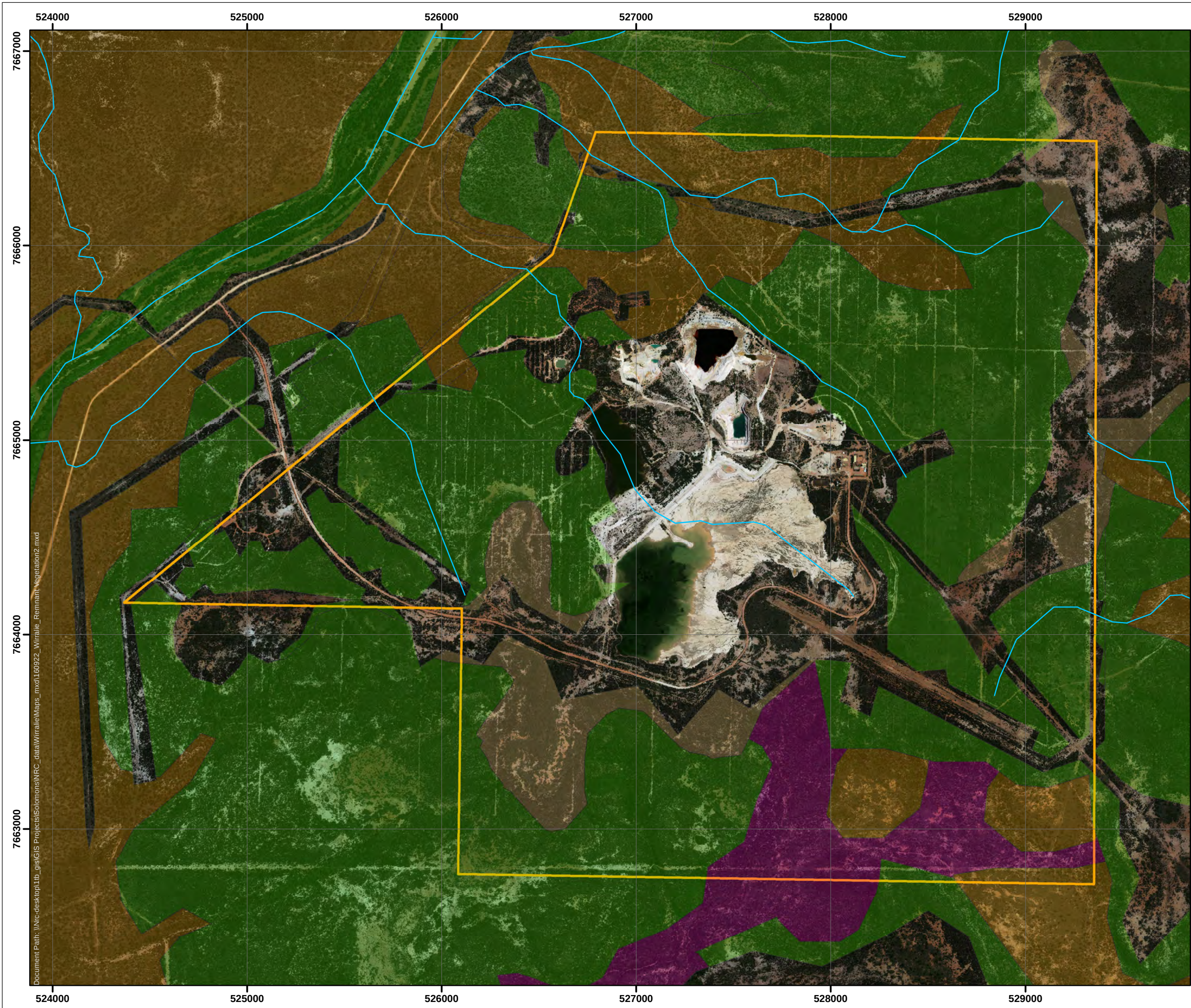
Legend

-  Wirralie Mining Lease
-  Contoured - No topsoil
-  Never Disturbed
-  Previously rehabilitated - ACM
-  Topsoil Stockpile
-  Topsoil by Delta
-  Safety Bund

Credits:
Mine Lease boundary
© State of Queensland
(Department of Natural
Resources and Mines) 2016
Imagery supplied by Client
30/09/2010

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 22-Sep-16





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SOLOMONS GOLD

WIRRALIE GOLD MINE MOUNT COOLON

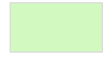
REMNANT VEGETATION

Legend

-  Wirralie Mining Lease
-  Watercourse

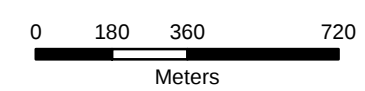
Remnant Vegetation

Status

-  Endangered-dominant
-  Endangered-subdominant
-  Of Concern - dominant
-  Of Concern - subdominant
-  Least Concern

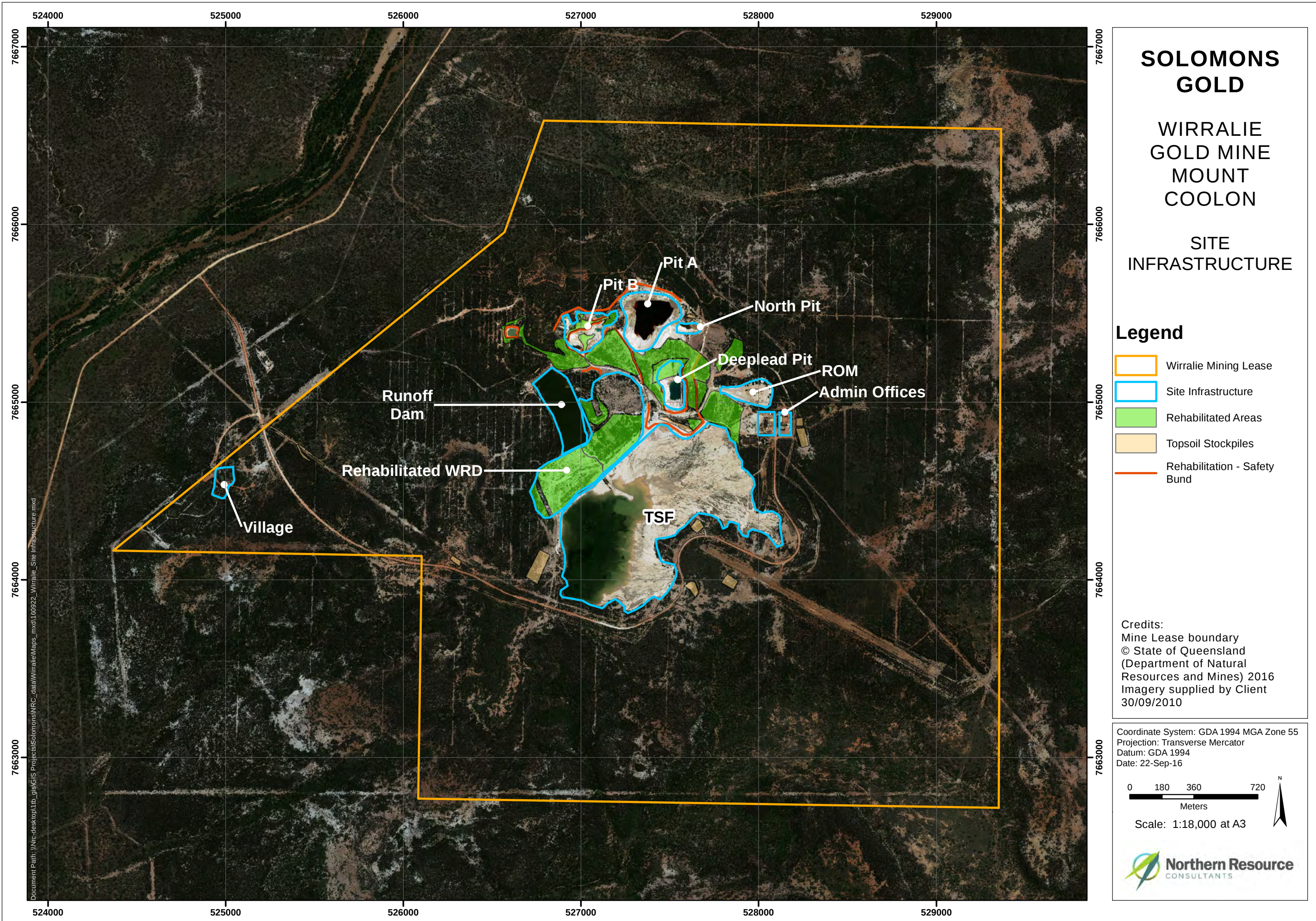
Credits:
Mine Lease boundary
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Imagery supplied by Client
30/09/2010

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
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Scale: 1:18,000 at A3





SOLOMONS GOLD

WIRRALIE GOLD MINE MOUNT COOLON

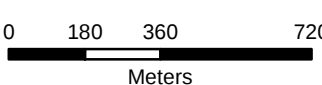
SITE INFRASTRUCTURE

Legend

-  Wirralie Mining Lease
-  Site Infrastructure
-  Rehabilitated Areas
-  Topsoil Stockpiles
-  Rehabilitation - Safety Bund

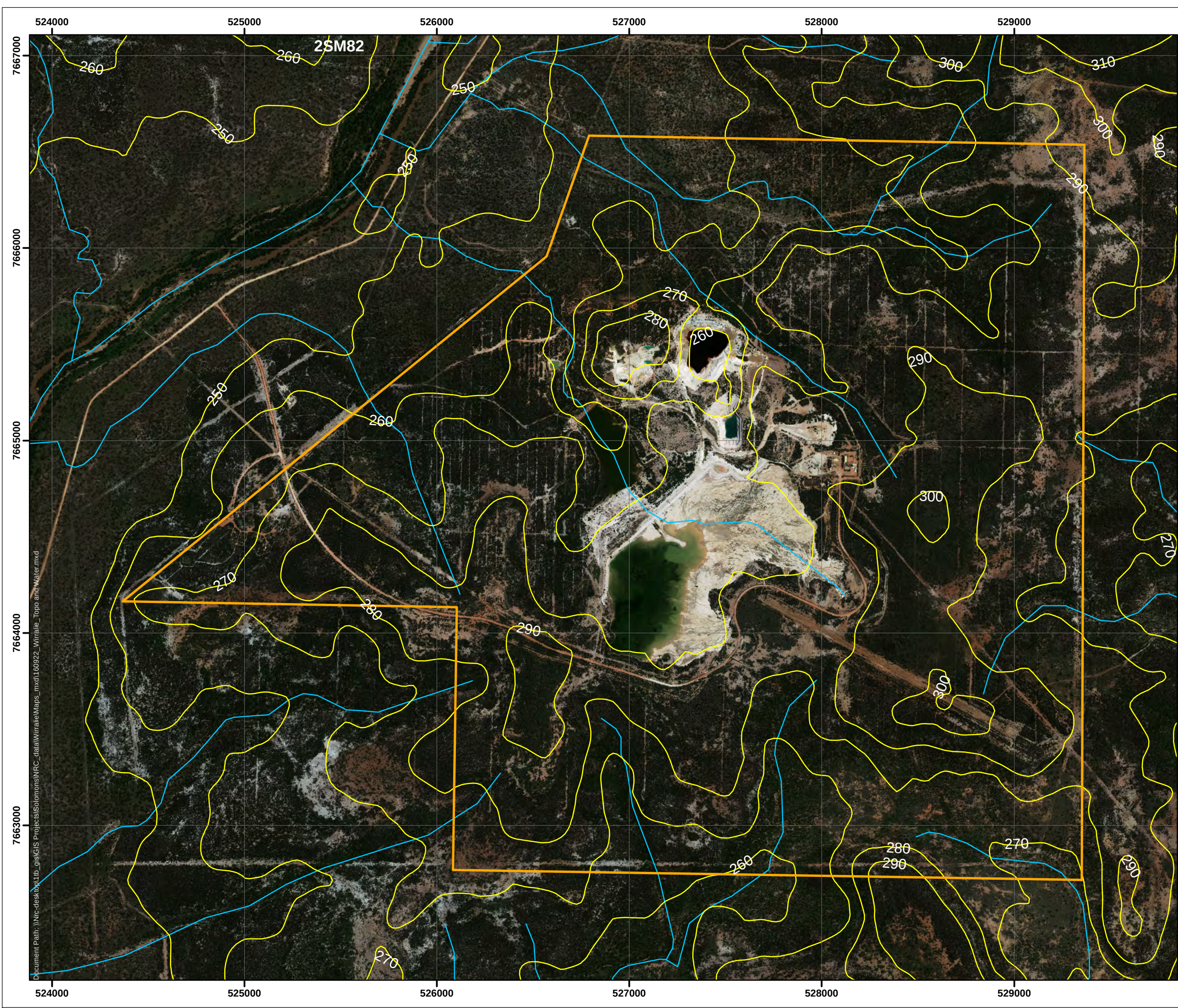
Credits:
Mine Lease boundary
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Imagery supplied by Client
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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 22-Sep-16



Scale: 1:18,000 at A3





SOLOMONS GOLD

WIRRALIE GOLD MINE MOUNT COOLON

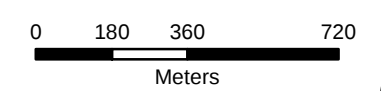
TOPOGRAPHY AND WATERCOURSES

Legend

-  Wirralie Mining Lease
-  Elevation contours (10m intervals)
-  Watercourses

Credits:
Mine Lease boundary
© State of Queensland
(Department of Natural
Resources and Mines) 2016
Imagery supplied by Client
30/09/2010

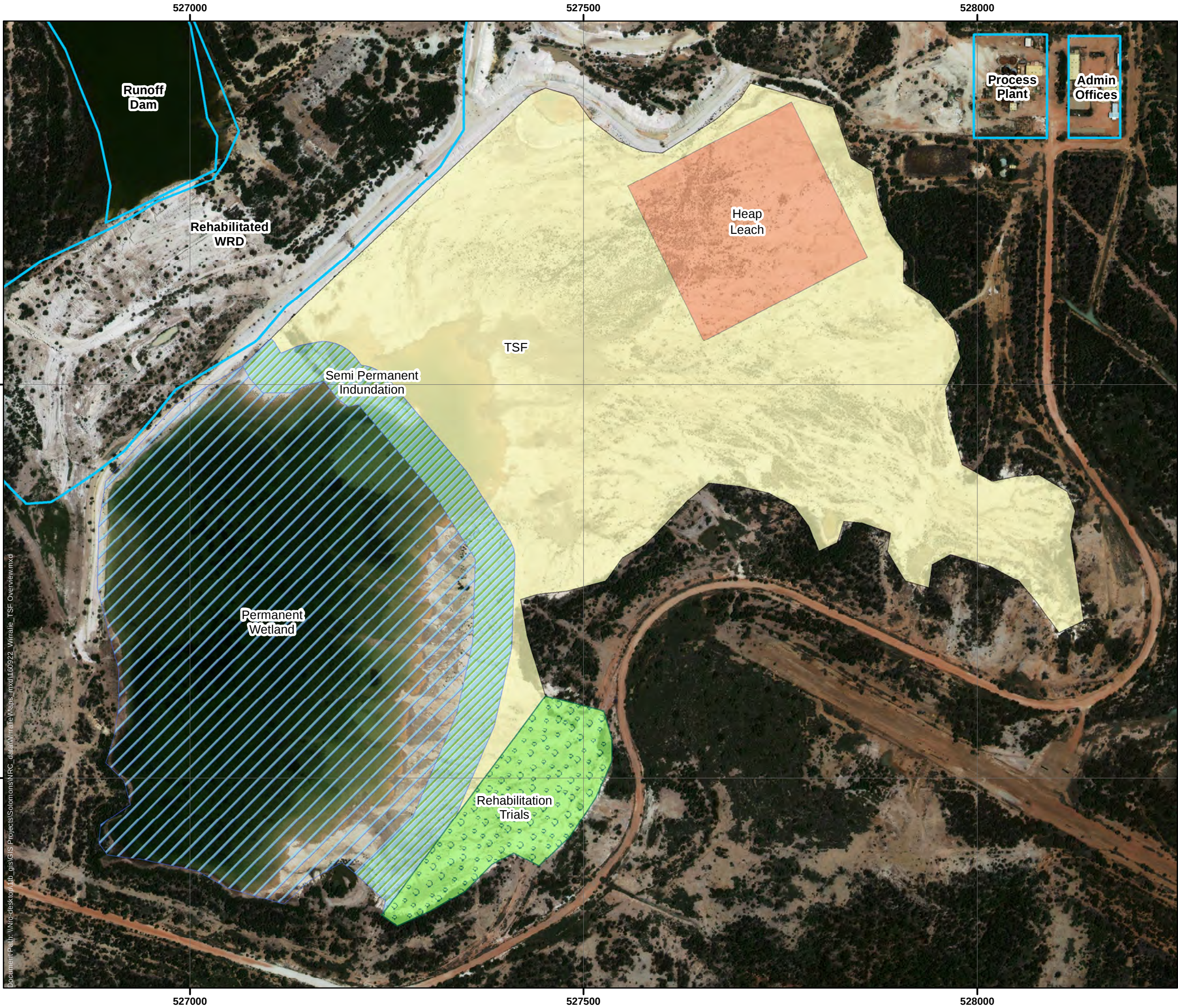
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**SOLOMONS
GOLD**

**WIRRALIE
GOLD MINE
MOUNT
COOLON**

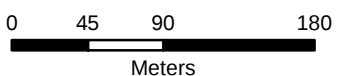
**TAILING STORAGE
FACILITY OVERVIEW**

Legend

- Site Infrastructure
- Tailing Storage Facility Overview**
 - TSF - 42Ha
 - Heap Leach - 5Ha
 - Rehabilitation Trials - 3.5Ha
 - Semi Permanent Indundation - 5Ha
 - Permanent Wetland - 25Ha

Credits:
Imagery supplied by Client
30/09/2010

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 22-Sep-16



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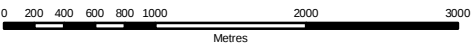




ATTACHMENT B – FLOODCHECK REGIONAL FLOOD MAP



**INTERIM FLOODPLAIN ASSESSMENT OVERLAY
SUTOR RIVER SUB-BASIN
2011 V1.0**



SCALE 1:50000
Original Size is A3

© The State of Queensland (Department of Environment and Resource Management) 2011. Imagery © ESRI 2009.
Produced for the Queensland Reconstruction Authority by the Department of Environment and Resource Management, September 2011.

- LEGEND**
- Interim Floodplain Assessment Overlay
 - Cadastral
 - Planning Scheme Boundaries
 - Locality Boundaries
 - Current Local Government Boundaries
 - Watercourses
 - Drainage Divisions
 - Drainage Basins
 - Gauging Station

MAP INFORMATION

Imagery: ESRI ArcGIS Online Imagery Basemap

Cadastral: Digital Cadastral Database (DCDB) is current as September 2011. Positional accuracy representing the 'maximum error' has been calculated at ± 57 metres.

Floodplain Assessment Overlay: For more information regarding the capture of this line please see the Foreword at the front of this atlas.

Watercourses: The average accuracy of the data is plus or minus 25 metres in the horizontal position

Drainage Sub-Basin: Sutor River

Drainage Basin: Burdekin

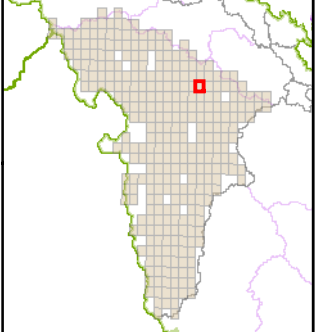
Drainage Division: North East Coast

Datum: Horizontal - Geocentric Datum of Australia 1994 (GDA94)

Projection: Horizontal - Map Grid of Australia (MGA94), which is a standard Universal Transverse Mercator (UTM) projection in Zone 55 with Central Meridian 147° East

Grid: Grid lines are at 5 kilometre intervals

Technical enquiries:
The Manager
GIS Mapping Services (Client Outcomes), Spatial Information Group
Department of Environment and Resource Management
GPO Box 2454, Brisbane QLD 4001



Queensland Reconstruction Authority



Map No.:
1203.102