



Document Information

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Executive Summary

For the Executive Summary drawn from the AGL Macquarie Additional Pre-existing Contamination Study (AGLM APECS) report on the Phase 1 Preliminary Environmental Site Assessment (PESA), completed by ES for the Tomago Development Site (TDS): 15107 TDS APECS - Volume 5 of 7, refer to **15092 AGLM APECS – Volume 1 of 7: Section 9.1; TDS APECS Executive Summary**

Limitations

Limitations and Important Information About this Report

This report has been prepared in accordance with the scope of services described in the previous sections of this report. The report has been prepared for the sole use of:

- AGL Macquarie Pty Limited (the client) and its related bodies corporate (as defined in the Corporations Act 2001 (Cth) (collectively, the AGL Parties); and
- any person who purchases the land to which this report relates from the AGL Parties; and

(Relevant Parties) and has been prepared in accordance with a scope of work agreed by the client.

The report or document does not purport to provide legal advice and any conclusions or recommendations made should not be relied upon as a substitute for such advice.

The report does not constitute a recommendation by Environmental Strategies Pty Ltd (ES) for the client, the Relevant Parties or any other party to engage in any commercial or financial transaction and any decision by the client, the Relevant Parties or other party to engage in such activities is strictly a matter for them.

The report relies upon data, surveys, measurements and results taken at or under the site at particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Relevant Parties. Furthermore, the report has been prepared solely for use by the Relevant Parties and ES accepts no responsibility for its use by other parties. Subject to the express terms of any agreement between the client and ES, the client agrees that ES' report or associated correspondence:

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Subject to the express terms of any agreement between the client and ES, no warranties, express or implied, are made. Subject to the scope of work undertaken, ES' assessment is limited strictly to identifying typical environmental conditions associated with the subject property based on the scope of work and testing undertaken and does not include and evaluation of the structural conditions of any buildings on the subject property or any other issues that relate to the operation of the site and operational compliance of the site with state or federal laws, guidelines, standards or other industry recommendations or best practice. Scope of work undertaken for assessments are agreed in advance with the client and may not necessarily comply with state or federal laws or industry guidelines for the type of assessment conducted.

Additionally unless otherwise stated ES did not conduct soil, air, wastewater or other matrix analyses including asbestos or perform contaminated sampling of any kind. Nor did ES investigate any waste material from the property that may have been disposed off the site, or undertake and assessment or review of related site waste management practices.

The results of this assessment are based upon (if undertaken as part of the scope work) a site inspection conducted by ES personnel and/or information from interviews with people who have knowledge of site conditions and/or information provided by regulatory agencies. All

conclusions and recommendations regarding the property are the professional opinions of the ES personnel involved with the project, subject to the qualifications made above.

While normal assessments of data reliability have been made, subject to the express terms of any agreement between the client and ES, ES assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of ES, or developments resulting from situations outside the scope of this project/assessment.

ES is not engaged in environmental auditing and/or reporting of any kind for the purpose of advertising sales promoting, or endorsement of any client's interests, including raising investment capital, recommending investment decisions, or other publicity purposes.

Information relating to soil, groundwater, waste, air or other matrix conditions in this document is considered to be accurate at the date of issue. Surface, subsurface and atmospheric conditions can vary across a particular site or region, which cannot be wholly defined by investigation. As a result, it is unlikely that the results and estimations presented in this report will represent the extremes of conditions within the site that may exist. Subsurface conditions including contaminant concentrations can change in a limited period of time and typically have a high level of spatial heterogeneity.

From a technical perspective, there is a high degree of uncertainty associated with the assessment of subsurface, aquatic and atmospheric environments. They are prone to be heterogeneous, complex environments, in which small subsurface features or changes in geologic conditions or other environmental anomalies can have substantial impact on water, air and chemical movement.

Major uncertainties can also occur with source characterisation, assessment of chemical fate and transport in the environment, assessment of exposure risks and health effects, and remedial action performance. These factors make uncertainty an inherent feature of potentially impacted sites. Technical uncertainties are characteristically several orders of magnitude greater at impacted sites than for other kinds of projects.

In relation the conduct of Asbestos inspections or the preparation of hazardous materials reports ES has conducted inspections and the identification of hazardous material within the constraints presented by the property. Whist efforts are made to access areas not normally accessed during normal use of the site to identify the presence of asbestos or other hazardous material, unless explicitly tested no guarantee can be provided that such material is or is not present.

ES' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report or reports reviewed. It is possible that additional testing and analysis might produce different results and/or different opinions or other opinions. ES has limited its investigation(s) to the scope agreed upon with its client. ES believes that its opinions are reasonably supported by the testing and analysis that has been undertaken (if any), and that those opinions have been developed according to the professional standard of care for the environmental consulting profession in this area at this time. Other opinions and interpretations may be possible. That standard of care may change and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.

Glossary

Abbreviation	Description
ABC	Ambient Background Concentration (NEPM 2013 Sch. B1)
ACL	Added Contaminant Limit (NEPM 2013 Sch. B1)
АСМ	Asbestos Containing Material
ADWG	Australian Drinking Water Guidelines
AFFF	Aqueous Film Forming Foams
AGLM	AGL Macquarie Pty Limited
AHD	Australian Height Datum
AIC	Areas of Identified Contamination
AMG	Australian Map Grid
ANZECC	Australian and New Zealand Environment Conservation Council
APECS	Additional Pre-Existing Contamination Study
АРНА	American Public Health Association
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
As	Arsenic
AS	Australian Standard
ASLP	Australian Standard Leaching Procedure
ASS	Acid Sulfate Soils
AST	Aboveground Storage Tank
B(a)P	Benzo(a)pyrene
B(a)P TEQ	B(a)P Toxic Equivalence Quotient (NEPM 2013 Sch. B1)
bgl	Below ground level
втех	Benzene, Toluene, Ethylbenzene, Xylene
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene
btoc	Below top of casing
Cd	Cadmium
CEC	Cation Exchange Capacity
сос	Chain of Custody
СОРС	Contaminant of Potential Concern
Cr	Chromium
Csat	Soil saturation concentration (NEPM 2013 Sch. B1)
CSM	Conceptual Site Model
Cu	Copper
CVAAS	Cold Vapour Atomic AbsoReportion Spectrometry
DEC	Dept. of Environment & Conservation (now EPA)
DECC	Dept. of Environment & Climate Changed (now EPA)
DECCW	Dept. of Environment, Climate Change and Water (now EPA)
Decon 90	Cleaning agent used to decontaminate equipment during sampling

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Abbreviation	Description	
Depths (m)	Depths have been reported as metres below the ground surface	
2.0	unless noted otherwise.	
	Dissolved Oxygen	
DP	Deposited Plan	
DQA	Data Quality Assessment	
DQI	Data Quality Indicator(s)	
DQO	Data Quality Objective(s)	
DSI	Detailed Site Investigation	
EC	Electrical Conductivity	
Eh	Redox Potential	
EIL	Environmental Investigation Level	
EMP	Environmental Management Plan	
ENM	Excavated Natural Material	
EPA	Environmental Protection Authority	
ES	Environmental Strategies Pty Ltd	
ES LPS APECS Screening	ES derived LPS APECS Screening Criteria for Salinity in groundwater	
Criteria		
ESA	Environmental Site Assessment	
ESL	Ecological Screening Level	
ESMW	Monitoring Well installed by Environmental Strategies	
FA	Fibrous Asbestos	
FB	Field Blank (quality control sample)	
F1	TRH fraction C6-C10 less BTEX for HSLs	
F2	TRH fraction >C10-C16 less Naphthalene for HSLs	
F3	TRH fraction >C16-C34	
F4	TRH fraction >C34-C40	
GAC	Groundwater Assessment Criteria	
GCFID	Gas chromatography with flame ionization detector	
GCMS	Gas Chromatograph Mass Spectrometer	
GIL	Groundwater Investigation Level(s)	
GME	Groundwater Monitoring Event	
GPR	Ground Penetrating Radar	
GSW	General Solid Waste	
GSW (Special Waste)	Asbestos Waste	
ha	Hectare (10 000 square metres in area)	
Hg	Mercury	
HIL	Health Investigation Level	
HRA	Health Risk Assessment	
HSE	Health Safety and Environment	
HSL	Health Screening Level	
HW	Hazardous Waste	

Additional Pre-Existing Contamination Study 15107RP01 TDS APECS PESA FINAL

Abbreviation	Description
ICPMS	Inductively coupled plasma mass spectrometry
ID	Identification or inner diameter where referenced to well casing
IL	Investigation Level(s)
IP	Interface Probe (measure in ground oil & water depth
ISQG	Interim Sediment Quality Guidelines
JSA	Job Safety Analysis
km	Kilometre
LCS	Laboratory Control Sample
LL	Lake Liddell
LNAPL	Light Non Aqueous Phase Liquid
LOR	Limit of Reporting
LPS	Liddell Power Station
m	Metre
mbgs	Metres below ground surface
mAHD	Metres Australian Height Datum
МАН	Monocyclic Aromatic Hydrocarbons
mbgl	Metres below ground level
mBTOC	Metres below top of casing (of monitoring well)
MGA	Map Grid of Australia 1994 - Coordinates
mg/kg	Milligrams per kilogram
mg/l	Milligrams per litre
ML	Management Limit for TPH fractions F1-F4 in soil (NEPM 2013)
ml	Millilitres
mm	Millimetres
Ms	MilliSiemens
MS	Matrix Spike or Mass Spectrometry or Mass Spectra
MSD	Matrix Spike Duplicate
МТВЕ	Methyl-tert Butyl Ether
mV	Milli-Volts
MW	Monitoring Well
N	Nitrogen
NAPL	Non-Aqueous Phase Liquid(s)
ΝΑΤΑ	National Association of Testing Laboratories
NEPC	National Environment Protection Council
NEPM 1999	National Environment Protection (Assessment of Site Contamination) Measure (as made on 10 December 1999)
NEPM 2013	NEPM 1999 incorporating amendment taking effect on 16 May 2013
NHMRC	National Health and Medical Research Council
Ni	Nickel
NL	Non Limiting

Abbreviation	Description
NSW	New South Wales
NSW EPA	NSW Environment Protection Authority
NSW OEH	NSW Office of Environment and Heritage
N/A	Not Applicable
OCPs	Organochlorine Pesticides
OPPs	Organophosphorus Pesticides
РАН	Polycyclic Aromatic Hydrocarbon
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness, Sensitivity
Pb	Lead
PFAS	Per and Polyfluorinated alkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
PID	Photo-Ionisation Detector
ppm	Parts per million
PQL	Practical Quantitation Limit
PSI	Preliminary Site Investigation
P&T	Purge and Trap
QA	Quality Assurance
QC	Quality Control
RB	Rinsate Blank (quality control sample)
RPD	Relative Percentage Difference
SAC	Soil Assessment Criteria
SAQP	Sampling and Analysis Quality Plan
SB	Soil Bore
SDAC	Sediment Assessment Criteria
SGS	SGS Australia Pty Ltd
SSC	Soil Screening Criteria
SWAC	Surface Water Assessment Criteria
SWL	Standing Water Level
ТВ	Trip Blank
ТВА	To be advised
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Tomago Development Site
Tier 1 Soil Vapour	Generic soil vapour assessment criteria referenced for selected
Criteria	analytes in NEPM 1999 (amendment 2013) Sch. B1
	Total Organic Carbon
	Total Dissolved Solids
	I OTAI PETROIEUM Hydrocarbons
IRH	I otal Recoverable Hydrocarbons
UCL	Upper Confidence Level

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Additional Pre-Existing Contamination Study 15107RP01 TDS APECS PESA FINAL

Abbreviation	Description
USCS	Unified Soil Classification System
UST	Underground Storage Tank
UCL	Upper Confidence Limit
uPVC	Unplasticised polyvinyl chloride
USEPA	United States Environmental Protection Agency
USCS	Unified Soil Classification System
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WHS	Work Health and Safety
Xylenes	The sum of ortho- (o-), meta- (m-), and para- (p-) xylenes
Zn	Zinc
μS	Micro Siemens
оС	Degrees Celsius
μg/L	Micrograms per litre

1 Introduction

AGL Macquarie (AGLM) engaged Environmental Strategies Pty Ltd (ES) to complete a Phase 1 Preliminary Environmental Site Assessment (TDS PESA) of the property identified as the Tomago Development Site (TDS), located at 1902 and 1940 Pacific Highway, Tomago NSW.

A site location map and site layout plan has been provided in Appendix A.

1.1 Background

AGLM acquired the TDS on 2 September 2014 (Completion). No activities have been carried out by AGL Macquarie on the TDS since acquisition. The TDS currently remains vacant apart from a residence, which is occupied, and an adjoining garage/shed.

As the TDS is located in an industrial area, a review of historical and current land uses is required to assist in evaluating the likelihood of contamination being present as at Completion (Pre-Existing Contamination).

1.2 Objectives of the Investigation

The overall objective of the broader study, as provided in the AGLM Specification: Additional Pre-Existing Contamination Study, Bayswater and Liddell Power Stations, April 2015, was to the define to extent practicable, the nature and extent of contamination on these sites and to make determination whether the contamination identified is Pre-Existing Contamination.

To this end, this Phase 1 ESA was aimed at identifying:

- areas of environmental concern (AEC);
- chemicals of potential concern (COPC) associated with each identified AEC;
- environmental media and or potential receptors that may be impacted by specific COPC within AECs;
- (where practicable given the scope) the extent to which any contamination identified was Pre-Existing Contamination; and
- whether a Stage 2 ESA was required to assess the environmental condition of the TDS.

1.3 Scope of Works

The scope of works for this TDS PESA was as follows:

- Preparation of a Work, Health and Safety (WHS) Plan and Job Hazard Analysis (JHA) to be implemented during the walkover inspection of the Site;
- A walkover inspection to characterise the property setting, including inspection of the surface of the TDS for obvious signs of potential contamination and/or contaminant sources (i.e. underground tanks, fly-tipped waste);
- A visual evaluation of surrounding land uses to identify any neighbouring activities which may have affected or present a potential risk to the environmental condition of the TDS;
- A review of available zoning plans, council records, and documents to determine potentially contaminating activities that may have occurred on the site;
- An evaluation of aerial photographs to assist in assessing historical land uses and conditions on and adjacent to the site;
- Review of the Local Council Dangerous Goods license database to determine the presence of any licensed dangerous goods formerly stored on the site;
- Review of historical title deed information and NSW EPA Contaminated Site Register;
- A review of the environmental setting with regards to geology, topography, hydrology and hydrogeology; and

Preparation of a report in general accordance with the National Environmental Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013), (NEPM 2013) (Ref.1) and NSW Environment Protection Authority (EPA) reporting guidelines (Ref 2).

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2 Site Identification

The location of the TDS is shown in **Figure 1**, **Appendix A**. The TDS details are provided in **Table 2.1** below and described in detail in the following sections.

Table 2.1: S	ummary of	Site	Details
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Site Characteristic	Detail
Street Address	1902 and 1940 Pacific Highway, Tomago NSW 2322
Lots / DPs	Lot 2, DP 1043561 (in two sections) Lot 3, DP 1043561
Local Government Area	Port Stephens Council
Land Zoning	Lot 2, DP 1043561 is zoned part Zone E2 – Environmental Conservation (<i>Port Stephens Local Environment Plan 2013</i>) and part Zone IN1 – General Industrial (<i>Port Stephens Local Environment Plan 2013</i>). Lot 3, DP 1043561 is zoned Zone IN1 – General Industrial (<i>Port Stephens Local Environment Plan 2013</i>).
Site Area	Lot 2, DP 1043561 – 11.385ha (9.800ha + 1.585ha) Lot 3, DP 1043561 – 16.670ha
Geographic Coordinates (to approximate centre of site) Projection: GDA94 – NSW Lambert	Lot 2, DP 1043561 – Easting: 9739961.011, Northing: 4538333.110 Lot 2, DP 1043561 – Easting: 9739374.102, Northing: 4538152.525 Lot 3, DP 1043561 – Easting: 9740263.817, Northing: 4538385.466

2.1 Site Description

The current TDS layout is presented in Appendix A.

A site walkover inspection was completed by Environmental Strategies environmental scientists Ryan Wells, Greg Sheehan and Jack O'Shaughnessy on Thursday 16th July 2015. Access to the TDS was arranged by Ray White Real Estate prior to the site walkover, and following notice to the current private tenant of the residence at the time of the site walkover. The residence was not entered as part of the site inspection, as it was occupied.

The TDS comprises two parts separated by developed land. The TDS is bounded by the Pacific Highway to the north-west, Tomago Road to the south-west, and Old Punt Road to the east. The TDS is surrounded by the Hunter River floodplain to the north, west and south-west, with dense vegetation to the north-east and east, and commercial/industrial to the south and south east.

The larger (northern) part of the TDS, identified as TDS-1 for the purposes of this report is predominantly triangular in shape and comprises of all of 1940 Pacific Highway (Lot 3) and the larger section of 1902 Pacific Highway (Lot 2). TDS-1 occupies a total area of approximately 21.2 ha. The north-west boundary is defined by the Pacific Highway, with the western and southern boundaries defined by the properties on Kilroy and Kennington Drives, respectively. The north eastern boundary is parallel to a road, which appears to be the former alignment of the northern section of Old Punt Road. The road is shown by a recent survey (October 2015) to be within the boundary of Lot 3.

The smaller (southern section) of Lot 2, identified as TDS-2 in this report, is also triangular in shape with two boundaries defined by the Pacific Highway on the north-west and Tomago Road. The remaining boundary on the eastern side is less clearly defined and backs onto land which is used for residential and commercial purposes on Kilcoy and Martin Drives, some of

which remains vacant. TDS-2 comprises the remaining, undeveloped section of Lot 2, that being the smaller of the two sections. TDS-2 covers an area of approximately 1.6 ha, and is low lying, swampy and heavily vegetated with reeds, long grass, wetland trees and shrubs. In addition to being naturally swampy it appears to also receive additional runoff from a number of surrounding properties and from both the Pacific Highway and Tomago Road. A stormwater culvert was observed to direct runoff into TDS-2 from the Pacific Highway.

A residence and adjacent shed/garage are located on the Lot 3 part of TDS-1, close to the Pacific Highway. The footprint of the residence is approximately 273 m², and the shed occupies approximately 98 m². The shed contains various quantities of chemicals and oils.

The balance of TDS-1 is currently undeveloped and heavily vegetated with shrubs or grasses. Some vehicle and animal tracks are evident across the majority of the centre section of TDS-1.

Photographs of the TDS are provided in **Appendix B**. Further details relating to the site walkover are included in **Section 4**.

2.2 Inaccessible Areas

During the site walkover, ES staff inspected both the interior and exterior of the shed. Various quantities of chemicals and oils were noted. Within the shed ES staff were unable to gain access through a locked door, which prevented inspection of the full interior. Enquires made by ES through the real estate agent handling the property could not confirm what the locked section of the shed contained. Subsequent attempts to interview the site resident were unsuccessful.

ES staff did not enter the residence during the inspection, as it was occupied.

3 Site History

3.1 Zoning

3.1.1 Current Zoning

The TDS is currently zoned:

- part Zone E2 Environmental Conservation (Port Stephens Local Environmental Plan 2013), (Ref 3).
- part Zone IN1 General Industrial (Port Stephens Local Environmental Plan 2013), (Ref 3)

The description of the zoning from the *Port Stephens Local Environment Plan 2006* (LEP 2013), (Ref 3) is presented below:

Zone E2 – Environmental Conservation

- Objectives of zone
 - To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
 - To prevent development that could destroy, damage or otherwise have an adverse effect on those values.
- Permitted without consent Bee keeping; Environmental protection works; Home occupations.
- Permitted with consent

Bed and breakfast accommodation; Building identification signs; Business identification signs; Dual occupancies; Dwelling houses; Eco-tourist facilities; Environmental facilities; Flood mitigation works; Home-based child care; Home businesses; Information and education facilities; Recreation areas; Research stations; Roads; Water recreation structures; Water supply systems.

• Prohibited

Business premises; Hotel or motel accommodation, Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Water treatment facilities; Any other development not specified in item 2 or 3 [being development permitted without consent or with consent].

Zone IN1 – General Industrial

- Objectives of zone
 - To provide a wide range of industrial and warehouse land uses.
 - To encourage employment opportunities.
 - To minimise any adverse effect of industry on other land uses.
 - To support and protect industrial land for industrial uses.
- Permitted without consent

Nil.

• Permitted with consent

Airstrips; Boat building and repair facilities; Boat launching ramps; Boat sheds; Correctional centres; Crematoria; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; Garden centres; General industries; Hardware and building supplies; Heavy industrial storage establishments; Heavy industries; Helipads; Heliports; Highway service centres; Industrial retail outlets; Industrial training facilities; Jetties; Landscaping material supplies; Light industries; Mortuaries; Neighbourhood shops; Plant nurseries; Port facilities; Research stations; Restricted premises; Roads; Rural supplies; Sawmill or log processing works; Service stations; Sex services premises; Signage; Stock and sale yards; Timber yards; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres; Water supply systems; Wharf or boating facilities; Wholesale supplies.

• Prohibited

Any development not specified in item 2 or 3 [being development permitted without consent or with consent].

3.2 Current Land Use

Part of TDS-1 is currently occupied by a residence, comprising one house and an adjoining, detached storage shed. The remainder of TDS-1 is undeveloped and unoccupied.

TDS-2 is a vacant triangular block of land which is heavily vegetated and largely water logged.

3.3 Council Development Approvals

No development plans have been submitted by AGL Macquarie to Port Stephens Council in respect of the TDS.

3.4 Title Deeds

A complete listing of historic title deeds is provided in **Appendix C** and the information has been summarised in the following sections.

The current title details show that AGL Macquarie Pty Ltd is currently the registered owner of both Lot 2 / DP 1043561 and Lot 3 / DP 1043561.

2014 – to date	AGL Macquarie Pty Ltd			
2010 – 2014	Macquarie Generation			
2002 – 2010	Tomago Aluminium Company Pty Limited			
	(Lot 3 DP 531358)			
1988 – 2002	Tomago Aluminium Company Pty Limited			
	(Lot 3 DP 531358 – CTVol 10977 Fol 163)			
1985 – 1988	Tomago Aluminium Company Pty Limited			
1969 – 1985	Robert Evan Jones, dairyman & butcher			
	(Part Portion 6 Parish Stockton – Area 433 Acres – CTVol 4856 Fol 26)			
1945 – 1969	Robert Evan Jones, dairyman & butcher			
1939 – 1945	Lionel Benjamin Israel, merchant			
1939 – 1939	Perpetual Trustee Company (Limited)			
1937 – 1939	Ernest Petherbridge, grazier			

Table 3.1: Summary of Proprietors - Lot 2 DP 1043561

	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231 & CTVol 2372 Fol 49)
1923 – 1937	Reginald Cowlishaw, solicitor Stella Cowlishaw, spinster Leslie Cowlishaw, medical practioner
1913 – 1923	Catherine Chambers Cowlishaw, widow Reginald Cowlishaw, solicitor Jane Cowlishaw, widow
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231 & CTVol 1042 Fol 230)
1895 – 1913	Thomas Cowlishaw, merchant Mahlon Clarke Cowlishaw, merchant

Table 3.2: Summary of Proprietors – Lot 3 DP 1043561

	(Lot 3 DP 1043561)
2014 – to date	AGL Macquarie Pty Ltd
2010 – 2014	Macquarie Generation
2002 – 2010	Tomago Aluminium Company Pty Limited

See Notes (a), (b) & (c).

Table 3.2 Note (a)

	(Lot 3 DP 531358)	
1988 – 2002	Tomago Aluminium Company Pty Limited	
	(Lot 3 DP 531358 – CTVol 10977 Fol 163)	
1985 – 1988	Tomago Aluminium Company Pty Limited	
1969 – 1985	Robert Evan Jones, dairyman & butcher	
	(Part Portion 6 Parish Stockton – Area 433 Acres – CTVol 4856 Fol 26)	
1945 – 1969	Robert Evan Jones, dairyman & butcher	
1939 – 1945	Lionel Benjamin Israel, merchant	
1939 – 1939	Perpetual Trustee Company (Limited)	
1937 – 1939	Ernest Petherbridge, grazier	
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231 & CTVol 2372 Fol 49)	

1923 – 1937	Reginald Cowlishaw, solicitor Stella Cowlishaw, spinster Leslie Cowlishaw, medical practioner
1913 – 1923	Catherine Chambers Cowlishaw, widow Reginald Cowlishaw, solicitor Jane Cowlishaw, widow
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231 & CTVol 1042 Fol 230)
1895 – 1913	Thomas Cowlishaw, merchant Mahlon Clarke Cowlishaw, merchant

Table 3.2 Note (b)

	(Lot 1 DP 726277)		
1988 – 2002	Tomago Aluminium Company Pty Limited		
	(Closed Road, Old Punt Road – Parish Stockton)		
Prior – 1988	Crown Road		

Table 3.2 Note (c)

	(Lot 1 DP 878496)		
1998 – 2002	Tomago Aluminium Company Pty Limited		
	(Lot 1 DP 131902)		
1996 – 1998	Tomago Aluminium Company Pty Limited		
	(Lot 1 DP 131902 – Area 674 Acres 0 Roods 24 Perches – CTVol 6352 Fol 184)		
1981 – 1996	Tomago Aluminium Company Pty Limited		
1951 – 1981	Courtaulds (Australia) Limited		
	(Part Portion 6 Parish Stockton – Area 1146 Acres – CTVol 5533 Fol 186)		
1945 – 1937	John Thomas McKee, merchant		
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231 & CTVol 2372 Fol 49)		
1923 – 1937	Reginald Cowlishaw, solicitor		
	Stella Cowlishaw, spinster		
	Leslie Cowlishaw, medical practioner		
1913 – 1923	Catherine Chambers Cowlishaw, widow		
	Reginald Cowlishaw, solicitor		

	Jane Cowlishaw, widow
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231 & CTVol 1042 Fol 230)
1895 – 1913	Thomas Cowlishaw, merchant Mahlon Clarke Cowlishaw, merchant

3.4.1 Items of Note from the Title Deeds Information

The following items from the available title deed information were noted as important in regards to the TDS PESA:

- The lots which form the TDS have changed identifiers multiple times according to the available records;
- Easements on both lots include multiple gas pipelines and electricity transmission lines;
- Tomago Aluminium Company Pty Ltd sold the TDS to Macquarie Generation in 2010; and

AGL Macquarie acquired the TDS in 2014.

3.5 Aerial Photographs

ES reviewed aerial photographs from 1954, 1966, 1975, 1987, 1998 and 2004 supplied by NSW Government Land & Property Information.

Copies of the aerial photographs are included in **Appendix D**. The relevant information from the aerial photographs review is summarised in **Table 3.3** below.

Date	Description of the Subject Site	Description of Surrounding Land
NSW 252 - 5090 Newcastle 1954 Run 2	The existing residence and shed are shown in 1954 to be in a similar location as today. However, the footprint of the buildings is slightly different than is shown on later photos, with the residence and shed slightly further apart in the earliest photo. TDS-1 has been mostly cleared of woody vegetation with grass cover evident. A drainage channel or vehicular track runs from the central area of the site east towards the boundary where a main road is located. TDS-2 remains uncleared. Old Punt Road connects Tomago Road to the Pacific Highway parallel to the TDS's north-east boundary.	 North: vacant floodplain, likely to be mostly cleared. West: Vacant floodplain, likely to have been mostly cleared. South: Some buildings, likely of a residential purpose, aluminium smelter also present to south-east. Mostly cleared of trees and shrubs, with grasses dominant. East: Vacant land mostly uncleared land with exception of a cleared strip.

Table 3.3: Summary of Aerial Photography at 1902-1940 Pacific Highway Tomago

Date	Description of the Subject Site	Description of Surrounding Land		
NSW 1464 – 5167 Newcastle 1966 Run 2N	The residence and shed appear to have either been renovated, with the residence extended or have been replaced. The buildings occupy the same section of the TDS and in the same orientation as in the 1954 photo. This suggests that the buildings are more likely to have been renovated, than replaced. There is no other new infrastructure on the TDS. The central drainage channel or vehicular track appears to be disused or overgrown. TDS- 2 remains uncleared. Old Punt Road connects Tomago Road to the Pacific Highway parallel to the Site's north-east boundary.	 North: There is no apparent change. West: There is no apparent change. South: There appears to be more buildings along Tomago Road, and a larger industrial/commercial shed to the south-east of the smaller subject site. East: There appears to be no apparent change. 		
NSW 2314 – 92 Newcastle 1975 Run 6	The TDS appears to be unchanged, aside from the clearing of some woody vegetation in the south-eastern corner of the main site. TDS-2 remains uncleared. Old Punt Road still connects Tomago Road to the Pacific Highway parallel to the Site's north-east boundary.	 North: Little appears to have changed. West: A cluster of buildings have been erected to the west of the main site and immediately north of the smaller site. This facility appears to be extracting from or depositing water to the Hunter River, evidenced by the pipeline leading north-west to the river. South: The clearing of vegetation has continued from the subject site. Further dwellings have been erected, as has the former Newcastle Speedway. East: Scarring of the land is visible for what could be extraction of the Tomago sands. 		
NSW 3571 – 28 Newcastle 1987 Run 6	The TDS largely appears unchanged. No additional structures have been erected, however there is some land scarring south-east of the residential dwellings. From this clearing, there is a vehicular track that dissects the property to the eastern boundary, and finishes at the same location as the previous track, evident in the 1954 aerial photograph. The road it connects to appears to remain in use, however no longer as a primary route. There is now a small water storage body, likely man-made, in the north-east corner of the site, just south of the stand of trees. TDS-2 remains uncleared. The northern section of Old Punt Road adjacent to the TDS boundary has been realigned further to the north-east and now joins the Pacific Highway approximately 300 m further north.	 North: Little appears to have changed. West: Consolidation of the building for industrial/commercial purposes. South: An increased number of industrial/commercial premises have been erected. Further clearing and a much greater impact to the south-east with the expansion of the Tomago Aluminium facility. East: There appears to be little change. 		

Date		Description of the Subject Site	Description of Surrounding Land	
NSW (M2143) Newcastle Run 5	4456 1998	Vegetation in the south-east corner is regenerating. The remainder of the TDS appears similar to 1987.	 North: Little appears to have changed. West: Little appears to have changed. South: buildings, seemingly for industry purposes, have risen onto the Hunter River, at the point where the river branches into a fork. Previous dwellings appear to have been consolidated with the erection of others into an industrial estate. East: Previously scarred lands are regenerating with woody vegetation however scarring remains. Beyond scarred land is further scarred land with some additional buildings, likely for industry purposes. 	
NSW (M2448) Newcastle Run 9	4875 2004	Regeneration of vegetation in south-east corner continues, and is also thicker in north-east corner. Throughout the TDS there appears to be more solitary trees than previously. The south-west corner of the main site appears to have a type of circular/oblong track (possibly used for the training of horses). TDS-2 remains uncleared. Since 2004 the area immediately to the west and south of TDS-1 has been extensively developed, with industrial / commercial properties established along the newly created roads of Kilcoy and Kennington Drives and Abbot Lane.	 North: Little appears to have changed. West: More vegetation is apparent, as is the appearance of further dwellings, likely residential and associated sheds. South: Further erections of industrial buildings. West: Further erections of industrial buildings. 	

Aerials sourced from the NSW Land & Property Information, a division of the Department of Finance & Services.

The review of historical aerial photography indicates that:

- The TDS has never been used for industrial purposes or for market gardens;
- The TDS appeared to be used partly for residential purposes but to otherwise have remained vacant since the time of the earliest available aerial photograph in 1954;
- A large industrial facility (Tomago Aluminium Smelter, in various stages of expansion), located 0.5 km to the south-east of the Site, was present in the earliest available aerial photograph in 1954;
- The TDS borders an industrial cluster, which began populating from the 1966 and may have a history of manufacturing of building materials;
- Motor sporting facilities were present at a distance of approximately 0.5 km southsoutheast from the TDS between the1966 and 1998; and
- Industrial and/or commercial land use in the vicinity of the TDS intensified in the period from 1987 to the present.

3.6 Chemical Inventory

As stated in **Section 3.1**, a shed was observed adjacent the main residence. The shed is a separate and closed building comprised of brick (walls) and concrete sealed floors with no bunding and was observed to contain domestic (small) quantities of various chemicals and oils. The shed floor was observed to be in good condition with only minor staining, such as would be expected to be found in a domestic setting. The following quantities of chemicals and oils were observed in the shed:

Item	Number of Items	Quantity
Boston Penetrating and Multilube Spray	1	400 g
Castrol Brake Fluid	1	4 L
Diggers All Purpose Thinner Premium Grade	1	4 L
Duplicolour Metalcast colour paint	1	311 g
CRC Co Contact Cleaner	1	350 g
Mobil Mobilube HO Multigrade Transmission and Differential Oil	1	1 L
Gas bottle	1	
Kumho P&B Chemicals Acetone	1	205 L
12V Battery	1	_

No industrial, manufacturing or market gardening processes were evident on the site walkover and no evidence of these activities in the past was identified. However, based on observations it is possible that the non-commercial repair, painting and / or maintenance of private vehicles is likely to have occurred.

3.7 Product Spill and Loss History

No information regarding product spill and loss history was available for review at the time of writing this report and, given the site history, it seems unlikely that any such records are in existence for the TDS.

3.8 Discharges to Land, Water and Air

No information regarding discharges to land, water and air from the TDS was available for review at the time of writing this report. Given the site history and observations made during the site inspection it is considered that the current and approved uses of the TDS under the site zoning have low potential to impact the environment (either on the TDS or adjoining properties).

3.9 Waste Disposal Locations

No information regarding disposal locations was available for review at the time of writing this report. Waste disposal activities, observed during the site walkover, were not identified from review of aerial photographs. Given the site history, other than the observations made during the site inspection, it is considered that the TDS has low potential for the presence of unidentified onsite waste disposal areas. The geotechnical borelogs (DP June 2008) did not note the presence of fill in any of the 32 bores advanced across the TDS.

3.10 Complaint History

No information regarding complaint history was available for review at the time of writing this report. Given the TDS has been used for residential purposes, it is unlikely that a complaint history exists.

3.11 Local Site Knowledge (Past and Present)

No information regarding local site knowledge was reviewed at the time of writing this report. However, ES staff involved in the preparation of this report have several decades of regional knowledge and have applied this to consideration of the report findings.

3.12 Permits, Licences, approvals and trade waste agreements

AGL holds no information regarding any permits, licences, approvals and trade waste agreements for the TDS. ES did not make further enquires as to the existence of the above, as based on the historical use, the largely undeveloped nature, and the observations made during the site walkover, it is unlikely that such items exist for the TDS.

3.13 Property Searches

The following property searches have been completed:

- Notices under the Contaminated Land Management Act (CLM) Act (Ref 4); and
- Notices under the Protection of the Environment Operations Act (POEO) Act (Ref 5).

3.13.1 Review of NSW EPA Record of Notices

The NSW EPA Contaminated Land Public Record contains records of written notices issued under the CLM Act, including those prior to the commencement of the CLM Amendment Act 2008. ES searched the record for Notices issued to sites in Tomago NSW between 1 January 1951 and 27 July 2015 (the date of the search). It is noted that the Contaminated Land Public Record is not a listing of all contaminated sites in New South Wales.

The search did not return records of any EPA notices issued to the TDS, nor to sites within 1 km of the TDS.

3.13.2 Review of List of Contaminated Sites Notified to NSW EPA

At the date of the search conducted 27 July 2015, the TDS was not included on the List of Contaminated Sites Notified to EPA (Ref 6), being current at 27 July 2015.

The list is a publically available list of contaminated sites that EPA is aware of, with regard to its regulatory role under the CLM Act. Note that an absence of a site from the list does not necessarily imply the site is not contaminated (NSW EPA).

3.13.3 Review of POEO Public Register

ES searched the Protection of the Environment Operations (POEO) Act Public Register (Ref 7) for licenses, and notices issued under the POEO Act to sites in Tomago NSW. The registered search returned no results for the TDS, nor for sites within 1 km of the TDS.

A site specific search of known industrial sites within 1 km of TDS showed that activities of Tomago Aluminium Company Pty Ltd, located at 35 & 45 Tomago Road are regulated by NSW EPA under Environmental Protection Licence (EPL) 6163. EPL 6163 licences the following activities:

- Scheduled Activity
 - Metallurgical activities;
 - Waste Processing (non-thermal treatment);
 - Waste Storage.
- Fee Based Activity
 - Aluminium production (alumina), >10000 T processed;
 - Metal waste generation, > 100 T generated or stored;
 - \circ $\;$ Non-thermal treatment of hazardous and other waste, Any T (tonnage) treated; $\;$
 - Waste storage hazardous, restricted solid, liquid, clinical and related waste and asbestos waste, >0 T stored.

3.13.4 Review of Aboriginal Heritage Register

A review of the NSW OEH list of registered Aboriginal sites (Ref 8) does not include the TDS or any of the surrounding properties. This is also verified by the NSW OEH Atlas of Registered Aboriginal sites.

3.14 Review of Council Records

Planning Certificates under section 149(2) and 149(5) of the *Environmental Planning* & *Assessment Act (1979) (as amended)* (Ref 11) were requested from Port Stephens Council for each Lot/DP on the Site. Copies of the certificates are provided in **Appendix E**. Review of the certificates indicated the following (for both Lots/DPs comprising the Site):

- The controlling instrument for the subject site is currently the Port Stephens Local Environment Plan 2013. State Environment Planning Policies (SEPPs) which apply to development on the land are detailed in the planning certificates;
- The zoning for the Site is part Zone E2 Environmental Conservation (Port Stephens Local Environmental Plan 2013) and part Zone IN1 – General Industrial (Port Stephens Local Environmental Plan 2013);
- No Draft Local Environment Plans or Draft State Environment Planning Policies currently exist or have been publicly displayed for comment which may affect the development on the subject site;
- The Port Stephens Development Control Plan 2013 applies to the subject site with the purpose of carrying out development on the land (the TDS);
- The TDS does not include or comprise a critical habitat;
- The TDS is not in a conservation area;
- No item of environmental heritage is situated on the Lots;
- Complying development may not be carried out on the subject site, under SEPP (Exempt & Complying Development Codes) 2008;
- The TDS is not affected by the operation of Section 38 or 39 of the *Coastal Protection Act 1979*;
- The TDS is not affected by an order under 4D of the *Coastal Protection Act 1979*;
- The TDS is not affected by temporary coastal protection works;
- The TDS is not subject to annual charges under section 496B of the Local Government Act 1993 for coastal protection services relating to existing coastal protection works to which the owner (or any previous owner) of the land has consented;
- The TDS is not within a proclaimed mine subsidence district under the *Mine Subsidence Compensation Act 1961;*
- Lot 2 and Lot 3 are both affected by a proposal for road widening or road realignment in accordance with one of the following:- (1) Section 25 of the *Roads Act 1993*; or (2) an environmental planning instrument; or (3) a resolution of Council;
- Council's records indicate that Lot 2 and Lot 3 may be wholly or partially contaminated which may restrict development. Any purchaser(s)/user(s) of the subject site must satisfy themselves that the land is fit, or be reasonably made fit, for the purposes proposed for the site. Responsibility for identification and management of contaminated lands rests with the landowner (See notes below regarding the planning certificate for the Site for more detail).
- The TDS is not affected by RAAF Base Williamtown & Salt Ash Weapons Range 2025 ANEF (10th August 2011); or the Aircraft Noise Planning Area within Chapter B15 Aircraft Noise for Buildings of the *Port Stephens Development Control Plan 2013*;
- Council's records indicate Lot 2 and Lot 3 may be wholly or partially flood prone land. Council has adopted policy which restricts development on land so affected. Development on flood prone land is subject to flood related development controls;
- Port Stephens Local Environment Plan 2013 does not provide for the acquisition of the TDS, or part thereof, by a public authority as referred to in Section 27 of the Environmental Planning & Assessment Act 1979;

- Contribution plans applicable to the TDS include Port Stephens Section 94 Development Contributions Plan 2007, and Port Stephens Section 94A Development Contributions Plan 2006. These documents specify development contributions required towards the cost of providing additional community services of facilities if a property is developed;
- The TDS is not biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*), that Council is aware;
- The TDS has no biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*, that Council is aware;
- The TDS is shown as bush fire prone land, as defined in the Environmental Planning and Assessment Act 1979, in Council's records;
- Council has not been notified of any Property Vegetation Plans under the Native Vegetation Act 2003;
- The TDS is not affected by an order under the *Trees (Disputes Between Neighbours) Act 2006* of which Council is aware;
- The TDS is not affected by a direction by the Minister, in force under Section 75P(2) (c1) of the Environmental Planning and Assessment Act 1979;
- Council is not aware of a Site Compatibility Certificate affecting the site and no terms referred to in clause 18(2) of the policy have been imposed as a condition of development consent;
- The TDS is not affected by a valid Site Compatibility Certificate (infrastructure) issued under the State Environment Planning Policy (Infrastructure) 2007;
- The TDS is not affected by a current Site Compatibility Certificate issued under the State Environmental Planning Policy (Affordable Rental Housing) 2009, nor is Council aware of the land being affected by any terms of a kind referred to in clause 17(1) or 38(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as conditions of consent to a development application granted after 11 October 2007;
- There are no prescribed matters under Section 59(2) of the *Contaminated Land Management Act 1997* to be disclosed.
- The TDS is not subject to any exemption under Section 23 or authorisation under Section 24 of the National Building and Jobs Plan (State Infrastructure Delivery) Act 2009.

The Planning Certificate states that:

Council must take into consideration the likely effect of proposed development on the heritage significance of a heritage item, heritage conservation area, archaeological site or potential archaeological site and on its setting when determining an application for consent to carry out development on land in its vicinity.

When determining a development application on known or potential archaeological sites of both Aboriginal and non-Aboriginal heritage significance, Council must consider an assessment of how the proposed development would affect the conservation of the site and any relic known or reasonably likely to be known at the site.

The property is located within the Tomago Aluminium Smelter Buffer Zone. Tomago Aluminium Pty Ltd is required to take all reasonable steps to acquire certain properties within this buffer zone. Due to the proximity of the site to Tomago Aluminium, potential exists for the site [TDS] to have been impacted by air or water releases from the smelter [this issue is discussed in further detail in Section 4.16].

This property is located within or adjacent to the RMS' preferred route corridor for the F3 Freeway to Raymond Terrace Pacific Highway upgrade.

All areas of the Port Stephens Local Government Area are now, or forecast to be, affected by aircraft noise from time to time.

Clause 5.9 of the Port Stephen Local Environment Plan 2013 applies to the land, and states:

"A person must not ringbark, cut down, top lop, remove, injure, wilfully destroy any tree or other vegetation without either development consent or a permit granted by Council as specified in Port Stephens Development Control Plan 2013"

However, clause 5.9 may not apply in respect to certain circumstances.

Parts of the Port Stephens Local Government Area are affected by koala habitat, and is subject to Port Stephens Comprehensive Koala Plan of Management 2002 (Ref 9), made under State Environmental Planning Proposal 44. [A review of the Port Stephens Koala Management Map, shows that most of the site is designated as 'Cleared Land', however a triangular section trees at the northern tip of the TDS, north of the manmade dam is designated as 'Supplementary Koala Habitat'. This section is approximately 1.8 ha in area.]

Parts of the Port Stephens Local Government Area contain plants listed under the Noxious Weed Act 1993 which may restrict the use of the land. Identification of weeds was outside the scope of the current investigation.

3.15 Potential Onsite Contaminant Sources

A review of the historical records, anecdotal information and observations made during the walkover inspection indicate the following potential historic and current contaminant sources on the site:

- Potential asbestos containing material located in the eaves of the buildings, and also within the eastern boundary of Lot 3, on the edge of a sealed road of poor condition.
- Storage and use of chemicals.
- Septic systems present one each on northern and western aspect of the residential building.
- Minor oil stains on grass.
- Raised mound with 200 L drum, with evidence of burning.
- Burnt out cars, with possible extraction of fuel systems.
- General rubbish, possibly blown in from Pacific Highway.
- Other rubbish including polystyrene, bricks, car parts including doors and tyres.
- Mounded vegetation with possible fill that includes gravels and rocks.
- Paint on eaves of both the residence and the shed is flaking and has potential to contain lead and other heavy metals.

3.16 Potential Off Site Contaminant Sources

A review of the historical records, anecdotal information and site observations indicate the following potential historic and current contaminant sources to the site:

Tomago Aluminium Smelter – smelting of aluminium produces a number of by-products which have potential to impact the environment. Some of these by-products are discharges to the atmosphere and so have minor potential to directly impact surrounding properties by residing in either soil or water. However, there are two notable exceptions to the above. These are fluorides and polycyclic aromatic hydrocarbons (PAHs), both of which are known to not only be produced by aluminium smelting but to have potential to impact soil, surface and groundwater on smelter and surrounding sites. The potential for impact to have occurred on the TDS as a result of the proximity of the smelter is supported by the information provided on the Port Stephens DCP 2013 and associated planning certificates. However, further examination of the physical setting of the TDS indicates that the potential for fluorides and /or PAHs originating from Tomago Aluminium to have contributed significantly to the contamination of the Site is likely to be low for the following reasons:

- the closest point of the Tomago Aluminium facility is more than 0.5 km away from the Site;
- a natural ridge, fully vegetated with healthy, mature trees, which is higher than the smelter site or the TDS, is a likely buffer to airborne impacts between the TDS and Tomago Aluminium;
- The topography indicates that surface water immediately north-west of the Tomago Aluminium facility (that is between Tomago Aluminium and the TDS) and groundwater on the Tomago Aluminium site are likely to flow to the south, away from the TDS; and
- Surface runoff from Tomago Aluminium is predominantly directed to a large catchment dam on the southern side of the facility and from there flows south into the Hunter River, again away from the TDS.

4 Site Condition and Surrounding Environment

4.1 Site Observations

During the site walkover inspection, a number of observations were made with regards to potential or actual sources of impact. These observations are discussed in greater detail in the following section. A summary of observations from review of available information and the site walkover is provided in **Table 4.1**.

Table 4.1: Summary of Observations at the TDS

Site Walkover Photo (Appendix B)	Location(s)	Condition
Abandoned motor vehicles	Northern, near dwellings	Poor
Dumping of rubbish, including car parts	North-eastern boundary road	Poor
Possible asbestos containing material	North-eastern boundary road	Poor
One of many survey pegs identified	Throughout site	
Uncapped and unknown groundwater monitoring well	Central	Fair
Dense vegetation	Smaller Lot 2	Fair
Residence	Lot 3	Fair
Shed	Lot 3	Fair

4.2 Hazardous Materials

ES did not undertake a formal hazardous materials assessment during the site walkover inspection. It is not known to ES if a hazardous material survey or an environmental site assessment has ever been undertaken to date. AGLM were able provide a geotechnical report, Douglas Partners: Report on Geotechnical Investigation; Proposed Gas Storage Area – Proposed Power Station, Old Punt Road, Tomago; Project 39762.1, June 2008 (DP June 2008) (Ref 10) as part of the site background information, but no environmental assessment reports were provided or have been reviewed.

Potential asbestos containing material was observed within the eaves of the buildings and in other areas of the TDS where fly dumping was evident.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by Work Cover NSW did not identify any licensed Dangerous Goods items on the TDS:

Please refer to **Appendix E** for details of the searches completed by Work Cover NSW.

4.3 Storage Tanks

Observations made during the site inspection did not identify the presence of any underground storage tanks (USTs) at the TDS at the time of the site walkover inspection. Work Cover records also did not indicate the presence of USTs on the TDS.

4.4 Surrounding Land-uses

The current land-uses of adjacent properties surrounding the TDS are summarised below:

North: Hunter River and floodplain;

East: Dense vegetation and commercial/industrial buildings. The Tomago Aluminium Smelter operates within approximately 1km south east of the TDS;

South: Hunter River and floodplain, commercial/industrial buildings adjoining the site. These businesses were observed to include:

- All Class Training Pty Ltd Provides training and assessment for WorkCover High Risk Work Licence classes (except boiler)" (Ref.15);
- APM Engineering "Design & Supply of Custom Polyurethane Products" (**Ref.16**);
- Pacific Rail Engineering Provides "inspections, service and repairs" of rail based equipment (Ref.17);
- All Engineering Services Pty Ltd, Tomago Division no information available;

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- Hunter Valley Compressors Pty Ltd Provides "electrical, petrol and diesel powered breathing air compressors for recreational and commercial applications" (Ref.18);
- VINKEM Packaging Provides "packaging products for the wine industry" (Ref.19);
- Tropic Asphalts Pty Ltd provider of asphalt (Ref.20)

West: Hunter River and floodplain.

4.5 Topography

The buildings sit on the crest of a low hill. In relation to the position of the buildings the TDS falls towards the western, northern and eastern boundaries, with the gradient steepest towards the western boundary (toward Lot 2). The slope gradient towards the eastern boundary was noticeable, but not steep.

In general, the land immediately to the north and east is higher than the TDS, and forms part of a low, crescent-shaped ridge which is predominantly covered with bushland, running from almost the Pacific Highway in the north to Tomago Road in the south.

4.6 Conditions of the Site Boundary

A number of boundaries exist between the properties that comprise the TDS. For the purposes of this investigation the conditions of the boundaries on the perimeter of the entire subject site are listed below:

- Northern Boundary: Fence appeared to be in poor condition.
- Western Boundary: Fence appeared to be in good condition.
- Eastern Boundary: Fence appeared to be in poor condition, with areas of no fence present.

4.7 Visible Signs of Contamination

Visible signs of contamination, or potential contamination on the TDS, were evidenced as follows:

- oil stained grass which appeared highly stressed (several small patches observed around dumped car parts (approximately 30m south east of the residential building, each <1 m diameter):
- flaking paint that may be of a leaded base on the eaves of both buildings;
- eaves on the two buildings are possibly asbestos containing material (ACM);
- fill mounds (which contain potential ACM); and
- car parts.

4.8 Visible Signs of Plant Stress.

There were no visible signs of plant stress in the vegetated areas of the subject site, other than the oil stained grass as noted above.

4.9 Presence of Drums, Wastes and Fill Material

There were no visible signs of putrescible waste on the TDS, but general waste was observed onsite during the site walkover inspection. The presence of two, 205 L steel drums was observed in close proximity to the abandoned vehicles with evidence that they had either been used for burning of rubbish and/or as receptacles for bonfires. The drums were punctured in several locations around the sides, presumably to allow better air flow. It is unknown what materials may have been combusted. Potential ACM was observed in one of the areas along the northern boundary in which some fly dumping of waste had occurred.

Extensive fly dumping of waste material was noted along the majority of the former alignment of Old Punt Road, for a distance of approximately 500-600 m. Wastes such as drums, vehicle bodies, timber, vegetation clippings and a number of other general wastes were observed along this section of the TDS. The extent, position and spread of the observed waste and the surrounding vegetation made an accurate estimate of the volumes

encountered difficult. Further works to fully investigate and map the waste would be required to achieve this outcome.

No fill material was noted on the TDS in observations made during the Phase 1 ESA or the geotechnical investigation (DP June 2008), other than the mounds placed on the property adjacent to the eastern boundary of TDS-2, and which over time may have encroached over the boundary onto the TDS.

The locations of the above issues are shown on Figures 2-6 in Appendix A.

4.10 Odours

No significant odours were noted either in general across the TDS, or inside of the shed/garage.

4.11 Conditions of Buildings

The condition of both buildings on the TDS appears good, with the exception of flaking paint on the eaves.

4.12 Quality of Surface Water

A small dam approximately 15 m in diameter was observed in the north-west corner of the TDS. The dam is located on the southern side of the stand of trees. Drainage channels appear to have been constructed to allow for the direction of surface runoff from the southern and central sections of the site into the dam. These drainage channels were vegetated and dry at the time of the walkover inspection.

A second dam was observed on the southern side of TDS-1, approximately 45 m north of the northern end of Abbott Lane. This dam which is largely overgrown did not appear to hold water to the same degree as the northern dam and based on observations is only likely to hold water immediately after periods of rain. As per the northern dam drainage shallow channels appear to have been constructed to direct surface water from the southern section of TDS-1 into the dam.

No evidence of staining was observed in either the drains or the dams, nor was either observed to have notable indicators of impact, such as strong odours, scum, slicks or dead fauna.

TDS-2 is low lying and swampy, with surface water close to or above the site surface, particularly toward the centre. TDS-2 did have not notable indicators of impact, such as strong odours, scum, slicks or dead fauna. However, some or all of these indicators could reasonably be expected within a wetland on occasion, due to natural processes.

4.13 Local Sensitive Environments

Environmental receptors observed during the Phase 1 ESA walkover were:

- Commercial/industrial buildings to the south and between Lot 2 and Lot 3;
- Stands of trees (designated as Supplementary Koala Habitat) to the immediate northeast; and
- Beyond the Pacific Highway and Tomago Road, the Hunter River is to the north, west and south of the site, between which are wetlands and stands of mangrove.

5 Geology and Hydrogeology

5.1 Geology

A review of the Newcastle 1:250,000 Geological Series Sheet S1 56-2 (NSW Department of Mines, 1966) (Ref 12) indicates that a section of the TDS is mapped as Qa – Quaternary gravel, sand, silt, clay, "Waterloo Rock" Marine and freshwater deposits. The majority of the TDS, however, is mapped as Pt – Permian, Tomago Coal Measures, of shale, mudstone, sandstone, tuff and coal.

The Geotechnical Investigation (DP June 2008), (**Appendix G**) summarised the subsurface conditions on the sites as follows:

- TOPSOIL 0.0 to 0.05/0.7 m;
- Firm Clayey SILT/Silty Clay 0.05/0.3 to 0.15/1.0 m;
- Stiff CLAY/Silty CLAY 0.3/0.8 to 1.2/4.0 m;
- BEDROCK 1.2/4.2 m.

ES has reviewed the bore logs within the DP (June 2008) and note that the bedrock is described in each borehole as either 'siltstone' or 'sandstone'.

5.2 Fill Material

The site was observed to have raised mounds covered in vegetation that indicate the potential for an unknown fill material within the site. Minor cutting and filling activities have occurred on the site in order to construct the drainage systems and the manmade dams. Some gravels were noted at one vegetated mound. The position of the mounds is shown on **Figures 3 and 4** in **Appendix A**. However, no fill materials were noted in any of the 32 bores advanced across the site as part of the Geotechnical Investigation (DP June 2008). This indicates that other than the observed mounds, the potential for large volumes of uncontrolled fill to exist on the TDS is low.

5.3 Groundwater Bore Search

A search of the NSW National Resources Atlas (Ref 13) revealed a total of four registered groundwater bores within an approximate 500 m radius of the TDS. A listing of all registered groundwater bores is available in **Appendix F**. No details were available as to the construction or purpose of the bores. A summary of these groundwater bores is presented in **Table 5.1**.

Table 3.1. Summary of registered groundwater bores								
Works number	GDA94	GDA94	Distance	Purpose				
	Easting	Northing	from Site (m approx.)					
GW079605	378090.0	6368487.0	150 (nth of Lot 2 - small section)	No entry				
GW079591	379370.0	6369241.0	300 (NW of Lot 3)	No entry				
GW079412	379499.0	6369390.0	500 (NW of Lot 3)	No entry				
GW201068	379505.0	6367870.0	500 (SE of Lot 2 - large section)	Monitoring				
				Bore				

Table	5.1:	Summary	of	registered	groundwater	bores
		o annar y	<u> </u>	- cgiotei ca	Broananater	00.00

Of the groundwater bores listed above only one, GW079605 could be considered to be downgradient of the TDS, and therefore represent a potential receptor. Based on the topography the other three bores appear to be cross-gradient and so not likely to be representative of groundwater coming onto or leaving the TDS.

5.4 Onsite Groundwater Wells

A groundwater monitoring well was located during the site walkover, but this groundwater monitoring well was not identified on the search for registered groundwater bores. The well was uncapped and did not have any identification marks present. The depth to water was not

measured during the site investigation as wells were not anticipated to be encountered. However, the level of the water was shallow enough to be able to visually discern water in the well. Based on observations made at the time it is estimated that the standing water level was \leq 1.5 metres below ground level (mbgl).

5.5 Hydrogeology

DP June 2008 (**Appendix G**) made observations as to the depth of groundwater on the site when drilling bores for geotechnical purposes. Based on these observations, groundwater on the TDS could be considered to be present at shallow depths and was likely to be encountered above the bedrock within 1.5 mbgl, especially toward the southern section of the site.

The shallow groundwater is likely to be contained within the stiff clay above the bedrock and there may be some confining pressure from this zone by the shallow clay above it. The bedrock is anticipated to be of low permeability and unlikely to produce water within 15 metres of the surface. There is insufficient current data to predict whether there is any obvious connection between the shallow groundwater and surface water in the area.

On the northern section of the TDS it may be necessary to drill into the bedrock in order to intercept groundwater.

5.6 Hydrology

The nearest offsite surface water receptors are an open drain on the SE alignment of the Pacific Highway which appear to discharge back onto TDS-2. Surface water from TDS-2 appears to discharge from the southern tip directly into a large drainage channel flowing under Tomago Road and into wetland to the west. The large drainage channel appears to receive surface water runoff from most of the properties on the north-west side of Old Punt Road, including the southern section of TDS-1.

The onsite surface water receptors consist of a number of unlined drainage channels and dams. Visually, the onsite drainage channels in the vicinity of the buildings on TDS-1 flows to the man-made dam at the northern end of the TDS.

On the southern section of TDS-1, the drains appear to direct flow into the overgrown dam adjacent the southern boundary. This dam does not appear to hold water.

Beyond the boundaries, the Hunter River surrounds the site from the north, west and south with the closest point being approximately 450 m north, on the opposite side of the Pacific Highway. Based on observations made of the overall drainage system of the area it is likely that most of the surface water on the site would eventually be directed south under Tomago Road as stormwater.

The main elements of the surface drainage system on the TDS and adjoining properties is shown on **Figure 7** in **Appendix A.**

5.7 Summary of Local Meteorology

A review of available climate statistics for the subject site was obtained from the Bureau of Meteorology (Ref 14). The nearest observation point from which monthly climate statistics were available was Station 061390, based at the University of Newcastle, 7.8km away from the TDS which is located at 32.82°S, 151.70°E. The following information is a summary of the available datafrom1998-2015.

Table 5.2: Summary of local meteorological da

Statistics	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Тетр													
Mean max temp (°C)	29.1	28.2	26.7	23.8	21.0	18.4	17.8	19.7	22.8	24.7	25.9	27.6	23.9
Mean min temp (°C)	19.4	19.3	17.3	13.9	10.5	8.7	7.3	7.9	10.7	13.2	15.9	17.8	13.4
Rainfall													
Mean rainfall (mm)	70.4	145.2	111.3	140.2	100.9	124.1	58.9	65.0	65.7	60.0	119.3	74.3	1164.5

5.8 Acid Sulphate Soil Risk

The TDS has been classified as Class 2, Class 3 and Class 4 on the Acid Sulphate Soils (ASS) Maps in the Port Stephens Local Environmental Plan 2013 and is subject to the provision of Clause 7.1 which detail the restrictions to works within the appropriate Class on the land.

Class 2 encompasses land where development consent is required for works below the natural ground surface, and for works by which the water table is likely to be lowered. Class 3 encompasses land where development consent is required for works more than 1 m below the natural ground surface, works by which the water table is likely to be lowered more than one metre below the natural ground surface. Class 4 encompasses land where development consent is required for works more than 2 m below the natural ground surface, works by which the water table is likely to be lowered more than surface.

The Geotechnical Investigation (DP June 2008), (**Appendix G**) included an assessment of site specific ASS risk. The DP report concluded:

"The results of laboratory testing indicate that potential acid sulphate soils are present on the site and that all of the samples tested exceeded the ASSMAC [*Acid Sulfate Soils Management Advisory Committee*] action criteria, regardless of the quality of soil to be disturbed.

Therefore, development of the site should be undertaken with reference to an acid sulphate soil management plan."
6 Integrity Assessment

Information was collected from a number of sources to determine the risk of significant contamination being present on the TDS. The sources included a combination of government bodies and private organisations that have no specific knowledge of the TDS.

Port Stephens Council supplied the Section 149 (2&5) documents for the property (see Section 4.17). The Section 149 (2&5) documents were supplied through an automated online service, and therefore ES considers that the information presented by Port Stephens Council is accurate and without bias.

The data obtained from other historical sources reviewed have been found to be in general agreement. It is therefore considered that the information provided in this historical assessment has an acceptable level of reliability for the purpose of this report.

- Data gaps which may impact the ability to define AECs on the Site are: The extent of potential deposition from the Tomago Aluminium Smelter;
- The composition and age of observed mounds on the Site;
- If observed stockpiles adjacent TDS-2, encroach the AGLM property;
- Interviews with current and former site occupants / owners to obtain anecdotal evidence on the Site;
- Groundwater quality migrating on and off the Site; and
- Information regarding spills or incidents on the Site or on the surrounding properties/ roads.

7 Potential Contamination Issues

7.1 Potential Offsite Sources of Impact

Based on the historical review and field observations, the following potential sources of offsite impact were identified:

 Air and water borne impacts from surrounding industrial development, in particular Tomago Aluminium Smelter. However, the potential for significant impacts to the Site from this source is considered low

7.2 Onsite Areas of Environmental Concern

Based on the historical review and field observations, the following onsite AECs were identified:

- AEC 1: Septic Tanks;
- AEC 2: Residential Compound;
- AEC 3: Abandoned Motor Vehicles;
- AEC 4: Mounds / Potentially Stockpiled Material;
- AEC 5: Dumped waste (including potential ACM);
- AEC 6: Dam and stockpiled material; and
- AEC 7: Stockpiled material encroaching TDS-2 eastern boundary from adjacent property.

In addition, former use as agricultural land may have resulted in some impact by pesticides. These will be assessed by organochlorine and organophosphate pesticide but cannot be identified as an individual AEC. In addition, there are gas and electricity easements present which have the potential to give rise to impacts. A walkover inspection did not reveal visible or olfactory evidence of any impacts from these sources.

The AECs identified above are considered to be of low environmental risk and are expected to give rise to only localised, if any, contamination of environmental media.

Refer to **Figures 3 and 4, Appendix A** for the locations of the AECs, and **Figure 5** for observations of stockpiles encroaching TDS-2 (AEC 7).

7.3 Chemicals of Potential Concern

Based on the AECs the following chemicals of potential concern (CoPC) may be present in soil, groundwater, surface water and sediments on the TDS:

- Total recoverable hydrocarbons (TRH);
- Fluoride;
- Faecal and Total Coliforms (F&TC);
- E Coli;
- Volatile Organic Compounds (VOCs);
- BTEX (benzene, toluene, ethyl benzene, xylene);
- Volatile Organic Compounds;
- 8 priority metals (Arsenic (As),Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Zinc (Zn));
- Polycyclic aromatic hydrocarbons (PAHs);
- Organochlorine pesticides (OCP);
- Organophosphorus pesticides (OPP);
- Polychlorinated biphenyls (PCBs); and
- Asbestos.

ES have included VOCs and PCBs as CoPC due to the potential presence of fill on the Site sourced from an unknown origin. ES considers this approach to be conservative.

Table 7.1 below outlines the CoPC in which will be analysed for the following environmental media in each AEC or at background location on the TDS.

Table 7.1: CoPC in each AEC

AEC	Media	CoPC
AFC 1	Soil	TRH
	3011	 BIEX PΔHs
		 8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
		Asbestos – surface/ fill samples only
		■ F&TC ■ E Coli
		TRH
	Groundwater	BTEX
		PAHs
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) ENTC
		E Coli
		TRH
AEC 2	Soil	 BTEX
		PAHs
		 PCBS OCP
		 OP
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
		 Asbestos – surface/ fill samples only E&TC
		E Coli
		TRH
	Groundwater	BTEX
		PAHs Motole (Ac. Cd. Cr. Cu. Db. Hg. Ni. Zo)
		 8 Metals (As, cu, cr, cu, Pb, ng, Ni, 2n) Lead
	Material	 Asbestos
	Analysis	
		Lead
	Surface Soils	Asbestos
AEC 3	Soil	BTEX
		PAHs
		PCBs
		 8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) Ashestos
		TRH
	Groundwater	= BTEX
		PAHs
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
	Material Analysis	 Lead Asbestos
		■ TRH
AEC 4	Soil (stockpile / mound	= BTEX
	samples)	PAHs
		 PCBS 8 Metals (As Cd Cr Cu Ph Ha Ni 7n)
		Asbestos
		Lead
	iviaterial Analysis	Asbestos
	Soil	= TRH
ALC J	3011	BTEX
		- гапз = PCBs
		 8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
		Asbestos
	Groundwater	TRH
	Groundwater	 BIEX PΔHs
		 8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
AGL Macauarie Pty Limited		Additional Pre-Existing Contamination Study

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	Material Analysis	Lead Aspertor
	,	- Aspestos
1700		TRH TRH
AEC 6	Soil (stockpile / mound	BTEX
	samples)	PAHs
		PCBs
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
		Asbestos
		■ TRH
	Surface Water	■ BTEY
		 8 Motols (As Cd Cr Cu Ph Hg Ni Zn)
	Sediment	
	000	BIEX
		PAHS
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
AEC 7	Soil (stockpile / mound	TRH TRH
AEC 7		BTEX
	samples)	PAHs
		 OCP
		 OP
		PCBs
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
		Asbestos
		Lead
	Material Analysis	Asbestos
		TRH
Background Locations	Soil	BTEX
		PAHs
		OCP
		■ OP
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
		Ashestos
		TRH
	Groundwater	
		= 1013 = 2 Motals (As Cd Cr Cu Dh Ha Ni Za)
	Surface Water	
		BIEX
		PAHs
		VOCs – selected analysis***
		8 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
	Currence Cell-	Lead
	Surface Solls	Asbestos
		 Fluoride
		Lead
	Material Analysis	Asbestos

The ASS potential of the soils encountered may potentially require further assessment once specific development plans for the TDS are finalised.

7.4 Potentially Impacted Materials

Based on the Phase 1 ESA potentially impacted materials on the Site are considered to be:

- Soils;
- Groundwater;
- Mounds/ stockpiled material;
- Surface water; and
- Sediments.

Refer to **Table 7.1** for information on the CoPC of each potentially impacted media on the Site. The extent of impacts are currently unknown; however, ES considers that the extent of any impacts to be small as the walkover inspection and documents reviewed during this investigation indicate there is only a low potential for significant contamination on the TDS.

8 Conclusions and Recommendations

8.1 Conclusions

Based on the historical review and field observations seven onsite AECs were identified:

- AEC 1: Septic Tanks;
- AEC 2: Residential Compound;
- AEC 3: Abandoned Motor Vehicles.
- AEC 4: Mounds / Potentially Stockpiled Material;
- AEC 5: Dumped waste (including potential ACM);
- AEC 6: Dam and stockpiled material; and
- AEC 7: Stockpiled material encroaching TDS-2 eastern boundary from adjacent property.

The AECs identified above are considered to be of low environmental risk and are expected to give rise to only localised, if any, contamination of environmental media.

Based on the AECs chemicals of potential concern (CoPC) may be present in soil, groundwater, surface water and sediments on the TDS including as asbestos in soil and sediment.

Based on the field observations, it is considered likely that the previous activities on the TDS have resulted in localised and minor contamination of near-surface soils. Potential also exists for localised asbestos impacts in the vicinity of fill mounds on the eastern boundary of TDS-2. Further intrusive assessment would be required to confirm these opinions and quantify any risk. It is considered, based on the land use history and the absence of any development on the TDS by AGLM since Completion, that any contamination detected is likely to be Pre-Existing Contamination.

8.2 Recommendations

A Phase 2 environmental site assessment (ESA) should be undertaken to determine the quality of site soils, groundwater, sediment and surface water. Based on the TDS PESA findings the Phase 2 ESA investigation should target potentially impacted environmental media with the AECs as listed in **Table 7.1**.

Based on the results documented in this report, any subsequent intrusive investigation undertaken as part of a Phase 2 ESA, should be of limited scope within the targeted AECs. However, for completeness the larger part of the TDS which is undeveloped should also be subject to a less intensive, intrusive investigation to assess for the presence of regional contamination, due to the low probability of emissions and contaminated groundwater from the Tomago Aluminium Smelter.

The ASS potential of the soils on the TDS needs to be assessed but could be carried out in a separate assessment once any specific development plans are finalised.

9 References

- 1. National Environmental Protection Council (NEPC): National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013);
- 2. NSW Office of Environment and Heritage: Guidelines for Consultants Reporting on Contaminated Sites, 2000;
- 3. Port Stephens Local Environment Plan, 2013;
- 4. NSW Contaminated Land Management Act 1997 No 140;
- 5. NSW Protection of the Environment Operations Act 1997;
- List of NSW contaminated sites notified to the EPA <u>http://www.epa.nsw.gov.au/clm/publiclist.htm (accessed 2015);</u>
- 7. POEO Licence List <u>https://www.epa.nsw.gov.au/prpoeoapp/ExportPRPOEOLicence.aspx (accessed 2015);</u>
- 8. NSW Office of Environment and Heritage: Declaration of Aboriginal Places <u>http://www.environment.nsw.gov.au/AboriginalPlaces/history.htm (accessed 2015);</u>
- 9. Port Stephens Council Comprehensive Koala Plan of Management (CKPoM), June 2002;
- 10. Douglas Partners: Report on Geotechnical Investigation; Proposed Gas Storage Area Proposed Power Station, Old Punt Road, Tomago; Project 39762.1, June 2008;
- 11. NSW Environmental Planning and Assessment Act 1979;
- Newcastle 1:250,000 Geological Series Sheet S1 56-2 (NSW Department of Mines, 1966);
- NSW Department of Primary Industries Water: NSW Resource Atlas <u>http://allwaterdata.water.nsw.gov.au/water.stm (accessed 2015);</u>
- 14. Australian Government Bureau of Meteorology: Climate Data Online www.bom.gov.au/climate/data/index.shtml (accessed 2015);
- 15. http://allclass.net.au/www/?page_id=10 (accessed 2015);
- 16. http://www.apmengineering.com.au/About-Us (accessed 2015);
- 17. http://www.pacificrail.com.au/about.html (accessed 2015);
- 18. http://www.huntervalleycompressors.com/about-us (accessed 2015);
- 19. <u>http://www.vinkempackaging.com.au/ (accessed 2015);</u>
- 20. http://www.tropicasphalts.com.au/ (accessed 2015).





1. additional note- odours from motorist exaust 2. telstra cable (east-west) 3. oil stain 4. septic tank (power and water connections) 5. electricity cable (E-W) 6. dense vegetation surrounding property 7. house (possible asbestos containing material, parked cars' trailers) 8. smaller septic tank 9. swamp (surface water at river level) 10. 44 galon drum 11. Burnt out cars 12. Mounted vegetation 13. Sandstone bedrock 14. Partially cleared vehicle access 15. Channel 16. Dumping 17. Dam 18. Uprooted tree 19. Boundary Mark 20. Northern boundary fence 21. northern- wester fence corner 22. HV lines further to north 23. Dense scrub 24. Access road, telecom, stockpiles 25. Offsite northern boundary, (on bitumen road) 26. drain 27. possile ACM 28. telstra marker, inside northern side boundary 29. Loose unmarked service line 30. drainage channel 31. eastern area of site 32. Survey peg 33. survey peg 34. dense vegetation 35. survey peg, monitoring well 36. SE corner 37. Survey Peg 38. brick fill in road 39. dense vegetation 40. brick/irrigation line 41. dumping 42. entrance to residentual property, house 43. Septic tank, miscellaneous goods 44. Residentual compund 44. Residentual compund 45. track to dumping, fence line from boundary 45. track to dumping, fence line from boundary



Client: AGLM
Drawing Number: 15107_Phase1_G002.mx
Date: 30/09/2015
Drawn By: NP
Reviewed By: CW



Figure 4 Area Of Environmental Concern 1 Phase 1 Preliminary Site Investigation – Tomago NSW



EnvironmentalStrategies



Site Boundary

Observation Locations

5.electricity cable (E-W)

4. septic tank (power and water connections)

7. house (possible asbestos containing material, parked cars' trailers) 8. smaller septic tank

3.oilstain

42. entrance to residentual property, house 44. Residentual compund

10.44 galon drum

41. dumping

11. Burnt out cars

40. brick/irrigation line

			Client: AGLM	
			Drawing Number: 15107_Phase1_G004.mxd	4
	60	90	Date: 08/10/2015	
Metres			Drawn By: NP	
			Reviewed By: CW	

1. additional note-odours from motorist exaust

6. dense vegetation surrounding property 16. Dumping 12. Mounted vegetation

17. Dam

15. Channel

13. Sandstone bedrock

ree: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS

Figure 5 Area Of Environmental Concern 2 Phase 1 Preliminary Site Investigation – Tomago NSW

es

EnvironmentalStrategies



45. track to dumping, fence line from boundary

29. Loose unmarked service line

ar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS

Figure 6 Area Of Environmental Concern 3 Phase 1 Preliminary Site Investigation – Tomago NSW

es

EnvironmentalStrategies





Client Name AGL Macquarie Site Location 1902 & 1940 Pacific Highway, Tomago, NSW



Photo No.	Date	
2	11 August 2015	
Description Evidence of du vegetation	mping in	<image/>

Environmental Strategies			SITE PHOTOGRAPHS		
Client Name Site Location AGL Macquarie 1902 & 1940 Pacific Hig			hway, Tomago, NSW	Project No. 15107	
Photo No.	Date				
3	11 August 20	15			
Evidence of du	umping				

Photo No.	Date	
4	11 August 2015	
4 Description Dumping of rub	11 August 2015	



Client Name AGL Macquarie

Site Location 1902 & 1940 Pacific Highway, Tomago, NSW



Photo No.	Date	
6	11 August 2015	
Description		



Client Name AGL Macquarie Site Location 1902 & 1940 Pacific Highway, Tomago, NSW



Photo No.	Date	
8	11 August 2015	
Description		
Signs of dumpir door amongst v	ng . possible car egetation	



Client Name AGL Macquarie Site Location 1902 & 1940 Pacific Highway, Tomago, NSW



10 11 August 2015 Description Scrap metal stockpile	Photo No.	Date	to No. Date	
Description Scrap metal stockpile	10	11 August 2015	10 11 August 2015	
	10 Description Scrap metal sto	11 August 2015	10 11 August 2015 iption metal stockpile	



Client Name AGL Macquarie Site Location 1902 & 1940 Pacific Highway, Tomago, NSW

Photo No.	Date	
11	11 August 2015	
Description		
Possible asbest material	os containing	

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17th August, 2015

ENVIRONMENTAL STRATEGIES PTY LIMITED PO Box 232, CARRINGTON NSW 2294

Attention: Greg Sheehan,

RE:

1902 & 1940 Pacific Highway Tomago Project Reference 15107

Note 1:	Lot 2	DP 1043561	(page 1)
Note 2:	Lot 3	DP 1043561	(page 4)

Note 1:

Current Search

Folio Identifier 2/1043561 (title attached) DP 1043561 (plan attached) Dated 24th July, 2015 Registered Proprietor: AGL MACQUARIE PTY LTD

Title Tree Lot 2 DP 1043561

Folio Identifier 2/1043561

Folio Identifier 3/531358

Certificate of Title Volume 10977 Folio 163 Certificate of Title Volume 4856 Folio 26 CTVol 1042 Folio 231 & CTVol 2372 Folio 49 CTVol 1042 Folio 231 & CTVol 1042 Folio 230

Summary of Proprietors Lot 2 DP 1043561

Year

Proprietor

	(Lot 2 DP 1043561)					
2014 - todate	AGL Macquarie Pty Ltd					
2010 - 2014	Macquarie Generation					
2002 - 2010	Tomago Aluminium Company Pty Limited					
	(Lot 3 DP 531358)					
1988 - 2002	Tomago Aluminium Company Pty Limited					
	(Lot 3 DP 531358 – CTVol 10977 Fol 163)					
1985 – 1988	Tomago Aluminium Company Pty Limited					
1969 – 1985	Robert Evan Jones, dairyman & butcher					
	(Part Portion 6 Parish Stockton – Area 433 Acres – CTVol 4856 Fol					
	26)					
1945 – 1969	Robert Evan Jones, dairyman & butcher					
1939 – 1945	Lionel Benjamin Israel, merchant					
1939 – 1939	Perpetual Trustee Company (Limited)					
1937 – 1939	Ernest Petherbridge, grazier					
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231					
	& CTVol 2372 Fol 49)					
1923 – 1937	Reginald Cowlishaw, solicitor					
	Stella Cowlishaw, spinster					
	Leslie Cowlishaw, medical practioner					
1913 – 1923	Catherine Chambers Cowlishaw, widow					
	Reginald Cowlishaw, solicitor					
	Jane Cowlishaw, widow					
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231					
	& CTVol 1042 Fol 230)					
1895 – 1913	Thomas Cowlishaw, merchant					
	Mahlon Clarke Cowlishaw, merchant					

Note 2:

Current Search

Folio Identifier 3/1043561 (title attached) DP 1043561 (plan attached) Dated 24th July, 2015 Registered Proprietor: AGL MACQUARIE PTY LTD

Title Tree Lot 3 DP 1043561

Folio Identifier 3/1043561

(a)	(b)	(c)
Folio Identifier 3/531358	Folio Identifier 1/726277	Folio Identifier 1/878496
CTVol 10977 Folio 163	Crown Land	Folio Identifier 1/131902
CTVol 4856 Folio 26	****	CTVol 6352 Folio 184
CTVol 1042 Folio 231 & CTVol 2372 Folio 49		CTVol 5533 Fol 186
		CTVol 1042 Folio 231
CTVol 1042 Folio 231		& CTVol 2372 Folio 49
& CTVol 1042 Folio 230		
		CTVol 1042 Folio 231
****		& CTVol 1042 Folio 230

Summary of Proprietors Lot 3 DP 1043561

Year

Proprietor

	(Lot 3 DP 1043561)
2014 - todate	AGL Macquarie Pty Ltd
2010 - 2014	Macquarie Generation
2002 - 2010	Tomago Aluminium Company Pty Limited

See Notes (a) & (b)

Note (a)

	(Lot 3 DP 531358)
1988 - 2002	Tomago Aluminium Company Pty Limited
	(Lot 3 DP 531358 – CTVol 10977 Fol 163)
1985 – 1988	Tomago Aluminium Company Pty Limited
1969 – 1985	Robert Evan Jones, dairyman & butcher
	(Part Portion 6 Parish Stockton – Area 433 Acres – CTVol 4856 Fol
	26)
1945 – 1969	Robert Evan Jones, dairyman & butcher
1939 - 1945	Lionel Benjamin Israel, merchant
1939 – 1939	Perpetual Trustee Company (Limited)
1937 – 1939	Ernest Petherbridge, grazier
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231
	& CTVol 2372 Fol 49)
1923 – 1937	Reginald Cowlishaw, solicitor
	Stella Cowlishaw, spinster
	Leslie Cowlishaw, medical practioner
1913 – 1923	Catherine Chambers Cowlishaw, widow
	Reginald Cowlishaw, solicitor
	Jane Cowlishaw, widow
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231
	& CTVol 1042 Fol 230)
1895 – 1913	Thomas Cowlishaw, merchant
	Mahlon Clarke Cowlishaw, merchant

Note (b)

	(Lot 1 DP 726277)
1988 - 2002	Tomago Aluminium Company Pty Limited
	(Closed Road, Old Punt Road – Parish Stockton)
Prior – 1988	Crown Road

Note (c)

	(Lot 1 DP 878496)
1998 - 2002	Tomago Aluminium Company Pty Limited
	(Lot 1 DP 131902)
1996 – 1998	Tomago Aluminium Company Pty Limited
	(Lot 1 DP 131902 – Area 674 Acres 0 Roods 24 Perches – CTVol 6352
	Fol 184)
1981 – 1996	Tomago Aluminium Company Pty Limited
1951 – 1981	Courtaulds (Australia) Limited
	(Part Portion 6 Parish Stockton – Area 1146 Acres – CTVol 5533 Fol
	186)
1945 - 1937	John Thomas McKee, merchant
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231
	& CTVol 2372 Fol 49)
1923 – 1937	Reginald Cowlishaw, solicitor
	Stella Cowlishaw, spinster
	Leslie Cowlishaw, medical practioner
1913 – 1923	Catherine Chambers Cowlishaw, widow
	Reginald Cowlishaw, solicitor
	Jane Cowlishaw, widow
	(Portion 6 Parish Stockton – Area 1973 Acres – CTVol 1042 Fol 231
	& CTVol 1042 Fol 230)
1895 – 1913	Thomas Cowlishaw, merchant
	Mahlon Clarke Cowlishaw, merchant

ABN: 84 104 377 806 GPO BOX 15 Sydney NSW 2001 DX 17 SYDNEY

Telephone: 1300 052 637



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HISTORY OF TITLE TRANSACTION

			.e. 2/1045501						
LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH									
		SEARCH DAT	E						
		24/7/2015	- 4:58PM						
FOLIO: 2/10	43561								
Firs Prio	t Title(s): r Title(s):	OLD SYSTEM 3/531350							
Recorded	Number DP1043561	Type of Instrument DEPOSITED PLAN	C.T. Issue FOLIO CREATED						
10/10/0000	551000056	DEPARTMEN DI N	EDITION 1						
12/10/2006	DP1093076	DEPOSITED PLAN							
24/10/2006	DP270494	DEPOSITED PLAN	EDITION 2						
12/9/2008	DP2/0494	CAVEAT							
2/3/2010	AF345039	DEDOCTIED DI M							
27/5/2010	DP1151103	DEPOSITED FLAN							
28/6/2010	AF546587	TRANSFER GRANTING EASEMENT TRANSFER GRANTING EASEMENT							
22/7/2010	AF599620	TRANSFER GRANTING EASEMENT							
10/8/2010	AF658232	TRANSFER INCLUDING COVENANT	EDITION 3						
20/8/2010	DP1155313	DEPOSITED PLAN							
19/9/2014	AI862746	REQUEST	EDITION 4						
	* * *	END OF SEARCH ***							

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HISTORY OF TITLE TRANSACTION

			Title Referenc	e: 3/1043561		
LAND A	ND PROPERTY	INFORMATION NEW S	OUTH WALES - H	ISTORICAL SEA	RCH	
			SEARCH DATI	2		
			24/7/2015	- 1:58PM		
FOLIO: 3/10	43561					
Firs Prio	t Title(s): r Title(s):	1/726277 3/531358 1/878496	OLD SYSTEM 1/726277			
Recorded	Number	Type of Instrument	t	C.T. Issue		
17/9/2002	DP1043561	DEPOSITED PLAN	-	FOLIO CREATE EDITION 1	D	
12/10/2006	DP1093076	DEPOSITED PLAN		EDITION 2		
2/3/2010	AF345639	CAVEAT				
27/5/2010	DP1151103	DEPOSITED PLAN				
28/6/2010 28/6/2010	AF546575 AF546587	TRANSFER GRANTING	EASEMENT EASEMENT			
22/7/2010	AF599620	TRANSFER GRANTING	EASEMENT			
10/8/2010	AF658232	TRANSFER INCLUDING	G COVENANT	EDITION 3		
20/8/2010	DP1155313	DEPOSITED PLAN				
10/4/2014	AI504017	DEPARTMENTAL DEAL	ING			
12/5/2014	AI387614	TRANSFER GRANTING	EASEMENT	EDITION 4		
19/9/2014	AI862746	REQUEST		EDITION 5		

*** END OF SEARCH ***

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TITLE SEARCH

FOL	IO: 2/1043	561				
	SE.	ARCH DATE	TIME	EDITION NO	DATE	
	24	/7/2015	4:12 PM	4	19/9/2014	
LAN	D					
LOT	2 IN DEPO AT TOMAGO LOCAL GOVE PARISH OF TITLE DIAG	SITED PLAN 10 RNMENT AREA P STOCKTON CO RAM DP1043561	43561 ORT STEPHENS UNTY OF GLOUCE:	STER		
FIR	ST SCHEDUL	3				
AGL	MACQUARIE	PTY LTD		(R AI862746)	
SEC	OND SCHEDU	LE (13 NOTIFI	CATIONS)			
1 2	RESERVATI DP646855	ONS AND CONDI EASEMENT FOR	TIONS IN THE C	ROWN GRANT(S) 3 METRES WIDE AFE	ECTING	
3	DP1093076	EASEMENT FOR METRE (S) WID	DRAINAGE OF WARIABLE	ATER AND RIGHT OF APPURTENANT TO T	ACCESS 20 HE LAND	
4	DP1093076	EASEMENT FOR WIDE METRE (S	DRAINAGE OF WAR	ATER AND RIGHT OF IABLE APPURTENANT	ACCESS 20 TO THE	
5	DP270494	EASEMENT FOR	DRAINAGE OF W	ATER 16 METRE(S)	WIDE AND	
6	DP270494	EASEMENT FOR	WATER SUPPLY	4 METRE(S) WIDE (DVE DESCRIBED (DO	M)	
7	DP1151103	EASEMENT FOR	GAS PIPELINE : ESCRIBED	20 WIDE APPURTENA	NT TO THE	
8	AF546575	EASEMENT FOR APPURTENANT PART DESIGNA	GAS PIPE LINE TO THE LAND AB TED (A) IN DP1	3 METRE(S) WIDE DVE DESCRIBED AFE 152082	ECTING THE	
9	AF546587	EASEMENT FOR APPURTENANT PART DESIGNA	GAS PIPELINE TO THE LAND ABO TED (B) IN DP1	5 METRE(S) WIDE DVE DESCRIBED AFE 152082	ECTING THE	
10	AF599620	EASEMENT FOR LAND ABOVE D IN DP1152084	GAS PIPELINE ESCRIBED AFFEC	1 WIDE APPURTENAN FING THE SITE DES	T TO THE IGNATED (B)	
11	AF599620	EASEMENT FOR APPURTENANT ' SITE DESIGNA'	GAS PIPELINE : TO THE LAND ABO TED (A) IN DP1:	3 WIDE & VARIABLE DVE DESCRIBED AFE 152084	ECTING THE	
12 13	AF658232 DP1155313	COVENANT EASEMENT FOR	ELECTRICITY T	RANSMISSION LINE	VARIABLE	
				END OF PAGE 1 -	CONTINUED OVER	
				PRINTED ON 24/7/	2015	

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FOLIO: 2/1043561			PAGE 2	
SECOND SCHEDULE (13	NOTIFICATIONS) (CONT	INUED)		
WIDTH DESCRI	AND ACCESS THERETO A BED	PPURTENANT TO THE	LAND ABOVE	
NOTATIONS				
UNREGISTERED DEALING	S: NIL			
*** END OF	SEARCH ***			
		PRINTED ON 24/7/2	015	
NY ENTRIES PRECEDED BY AN AS	STERISK DO NOT APPEAR ON TH	E CURRENT EDITION OF THE	CERTIFICATE OF TITLE.	

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TITLE SEARCH

						-0.2.1.2.2.4			
FOI	LIO: 3/1043	561							
	SE	ARCH DATE	TIME		EDITION NO	DA DA	TE		
	24	/7/2015	4:12 PM		5	19/9	/2014		
LAÌ	ND								
LO	 F 3 IN DEPC	SITED PLAN 1	043561						
	AT TOMAGO								
	LOCAL GOVE	RNMENT AREA	PORT STEPHENS	CUED					
	TITLE DIAG	RAM DP104356	1	SIEK					
		-							
FI	KST SCHEDUI	E.							
AGI	L MACQUARIE	PTY LTD				(R AI86	2746)		
SEC	COND SCHEDU	LE (9 NOTIFI	CATIONS)						
1	LAND EXCL	UDES MINERAL	S AND IS SUBJEC	T TO RE	SERVATION	S AND			
	CONDITION	IS IN FAVOUR	OF THE CROWN WI	THIN TH	IE PART(S)	SHOWN	SO		
	INDICATED) IN THE TITL	E DIAGRAM - SEE	CROWN	GRANT(S)	AND			
2	DP1151103	IM S700000A EASEMENT FO	R GAS PIPELINE	20 WTDE	APPURTEN	ANT TO	THE		
_		LAND ABOVE	DESCRIBED						
3	AF546575	EASEMENT FO	R GAS PIPE LINE	3 METR	E(S) WIDE				
		PART DESIGN	TO THE LAND AB	OVE DES 152082	SCRIBED AF	FECTING	THE		
4	AF546587	EASEMENT FO	R GAS PIPELINE	5 METRE	(S) WIDE				
		APPURTENANT	TO THE LAND AB	OVE DES	CRIBED AF	FECTING	THE		
5	AF599620	EASEMENT FO	ATED (B) IN DP1 R GAS PIPELINE	152082 1 WIDE		יר חידי ידיו	ЧR		
Ĵ	111 999 020	LAND ABOVE	DESCRIBED AFFEC	TING TH	IE SITE DES	SIGNATE	D (B)		
		IN DP115208	1						
6	AF599620	EASEMENT FO	K GAS PIPELINE	3 WIDE	& VARIABL	3 RECTING	THE		
		SITE DESIGN	ATED (A) IN DP1	152084	CREDED API				
7	AF658232	COVENANT							
8	DF1155313	WIDTH AND A	K ELECTRICITY T	RANSMIS	SION LINE	VARIAB	LE ABOVE		
		DESCRIBED	CODO INDREIO A				in a c c c c c c c c c c c c c c c c c c		
9	AI387614	EASEMENT FO DESIGNATED	R ENERGY TRANSM (A) IN PLAN WIT	ISSION H AI387	AFFECTING 614	THE PA	RT		
NOT	TATIONS								
222									
DP6 UNF	537481 NOTE REGISTERED	: PLAN OF PRO DEALINGS: NI	DPOSED EASEMENT L						
	* * *	END OF SEARCH	H ***						

* ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE, WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER. Req:R247364 /Doc:DL Al862746 /Rev:24-Sep-2014 /Sts:SC.OK /Pgs:ALL /Prt:25-Feb-2016 19:25 /Seq:1 of 51 Ref:Environ Strat - T /Src:T

	Form: 11R Release: 4·1	REQUEST New South Wales AT8627A6C						
	PRIVACY NOTE: 5 by this form for the Register is ma	Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to concern and the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that de available to any person for search upon payment of a fee, if any. $E \times TRA$ FEE $\times T$ RAISED.						
(A)		If applicable Office of Hereits boly NSW Treasury Duty Asst Deterits: D						
(B)	TORRENS TITLE	Refer Schedule 1 Part A (as shown in Annexure 1 Part A) of Annexure "B"						
(C)	REGISTERED DEALING	Number Torrens Title						
(D)	LODGED BY	Document Collection BoxName, Address or DX, Telephone, and Customer Account Number if any HERBERT SMITH FREEHILLS 124217ECODE27124217EReference: 201301205 D2011/411222 \$22.67615R						
(E)	APPLICANT	TREASURER OF THE STATE OF NEW SOUTH WALES						
(F)	NATURE OF REQUEST	Request to record vesting and issue Certificates of Title						
(G)	TEXT OF REQUEST							
	The applican . the Regist (as shown in 494) pursuan Generation N attached as	nt requests that: Frar General records the vesting of the titles listed in Schedule 1 Part A Annexure 1 Part A) of Annexure "B" in AGL Macquarie Pty Ltd(ACN 167 859 It to the Electricity Generator Assets (Authorised Transactions) (Macquarie Business) Order 2014 dated (September 2014, a true copy of which is Annexure "B".						
	. the Regist as registere	rar General issues new Certificates of Title noting AGL Macquarie Pty Ltd ed proprietor.						
	DATE 15	eptember 2017						
(H)	I certify I am an e signed this dealin [See note* below	ligible witness and that the applicant Certified correct for the purposes of the Real Property Act 1900 by the applicant.						
	Signature of witn	ess: Signature of applicant:						
	Name of witness: Address of witnes	: SEE ANNEXURE "A" :ss:						

(I) This section is to be completed where a notice of sale is required and the relevant data has been forwarded through eNOS.
 The applicant certifies that the eNOS data relevant to this dealing has been submitted and stored under eNOS ID No.
 Full name: Signature:

* s117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation. ALL HANDWRITING MUST BE IN BLOCK CAPITALS Page 1 of 51 [303]

ANNEXURE "A"

Executed by

Philip Gaetjens, Secretary of the Treasury, as the delegate of: THE HON ANDREW CONSTANCE, Treasurer of NSW,

pursuant to delegation of functions under section 27 Electricity Generator Assets (Authorised Transactions) Act 2012 dated 1 September 2014 for and on behalf of Macquarie Generation, but not so as to incur any personal liability,

in the presence of:

Nr

Signature of witness

Signature of

John MACKA7, Name of witness (please print)

Page + 2 of 51



Electricity Generator Assets (Authorised Transactions) Act 2012

Vesting Order - Macquarie Generation Business

An order for the vesting of the assets, rights and liabilities of Macquarie Generation identified in this Order in AGL Macquarie.

I, Andrew Constance, Treasurer of New South Wales, make the following Order under section 13 and Schedule 4 of the *Electricity Generator Assets (Authorised Transactions) Act 2012* (the *Act*).

1. Citation

This Order may be cited as the Electricity Generator Assets (Authorised Transactions) (Macquarie Generation Business) Order 2014.

2. Effective Time

This Order is made with effect from 11:59 pm on the day immediately prior to the Completion Date (the *Effective Time*).

3. Vesting

The assets, rights and liabilities of Macquarie Generation listed or described in Schedule 1 to this Order, being assets, rights and liabilities of a public sector agency that is an electricity generator, are vested in AGL Macquarie with effect on the Effective Time (unless a later time is specified in this Order), subject to the terms and conditions set out in this Order.

4. Excluded Assets and Liabilities

- 4.1 Nothing in this Order shall have the effect of vesting any Excluded Assets and Liabilities.
- 4.2 In addition:
 - (a) any Excluded Assets and Liabilities which are expressed to be excluded only to an extent are excluded only to that extent;
 - (b) any Excluded Assets and Liabilities which are expressed to be excluded from any category of Macquarie Generation Business property in Schedule 1 are also excluded from each other category of Macquarie Generation Business property in Schedule 1 to that extent;
 - (c) assets, rights and liabilities vested by this Order are vested only to the extent of Macquarie Generation's interest in the assets, rights and liabilities at the Effective Time; and
 - (d) save as expressly provided in this Order, to the extent that any asset, right or liability vested by this Order exists because of Macquarie Generation's status as a public sector agency, that asset, right or liability shall cease to exist once the relevant asset, right or liability is no longer held by a public sector agency.
- 4.3 The assets, rights and liabilities listed and described in the EAMHC Vesting Order are vested in AGL Macquarie under the EAMHC Vesting Order and not this Order.

Page n- 3 of SI Pike
5. Definitions and interpretation

Definitions

5.1 In this Order:

AGL Macquarie means AGL Macquarie Pty Ltd ACN 167 859 494 of Level 22, 101 Miller Street, North Sydney, New South Wales 2060.

Barnard Transmission Assets means the 95 km 132 kV wood pole electricity transmission line (designated line No.95B) and infrastructure from TransGrid's 330/132 kV Muswellbrook substation to the Barnard River Scheme including:

- (a) the 95B line protection, control and alarm systems (at Muswellbrook substation);
- (b) droppers from TransGrid's overhead conductors, terminal palms and fasteners;
- (c) substation gantry tower supporting overhead conductors from TransGrid's power line;
- (d) 132/11kV power transformers;
- (e) 132kV voltage transformers;
- (f) 132kV isolators and earth switches;
- (g) 132kV circuit breakers;
- (h) Feeder 95B 132kV fault earth switch;
- (i) 132kV busbar;
- (j) control, protection and secondary equipment associated with the above equipment;
- (k) substation civil works;
- (l) part of Lot 6310 of DP 791666 relating to the Barnard switchyard; and
- (m) associated structures, plant and equipment.

Claim means any claim, cost (including legal costs on a solicitor and client basis), damages, debt, expense, Tax, Liability, Loss, obligation, allegation, suit, action, demand, cause of action, proceeding or judgment of any kind however arising or caused, and whether direct or indirect, present, fixed or unascertained, consequential, incidental, future, actual or contingent or economic, whether at law, in equity, under statute or otherwise.

Completion means completion of the sale of the Macquarie Generation Business to AGL Macquarie under the Sale and Purchase Agreement.

Completion Date means the date on which Completion occurs.

Data Room Documentation means all information and materials made available to AGL Macquarie in the data room hosted by Ansarada Pty Ltd on behalf of the NSW Government and Macquarie Generation prior to 11:59 pm on 17 August 2014.

Development Consent means any consent or deemed consent under the Environmental Planning and Assessment Act 1979 (NSW) to carry out development.

Development Sites means:

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- (a) the site of approximately 320 hectares comprising Lot 25, DP 225426 and Lot 322, DP 625513 proximate to the Power Stations; and
- (b) the site of approximately 26 hectares situated on the Pacific Highway approximately 15 km northwest of Newcastle.

EAMHC means the Electricity Assets Ministerial Holding Corporation established under section 12 of the Act.

EAMHC Vesting Order means the Electricity Generator Assets (Authorised Transactions) (Electricity Assets Ministerial Holding Corporation Property) (AGL Macquarie) Order 2014.

ESC Act means the Energy Services Corporations Act 1995 (NSW).

Excluded Assets and Liabilities means the assets, rights and liabilities listed or described in Schedule 2.

Fringe Benefit Tax means the tax imposed by the Fringe Benefits Tax Act 1986 (Cth).

Government Agency means, whether foreign or domestic:

- (a) a government, whether federal, state, territorial or local;
- (b) a department, office or minister of a government acting in that capacity; or
- (c) a commission, delegate, instrumentality, agency, board, or other governmental, semigovernmental, judicial, administrative, regulatory, monetary or fiscal authority, whether statutory or not (including, for the avoidance of doubt, Australian Energy Market Operator Limited (ACN 072 010 327) and any stock exchange).

GST means:

- (a) GST as defined in A New Tax System (Goods and Services Tax) Act 1999 (Cth); and
- (b) any notional liability for GST payable on a supply.

Law means any statute, regulation, rule, proclamations, ordinance, by-law or code or principles of law established by decisions or courts.

Liability means any liability, whether actual or contingent or prospective, present or future, quantified or unquantified.

Loss means any cost (including legal costs on a solicitor and client basis), damages, debt, expense, underpayment or Tax, Liability or loss and whether actual or contingent, present or future, quantified or unquantified and whether based on contract, tort, statute or otherwise.

Macquarie Generation means Macquarie Generation (ABN 18 402 904 344), a corporation constituted by the ESC Act and the SOC Act.

Macquarie Generation Business means the business carried on by Macquarie Generation as at the Effective Time in connection with the ownership, occupation, operation, maintenance and/or use of the Power Stations, including the Hunter Valley Gas Turbine and the Liddell Solar Farm, the Development Sites and the Barnard Transmission Assets (and, to avoid doubt, including business in connection with the ownership, occupation, operation, maintenance and/or use of any asset specifically listed or described in Schedule 1 to this Order), including:

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- the generation and despatch of electricity from, and the provision of ancillary services by, the Power Stations and the maintenance of the connection of the Power Stations to the electricity transmission network;
- (b) ownership, occupation, operation, maintenance and/or use of the land occupied by the Power Stations;
- (c) ownership, occupation, operation, maintenance and/or use of all property, plant, equipment, infrastructure and facilities comprising the Power Stations;
- (d) fuel and water storage, handling, treatment and use and the management of all waste;
- (e) the holding and maintenance of all licences and authorisations necessary to own, occupy, operate, maintain and/or use the Power Stations and their associated infrastructure;
- (f) the employment and supervision of all personnel employed in the ownership, occupation, operation, maintenance and/or use of the Power Stations; and
- (g) the entry into and performance of all contracts entered into in connection with the ownership, occupation, operation, maintenance and/or use of the Power Stations.
- but excluding (for the purpose of this Order only and not for the purpose of the Sale and Purchase Agreement or any other purpose) those assets which are to vest in AGL Macquarie under the EAMHC Vesting Order.

Macquarie Generation Transaction Document has the meaning given to that term in paragraph (a) of Schedule 2.

National Tax Equivalence Regime means the rules of the National Tax Equivalence Regime as set out in the Manual for the National Tax Equivalence Regime dated February 2012 (Version 8) and as updated in later versions.

NSW Government means the Crown in Right of the State of New South Wales.

Other Workers Compensation Claimant means:

- (a) an independent contractor of Macquarie Generation; or
- (b) an employee of an independent contractor of Macquarie Generation; or
- (c) any other person who has provided services to Macquarie Generation (whether directly or indirectly) or otherwise at Macquarie Generation's premises; or
- (d) any family member (including a spouse or dependent) of a current or former employee of Macquarie Generation or a person referred to in paragraphs (a) to (c) of this definition, to the extent such family member is entitled to bring a Workers' Compensation Claim on behalf of such person,

and for the purposes of this definition, references to Macquarie Generation include any predecessor entity of Macquarie Generation which constructed or previously operated one or both of the Power Stations.

Power Stations means the Bayswater and Liddell Power Stations, including the Hunter Valley Gas Turbine and the Liddell Solar Farm, and **Power Station** means any of them.

Property means the real property identified in Section 1 of Schedule 1.

Page to of 51

Retained Contract means a contract:

- (a) to which Macquarie Generation is a party as at the Effective Time which is governed by law other than the law of New South Wales (other than any such contracts which are Excluded Assets); and
- (b) that is not novated to AGL Macquarie on or before Completion.

Sale and Purchase Agreement means the Sale and Purchase Agreement (Macquarie Generation Assets) between the NSW Government, Macquarie Generation and AGL Macquarie dated 12 February 2014, to be implemented in accordance with an agreement between the parties dated 20 August 2014.

Sale Process means the process conducted by the NSW Government in respect of the sale of the Macquarie Generation Business and all other electricity generation assets (as defined in the Act) as well as the sale or lease of the Cobbora coal mine development project.

Security means a guarantee, indemnity, letter of credit, performance bond, letter of comfort or other assurance or assumption of responsibility, however it is described, given for a debt or liability of another person or the solvency or financial condition of another person.

SOC Act means State Owned Corporations Act 1989 (NSW).

Tax means:

- (a) a tax, tax equivalent, levy, charge, impost, deduction, withholding or duty of any nature (including stamp and transaction duty and GST) at any time imposed or levied by any Government Agency or required to be remitted to, or collected, withheld or assessed by, any Government Agency; and
- (b) any related interest, expense, fine, penalty or other charge on those amounts,

and includes any amount that a person is required to pay to another person on account of that other person's liability for Tax.

Transaction Materials means:

- (a) a copy in machine readable or printed form of the Data Room Documentation;
- (b) originals of contracts transferred from Macquarie Generation to AGL Macquarie at Completion (whether under this Order or otherwise); and
- (c) copies of the Retained Contracts which are in the possession of Macquarie Generation prior to the Effective Time.

Workers Compensation Liabilities and Claims means (whether under applicable Law or at common law):

- (a) all present and future Claims by any current or former employee of Macquarie Generation in respect of dust diseases and workers compensation arising in relation to their employment with Macquarie Generation prior to Completion;
- (b) all present and future Claims by any Other Workers Compensation Claimant in respect of dust diseases and workers compensation arising in connection with the work for or services provided by that Other Workers Compensation Claimant to Macquarie Generation prior to Completion; and

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(c) all present and future Claims by a person other than a person referred to in paragraph
 (a) or (b) in respect of dust diseases arising in connection with any events or
 exposures relating to Macquarie Generation's business occurring prior to Completion, including such a person exposed through his or her family member being a person referred to in paragraph (a) or (b),

and for the purposes of this definition, references to Macquarie Generation include any predecessor entity of Macquarie Generation which constructed or previously operated one or both of the Power Stations.

Interpretation

- 5.2 In this Order, except where the context otherwise requires:
 - (a) words used in this Order but not defined in it have the meaning given to them in the Act;
 - (b) the singular includes the plural and vice versa;
 - (c) another grammatical form of a defined word or expression has a corresponding meaning;
 - (d) a reference to a document or instrument includes the document or instrument as novated, altered, supplemented or replaced from time to time;
 - (e) a reference to a party to a document includes the party's executors, administrators, successors and permitted assigns and substitutes;
 - (f) a reference to a person includes a natural person, partnership, body corporate, association, governmental or local authority or agency or other entity;
 - (g) a reference to a statute, ordinance, code or other law includes regulations and other instruments under it and consolidations, amendments, re enactments or replacements of any of them;
 - (h) the meaning of general words is not limited by specific examples introduced by "including", "for example" or similar expressions; and
 - (i) the words "including" or "includes" means "including, but not limited to", or "includes, without limitation" respectively.
- 5.3 Where a transferee of any assets, rights or liabilities being vested under this Order is not expressly named, the transferee is AGL Macquarie.

Paye = 8 of SI

1. Re	al Property			
The assets, r ownership, o	ights and liabilities of Macquarie Generation in, attac weupation or possession of the property, or used by M	ching to or running with an Macquarie Generation in cc	y of the property identified b nunection with the Macouarie	elow, or arising as a result of concration Business including
(a)	the benefit and burden of any registered leasehold affections attaching to a property;	d interests, easements, cove	chants, restrictions on use, pro	ofits a prendre or other registered
(q)	any Development Consents that run with a proper	rty or are an asset of Macqu	uarie Generation as the holde	r of a real nronerty interest: and
(c)	any improvements on a property or which are an a	asset of Macquarie Genera	tion as the holder of a real nr	oberty interest
Part A: Fre	ehold Property		• • •	
Each of the p	roperties listed in Annexure 1 - Part A: Freehold P	roperty.		
Part B: Lea	sehold Property			
Each of the f	ollowing registered leases and the rights and obligation	ons of Macquarie Generation	on under them:	
Lease ID #	Tenant	Registration No	Title Reference	Expiry Date
Quarry Land	Lease to Macquarie Generation 6	577381	180/812852	10 February 2020

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In addition to all easements and affectations registered on the Freehold Property titles set out in Part A, each of the registered easements and the rights and obligations of Macquarie Generation listed in Annexure 1 - Part C: Registered Easements

' residu	title in the name of Macquarie Generation remaining in:
ວັ •	nveyance Book 2762 No 56;
വ് •	nveyance Book 4188 No 510; and
ບັ •	nveyance Book 2816 No 912.
istered	Covenant AD271152
E: Un	registered Interests
issets, gemen re usec	ights, obligations and liabilities of Macquarie Generation in all unregistered leases, licences, easements, access arrangements and other property s, to the extent such assets, rights, obligations and liabilities are located at or on the property identified above in Section 1 or affect that property, by Macquarie Generation in connection with the Macquarie Generation Business.
Рг	perty, Plant and Equipment
ssets, arty loc fule 1, /:	ights and liabilities of Macquarie Generation in all fixtures, inventory, chattels, plant, equipment, infrastructure, facilities and other tangible ated at or on the Property, or located at or on the Property the subject of (or affected by) a real property interest identified in Section 1 of this to the extent owned or used by Macquarie Generation in connection with the Macquarie Generation Business, including the property identified
(a)	all of the fixed assets listed in Annexure 2 - Macquarie Generation Power Station Assets;
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Each of the following registered interests and the rights and obligations of Macquarie Generation under them:

Part D: Other Property Interests

Any

Regis

Part

Page 10 ut SI

- all of the moveable assets listed in Annexure 3 Macquarie Generation Moveable Assets; 6
- all of the spare parts listed in Annexure 4 Macquarie Generation Inventory and Spares; છ

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	(p)	all of the motor vehicles listed in Annexure 5 - Macquarie Generation Fleet Assets; and
	(e)	all of the information technology assets listed in Annexure 6 - Macquarie Generation IT Assets.
3.	Con	tracts
The a enfor Busin	issets, rig ceable ai tess, incl	ghts and liabilities of Macquarie Generation in all contracts, purchase orders, undertakings, representations, deeds, agreements or legally rangements to the extent entered into by, or benefitting or burdening Macquarie Generation in connection with the Macquarie Generation uding the contracts, arrangements and licences identified below:
	(a)	all of the contracts listed in Annexure 7 - Macquarie Generation Contracts;
	(P)	all of the insurance policies relating to the Macquarie Generation Business (including any excess layers in relation to those policies, if any) which are current at the Effective Time and all insurance policies relating to the Macquarie Generation Business for the period prior to 30 June 2013 (including any excess layers in relation to those policies, if any), including those insurance policies listed in Annexure 8 - Macquarie Generation Insurance Policies (but excluding any such policies in respect of which AGL Macquarie is added together with and/or substituted for Macquarie Generation in accordance with the Sale and Purchase Agreement prior to the Effective Time); and
	(c)	all of the purchase orders listed in Annexure 9 - Macquarie Generation Purchase Orders.
Notw 7.35 c Gener appro	ithstandi of the An ation an ved (rath	ng anything else in this Order, the assets, rights and liabilities of Macquarie Generation in the Ravensworth South Agreement set out in item nexure 7 vest in AGL Macquarie immediately after a notice is issued under clause 121(7) of the <i>Mining Act 1992</i> (NSW) advising Macquarie d/ or AGL Macquarie that the application to transfer Macquarie Generation's interest in ML 1484 and ML 1485 to AGL Macquarie has been er than vesting at the Effective Time).
4	Othe	r Personal Property
The at	ssets, rig	hts and liabilities of Macquarie Generation in all goodwith commission wights of and in the second

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choses in action to the extent owned by, benefitting or burdening Macquarie Generation in connection with the Macquarie Generation Business including any littles of Macquarie Generation in all goodwill, securities, rights of action, claims, receivables from debtors, records and all other bank guarantee, letter of credit and other security documents given in favour of Macquarie Generation listed in Annexure 10 - Macquarie Generation **Outstanding Securities.** The assets, righ

5. Other Rights and Property

The assets, rights and liabilities of Macquarie Generation in:

- invitations to tender, expressions of interest, requests for proposal and like processes made by Macquarie Generation, together with all responses received and any arrangements entered into in relation to such invitations and requests listed in Annexure 11 - Macquarie Generation EOI and Tender Status Reports; and (a)
- all advice received from professional advisers comprised in the reports delivered to AGL Macquarie on the Completion Date, ම

to the extent owned, benefitting or burdening Macquarie Generation in connection with the Macquarie Generation Business.

6. Liabilities

connection with the Macquarie Generation Business, whether in each case actual or contingent or prospective, present or future, quantified or unquantified. All of Macquarie Generation's liability in relation to any disputes, claims, litigation and proceedings of any nature and for any debts, charges, imposts, withholdings, deductions, claims, demands or losses and all other liabilities not otherwise vested in the Order and in each case to the extent arising in

Schedule 2

Excluded Assets and Liabilities

All of Macquarie Generation's rights, title and interests in, and obligations and liabilities arising from the following as at the Effective Time:

- (other than this Order) entered into pursuant to that agreement (Macquarie Generation Transaction Document) including Macquarie Generation's all rights, title, interests, obligations and liabilities arising in connection with the Sale and Purchase Agreement and any agreement or arrangement obligation to pay stamp duty; (a)
- any asset, right or liability to the extent expressly transferred, dealt with in, excluded or otherwise taken account of in a Macquarie Generation Transaction Document including: **e**
- (i) adjustment payments for movements in working capital, employee entitlements; and
- any intellectual property associated with Macquarie Generation's registered and unregistered trade marks, domain name, registered business name or other product names, logos or get up; Ξ
- Macquarie Generation's statutory rights, responsibilities, functions and liabilities under any Law, including under: 3
 - (i) the Act;

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- (ii) the SOC Act; and
- (iii) the ESC Act,

in each case as applying as a consequence only of Macquarie Generation's status as a public sector agency;

- all assets, rights or liabilities transferred, vested, or dealt with in any other order or direction made under the Act, including under the *Electricity* Generator Assets (Authorised Transactions) (Macquarie Generation Dust Diseases Liabilities) Order 2014; Ð
- all books and records related to the Sale Process as held by Macquarie Generation at the Effective Time (but this exclusion does not apply to the ٩

(b)	any compen: any petroleu	ation or royalty payable to Macquarie Generation from exploration licence issued under the <i>Petroleum (O</i>)	om AGL Upstream Investments Pty Limited (ABN 58 115 063 74 nshore) Act 1991 (NSW);	44) in relation to
Ð	all rights, titl	e and interests in any and all advisor agreements ente	cred into by Macquarie Generation directly in connection with the	e Sale Process:
(s)	the below-lis	ted Excluded Contracts (including all of Macquarie C	Generation's obligations and liabilities under or in respect of that	contract);
Con	tract ID #	Counterparty/ies	Contract Name/Description	Date
		Environmental Resources Management	Agreement to undertake environmental site assessments at Macquarie Generation.	10 July 2013
		Tomago Aluminium Company Pty Limited Alcan Primary Metal Australia Pty I imited	Clean Energy Future Implementation Agreement	27 April 2012
		Cathjoh Holdings Pty Limited		
		Gove Aluminium Finance Ltd		
		Hydro Aluminium Australia Pty Limited		
		Hydro Aluminium Tomago		
45002	1077701	CEH Survey	Coal Surveyor	13 August 2014
45002	278021	SGS Australia Pty Ltd	Coal Sampling for Stocktake	20 August 2014
45002	278199	Noble Engineering Services Pty Ltd	Fuel Oil Surveyor	25 August 2014
45002	18231	Major Ideas Consulting Pty Ltd	Fuel Stocktake Expert	25 August 2014

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the below-listed lease (including all of Macquarie Generation's obligations and liabilities under the lease); and

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Expiry Date	29 June 2016		
Title Reference	Lease Folios 28/LF377 and 29/LF377 comprised in Folio Identifiers 104/836610A and 104/836610B	Retained Contract.	
Registration No	AG478786	n accordance with the terms of a l	
Tenant	Sublease to Macquarie Generation	Macquarie Generation under or i	
Lease ID #	admich Licillises	(u) any Security held by A	

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Execution

Executed as an Order by

Philip Gaetjens, Secretary of the Treasury, as the delegate of: THE HON ANDREW CONSTANCE, Treasurer of NSW, pursuant to delegation of functions under section 27 Electricity Generator Assets (Authorised Transactions) Act 2012 dated 1 September 2014

in the presence of:

vlu

Signature of witness

Signature of

JOHN MACKAY Name of witness (please print)

Date:

0 1 SEP 2014

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Annexure 1 - Property

Part A: Freehold Property

DP	Comprised in	Registered Owner	Local Court Area
	part of Auto Consol		Local Govi. Area
Generation			
625973		Macquarie Generation	SINGLETON
700554		Macquarie Generation	SINGLETON / MUSWELLBROOK
752468	10030-198	Macquarie Generation	SINGLETON
752468	10030-198	Macquarie Generation	SINGLETON
752468	10030-198	Macquarie Generation	SINGLETON
752486	13165-19	Macquarie Generation	MUSWELLBROOK
774706		Macquarie Generation	SINGLETON
966589	2172-59	Macquarie Generation	MUSWELLBROOK
966589	2172-59	Macquarie Generation	MUSWELLBROOK
1059007		Macquarie Generation	SINGLETON
1123501		Macquarie Generation	SINGLETON
113655	4781-25	Macquarie Generation	SINGLETON
113655	4781-25	Macquarie Generation	SINGLETON
113655	4781-25	Macquarie Generation	SINGLETON
113655	4781-25	Macquarie Generation	SINGLETON
225426		Macquarie Generation	MUSWELLBROOK
247943		Macquarie Generation	MUSWELLBROOK
247943	13165-19	Macquarie Generation	MUSWELLBROOK
247945		Macquarie Generation	SINGLETON
247945	<u> </u>	Macquarie Generation	SINGLETON
616024		Macquarie Generation	SINGLETON / MUSWELLBROOK
628645		Macquarie Generation	SINGLETON
	DP Generation 625973 700554 752468 752468 752468 752468 752468 752468 752468 752468 752486 752486 752486 752486 966589 966589 966589 966589 966589 966589 1059007 1123501 113655 113655 113655 113655 113655 225426 247943 247943 247945 616024 628645	DP Comprised in part of Auto Consol Generation 625973 700554 700554 700554 70030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 10030-198 752468 12172-59 966589 2172-59 966589 2172-59 966589 2172-59 1059007 1123501 113655 4781-25 113655 4781-25 113655 4781-25 113655 4781-25 225426 247943 247943 13165-19 247945 247945 247945 5 616024 628645	DPComprised in part of Auto ConsolRegistered OwnerGeneration625973Macquarie Generation700554Macquarie Generation75246810030-198Macquarie Generation75246810030-198Macquarie Generation75246810030-198Macquarie Generation75246810030-198Macquarie Generation75246810030-198Macquarie Generation75246813165-19Macquarie Generation75248613165-19Macquarie Generation74706Macquarie Generation9665892172-59Macquarie Generation9665892172-59Macquarie Generation1059007Macquarie Generation1123501Macquarie Generation1136554781-25Macquarie Generation1136554781-25Macquarie Generation1136554781-25Macquarie Generation1136554781-25Macquarie Generation225426Macquarie Generation24794313165-19Macquarie Generation24794313165-19Macquarie Generation247945Macquarie Generation247945Macquarie Generation247945Macquarie Generation247945Macquarie Generation247945Macquarie Generation247945Macquarie Generation247945Macquarie Generation247945Macquarie Generation247945Macquarie Generation

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Lot	DP	Comprised in part of Auto Consol	Registered Owner	Local Govt. Area
1	658099		Macquarie Generation	MUSWELLBROOK
1	738417		Macquarie Generation	SINGLETON
17	752468	4781-25	Macquarie Generation	SINGLETON
18	752468	4781-25	Macquarie Generation	SINGLETON
30	752468	4781-25	Macquarie Generation	SINGLETON
31	752468	4781-25	Macquarie Generation	SINGLETON
62	752468	5565-111	Macquarie Generation	SINGLETON
73	752468	4781-25	Macquarie Generation	SINGLETON
75	752468	4781-25	Macquarie Generation	SINGLETON
76	752468	4781-25	Macquarie Generation	SINGLETON
88	752468	4781-25	Macquarie Generation	SINGLETON
89	752468	5565-111	Macquarie Generation	SINGLETON
91	752468	4781-25	Macquarie Generation	SINGLETON
103	752468	5565-111	Macquarie Generation	SINGLETON
105	752468	5565-111	Macquarie Generation	SINGLETON
125	752468		Macquarie Generation	SINGLETON
151	752468	10030-198	Macquarie Generation	SINGLETON
19	752486	1387-196	Macquarie Generation	MUSWELLBROOK
74	752486	1387-196	Macquarie Generation	MUSWELLBROOK
1	774679		Macquarie Generation	SINGLETON
2	774679		Macquarie Generation	SINGLETON
3	774681		Macquarie Generation	MUSWELLBROOK
1	774706		Macquarie Generation	SINGLETON
2	774706		Macquarie Generation	SINGLETON
3	774706		Macquarie Generation	SINGLETON
51	1199745		Macquarie Generation	SINGLETON

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Lot	DP	Comprised in part of Auto Consol	Registered Owner	Local Govt. Area
1	986496		Macquarie Generation	SINGLETON
2	986496		Macquarie Generation	SINGLETON
1000	1132937		Macquarie Generation	SINGLETON
1	1142103		Macquarie Generation	SINGLETON
2012	1151790		Macquarie Generation	SINGLETON
1	1155775	_	Macquarie Generation	SINGLETON
1	1158697		Macquarie Generation	MUSWELLBROOK
1	1158700		Macquarie Generation	MUSWELLBROOK
2	1167986		Macquarie Generation	SINGLETON
120	1174907		Macquarie Generation	SINGLETON
1	1175303		Macquarie Generation	SINGLETON
2	1175303		Macquarie Generation	SINGLETON
4	1193430		Macquarie Generation	MUSWELLBROOK
9	1193430		Macquarie Generation	MUSWELLBROOK
19	752468	4781-25	Macquarie Generation	SINGLETON
18	752486	1387-196	Macquarie Generation	MUSWELLBROOK
2	966589	2172-59	Macquarie Generation	MUSWELLBROOK
601	1019325		Macquarie Generation	SINGLETON / MUSWELLBROOK
2	1022827		Macquarie Generation	MUSWELLBROOK
1	1135603	<u> </u>	Macquarie Generation	MUSWELLBROOK
1	135548		Macquarie Generation	MUSWELLBROOK
1	199669		Macquarie Generation	MUSWELLBROOK
4	201211	9495-67	Macquarie Generation	MUSWELLBROOK
1	214241	9495-67	Macquarie Generation	MUSWELLBROOK
1	236869		Macquarie Generation	MUSWELLBROOK
30	1193296		Macquarie Generation	MUSWELLBROOK

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Lot	DP	Comprised in part of Auto Consol	Registered Owner	Local Govt. Area
23	1193430		Macquarie Generation	MUSWELLBROOK
28	1193430		Macquarie Generation	MUSWELLBROOK
21	1193296		Macquarie Generation	MUSWELLBROOK
23	1193296		Macquarie Generation	MUSWELLBROOK
28	1193296		Macquarie Generation	MUSWELLBROOK
1	1193430		Macquarie Generation	MUSWELLBROOK
24	241179		Macquarie Generation	MUSWELLBROOK
25	241179		Macquarie Generation	MUSWELLBROOK
26	241179		Macquarie Generation	MUSWELLBROOK
27	241179		Macquarie Generation	MUSWELLBROOK
28	241179		Macquarie Generation	MUSWELLBROOK
29	241179		Macquarie Generation	MUSWELLBROOK
30	241179		Macquarie Generation	MUSWELLBROOK
42	241179		Macquarie Generation	MUSWELLBROOK
43	241179		Macquarie Generation	MUSWELLBROOK
44	241179		Macquarie Generation	MUSWELLBROOK
45	241179		Macquarie Generation	MUSWELLBROOK
46	241179		Macquarie Generation	MUSWELLBROOK
1	247944	8427-24	Macquarie Generation	MUSWELLBROOK
2	247944	8427-24	Macquarie Generation	MUSWELLBROOK
3	247944	2221-156	Macquarie Generation	MUSWELLBROOK
4	247944	2221-156	Macquarie Generation	MUSWELLBROOK
5	247944		Macquarie Generation	MUSWELLBROOK
8	247944	1611-9	Macquarie Generation	MUSWELLBROOK
11	247944	7023-116	Macquarie Generation	MUSWELLBROOK
17	247944	7023-116	Macquarie Generation	MUSWELLBROOK

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Lot	DP	Comprised in part of Auto Consol	Registered Owner	Local Govt. Area
18	247944	1611-9	Macquarie Generation	MUSWELLBROOK
31	1193430	6382-138	Macquarie Generation	MUSWELLBROOK
37	1193430	6382-138	Macquarie Generation	MUSWELLBROOK
11	250890	6382-138	Macquarie Generation	MUSWELLBROOK
3	252529		Macquarie Generation	MUSWELLBROOK
4	252529		Macquarie Generation	MUSWELLBROOK
5	252529		Macquarie Generation	MUSWELLBROOK
6	252529		Macquarie Generation	MUSWELLBROOK
31	255215		Macquarie Generation	MUSWELLBROOK
32	255215		Macquarie Generation	MUSWELLBROOK
33	255215		Macquarie Generation	MUSWELLBROOK
34	255215	_	Macquarie Generation	MUSWELLBROOK
35	255215		Macquarie Generation	MUSWELLBROOK
35	1193430		Macquarie Generation	MUSWELLBROOK
27	1193430		Macquarie Generation	MUSWELLBROOK
38	255215		Macquarie Generation	MUSWELLBROOK
39	255215		Macquarie Generation	MUSWELLBROOK
40	255215		Macquarie Generation	MUSWELLBROOK
6	258548		Macquarie Generation	MUSWELLBROOK
29	1193296		Macquarie Generation	MUSWELLBROOK
14	1193430		Macquarie Generation	MUSWELLBROOK
1	574166		Macquarie Generation	MUSWELLBROOK
74	752468	4781-25	Macquarie Generation	SINGLETON
5	1193227		Macquarie Generation	MUSWELLBROOK
6	1193227		Macquarie Generation	MUSWELLBROOK
27	1193296		Macquarie Generation	MUSWELLBROOK
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Lot	DP	Comprised in part of Auto Consol	Registered Owner	Local Govt. Area
31	1156562		Macquarie Generation	MUSWELLBROOK
23	752486	1611-9	Macquarie Generation	MUSWELLBROOK
24	752486	· · · ·	Macquarie Generation	MUSWELLBROOK
25	752486		Macquarie Generation	MUSWELLBROOK
28	752486		Macquarie Generation	MUSWELLBROOK
34	752486		Macquarie Generation	MUSWELLBROOK
116	752486	7092-13	Macquarie Generation	MUSWELLBROOK
144	752486	1392-128	Macquarie Generation	MUSWELLBROOK
145	752486	1392-128	Macquarie Generation	MUSWELLBROOK
157	752486		Macquarie Generation	MUSWELLBROOK
160	752486	7092-13	Macquarie Generation	MUSWELLBROOK
162	752486		Macquarie Generation	MUSWELLBROOK
163	752486	7092-13	Macquarie Generation	MUSWELLBROOK
313	752486	1611-9	Macquarie Generation	MUSWELLBROOK
320	752486		Macquarie Generation	MUSWELLBROOK
24	1193430		Macquarie Generation	MUSWELLBROOK
29	1193430		Macquarie Generation	MUSWELLBROOK
33	1193430		Macquarie Generation	MUSWELLBROOK
38	1193430		Macquarie Generation	MUSWELLBROOK
40	1193430		Macquarie Generation	MUSWELLBROOK
1	790994		Macquarie Generation	MUSWELLBROOK
181	812852		Macquarie Generation	MUSWELLBROOK
16	1193430		Macquarie Generation	MUSWELLBROOK
2	929149	<u> </u>	Macquarie Generation	MUSWELLBROOK
102	1053098		Macquarie Generation	MUSWELLBROOK
8	1193430		Macquarie Generation	MUSWELLBROOK
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Lot	DP	Comprised in part of Auto Consol	Registered Owner	Local Govt. Area
10	1105152		Macquarie Generation	MUSWELLBROOK
11	1105152		Macquarie Generation	MUSWELLBROOK
3	1105210		Macquarie Generation	MUSWELLBROOK
1	1106490		Macquarie Generation	MUSWELLBROOK
1	1126279		Macquarie Generation	MUSWELLBROOK
2	1135606		Macquarie Generation	MUSWELLBROOK
5	1140127		Macquarie Generation	MUSWELLBROOK
12	1193430		Macquarie Generation	MUSWELLBROOK
11	1151798		Macquarie Generation	MUSWELLBROOK
12	1151798		Macquarie Generation	MUSWELLBROOK
6	1175270	<u>·</u>	Macquarie Generation	MUSWELLBROOK
19	247944	8427-24	Macquarie Generation	MUSWELLBROOK
2	774681		Macquarie Generation	MUSWELLBROOK
1	1095515		Macquarie Generation	MUSWELLBROOK
2	1095515		Macquarie Generation	MUSWELLBROOK
107	547864		Macquarie Generation	SINGLETON
1	234545		Macquarie Generation	SINGLETON
1	616025		Macquarie Generation	MUSWELLBROOK / SINGLETON
1	252530	13165-19	Macquarie Generation	MUSWELLBROOK
2	574168		Macquarie Generation	MUSWELLBROOK / SINGLETON
1	574168		Macquarie Generation	MUSWELLBROOK / SINGLETON
9	247943	13165-19	Macquarie Generation	MUSWELLBROOK
2	327372	1	Macquarie Generation	MUSWELLBROOK
1	369326		Macquarie Generation	MUSWELLBROOK / SINGLETON

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Lot	DP	Comprised in part of Auto Consol	Registered Owner	Local Govt. Area
3	247943	2172-59	Macquarie Generation	MUSWELLBROOK
3	1193186		Macquarie Generation	SINGLETON
4	247943		Macquarie Generation	MUSWELLBROOK
6	247943		Macquarie Generation	MUSWELLBROOK
Barnard				
631	791666		Macquarie Generation	UPPER HUNTER
Lambton				
3093	755247	13299-28	Macquarie Generation	NEWCASTLE
3145	755247	13299-28	Macquarie Generation	NEWCASTLE
3150	755247	13299-28	Macquarie Generation	NEWCASTLE
Tomago Deve	lopment Site			
2	1043561		Macquarie Generation	PORT STEPHENS
3	1043561		Macquarie Generation	PORT STEPHENS
Bayswater B I	Development Si	te	- -	
25	225426		Macquarie Generation	SINGLETON
322	625513		Macquarie Generation	SINGLETON / MUSWELLBROOK
Other Land	.			
10	1193430		Macquarie Generation	MUSWELLBROOK
18	1193430		Macquarie Generation	MUSWELLBROOK
21	1193430		Macquarie Generation	MUSWELLBROOK
19	1193296		Macquarie Generation	MUSWELLBROOK
11	815320		Macquarie Generation	MUSWELLBROOK

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Part C: Registered Easements

Ž	Title Decertation				
		Folio Identifier	Registered Proprietor	Dealing or	Description of Facement
-	. Lot 5 DP802081	5/802081	William James Revnolds		
					the title diagram created by V248097 for Transmission
ſ		1,000001			line 45 wide
i 	1 1701 + INT 002001	4/802081	Stephen Bruce Reichel and	V248097	Easement(s) affecting the nart(s) shown so hurdened in
			Jennifer Ann Reichel		the title diagram created by V248097 Easement for
<u>.</u>	Lot 137 DP752484	137/757404			Transmission line 45 wide
		+0+7C///CI	Noel I homas Symington	X963909	Easement for Transmission line affecting the part of the
					land within described shown as easement 45 metres
4	I of 183 DP757484	107/75/01			wide in DP640311
•		+0+7C1/C01	William Thomas Canning	Z532228	Easement for Transmission line affecting the part of the
ľ	I of A8 DD757404		(Estate: Perpetual Lease)		land above described shown so hurdened in DE40211
.	4047C/J/L 04 107	48/ /22484	William Thomas Canning	Z532228	Easement for Transmission line affecting the nart of the
4	1 of \$0 DD752484		(Estate: Perpetual Lease)		land above described shown so hurdened in DD640211
ò	4047C/ JCT 0C 107	20//J22484	William Thomas Canning	Z532228	Easement for Transmission line affanting the new off
ſ			(Estate: Perpetual Lease)		and above described shows so bundanced in the
	LOU Z UP11/8473	2/1178473	Brian John Shaw and	DD1178473	Line and the second sec
			Aileen Marie Cham	C/+0/11 1/1	Easement for electricity and other purposes 45 metre(s)
			WEIGHT INTERIC STICK		wide affecting the part(s) shown so burdened in the title
ø	Lot 201 DP735099	201/735000			diagram
			Nonald John Hammond and	Y137563	Easement for Transmission line 45 wide affecting the
			Helen Hammond		part of the land above described so shown burdened in
.6	I ot 457 DP603550	457/603550			DP640311
			Percy John Clement and Jenifer Ioan Clement	Y336794	Easement for Transmission line affecting the part of the
10.	Lot 180 DP752484	180/752484	Rrian Ichn Cham and		land shown so burdened in DP640311
				X / 20681	Easement for Transmission line affecting the part of the
			AUCCUI MARE SNAW		land above described shown 45 metres wide in
	I of 141 DP737117	011000/171			DP640311
		71170/11-1	Anthony John Gill and Chelses I mice Distant	Y785488	Easement for Transmission line affecting part of the land
			CHOISES TOURSE MICHENS		above described shown so burdened in DP640311

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Ref:Environ Strat - T /Src:T

Ŷ	Title Description	Folio Identifier	Registered Proprietor	Dealing or Plan number	Description of Easement
			Marion Joy Leggett		land within described shown 45 wide in DD640311
23.	. Lot 91 DP752490	91/752490	Dean Andrew Leggett and	Y335041	Easement for Transmission line affecting the mart of the
			Marion Joy Leggett		land within described shown 45 wide in DD640211
24	. Lot 1 DP316605	1/316605	Dean Andrew Leggett and	Y335041	Easement for Transmission line affecting the next of the
			Marion Joy Leggett		land within described shown 45 wide in DP640211
52	. Lot 2 DP840789	2/840789	Judith Fay McMahon	Y230460	Easement for Transmission line 45 wide affecting the
è					part(s) shown so burdened in the title diagram
70.7	Lot 92 DP752490	Part Auto Consol	Ellis Warren Lawrence,	Y557382	Easement for Transmission line affecting the part shown
		15399-218	Daphne Jean Lawrence and		45 metres wide in DP640312
			Ross Frederick Lawrence		
27.	Lot 99 DP752490	Part Auto Consol	Ellis Warren Lawrence,	Y557382	Easement for Transmission line affecting the next shows
		15399-218	Daphne Jean Lawrence and		45 metres wide in DP640312
			Ross Frederick Lawrence		
28.	Lot 53 DP752490	Part Auto Consol	Ellis Warren Lawrence,	Y557382	Easement for Transmission line affecting the part shown
		15399-218	Daphne Jean Lawrence and		45 metres wide in DP640312
			Ross Frederick Lawrence		
29.	Lot 31 DP752490	Part Auto Consol	Ellis Warren Lawrence,	Y557382	Easement for Transmission line affecting the nort shown
-		15399-218	Daphne Jean Lawrence and		45 metres wide in DP640317
0			Ross Frederick Lawrence		
30.	Lot 46 DP752483	Part Auto Consol	Ellis Warren Lawrence,	Y557382	Easement for Transmission line affecting the nart shown
		15399-218	Daphne Jean Lawrence and		45 metres wide in DP640312
		-	Ross Frederick Lawrence		
31.	Lot 57 DP752483	Part Auto Consol	Ellis Warren Lawrence,	Y557382	Easement for Transmission line affecting the nort shown
		15399-218	Daphne Jean Lawrence and		45 metres wide in DP640312
			Ross Frederick Lawrence		
32.	Lot 106 DP752483	Part Auto Consol	Ellis Warren Lawrence,	Y557382	Easement for Transmission line affecting the part shown
		15399-218	Daphne Jean Lawrence and		45 metres wide in DP640312
			Ross Frederick Lawrence		
33.	Lot 342 DP752483	342/752483	Daphne Jean Lawrence and	Bk 3778	Easement for Transmission line affecting the part shown

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°N No	Title Description	Folio Identifier	Registered Proprietor	Dealing or Plan number	Description of Easement
			Ross Frederick Lawrence	No.873	as 'Proposed Easement for Transmission line' in DP640312
34.	Lot 100 DP752483	100/752483	Ross Frederick Lawrence and Wendy May Lawrence	Y416925	Easement for Transmission line affecting the part of the land shown in DB640313
35.	Lot 109 DP752483	109/752483	Ross Frederick Lawrence and Wendy May Lawrence	Y416925	Easement for Transmission line affecting the part of the land shown in Db640313
36.	Lot 1 DP131621	Part Auto Consol 5510-226	Ross Frederick Lawrence and Wendy May Lawrence	DP131621	Easement for Transmission line affecting the part of Lot 1 in DP131621 within described designated (B) in
37.	Lot 100 DP634590	100/634590	John Gregory Hall and Susan Karen Hall	Y232986	Easement for Transmission line affecting the part of the land above described shown so hurdened in DP640317
38.	Lot 101 DP634590	101/634590	Rose Valley (Rouchel) Pty Ltd and Edward William Lane Doyle	X912136	Easement for Transmission line affecting the part shown 45 metres wide in DP640312
39.	Lot 1 DP131628	1/131628	William John Houston Paradice	Y119811	Easement for Transmission line affecting the part of the land described designated (B) in DP131628
40.	Lot 349 DP752483	349/752483	Andrew Donald Carter	Y626383	Easement for Transmission line affecting the part of the land above described shown so burdened in DP640312 Sheet 2
41.	Lot 358 DP752483	358/752483	Neil James Sinderberry and Garry Leonard Sinderberry	Z265960	Easement for Transmission line 45 wide affecting the part of the land above described shown so burdened in DP640312
42.	Lot 308 DP752483	308/752483	Neil James Sinderberry and Garry Leonard Sinderberry	Z265960	Easement for Transmission line 45 wide affecting the part of the land above described shown so burdened in DP640312
43.	Lot 305 DP752483	305/752483	Neil James Sinderberry and Garry Leonard Sinderberry	Z265960	Easement for Transmission line 45 wide affecting the part of the land above described shown so burdened in DP640312
44.	Lot 300 DP752483	300/752483	Neil James Sinderberry and	Z265960	Easement for Transmission line 45 wide affecting the

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burdened in	fecting the burdened in	wide affecting 0 in 2	wide affecting 0 in 2	wide affecting so burdened	wide affecting so burdened	fecting the ourdened in
	- 19 - 1	1 m -		~ ~	2 2	22-0-

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Ŝ	. Title Description	Folio Identifier	Registered Proprietor	Dealing or Plan numb a r	Description of Easement
			Garry Leonard Sinderberry		part of the land above described shown so burdened in DP640313
45.	. Lot 1 DP168440	Part Auto Consol 13695-81	Neil James Sinderberry and Garry Leonard Sinderberry	Z265960	Easement for Transmission line 45 wide affecting the part of the land above described shown so burdened in
46.	Lot 1 DP1114027	Part Auto Consol 3140-88	The Water Conservation and Irrigation Commission	E217596	Easement for Transmission line 45 metres wide affecti the part of Lot 1 in DP1114027 and Lot 330 in
47.	Lot 330 DP752483	Part Auto Consol 3140-88	The Water Conservation and Irrigation Commission	E217596	Easement for Transmission line 45 metres wide affecti the part of Lot 1 in DP1114027 and Lot 330 in DP757483 shown so hurdened in DE40010
48.	Lot 91 DP752483	91/752483	The Water Conservation and Irrigation Commission	E217596	Easement for Transmission line 45 metres wide affecting the part of the land above described shown so burdened in DP640312
49.	Lot 96 DP752446	96/752446	The Water Conservation and Irrigation Commission	E217596	Easement for Transmission line 45 metres wide affecting the part of the land above described shown so burdened in DP640179
20.	Lot 6 DP952240	Part Auto Consol 2664-107	The Water Conservation and Irrigation Commission	E217596	Easement for Transmission line 45 wide affecting the part of the land above described shown so burdened in DP640179
51.	Lot 138 DP752483	Part Auto Consol 15384-183	Water Resources Commission	E217596	Easement for Transmission line 45 metre(s) wide affecting the part(s) shown so burdened in DP640310
52	Lot 137 DP752483	Part Auto Consol 15384-183	Water Resources Commission	E217596	Easement for Transmission line 45 metre(s) wide affecting the part(s) shown so burdened in DP640310
53.	Lot 177 DP752483	Part Auto Consol 15384-183	Water Resources Commission	E217596	Easement for Transmission line 45 metre(s) wide affecting the part(s) shown so hurdened in DP640310
54.	Lot 140 DP752483	Part Auto Consol 15384-183	Water Resources Commission	E217596	Easement for Transmission line 45 metre(s) wide
55.	Lot 111 DP752446	Part Auto Consol	Water Resources Commission	E217596	Easement for Transmission line 45 metre(s) wide

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	Description of Easement	affecting the part(s) shown so burdened in DP640310	Notification in Government Gazette dated 15-11-1991 Fol 9682 Easement for Transmission line 45 metres	wide affecting the part of the land above described shown so burdened in DP640170	Notification in Government Gazette dated 15-11-1991	Fol 9682 Easement for Transmission line 45 metres	wide affecting the part of the land above described shown so hurdened in DP640170	Easement for Transmission line affecting the part of the	land above described shown as 45m wide in DP640179	Easement for Transmission line 45 metres wide	designated (D) affecting the part(s) of the land above	described shown so burdened in the title diagram (see	DP641430)	Easement for Transmission line 45 metre(s) wide	affecting the part(s) shown so burdened in the title	diagram	Easement for Transmission line 45 metres wide affectin	the part of the land above described shown so burdened	in DP641430	Easement for Transmission line 45 metre(s) wide	affecting the part(s) shown so burdened in the title	diagram	Easement for Transmission line 45 metre(s) wide	affecting the part(s) shown so burdened in the title	diagram	Easement for Transmission line 45 wide affecting part o	I the land above described shown so hurdened in
	Plan number		Notification 5		Notification 6			Y228357		Y108699				Z194788			Z194788			Y398470			Y398470			O513810	
	Registered Proprietor		Water Administration Ministerial Corporation		Water Administration	Ministerial Corporation		Antony Alfred Luke White	and Peter Michael White	Antony Alfred Luke White	and Peter Michael White			Pfister PT Pty Ltd			Pfister PT Pty Ltd			Pfister PT Pty Ltd			Ian John Farley and	Cheryl Lenore Farley		Daniel John Garland	
	Folio Identifier	15384-183	13/914678		133/752446			5/726256		102/1088878				102/1156729			212/711962			4/1164653			2/1164653			141/749839	
	Title Description		Lot 13 DP914678		Lot 133 DP752446			Lot 5 DP726256		Lot 102 DP1088878				Lot 102 DP1156729			Lot 212 DP711962			Lot 4 DP1 164653			Lot 2 UP1164653			Lot 141 DP749839	
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	Description of Easement	DP638675	Easement for Transmission line 45 metre(s) wide affecting the part(s) shown so burdened in the title diagram	Easement for Transmission line 45 metre(s) wide affecting the part(s) shown so burdened in the title	Easement for Transmission line affecting the part of the land within described shown so hundred in Discourse	Easement for Transmission line affecting the part of the land within described 45 metres wide shown in DP638677	Easement for Transmission line 45 metre(s) wide affecting the part(s) shown so burdened in DP638675	Easement for Transmission line 45 metre(s) wide affecting the part(s) of the land shown so burdened in the title diagram	Easement for Transmission line 45 metres wide affecting	Easement for Transmission line affecting the part of the land above described shown 45 metres wide in DP636033	Easement for Transmission line affecting the part of the land within described shown 45 metres wide in DP638677	Easement for Transmission line affecting the part of the land within described shown 45 metres wide in DP638677
	Dealing or Plan number		1695465	1695465	X226899	X207482	Bk 3770 No.331	X426921	Y236470	Y236470	X549020	X549020
	Registered Proprietor		Gary Bruce Johnson	Peter Robert Dawson and Estelle Ivy Dawson	Raymond John Garland and Zoe Lee Garland	Raymond John Garland	Ross Collison	Gavin Matthew MacCallum and Lucy Kathleen MacCallum	John Reginald Teague and Helen Dorothy Teague	John Reginald Teague and Helen Dorothy Teague	John Reginald Teague and Helen Dorothy Teague	John Reginald Teague and Helen Dorothy Teague
	Folio Identifier		211/1154848	212/1154848	2/16647	43/752476	17/1148428	2/1189234	6/661504	A/430878	Part Auto Consol 15227-70	Part Auto Consol 15227-70
	Title Description		Lot 211 DP1154848	Lot 212 DP1154848	Lot 2 DP16647	Lot 43 DP752476	Lot 17 DP1148428	Lot 2 DP1 189234	Lot 6 DP661504	Lot A DP430878	Lot 9 DP752476	Lot 11 DP752476
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g the part of the wide in	g the part of the wide in	g the part of the wide in e(s) wide in DP638677 g the part of the wide in	g the part of the wide in e(s) wide e(s) wide in DP638677 g the part of the wide in wide in	as 45 metres g the part of the wide in e(s) wide in DP638677 g the part of the wide in wide in affecting the am	as 45 metres g the part of the wide in e(s) wide e(s) wide in DP638677 g the part of the wide in wide in wide in affecting the am
mission line affecting t d shown 45 metres wit	mission line affecting t d shown 45 metres wit	mission line affecting t d shown 45 metres wid nission line 45 metre(s shown so burdened in mission line affecting t d shown 45 metres wid	mission line affecting t d shown 45 metres wid mission line 45 metre(s shown so burdened in mission line affecting t d shown 45 metres wid mission line affecting t d shown 45 metres wid d shown 45 metres wid	mission line affecting t d shown 45 metres wir nission line 45 metre(s shown so burdened in nission line affecting t d shown 45 metres wir d shown 45 metres wir d shown 45 metres wir nission line 45 wide af nission line 45 wide af nission line 45 wide af	mission line affecting t d shown 45 metres wid nission line 45 metre(s shown so burdened in nission line affecting t d shown 45 metres wid nission line affecting t d shown 45 metres wid nission line 45 wide af ned in the title diagram nission line 45 wide af ned in DP638911 ned in DP638911
wide in DP638677 Easement for Transr land within described	wide in DP638677 Easement for Transm land within described DP638677 Easement for Transm	wide in DP638677 Easement for Transn land within described DP638677 Easement for Transn affecting the part(s) s Easement for Transn land within described	wide in DP638677 Easement for Transm land within described DP638677 Easement for Transm affecting the part(s) s Easement for Transm land within described DP638677 Easement for Transm land within described	wide in DP638677 Easement for Transm land within described DP638677 Easement for Transm affecting the part(s) s Easement for Transm land within described DP638677 Easement for Transm land within described DP638683 Easement for Transm part shown so burden	wide in DP638677 Easement for Transm land within describec DP638677 Easement for Transm affecting the part(s) s Easement for Transm land within described DP638677 Easement for Transm land within described DP638683 Easement for Transm part shown so burden part shown so burden
Y571130	Y571130 X762526	Y571130 X762526 X762526	Y571130 X762526 X762526 X762526	Y571130 X762526 X762526 X762526 Y107561	Y571130 X762526 X762526 X762526 Y107561 Y107561
hael John Polin	hael John Polin arram Pty Limited	hael John Polin arram Pty Limited Farram Pty Limited	hael John Polin arram Pty Limited Farram Pty Limited Farram Pty. Limited	ihael John Polin arram Pty Limited Farram Pty Limited farram Pty. Limited in Matthew MacCallum Lucy Kathleen Callum	ihael John Polin arram Pty Limited Farram Pty Limited farram Pty. Limited in Matthew MacCallum Lucy Kathleen in Matthew MacCallum Lucy Kathleen in Matthew MacCallum Callum
55/752479 Micl	55/752479 Micl	55/752479 Mich Part Auto Consol W F 7091-117 W. F 46/752479 W. F	55/752479 Mich Part Auto Consol W Fi 7091-117 W. F 46/752479 W. F 87/661827 W. F	55/752479 Mich Part Auto Consol W Fi 7091-117 W. F 46/752479 W. F 37/661827 W. F 2/1048728 Gavi Maci	55/752479 Mich Part Auto Consol W Fi 7091-117 W. F 46/752479 W. F 87/661827 W. F 2/1048728 Gavi 87/52479 Gavi and 1 Maci 6avi and 1 Maci
Lot 55 DP752479	Lot 55 DP752479 5 Lot 54 DP752479 I	Lot 55 DP752479 5 Lot 54 DP752479 F Lot 46 DP752479 4	Lot 55 DP752479 5 Lot 54 DP752479 7 Lot 46 DP752479 4 Lot 87 DP661827 8	Lot 55 DP752479 5 Lot 54 DP752479 7 Lot 46 DP752479 4 Lot 87 DP661827 8 Lot 2 DP1048728 2	Lot 55 DP752479 5 Lot 54 DP752479 7 Lot 46 DP752479 4 Lot 87 DP661827 8 Lot 2 DP1048728 2 Lot 2 DP1048728 2
	80. I	80. I 81. I	80. I 81. I 82. I	80. L 81. L 82. L 83. L	80. L 81. L 82. L 83. L 84. L

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	Description of Easement	diagram	Easement for Transmission line 45 wide affect	part shown so burdened in DP638911	Easement for Transmission line affecting the r	land within described shown 45 metres wide in DP638683	Easement for Transmission line affecting the r	land within described shown 45 metres wide in	Easement for Transmission line 45 metre(s) w	affecting the part(s) of the land shown so burd	the title diagram	Easement for Transmission line affecting the n	land above described shown so burdened in DI	Easement for Transmission line affecting the p	Portion 85 shown so burdened in DP638683	Easement for Transmission line affecting the p	land within described shown 45 metres wide ir	Easement for Transmission line affecting the p	land above described shown as proposed easen	metres wide in DP638683	Easement for Transmission line affecting the p	land above described shown as proposed easen	metres wide in DP638683	Easement for Transmission line affecting the p	land above described shown as easement for	transmission line 45 wide in DP638682
	Dealing or Plan number		Y107561		Y571130		X720680		X720680			X529204		X529204		Y571130		Y287478			Y287478			U415642		
	Registered Proprietor	MacCallum	Gavin Matthew MacCallum	and Lucy Kathleen MacCallum	Scott James Mitchell and	Anne Margaret Mitchell	Scott James Mitchell and	Anne Margaret Mitchell	Scott James Mitchell and	Anne Margaret Mitchell		Scott James Mitchell and	Kerri Ann Mitchell	Scott James Mitchell and	Kerri Ann Mitchell	Nathan Robert Mamone		Douglas Andrew Taylor		- - - - -	Douglas Andrew Taylor			Ellerston Pty Limited		
	Folio Identifier		2/752479		75/752479		76/752479		991/1158227			79/752479		Part Auto Consol	12682-107	44/752479		57/752479		50/757170	61 47 61 100		CT1C2112	7/ 5 70/ 140		
	Title Description		Lot 2 DP752479		Lot 75 DP752479		Lot 76 DP752479		Lot 991 DP1158227			Lot 79 DP752479		Lot 85 DP752479		Lot 44 DP/52479		Lot 57 DP752479		I of 58 DD752470	61+701 JAT OC 107		I ~4 54 DD752472	TAL J4 DE 172412		
ľ	No.		86.		87.		88.		89.			90.	2	<u>у</u> І.	5	72.		93.		64	ŕ		50			

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parts of Lots 5, 6, 11, 19 & 20 in DP752472 as shown in parts of Lots 5, 6, 11, 19 & 20 in DP752472 as shown in parts of Lots 5, 6, 11, 19 & 20 in DP752472 as shown in parts of Lots 5, 6, 11, 19 & 20 in DP752472 as shown in parts of Lots 5, 6, 11, 19 & 20 in DP752472 as shown in Easement for Transmission line affecting the part of the Easement for Transmission line affecting the part of the Easement for Transmission line affecting the part of the Easement for Transmission line affecting the part of the Easement for Transmission line affecting the part of the Easement for Transmission line 45 wide affecting the land above described shown as easement for land above described shown as easement for and above described shown as easement for and above described shown as easement for and above described shown as easement for Description of Easement ransmission line 45 wide in DP638682 transmission line 45 wide in DP638682 transmission line 45 wide in DP638682 transmission line 45 wide in DP638682 DP638682 DP638682 DP638682 DP638682 DP638682 Dealing or Plan number U415642 **Registered Proprietor** Ellerston Pty Limited Ellerston Pty Limited Ellerston Pty Limited Ellerston Pty Limited **Ellerston Pty Limited** Ellerston Pty Limited **Ellerston Pty Limited** Ellerston Pty Limited Ellerston Pty Limited Ellerston Pty Limited Folio Identifier Part Auto Consol 55/752472 18/752472 17/752472 5442-197 15442-197 4579-223 4579-223 4579-223 4579-223 4579-223 **Title Description** 97. Lot 19 DP752472 98. Lot 20 DP752472 101. Lot 11 DP752472 103. Lot 17 DP752472 Lot 53 DP752472 Lot 52 DP752472 Lot 55 DP752472 102. Lot 18 DP752472 Lot 6 DP752472 100. Lot 5 DP752472 . 66 104. 96. 105. Ś

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N	Title Description				
		Folio identifier	Registered Proprietor	Plan number	Description of Easement
106.	Lot 1 DP66790	Part Auto Consol	Ellerston Ptv Limited	11415642	Freemont for T
		2207-8		7100110	affecting the part of I of 1 in DD65700 and 1.
107					DP638682
./01	LOI 2 UP / 524 / 2	Part Auto Consol	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide offerting the
		08-000			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in
108	I of 38 DD757477				DP752472 shown so burdened in DP638682
.001	7/470/377 00 107	Fart Auto Consol 2665 20	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
		00-000			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in
109.	Lot 50 DP752472	Dart Auto Concol	11 11		DP752472 shown so burdened in DP636282
		TALLAULO COUSO	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
		00-000			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in
011	I of 14 DD752477				DP752472 shown so burdened in DP636282
	7/ 47/ 107 11 107	FAIT AUTO CONSOI	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
		00-000			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in
	I of 74 DD757477				DP752472 shown so burdened in DP636282
	7/ 47 1/ 1/ 47 1/7	Fait Auto Consol	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
		000-2000			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in
112	I of JK DD767477				DP752472 shown so burdened in DP636282
	714701 377 107	Part Auto Consol	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
		00-000			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50. 71 and 77 in
113	I of 36 DP752472				DP752472 shown so burdened in DP636282
		Edit Auto Consol	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
		00-000			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in
114	I of 30 DD752473				DP752472 shown so burdened in DP636282
		RAILAUIO COIISOI	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
					part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in
115.	Lot 77 DP752472	Part Auto Concol			DP752472 shown so burdened in DP636282
		I GIL MUN CUIRNI	Ellerston rty Limited	U415641	Easement for Transmission line 45 wide affecting the

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Z	Titla Descrintion	Ealia Idaatiinaa		Dealing or	
i				Plan number	Description of Easement
		8665-80			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in DP752472 shown so hurdened in DD636282
16.	Lot 71 DP752472	Part Auto Consol	Ellerston Pty Limited	U415641	Easement for Transmission line 45 wide affecting the
		8062-80			part(s) of Lots 2, 14, 24, 26, 36, 38, 39, 50, 71 and 77 in DP752472 shown so hurdened in DD636782
17.	Lot 4 DP753693	4/753693	Christopher Stephen Young	Y304887	Easement for Transmission line affecting the part of the
18.	Lot 8 DP753693	8/753693	Glenrock Station Ptv Limited	0317361	Facement for Transmission line officiant to 201
					Least the real shown in DK18K81
19.	Lot 7 DP753693	Part Auto Consol	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part of the
اج	1 of 48 DD753687	Dott Auto Concel			land above described shown in DP638681
2	100CC/ 10 0F 107	rari Auto Consoi 4166-3	Gienrock Station Pty Limited	0317361	Easement for Transmission line affecting the part of the
51	Lot 9 DP753687	Part Auto Consol	Glenrock Station Div I imited	17751	Tailu above described shown in UP038081
			AINTING PLANNIN I IN TIMILIAN	100/100	casement for 1 ransmission line 45 metre(s) wide
		CO-7774			affecting the part(s) of Portions 8 & 9 shown so
22.	Lot 8 DP753687	Part Auto Consol	Glenrock Station Prv I imited	0317361	Forement for Transmission [1. 45
		4222-65		1001100	effecting the model of Decision and 8 0 of the model
					burdened in DP638681
23.	Lot 49 DP753687	49/753687	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part of the
					land above described shown in DP638681
4	Lot 88 DP753687	88/753687	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part of the
ļ	1 - 05 5552200				land above described shown in DP638681
Ċ.	180561 411 66 101	Part Auto Consol	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part(s) of
		047-0007			Lot s 94 & 95 in DP753687 shown so burdened in
Y	T -+ 04 DD767207				DP638681
ç.	1000001101 46 1001	Part Auto Consol	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part(s) of
		047-0007			Lot s 94 & 95 in DP753687 shown so burdened in
					DP638681

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	Tiele Door in the				
		Folio Identifier	Registered Proprietor	Dian number	Description of Easement
127	. Lot 53 DP753687	53/753687	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part of the
128	t. Lot 74 DP753687	74/753687	Glenrock Station Pty Limited	0317361	land above described shown in DP638681 Easement for Transmission line affecting the part of the
129	. Lot 58 DP753687	58/753687	Glenrock Station Pty Limited	0317361	land above described shown in DP638681 Easement for Transmission line affecting the part of the
130	. Lot 66 DP753687	66/753687	Glenrock Station Pty Limited	0317361	land above described shown in DP638681 Easement for Transmission line affecting the part of the
131	. Lot 51 DP753687	51/753687	Glenrock Station Pty Limited	0317361	land above described shown in DP638681 Easement for Transmission line affecting the part of the
132	. Lot 37 DP753687	37/753687	Glenrock Station Pty Limited	0317361	Eastment for Transmission line affecting the part of the land above described shown in DM23603
133	. Lot 64 DP753687	64/753687	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part of the
134	Lot 632 DP791666	632/791666	Glenrock Station Pty Limited	0317361	Easement for Transmission line affecting the part shown
135.	. Lot 631 DP791666	631/791666	Macquarie Generation	0317361	Easement for Transmission line affecting the part shown
136.	. Lot 3 DP753693	Part Auto Consol 4283-206	Glenrock Station Pty Limited	0317362	so burdened in DP638681 Easement for Water supply pipeline affecting the part of Lot 3 in DP753693 shown as "Proposed easement in stratum for tunnel 25 metres wide" in DP642724, and
					Easement for Water supply pipeline affecting the part of Lot 3 in DP753693 shown as "Proposed easement for
137.	Lot 8 DP753693	8/753693	Glenrock Station Pty Limited	0317362	water pipeline and access variable width" in DP642725 Easement for Water supply pipeline affecting the part of the land shown as "Proposed easement for water
138.	Lot 7 DP753693	Part Auto Consol	Glenrock Station Pty Limited	0317362	<u>Dipeline and access variable width</u> " in DP642725 Easement for Water supply pipeline affecting the nart of

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:					
° Ž	Title Description	Folio Identifier	Registered Proprietor	Plan number	Description of Easement
		4166-3			Lot 7 in DP753693 shown as "Promosed easement for
					water pipeline & access 15 wide & variable" in
139	Lot 71 DP753693	71/753603	Clanned Station D. I 1	001000	D/r042/20
			OTERLOCK STATION MY LIMITED	031/362	Easement for Water supply pipeline affecting the part of
					the land shown as "Proposed easement for water
140	1 of 40 DD753607	10/12/04			pipeline & access 15 wide & variable" in DP642728
	100000/101 64-1001	180501/64	Glenrock Station Pty Limited	0317362	Easement for Water supply pipeline affecting the part of
					the land shown as "Proposed easement for water
141	I ~4 70 DD763603	10/12/00			pipeline & access 15 wide & variable" in DP642728
Ŧ	101 101 101 101 101 101 101 101	5605C1/01	Glenrock Station Pty Limited	0317362	Easement for Water supply pipeline affecting the part of
					the land shown as "Proposed easement for water
-	1 - 40 Durrayor				pipeline & access 15 wide & variable" in DP642726
142.	101 40 101 101 101	Part Auto Consol	Glenrock Station Pty Limited	0317362	Easement for Water supply pipeline affecting the part of
		4100-3			Lot 48 in DP753687 shown as "Proposed easement for
					water pipeline and access 15 wide & variable" in
142	1 24 0 DD761607				DP642726
	100507101 4 1071	Part Auto Consol	Glenrock Station Pty Limited	0317362	Easement for Water supply pipeline affecting the part(s)
		C0-7774			of Portion 9 shown as "Proposed easement for water
					pipeline & access 15 wide & variable" & "Proposed
1 1 4	1 -4 86 DD753/07				easement for access 10 wide & variable" in DP642727
ţ	100551 717 00 107	/ 8050/ /08	Glenrock Station Pty Limited	0317362	Easement for Water supply pipeline affecting the part of
					the land shown as "Proposed easement for water
145	I ~ 53 DD752697	69 (369 COA			pipeline & access 15 wide & variable" in DP642727
	1005C1 JU CC 107	1805.01/50	Glenrock Station Pty Limited	0317362	Easement for Water supply pipeline affecting the part of
					the land shown as "Proposed easement for water
-					pipeline & access 15 wide & variable" in DP643669,
					and
					;
					Easement for access affecting the part of the land shown in DD642515
				_	

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or Description of Easement	Easement for access affecting the part of the land shown in DP642515	Easement for Water supply pipeline affecting the part of Lot 73 in DP753687 shown as "Proposed easement for water pipeline and access 15 wide & variable width" in DP643666, and Fasement for access affecting the new of 1 of 72 in	DP753687 shown in DP649515	Easement for Water supply pipeline affecting the part of the land shown as "Proposed easement for water pipeline & access 15 wide & variable width" in DP643666, and Easement for access affecting the part of the land shown	111 DP642515	Easement for Water supply pipeline affecting the part of the land shown as "Proposed easement for water pipeline & access 15 wide & variable width" in DP643667, and Easement for access affecting the part of the land shown in DP643515	Easement for Water supply pipeline affecting the part of the land shown in DP642481, and Easement for access affecting the part of the land shown	Easement for Water supply pipeline affecting the part of the land shown in DP642481. and
Dealing Plan num	0317362	0317362		0317362		0317362	0317362	0317362
Registered Proprietor	Glenrock Station Pty Limited	Glenrock Station Pty Limited		Glenrock Station Pty Limited		Glenrock Station Pty Limited	Glenrock Station Pty Limited	Glenrock Station Pty Limited
Folio Identifier	74/753687	Part Auto Consol 3654-209		58/753687	51/753207	/ 2055//15	66/753687	37/753687
Title Description	Lot 74 DP753687	Lot 73 DP753687		Lot 58 DP753687	I of \$1 DD753687		Lot 66 DP753687	Lot 37 DP753687
No.	146.	147.		148.	140		150.	151.

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	°. Vo	Title Description	Folio Identifier	Registered Proprietor	Dealing or Plan number	
						Easement
	152	. Lot 64 DP753687	64/753687	Glenrock Station Dry I imited	0117160	In UP042
				DIVITIONS DIGITION FLY LIMITED	705/160	Easement the land sl
						pipeline 1
						Easement in DP6425
	.£CI	Lot 632 DP791666	632/791666	Glenrock Station Pty Limited	0317362	Easement (E) in DP(
			_			
1						Easement
	154.	Lot 7004 DP96924	7004/96924	The State of New South Wales		Notificatio
-	-					Fol. 260.
						wide and v
	155	I of 111 DP1050007	111/1050007	() 		shown so l
			/004001/111	Coal & Allied Operations Pty	DP1059007	Easement
-1.	156	I of 150 DB1100745	150/1100745			wide affec
		C+/ 6611 JOT ACT 107	C4/6611/0C1	Coal & Allied Operations Pty	DP1199745	Right of ca
				Trta		affecting th
_						diagram.
						2

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Annexure 2 - Macquarie Generation Power Station Assets

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Annexure 3 - Macquarie Generation Moveable Assets

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Annexure 4 - Macquarie Generation Inventory and Spares

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Annexure 5 - Macquarie Generation Fleet Assets

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Annexure 6 - Macquarie Generation IT Assets

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Annexure 7 - Macquarie Generation Contracts

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Annexure 8 - Macquarie Generation Insurance Policies

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Annexure 9 - Macquarie Generation Purchase Orders

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Annexure 10 - Macquarie Generation Outstanding Securities

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Annexure 11 - Macquarie Generation EOI and Tender Status Reports

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Advance Legal Searchers Pty Ltd hereby certifies that the information contained in this document has been provided electronically by the Registrar General.



Number	Type of Instrument
DP1043561	DEPOSITED PLAN
DP1093076	DEPOSITED PLAN
AF345639	CAVEAT
DP1151103	DEPOSITED PLAN
AF546575	TRANSFER GRANTING EASEMENT
AF546587	TRANSFER GRANTING EASEMENT
AF599620	TRANSFER GRANTING EASEMENT
AF658232	TRANSFER INCLUDING COVENANT
DP1155313	DEPOSITED PLAN
	Number DP1043561 DP1093076 AF345639 DP1151103 AF546575 AF546587 AF599620 AF658232 DP1155313

10/4/2014 AI504017 DEPARTMENTAL DEALING

12/5/2014 AI387614 TRANSFER GRANTING EASEMENT

EDITION 4

EDITION 3

C.T. Issue

EDITION 1

EDITION 2

FOLIO CREATED

19/9/2014 AI862746 REQUEST EDITION 5

*** END OF SEARCH ***

Environ Strat – T

PRINTED ON 25/2/2016

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Recorded Number Type of Instrument

C.T. Issue

EDITION 1

EDITION 2

FOLIO CREATED

17/9/2002	DP1043561	DEPOSITED PLAN
12/10/2006	DP1093076	DEPOSITED PLAN
24/10/2006	DP270494	DEPOSITED PLAN
12/9/2008	DP270494	DEPOSITED PLAN
2/3/2010	AF345639	CAVEAT
27/5/2010	DP1151103	DEPOSITED PLAN
28/6/2010	AF546575	TRANSFER GRANTING EASEMENT
28/6/2010	AF546587	TRANSFER GRANTING EASEMENT
22/7/2010	AF599620	TRANSFER GRANTING EASEMENT
10/8/2010	AF658232	TRANSFER INCLUDING COVENANT

20/8/2010 DP1155313 DEPOSITED PLAN

19/9/2014 AI862746 REQUEST

EDITION 4

EDITION 3

*** END OF SEARCH ***

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Req:R247 Ref:Enviro	358 /Doc:DL AF6 on Strat - T /Src:	658232 /Rev: T	13-Aug-2010	/Sts:NO.OK /Pgs:A	ALL /Prt:25	-Feb-2016 19:1	7 /Seq:1 of 8	
• -	Form: 01TCV Release: 2.3 www.lpma.nsw.go	ov.au)	TRANS INCLUDING C New South Real Property	FER OVENA Wales Act 1900	NT A	F6582	32E
	PRIVACY NOTE: 3 by this form for the Register is ma	Section 31B of the establish de available to	the Real Proper ment and main any person for	ty Act 1900 (RP Act) au intenance of the Rea r search upon paymer	uthorises the al Property 1t of a fee, if	Registrar General Act Register, So Office of Sta Act Act Register, So Office of Sta	to collect the info ction 908 RP A to Revenue	ormation required the requires that
	STAMP DUTY	Office of Sta	te Revenue use	only		Client No: 1411509 Duty:	Trane No: 575	1272 12-82
(A)	TORRENS TITLE	Lot 2 and	l Lot 3 in	DP 1043561			12	
(B)	LODGED BY	Document Collection Box 28	Name, Addres LLPN: 124247U Reference: [s or DX, Telephone, ESPREO PROPERTY SE DY 235 53 DN 02 9210 095	and Custom N R 411E-S NEY 93	er Account Numb	er if any	CODE TV
(C)	TRANSFEROR	Tomago A	uminium Co	ompany Pty Ltd	(ABN 68	001 862 228)	
(D) (E)		The transferor specified abov and the TRA	acknowledges /e transfers to t NSFEROR	receipt of the consider he transferee an estat	ration of \$ e in fee simp with the <u>T</u>	1,980,000.00 ple RANSFEREE	as set out in s	s regards the land
(F) (G)	TRANSFEREE	Encumbrance Macquarie	s (if applicable Generation ON); on (ABN 18 402	904 3 9 4 4)	€ ×	10
(H)	DATE 0	21.03.2	010_	· · ·	-	<u> </u>		
(1)	Certified correct and executed on t authorised person pursuant to the au Corporation: Authority:	for the purpose behalf of the co (s) whose sign thority specifi Tomago Alu section 1	es of the Real P prporation nam ature(s) appear ed, minium Con 27 of the	roperty Act 1900 ed below by the r(s) below apany Pty Ltd Corporations A	act 2001			·····
	Name of authoris Office held:	ed person:	JLD John De rector	<u>auies</u>	Name of Office he	e of authorised per authorised person ld:	Roll Ge	eilweiler y secretary
	Certified correct and executed on authorised person pursuant to the a Corporation: Authority:	for the purposi behalf of the c n(s) whose sign thority specif Macquarie	es of the Real I proration nam nature(s) appea ed. Generation	Property Act 1900 and below by the r(s) below				
	Signature of authoris	orised person:	Mile	MAN BIRN		e of authorised per	son: 9. An	he is the
	Office held:	huf Exec	Ave & Ma	inagin Director	Office he	eld:	4 SECRETARY	MANZ X
	All handwriting 0911	G MUST BE IN B	LOCK CAPITALS.	Page 1 of	7	LAND AND PR	OPERTY MANAGE	MENT AUTHORITY

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. 1 Req:R247358 /Doc:DL AF658232 /Rev:13-Aug-2010 /Sts:NO.OK /Pgs:ALL /Prt:25-Feb-2016 19:17 /Seq:2 of 8 Ref:Environ Strat - T /Src:T

(J)	SCHEDULE 1 TO TRANSFER:					
(K)	Dated:					
	From: Tomago Aluminiu	um Company Pty Ltd (ABN 68 001 862 228)				
	To: Macquarie Generation (ABN 18 402 904 34)					
(L)	Land benefited by covenant:	Lot 1 and Lot 4 in DP 1043561 (the Benefited Land)				
	Land burdened by covenant:	Lot 2 and Lot 3 in DP 1043561 (the Burdened Land)				
(M)	Terms of the covenant:					

See Annexure

5. Raulu'

Signature of witness:

(N) Signature of witness:

Signature of transferor:

Signature of transferee:

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ANNEXURE TO THE TRANSFER DATED 2010 FROM TOMAGO ALUMINIUM COMPANY PTY LTD (TRANSFEROR) TO MACQUARIE **GENERATION** (TRANSFEREE)

Restrictive Covenant

It is agreed as follows.

Definitions and Interpretation 1.

1.1 Definitions

The following definitions apply unless the context requires otherwise:

Authorised Officer means any person whose title or acting title includes the word manager or similar expression or any secretary or director.

Benefited Owner means the Transferor, its successors and assigns, being the owner or occupier of or any person with any interest in the Benefited Land from time to time.

Burdened Owner means the Transferee its successors and assigns, being the owner, occupier of or any person with any interest in the Burdened Land from time to time.

Burdened Owner's DA means any development consent obtained by the Burdened Owner for the construction and operation of the Power Station.

Business Day means a day other than Saturday, Sunday or a public holiday in Sydney.

Environment Protection Authority means the NSW Environment Protection Authority and/or any other person, authority, instrumentality or body having jurisdiction, rights, powers, duties or responsibilities over the Benefited Land or any part of it.

Power Station means the natural gas-fuelled power station with a capacity of up to 800 megawatts the Burdened Owner plans to construct and operate on the Burdened Land.

Restrictive Covenant means each of the restrictions on the use of the Burdened Land as set out in paragraph 5.

Smelter means the aluminium smelter operated by the Benefited Owner on the Benefited Land.

1.2 Interpretation

Headings are for convenience only and do not affect interpretation. The following s of interpretation apply unless the context requires otherwise.



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- (a) The *singular* includes the plural and conversely.
- (b) A *gender* includes all genders.
- (c) Where a *word or phrase* is defined, its other grammatical forms have a corresponding meaning.
- (d) A reference to a *person* includes a body corporate, an unincorporated body or other entity and conversely.
- (e) A reference to a *clause* or *schedule* is to a clause of or schedule to this Covenant.
- (f) A reference to any *party* to this Covenant or any other deed or document includes the party's successors and permitted assigns.
- (g) Mentioning anything after *include, includes* or *including* does not limit what else might be included.
- (h) A reference to any *agreement or document* is to that agreement or document as amended, novated, supplemented, varied or replaced from time to time, except to the extent prohibited by this Covenant or that other agreement or document.
- (i) A reference to any *legislation* or to any provision of any legislation includes any modification or re-enactment of it, any legislative provision substituted for it and all regulations and statutory instruments issued under it.
- (j) Each *Schedule* and *Annexure* to, and certificate and document delivered under, this Covenant forms part of this Covenant.
- (k) A reference to a *right* or *obligation* of any two or more persons confers that right, or imposes that obligation, as the case may be, jointly and severally.
- (1) A reference to *writing* includes a facsimile transmission and any means of representing or reproducing words (in English), figures, drawings or symbols, in a visible, tangible form.
- (m) All *obligations* are taken to be required to be performed duly and punctually.
- (n) **Do** includes do, permit or omit or cause to be done or omitted.
- (o) No rule of *construction of documents* shall apply to the disadvantage of a party, on the basis that the party put forward this document or any relevant part of it.
- (p) If any term of this Covenant is *legally unenforceable or made inapplicable*, it shall be severed or read down, but so as to maintain (as far as possible) all other terms of this Covenant (unless to do so would change the underlying principal commercial purposes of this Covenant).

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2. Acknowledgments

The Benefited Owner and Burdened Owner acknowledge and agree that:

- (a) the land to which the benefit of the Restrictive Covenant is appurtenant is the whole and each part of the Benefited Land;
- (b) the land which is subject to the burden of the Restrictive Covenant is the whole and each part of the Burdened Land;
- (c) the owners in fee simple for the time being of the Benefited Land have the right to release the Restrictive Covenant; and
- (d) there are no persons other than the Burdened Owner and the Benefited Owner whose consent is required to a release variation or modification of the Restrictive Covenant.

3. Burdened Owner covenants

The Burdened Owner covenants that it:

- (a) has the power to create the Restrictive covenant on the Burdened Land imposed in this Covenant;
- (b) will observe and comply with the terns of the Restrictive Covenant at all times; and
- (c) will, when required by the Benefited Owner and at the cost of the Benefited Owner, do all things necessary to maintain the Restrictive Covenant on the Burdened Land as the Benefited Owner reasonably requires, including signing any further document or consent.

4. Damages not adequate remedy

The parties acknowledge and agree that damages are not an adequate remedy for breach of the Restrictive Covenant and the Burdened Owner consents to the Benefited Owner obtaining orders for injunctive relief if there is a breach of the Restrictive Covenant.

5. Restrictive Covenant

The Burdened Owner must:

- (a) not use or permit or suffer to be used the Burdened Land in a manner which:
 - exceeds Environment Protection Authority licence limits set on the Power Station for all relevant atmospheric emissions as may be regulated by the Environmental Protection Authority from time to time; or

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\end{array}$

exceeds Environment Protection Authority licence limits set on the Power Station for noise emanating from the Burdened Land; or

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- (iii) is outside the parameters of the Burdened Owner's DA.
- (b) not lodge or permit or suffer any application for any development consent in respect of the Burdened Land to be lodged with the relevant consent authority without the prior approval in writing of the Benefited Owner having been first obtained, such approval not to be unreasonably withheld if the proposed development would not (in the Benefited Owner's reasonable opinion) if implemented, cause or be likely to cause a breach of the covenants set out in paragraph (a);
- (c) not lease, licence, sell or permit or suffer to be let, licensed or sold the Burdened Land to any person unless:
 - (i) on or prior to completion of any sale or the grant of any lease or licence of the Burdened Land, the purchaser, lessee or licensee enters into a deed with the Benefited Owner in a form and containing such terms and conditions as are reasonably satisfactory to the Benefited Owner in which that person covenants with the Benefited Owner on the same terms as are set out in this Covenant; and
 - (ii) that person proposes and undertakes to use the Burdened Land for the sole purpose of operating the Power Station; and
- (d) not use the Burdened Land for any purpose other than the construction and operation of the Power Station.

6. Notices

Any notice given under this Covenant:

(a) must be in writing addressed to the intended recipient at the address shown below or the address last notified by the intended recipient to the sender:

Benefited Owner	Tomago Aluminium Company Limited PO Box 405 Raymond Terrace NSW 2324
Attention:	Company Secretary
Fax:	(02) 4966 9212
Burdened Owner	Macquarie Generation 34 Griffiths Road Lambton NSW 2299 PO Box 3416 Hamilton Delivery Centre NSW
Attention:	Company Secretary

Fax:

(02) 4968 7490

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- (b) must be signed by the sender or an Authorised Officer of the sender,
- (c) will be taken to have been given:
 - (i) (in the case of delivery in person when delivered, received or left at the above address;
 - (ii) (in the case of facsimile transmission) when recorded on the transmission result report unless:
 - (A) within 24 hours of that time the recipient informs the sender that the transmission was received in an incomplete or garbled form; or
 - (B) the transmission result report indicates a faulty or incomplete transmission; or
 - (iii) (in the case of post) on the second day after the date on which the notice is accepted for posting by the relevant postal authority.

If delivery or receipt is on a day which is not a Business Day in the place of receipt or is later than 4pm (local time) on a Business Day in the place of receipt, the notice will be taken to have been given on the next Business Day in the place of receipt.

7. Governing Law

This Covenant is governed by the laws of New South Wales. The parties submit to the non-exclusive jurisdiction of courts exercising jurisdiction there.

8. Stamp Duty and Costs

Each party must pay its own costs arising out of the preparation of this Covenant but the Burdened Owner must pay any stamp duty and registration fees (including fines and penalties) chargeable on this Covenant, on any instruments entered into under this Covenant, and in respect of the transaction evidenced by this Covenant. The Burdened Owner must indemnify the Benefited Owner on demand against any liability for that stamp duty (including fines and penalties).

9. Variations and Waivers to be in Writing

No variation, modification or waiver of any provision in this Covenant, nor consent to any departure by a party from any such provision, shall be of any effect unless it is in writing, signed by the parties or (in the case of a waiver) by the party giving it. Any such variation, modification, waiver or consent shall be effective only to the extent to or for which it may be made or given.

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Req:R247358 /Doc:DL AF658232 /Rev:13-Aug-2010 /Sts:NO.OK /Pgs:ALL /Prt:25-Feb-2016 19:17 /Seq:8 of 8

Ref:Environ Strat - T /Src:T

Baker & M^oKenzie

AMP Centre Level 27, 50 Bridge Street Sydney, NSW 2000, Australia ABN 32 266 778 912

Postal Address: PO Box R126 Royal Exchange, NSW 1223, Australia

Tel: +61 2 9225 0200 Fax: +61 2 9225 1595 DX: 218 SYDNEY www.bakernet.com

21 July 2010

The Registrar Land Property Information New South Wales Queens Square SYDNEY NSW 2000

Dear Sirs,

Certificates of Title Folio Identifiers 2/1043561 & 3/1043561 **Registered Proprietor: Tomago Aluminium Company Pty Limited**

We act for Macquarie Generation, the Caveator under Caveat AF345639 which is registered on the Certificates of Title to the above property.

We confirm that the Caveator consents to the registration of the Transfer Including Covenant (Transfer to the Caveator, Covenant in favour of Tomago Aluminium Company Pty Limited).

Please contact Rachel McNaught on (02) 8922 5389 if you have any queries.

Yours sincerely,

David Jones

Solicitor for the Caveator +61 2 8922 5319 david.jones@bakermckenzie.com

Other Contact: Rachel McNaught Associate +61 2 8922 5389 rachel.mcnaught@bakermckenzie.com

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WorkCover NSW 92–100 Donnison Street, Gosford, NSW 2250 Locked Bag 2906, Lisarow, NSW 2252 T 02 4321 5000 F 02 4325 4145 Customer Service Centre 13 10 50 DX 731 Sydney workcover.nsw.gov.au

4 August 2015

Attention: Greg Sheehan Environmental Strategies PO BOX 232 Carrington NSW 2294

Dear Mr Sheehan,

RE SITE: 1902 & 1940 Pacific Hwy Tomago NSW

I refer to your site search request received by WorkCover NSW on 28 July 2015 requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Brent)Jones Senior Licensing Officer Dangerous Goods Team



116 Adelaide Street, Raymond Terrace NSW 2324 PO Box 42, Raymond Terrace NSW 2324 DX 21406 ABN 16 744 377 876 Telephone: (02) 4980 0326 Facsimile: (02) 4987 3612 Email: <u>s149@portstephens.nsw.gov.au</u> <u>http://www.portstephens.nsw.gov.au</u>

PLANNING CERTIFICATE PURSUANT TO SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

APPLICANT DETAILS:

GREG SHEEHAN 10 DARVALL STREET CARRINGTON NSW 2294

Reference.: 15107

Application number: 91121

Receipt number: 2198685

Issue Date: 22/07/2015

PROPERTY DESCRIPTION:

1902 Pacific Highway TOMAGO 2322 LOT: 2 DP: 1043561 Parcel No: 37529

Disclaimer

Information contained in this certificate relates only to the land for which this certificate is issued on the day it is issued. This information is provided in good faith and Council shall not incur any liability in respect of any such advice. Council relies on state agencies for advice and accordingly can only provide that information in accordance with the advice. Verification of the currency of agency advice should occur. For further information, please contact Council's Strategy & Environment Section.

Title Information

Title information shown on this Planning Certificate is provided from Council's records and may not conform to information shown on the current Certificate of Title. Easements, restrictions as to user, rights of way and other similar information shown on the title of the land are not provided on this planning certificate.

Inspection of the land

The Council has made no inspection of the land for the purposes of this Planning Certificate.

PART A: INFORMATION PROVIDED UNDER SECTION 149 (2)

Matters contained in this certificate apply only to the land on the date of issue.

1. Name of Relevant Planning Instruments and DCPs

1.1 Which environmental planning instruments apply to the carrying out of development on the land?

Local Environmental Plan

Port Stephens Local Environmental Plan 2013 - Published on the NSW Legislation website and in force from 22 February 2014.

State Environmental Planning Policies

State Environmental Planning Policy No 21 - Caravan Parks

State Environmental Planning Policy No 30 - Intensive Agriculture

State Environmental Planning Policy No 33 - Hazardous and Offensive Development

State Environmental Planning Policy No 36 - Manufactured Home Estate

State Environmental Planning Policy No 44 - Koala Habitat Protection

State Environmental Planning Policy No 50 - Canal Estate Development

State Environmental Planning Policy No 55 - Remediation of Land

State Environmental Planning Policy No 62 - Sustainable Aquaculture

State Environmental Planning Policy No 64 - Advertising and Signage

State Environmental Planning Policy No 65 - Design Quality of Residential Flat Development

State Environmental Planning Policy No 71 - Coastal Protection

State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Exempt & Complying Development Codes) 2008

State Environmental Planning Policy (Affordable Rental Housing) 2009

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Rural Lands) 2008

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (Temporary Structures) 2007

Regional Environmental Plans

The Williams River Catchment Plan DOES NOT apply to this property

1.2 Which proposed environmental planning instruments apply to the carrying out of development on the land that is or has been the subject of community consultation or public exhibition?

Draft Local Environmental Plan

No Draft Local Environmental Plans currently exist which affect the site the subject of this certificate.

Draft State Environmental Planning Policies:

No Draft State Environmental Planning Policies have been Publicly Exhibited which affect the site the subject of this Certificate.

1.3 Which development control plans apply to the carrying out of development on the land?

Port Stephens Development Control Plan 2013

1.4 In this clause, proposed environmental planning instrument includes a planning proposal for the LEP or a draft environmental planning instrument.

No Draft Local Environmental Plans currently exist which affect the site the subject of this certificate.

2. Zoning And Land Use Under Relevant Local Environmental Plan(s):

For each environmental planning instrument or proposed instrument referred to in clause 1 above (other than a SEPP or proposed SEPP) that applies to the land:

2.1 What is the identity of the zoning for the land?

E2 Environmental Conservation

IN1 General Industrial

Port Stephens Local Environmental Plan 2013

- (a) The land is zoned E2 Environmental Conservation under the provisions of Part 2 in the Port Stephens Local Environmental Plan 2013.
- (b) Item 2 Permitted without consent Bee keeping; Environmental protection works; Home occupations
- (c) Item 3 Permitted with consent Bed and breakfast accommodation; Building identification signs; Business identification signs; Dual occupancies; Dwelling houses; Eco-tourist facilities; Environmental facilities; Flood mitigation works; Home-based child care; Home businesses; Information and education facilities; Recreation areas; Research stations; Roads; Water recreation structures; Water supply systems

(d) Item 4 - Prohibited

Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Water treatment facilities; Any other development not specified in item 2 or 3

(e) Development Standard for the erection of a dwelling-house

Clause 4.2B in the Port Stephens Local Environmental Plan 2013 includes a development standard that fixes a minimum land dimension for the erection of a dwelling-house. This clause applies to the land. The minimum lot size for the erection of a dwelling-house is identified on the Lot Size Map.

Port Stephens Local Environmental Plan 2013

- (a) The land is zoned IN1 General Industrial under the provisions of Part 2 in the Port Stephens Local Environmental Plan 2013.
- (b) **Item 2 Permitted without consent** Nil

(c) Item 3 – Permitted with consent

Airstrips; Boat building and repair facilities; Boat launching ramps; Boat sheds; Correctional centres; Crematoria; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; Garden centres; General industries; Hardware and building supplies; Heavy industrial storage establishments; Heavy industries; Helipads; Heliports; Highway service centres; Industrial retail outlets; Industrial training facilities; Jetties; Landscaping material supplies; Light industries; Mortuaries; Neighbourhood shops; Plant nurseries; Port facilities; Research stations; Restricted premises; Roads; Rural supplies; Sawmill or log processing industries; Service station; Sex services premises; Signage; Stock and sale yards; Timber yards; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres; Water supply systems; Wharf or boating facilities; Wholesale supplies

(d) **Item 4 - Prohibited** Any development not specified in item 2 or 3

(e) **Development Standard for the erection of a dwelling-house** No development standard that fixes a minimum land dimension for the erection of a dwelling-house applies to the land.

NOTE: The land subject of this certificate DOES NOT have a site specific clause applying to it.

2.2 Does the land include or comprise a critical habitat?

Port Stephens Local Environmental Plan 2013 DOES NOT identify the land as including or comprising critical habitat.

2.3 Is the land in a conservation area?

The land IS NOT located within a heritage conservation area under the provisions in Port Stephens Local Environmental Plan 2013.

2.4 Is an item of environmental heritage situated on the land?

The land IS NOT identified as containing an item of environmental heritage under the provisions in Port Stephens Local Environmental Plan 2013.

3. Complying Development (State Environmental Planning Policy – Exempt and Complying Development Codes) 2008

General Housing Code:

Complying development under the General Housing Code MAY NOT be carried out on the land.

Rural Housing Code:

Complying development under the Rural Housing Code MAY NOT be carried out on the land.

Commercial and Industrial Alterations Code:

Complying development under the Commercial and Industrial alterations Code MAY be carried out on the land.

Commercial and Industrial (New Buildings and Additions) Code:

Complying development under the Commercial and Industrial (New Buildings and Additions) Code MAY be carried out on the land.

Housing Alterations Code:

Complying development under the Housing Alterations Code MAY be carried out on the land.

General Development Code:

Complying development under the General Development Code MAY be carried out on the land.

Demolition Code:

Complying development under the Demolition Code MAY be carried out on the land.

Subdivision Code:

Complying development under the Subdivision Code MAY be carried out on the land.

Fire Safety Code:

Complying development under the Fire Safety Code MAY be carried out on the land.

Note: The abovementioned advice for all complying development codes is limited to identifying whether or not the land, the subject of this certificate, is on land where complying development may be carried out because of Clauses 1.17A (1), (1)(c) to (e), (2), (3) and (4), 1.18(1)(c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (the Codes SEPP). There may be other requirements under the Codes SEPP or another Environmental Planning Instrument that needs to be satisfied.

4. Coastal Protection

4.1 Is the land affected by the operation of section 38 or 39 of the Coastal Protection Act 1979, but only to the extent that the Council has been notified by the Department of Services, Technology and Administration?
The land IS NOT affected by the operation of section 38 or 39 of the Coastal Protection Act 1979 (which Council is aware).

4a Certain Information Relating To Beaches And Coasts

4a.1 Whether an order has been made under Part 4D of the Coastal Protection Act 1979 in relation to temporary coastal protection works (within the meaning of that Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.

The land IS NOT affected by an order under 4D of the Coastal Protection Act.

4a.2(a) Whether the council has been notified under section 55X of the Coastal Protection Act 1979 that temporary coastal protection works (within the meaning of the Act) have been placed on the land (or on public land adjacent to that land).

The land IS NOT affected by temporary coastal protection works.

4a.2(b) Whether the council is satisfied that the works referred to in 4A.2(a) have been removed and the land restored in accordance with the *Coastal Protection Act* 1979.

Not applicable.

4b. Annual Charges Under Local Government Act 1993 For Coastal Protection Services That Relate To Existing Coastal Protection Works

The land IS NOT subject to annual charges under section 496B of the Local Government Act 1993 for coastal protection services relating to existing coastal protection works to which the owner (or any previous owner) of the land has consented.

Note: "existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, reetments, groynes and beach nourishment) that existed before the commencement of section 553B of the Local Government Act 1993.

5. Mine Subsidence

5.1 Is the land proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961?

The land IS NOT within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961.

6. Road Widening And Road Realignment

Council's records indicate that the land the subject of this Certificate IS affected by a proposal for road widening or road realignment in accordance with one of the following:-(1) Section 25 of the Roads Act 1993; or (2) an environmental planning instrument; or (3) a resolution of Council. For further enquiries please contact the NSW Roads & Maritime Service's Property SectioN on 49240240.

7. Council and Other Public Authority Policies on Hazard Risk Restrictions

Council's records indicate that the land the subject of this certificate MAY be wholly or partially contaminated which may restrict development. Any purchaser(s)/user(s) of the subject site must satisfy themselves that the land is fit, or may reasonably be made fit, for the purposes proposed for the site. Responsibility for identification and management of contaminated land rests with the landowner. Further information may be obtained by contacting Council's Environmental Health Services Section on 4980 0394.

Council's records indicate that the land subject of this certificate IS NOT affected by RAAF Base Williamtown & Salt Ash Weapons Range 2025 ANEF (10th August 2011); or the Aircraft Noise Planning Area within Chapter B15.Aircraft Noise for Buildings of the Port Stephens Development Control Plan 2013.

7A. Flood Related Development Controls Information

Council's records indicate that the land may be wholly or partially flood prone land. On 19 December 2000, Council adopted a policy which restricts development on land so affected. Development on flood prone land is subject to flood related development controls. Information on the extent of flooding and development controls on land is available from Council's Flooding Engineer on 49800253.

Note: Flood related development controls relating to local overland flooding may affect any property near or adjacent to water courses, natural depressions, stormwater easments and drains. Further advice may be included regarding ocean storm surge flooding adjacent to the Port Stephens Foreshore.

8 Land Reserved For Acquisition

8.1 Does any environmental planning instrument or proposed environmental planning instrument referred to in item 1 above make provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning & Assessment Act?

Port Stephens Local Environmental Plan 2013 DOES NOT provide for the acquisition of this land, or part thereof, by a public authority as referred to in Section 27 of the Environmental Planning and Assessment Act 1979.

9. Contributions Plan

9.1 Which contributions plan/s apply to the land?

- * Port Stephens Section 94 Development Contributions Plan 2007.
- * Port Stephens Section 94A Development Contributions Plan 2006.

Note: These documents specify development contributions required towards the cost of providing additional community services or facilities if a property is developed. They are available on request from Council or can be viewed <u>www.portstephens.nsw.gov.au</u>.

9a Biodiversity Certified Land

9a.1 Is the land biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)?

No

10. Biobanking Agreements

10.1 Is there a biobanking agreement for the land under Part 7A of the Threatened Species Conservation Act 1995, that council is aware?

No

11. Bush Fire Prone Land

11.1 Is any of the land bushfire prone land as defined in the Environmental Planning & Assessment Act 1979?

The land IS shown as bush fire prone land in Council's records. Further details of any applicable restrictions on development of the land may be obtained on application to Council. For further information, please contact Council's Duty Officer by telephoning 49800255.

12. Property Vegetation Plans

12.1 Does a property vegetation plan under the Native Vegetation Act 2003 apply to the land, being a plan to which the council has been notified of its existence by the person or body that approved the plan under the Act?

Council has not been notified of any Property Vegetation Plans under the Native Vegetation Act 2003 that affect the land to which this certificate applies.

13. Orders Under Trees (Disputes Between Neighbours) Act 2006

13.1 Has an order been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land, being an order to which the council has been notified of?

The land IS NOT affected by an order under the Trees (Disputes Between Neighbours) Act 2006 (of which Council is aware).

14. Directions Under Part 3a

14.1 Is there a direction by the Minister in force under section 75P(2)(c1) of the Environmental Planning & Assessment Act 1979 that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect?

The land IS NOT affected by a direction by the Minister, in force under section 75P(2) (c1) of the Environmental Planning and Assessment Act 1979.

15. Site Compatibility Certificates And Conditions For Seniors Housing

15.1 If the land is land to which State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 applies, is there a current site compatibility certificate (seniors housing), of which the council is aware, in respect of proposed development on the land?

Site Compatibility Certificate:

Council is not aware of a site compatibility certificate (seniors housing) issued in respect of the subject land.

Condition of Consent:

No terms referred to in clause 18(2) of the policy have been imposed as a condition of development consent in respect of the land to which this certificate relates.

16. Site Compatibility Certificates For Infrastructure

16.1 Is there a valid site compatibility certificate (infrastructure), of which the council is aware, in respect of proposed development on the land?

The land IS NOT affected (of which Council is aware) by a valid site compatibility certificate (infrastructure) issued under the State Environmental Planning Policy (Infrastructure 2007).

17. Site Compatibility Certificates And Conditions For Affordable Rental Housing

17.1 Is there a current site compatibility statement (affordable rental housing), of which the council is aware, in respect of proposed development on the land?

The land IS NOT affected by a current site compatibility certificate (of which Council is aware) issued under State Environmental Planning Policy (Affordable Rental Housing) 2009.

17.2 Have any terms of a kind referred to in clause 17(1) or 38(1) of the State Environmental Planning Policy (Affordable Rental Housing) 2009 been imposed as a condition of consent to a development application in respect of the land?

The land IS NOT affected by any terms of a kind (of which Council is aware) referred to in clause 17(1) or 38(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as conditions of consent to a development application granted after 11th October, 2007 in respect of the land.

Section 59(2) of the Contaminated Land Management Act 1997

There are no prescribed matters under section 59(2) of the Contaminated Land Management Act 1997 to be disclosed.

Section 26 of the National Building and Jobs Plan (State Infrastructure Delivery) Act 2009

The land IS NOT subject to any exemption under Section 23 or authorisation under Section 24 of the Act (which Council is aware).

PART B: INFORMATION PROVIDED UNDER SECTION 149 (5)

This information is provided in accordance with Section 149(5) of the Environmental Planning and Assessment Act, 1979. Section 146(6) states that Council shall not incur any liability in respect of advice provided in good faith pursuant to Section 149(5) of the Act. If this information is to be relied upon, it should be independently checked.

Port Stephens Council must take into consideration the likely effect of proposed development on the heritage significance of a heritage item, heritage conservation area, archaeological site or potential archaeological site, and on its setting, when determining an application for consent to carry out development on land in its vicinity. Please contact Council's Development Assessment and Compliance Section by telephoning 49800115.

When determining a development application on known or potential archaeological sites of both Aboriginal and non-Aboriginal heritage significance, Port Stephens Council must consider an assessment of how the proposed development would affect the conservation of the site and any relic known or reasonably likely to be located at the site. Please contact Council's Please contact Council's Development Assessment and Compliance Section on 49800115 for more information.

This property is located within the Tomago Aluminium Smelter Buffer zone. Tomago Aluminium Company Pty Ltd are required to take all reasonable steps to acquire certain properties within this buffer zone. Please contact the Company Secretary, Tomago Aluminium Company Pty Limited, PO Box 405, Raymond Terrace NSW 2324 for further information.

This property is located within or adjacent to the RTAs preferred route corridor for the F3 Freeway to Raymond Terrace Pacific Highway upgrade. Please contact the RTA's Project Development Manager for further information, by phoning 49240242.

All areas of the Port Stephens Local Government Area are now, or are forecast to be, affected by aircraft noise from time to time. Further information concerning the degree of impact of noise from aircraft can be obtained by contacting Council's Strategy and Environment Section by telephoning 49800326.

Preservation of Trees or Vegetation

Clause 5.9 of Port Stephens Local Environmental Plan 2013 applies to the subject land:

"A person must not ringbark, cut down, top lop, remove, injure, wilfully destroy any tree or other vegetation without either development consent or a permit granted by Council as specified in Port Stephens Development Control Plan 2013".

Note: Clause 5.9 of Port Stephens Local Environmental Plan 2013 MAY NOT apply in respect to certain circumstances. For further information please refer to Clause 5.9 of Port Stephens Local Environmental Plan or contact Council's Strategy & Environment section by telephoning 49800255.

Koala Habitat

Parts of the Port Stephens Local Government Area are affected by Koala Habitat is subject to Port Stephens Comprehensive Koala Plan of Management 2002 made under State Environmental Planning Proposal 44. Further information can be obtained from Council's Strategy & Environment Section, 49800169.

Invasive Species

Parts of the Port Stephens Local Government Area contain plants listed under the Noxious Weed Act 1993 which may restrict the use of the land. Contact Council's Strategy & Environment Section on 49800326 for further information.

Development Consents Relating to the Land

Please contact Customer Relations by telephoning 4980 0255, for any enquiries regarding development consent over the land in the past 5 years.

For further information please contact the Strategy & Environment Section on 4980 0326.

Wayne Wallis General Manager

Per:



116 Adelaide Street, Raymond Terrace NSW 2324 PO Box 42, Raymond Terrace NSW 2324 DX 21406 ABN 16 744 377 876 Telephone: (02) 4980 0326 Facsimile: (02) 4987 3612 Email: <u>s149@portstephens.nsw.gov.au</u> <u>http://www.portstephens.nsw.gov.au</u>

PLANNING CERTIFICATE PURSUANT TO SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

APPLICANT DETAILS:

GREG SHEEHAN 10 DARVALL STREET CARRINGTON NSW 2294

Reference.: 15107

Application number: 91121

Receipt number: 2198685

Issue Date: 22/07/2015

PROPERTY DESCRIPTION:

1940 Pacific Highway TOMAGO 2322 LOT: 3 DP: 1043561 Parcel No: 37530

Disclaimer

Information contained in this certificate relates only to the land for which this certificate is issued on the day it is issued. This information is provided in good faith and Council shall not incur any liability in respect of any such advice. Council relies on state agencies for advice and accordingly can only provide that information in accordance with the advice. Verification of the currency of agency advice should occur. For further information, please contact Council's Strategy & Environment Section.

Title Information

Title information shown on this Planning Certificate is provided from Council's records and may not conform to information shown on the current Certificate of Title. Easements, restrictions as to user, rights of way and other similar information shown on the title of the land are not provided on this planning certificate.

Inspection of the land

The Council has made no inspection of the land for the purposes of this Planning Certificate.

PART A: INFORMATION PROVIDED UNDER SECTION 149 (2)

Matters contained in this certificate apply only to the land on the date of issue.

1. Name of Relevant Planning Instruments and DCPs

1.1 Which environmental planning instruments apply to the carrying out of development on the land?

Local Environmental Plan

Port Stephens Local Environmental Plan 2013 - Published on the NSW Legislation website and in force from 22 February 2014.

State Environmental Planning Policies

State Environmental Planning Policy No 21 - Caravan Parks

State Environmental Planning Policy No 30 - Intensive Agriculture

State Environmental Planning Policy No 33 - Hazardous and Offensive Development

State Environmental Planning Policy No 36 - Manufactured Home Estate

State Environmental Planning Policy No 44 - Koala Habitat Protection

State Environmental Planning Policy No 50 - Canal Estate Development

State Environmental Planning Policy No 55 - Remediation of Land

State Environmental Planning Policy No 62 - Sustainable Aquaculture

State Environmental Planning Policy No 64 - Advertising and Signage

State Environmental Planning Policy No 65 - Design Quality of Residential Flat Development

State Environmental Planning Policy No 71 - Coastal Protection

State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Exempt & Complying Development Codes) 2008

State Environmental Planning Policy (Affordable Rental Housing) 2009

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Rural Lands) 2008

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (Temporary Structures) 2007

Regional Environmental Plans

The Williams River Catchment Plan DOES NOT apply to this property

1.2 Which proposed environmental planning instruments apply to the carrying out of development on the land that is or has been the subject of community consultation or public exhibition?

Draft Local Environmental Plan

No Draft Local Environmental Plans currently exist which affect the site the subject of this certificate.

Draft State Environmental Planning Policies:

No Draft State Environmental Planning Policies have been Publicly Exhibited which affect the site the subject of this Certificate.

1.3 Which development control plans apply to the carrying out of development on the land?

Port Stephens Development Control Plan 2013

1.4 In this clause, proposed environmental planning instrument includes a planning proposal for the LEP or a draft environmental planning instrument.

No Draft Local Environmental Plans currently exist which affect the site the subject of this certificate.

2. Zoning And Land Use Under Relevant Local Environmental Plan(s):

For each environmental planning instrument or proposed instrument referred to in clause 1 above (other than a SEPP or proposed SEPP) that applies to the land:

2.1 What is the identity of the zoning for the land?

IN1 General Industrial

Port Stephens Local Environmental Plan 2013

- (a) The land is zoned IN1 General Industrial under the provisions of Part 2 in the Port Stephens Local Environmental Plan 2013.
- (b) Item 2 Permitted without consent
- Nil
- (c) Item 3 Permitted with consent

Airstrips; Boat building and repair facilities; Boat launching ramps; Boat sheds; Correctional centres; Crematoria; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; Garden centres; General industries; Hardware and building supplies; Heavy industrial storage establishments; Heavy industries; Helipads; Heliports; Highway service centres; Industrial retail outlets; Industrial training facilities; Jetties; Landscaping material supplies; Light industries; Mortuaries; Neighbourhood shops; Plant nurseries; Port facilities; Research stations; Restricted premises; Roads; Rural supplies; Sawmill or log processing industries; Service station; Sex services premises; Signage; Stock and sale yards; Timber yards; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres; Water supply systems; Wharf or boating facilities; Wholesale supplies

- (d) Item 4 Prohibited
 Any development not specified in item 2 or 3
 (a) Development 2 tendent for the second second
- (e) Development Standard for the erection of a dwelling-house No development standard that fixes a minimum land dimension for the erection of a dwelling-house applies to the land.

NOTE: The land subject of this certificate DOES NOT have a site specific clause applying to it.

2.2 Does the land include or comprise a critical habitat?

Port Stephens Local Environmental Plan 2013 DOES NOT identify the land as including or comprising critical habitat.

2.3 Is the land in a conservation area?

The land IS NOT located within a heritage conservation area under the provisions in Port Stephens Local Environmental Plan 2013.

2.4 Is an item of environmental heritage situated on the land?

The land IS NOT identified as containing an item of environmental heritage under the provisions in Port Stephens Local Environmental Plan 2013.

3. Complying Development (State Environmental Planning Policy – Exempt and Complying Development Codes) 2008

General Housing Code:

Complying development under the General Housing Code MAY NOT be carried out on the land.

Rural Housing Code:

Complying development under the Rural Housing Code MAY NOT be carried out on the land.

Commercial and Industrial Alterations Code:

Complying development under the Commercial and Industrial alterations Code MAY be carried out on the land.

Commercial and Industrial (New Buildings and Additions) Code:

Complying development under the Commercial and Industrial (new buildings and additions) code MAY NOT be carried out on the land.

Housing Alterations Code:

Complying development under the Housing Alterations Code MAY NOT be carried out on the land.

General Development Code:

Complying development under the General Development Code MAY NOT be carried out on the land.

Demolition Code:

Complying development under the Demolition Code MAY be carried out on the land.

Subdivision Code:

Complying development under the Subdivision Code MAY be carried out on the land,

Fire Safety Code:

Complying development under the Fire Safety Code MAY be carried out on the land.

Note: The abovementioned advice for all complying development codes is limited to identifying whether or not the land, the subject of this certificate, is on land where complying development may be carried out because of Clauses 1.17A (1), (1)(c) to (e), (2), (3) and (4), 1.18(1)(c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (the Codes SEPP). There may be other requirements under the Codes SEPP or another Environmental Planning Instrument that needs to be satisfied.

4. Coastal Protection

4.1 Is the land affected by the operation of section 38 or 39 of the Coastal Protection Act 1979, but only to the extent that the Council has been notified by the Department of Services, Technology and Administration?

The land IS NOT affected by the operation of section 38 or 39 of the Coastal Protection Act 1979 (which Council is aware).

4a Certain Information Relating To Beaches And Coasts

4a.1 Whether an order has been made under Part 4D of the Coastal Protection Act 1979 in relation to temporary coastal protection works (within the meaning of that Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.

The land IS NOT affected by an order under 4D of the Coastal Protection Act.

4a.2(a) Whether the council has been notified under section 55X of the Coastal Protection Act 1979 that temporary coastal protection works (within the meaning of the Act) have been placed on the land (or on public land adjacent to that land).

The land IS NOT affected by temporary coastal protection works.

4a.2(b) Whether the council is satisfied that the works referred to in 4A.2(a) have been removed and the land restored in accordance with the Coastal Protection Act 1979.

Not applicable.

4b. Annual Charges Under Local Government Act 1993 For Coastal Protection Services That Relate To Existing Coastal Protection Works

The land IS NOT subject to annual charges under section 496B of the Local Government Act 1993 for coastal protection services relating to existing coastal protection works to which the owner (or any previous owner) of the land has consented.

Note: "existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, reetments, groynes and beach nourishment) that existed before the commencement of section 553B of the Local Government Act 1993.

5. Mine Subsidence

5.1 Is the land proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961?

The land IS NOT within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961.

6. Road Widening And Road Realignment

Council's records indicate that the land the subject of this Certificate IS affected by a proposal for road widening or road realignment in accordance with one of the following:-(1) Section 25 of the Roads Act 1993; or (2) an environmental planning instrument; or (3) a resolution of Council. For further enquiries please contact the NSW Roads & Maritime Service's Property SectioN on 49240240.

7. Council and Other Public Authority Policies on Hazard Risk Restrictions

Council's records indicate that the land the subject of this certificate MAY be wholly or partially contaminated which may restrict development. Any purchaser(s)/user(s) of the subject site must satisfy themselves that the land is fit, or may reasonably be made fit, for the purposes proposed for the site. Responsibility for identification and management of contaminated land rests with the landowner. Further information may be obtained by contacting Council's Environmental Health Services Section on 4980 0394.

Council's records indicate that the land subject of this certificate IS NOT affected by RAAF Base Williamtown & Salt Ash Weapons Range 2025 ANEF (10th August 2011); or the Aircraft Noise Planning Area within Chapter B15.Aircraft Noise for Buildings of the Port Stephens Development Control Plan 2013.

7A. Flood Related Development Controls Information

Council's records indicate that the land may be wholly or partially flood prone land. On 19 December 2000, Council adopted a policy which restricts development on land so affected. Development on flood prone land is subject to flood related development controls. Information on the extent of flooding and development controls on land is available from Council's Flooding Engineer on 49800253.

Note: Flood related development controls relating to local overland flooding may affect any property near or adjacent to water courses, natural depressions, stormwater easments and drains. Further advice may be included regarding ocean storm surge flooding adjacent to the Port Stephens Foreshore.

8 Land Reserved For Acquisition

8.1 Does any environmental planning instrument or proposed environmental planning instrument referred to in item 1 above make provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning & Assessment Act?

Port Stephens Local Environmental Plan 2013 DOES NOT provide for the acquisition of this land, or part thereof, by a public authority as referred to in Section 27 of the Environmental Planning and Assessment Act 1979.

9. Contributions Plan

9.1 Which contributions plan/s apply to the land?

* Port Stephens Section 94 Development Contributions Plan 2007.

* Port Stephens Section 94A Development Contributions Plan 2006.

Note: These documents specify development contributions required towards the cost of providing additional community services or facilities if a property is developed. They are available on request from Council or can be viewed <u>www.portstephens.nsw.gov.au</u>.

9a Biodiversity Certified Land

9a.1 Is the land biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)?

No

10. Biobanking Agreements

10.1 Is there a biobanking agreement for the land under Part 7A of the Threatened Species Conservation Act 1995, that council is aware?

No

11. Bush Fire Prone Land

11.1 Is any of the land bushfire prone land as defined in the Environmental Planning & Assessment Act 1979?

The land IS shown as bush fire prone land in Council's records. Further details of any applicable restrictions on development of the land may be obtained on application to Council. For further information, please contact Council's Duty Officer by telephoning 49800255.

12. Property Vegetation Plans

12.1 Does a property vegetation plan under the Native Vegetation Act 2003 apply to the land, being a plan to which the council has been notified of its existence by the person or body that approved the plan under the Act?

Council has not been notified of any Property Vegetation Plans under the Native Vegetation Act 2003 that affect the land to which this certificate applies.

13. Orders Under Trees (Disputes Between Neighbours) Act 2006

13.1 Has an order been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land, being an order to which the council has been notified of?

The land IS NOT affected by an order under the Trees (Disputes Between Neighbours) Act 2006 (of which Council is aware).

14. Directions Under Part 3a

14.1 Is there a direction by the Minister in force under section 75P(2)(c1) of the Environmental Planning & Assessment Act 1979 that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect?

The land IS NOT affected by a direction by the Minister, in force under section 75P(2) (c1) of the Environmental Planning and Assessment Act 1979.

15. Site Compatibility Certificates And Conditions For Seniors Housing

15.1 If the land is land to which State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 applies, is there a current site compatibility certificate (seniors housing), of which the council is aware, in respect of proposed development on the land?

Site Compatibility Certificate:

Council is not aware of a site compatibility certificate (seniors housing) issued in respect of the subject land.

Condition of Consent:

No terms referred to in clause 18(2) of the policy have been imposed as a condition of development consent in respect of the land to which this certificate relates.

16. Site Compatibility Certificates For Infrastructure

16.1 Is there a valid site compatibility certificate (infrastructure), of which the council is aware, in respect of proposed development on the land?

The land IS NOT affected (of which Council is aware) by a valid site compatibility certificate (infrastructure) issued under the State Environmental Planning Policy (Infrastructure 2007).

17. Site Compatibility Certificates And Conditions For Affordable Rental Housing

17.1 Is there a current site compatibility statement (affordable rental housing), of which the council is aware, in respect of proposed development on the land?

The land IS NOT affected by a current site compatibility certificate (of which Council is aware) issued under State Environmental Planning Policy (Affordable Rental Housing) 2009.

17.2 Have any terms of a kind referred to in clause 17(1) or 38(1) of the State Environmental Planning Policy (Affordable Rental Housing) 2009 been imposed as a condition of consent to a development application in respect of the land?

The land IS NOT affected by any terms of a kind (of which Council is aware) referred to in clause 17(1) or 38(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as conditions of consent to a development application granted after 11th October, 2007 in respect of the land.

Section 59(2) of the Contaminated Land Management Act 1997

There are no prescribed matters under section 59(2) of the Contaminated Land Management Act 1997 to be disclosed.

Section 26 of the National Building and Jobs Plan (State Infrastructure Delivery) Act 2009

The land IS NOT subject to any exemption under Section 23 or authorisation under Section 24 of the Act (which Council is aware).

PART B: INFORMATION PROVIDED UNDER SECTION 149 (5)

This information is provided in accordance with Section 149(5) of the Environmental Planning and Assessment Act, 1979. Section 146(6) states that Council shall not incur any liability in respect of advice provided in good faith pursuant to Section 149(5) of the Act. If this information is to be relied upon, it should be independently checked.

Port Stephens Council must take into consideration the likely effect of proposed development on the heritage significance of a heritage item, heritage conservation area, archaeological site or potential archaeological site, and on its setting, when determining an application for consent to carry out development on land in its vicinity. Please contact Council's Development Assessment and Compliance Section by telephoning 49800115.

When determining a development application on known or potential archaeological sites of both Aboriginal and non-Aboriginal heritage significance, Port Stephens Council must consider an assessment of how the proposed development would affect the conservation of the site and any relic known or reasonably likely to be located at the site. Please contact Council's Please contact Council's Development Assessment and Compliance Section on 49800115 for more information.

This property is located within the Tomago Aluminium Smelter Buffer zone. Tomago Aluminium Company Pty Ltd are required to take all reasonable steps to acquire certain properties within this buffer zone. Please contact the Company Secretary, Tomago Aluminium Company Pty Limited, PO Box 405, Raymond Terrace NSW 2324 for further information.

This property is located within or adjacent to the RTAs preferred route corridor for the F3 Freeway to Raymond Terrace Pacific Highway upgrade. Please contact the RTA's Project Development Manager for further information, by phoning 49240242.

All areas of the Port Stephens Local Government Area are now, or are forecast to be, affected by aircraft noise from time to time. Further information concerning the degree of impact of noise from aircraft can be obtained by contacting Council's Strategy and Environment Section by telephoning 49800326.

Drinking Water Catchment

The land, or part thereof, is located within a drinking water catchment area as identified in Port Stephens Local Environmental Plan 2013. The catchment boundary is identified on the Drinking Water Catchment Map in Local Environmental Plan 2013 and clause 7.8 in the Local Environmental Plan 2013 will apply to the land.

Preservation of Trees or Vegetation

Clause 5.9 of Port Stephens Local Environmental Plan 2013 applies to the subject land:

"A person must not ringbark, cut down, top lop, remove, injure, wilfully destroy any tree or other vegetation without either development consent or a permit granted by Council as specified in Port Stephens Development Control Plan 2013".

Note: Clause 5.9 of Port Stephens Local Environmental Plan 2013 MAY NOT apply in respect to certain circumstances. For further information please refer to Clause 5.9 of Port Stephens Local Environmental Plan or contact Council's Strategy & Environment section by telephoning 49800255.

Koala Habitat

Parts of the Port Stephens Local Government Area are affected by Koala Habitat is subject to Port Stephens Comprehensive Koala Plan of Management 2002 made under State Environmental Planning Proposal 44. Further information can be obtained from Council's Strategy & Environment Section, 49800169.

Invasive Species

Parts of the Port Stephens Local Government Area contain plants listed under the Noxious Weed Act 1993 which may restrict the use of the land. Contact Council's Strategy & Environment Section on 49800326 for further information.

Development Consents Relating to the Land

Please contact Customer Relations by telephoning 4980 0255, for any enquiries regarding development consent over the land in the past 5 years.

For further information please contact the Strategy & Environment Section on 4980 0326.

Wayne Wallis General Manager

1 24/7 Per:

NSW Office of Water Work Summary

GW201068

Licence:	20BL172855	Licence Statu	s: AC VE		
		Authorised Purpos (s Intended Purpose(s	;ee ES B):):M N	E NG B	E
Work Type: Work Status: Construct.Method: Owner Type:	Bore Equipped Auger - Hollow light Private				
Commenced Date: Completion Date:	29 06 2011	Final Dept Drilled Dept	1: 7.50 m 1: 7.50 m		
Contractor Name:	C Group				
Driller:	Daniel James Dudley				
Assistant Driller:	Shaun Currie				
Property:	N A 576 MAG MAG 2322 NS	AD Standing Water Leve	1:		
GWMA: GW Zone:		Salinit Yiel	/: d:		

Site Details

Site Chosen By:

	Coun Form A: GL L Licensed:	ty Parish IC GL UC.39	Cadastre 104 1125747
Region: 20 - Hunter	CMA Map: 9232-	3N	
River Basin: 210 - HUN E VE Area/District:	Grid Zone:	Sca	le:
Elevation: 0.00 m (A.H.D.) Elevation Unknown Source:	Northing: 63678 Easting: 37950	70.0 Latitud 15.0 Longitud	le: 32°49'14.1"S le: 151°42'46.0"E
GS Map: -	MGA Zone: 0	Coordina Sour	ate G S - Geographic ce: nformation System

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
				(m)	(m)	Diameter	Diameter		
						(mm)	(mm)		
1		Hole	Hole	0.00	7.50	60			Auger - Hollow light
1		Annulus	aterworn ounded	4.50	7.50	60	60		Graded, PL Poured Shovelled
1	1	Casing	Pvc Class 12	0.00	4.50	60	50		Seated on Bottom, Glued
1	1	pening	Slots - Vertical	4.50	7.50	60		1	Casing - Bridge Slot, PVC Class
									12, ther, SL 50.0mm, A
									1.00mm

Water Bearing Zones

From	То	Thickness	WBZ Type	S.W.L.	D.D.L.	Yield	Duration	Salinity
(m)	(m)	(m)		(m)	(m)	(L/s)	(hr)	(mg/L)
1	1							

					Hole Depth (m)	
6.00	7.50	1.50	Unknown			

Geologists Log Drillers Log

		- 3			
From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)			
0.00	7.50	7.50	Sand, silty; fine to medium grained, dark grey, some rounded gravels	Sand	

Remarks

29 06 2011 orm A emarks Nat Carling, 5-Dec-2011 Coordinates based on location map provided with the orm-A. Bentonite Grout seal was installed, no details were provided.

End of GW201068

Warning To Clients: This raw data has een supplied to the NSW Office of Water y drillers licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use y you at your own risk. You should consider verifying this data efore relying on it. Professional hydrogeological advice should e sought in interpreting and using this data.

NSW Office of Water Work Summary

GW079605

Licence:	Licence Status:		
	Authorised Purpose(s): Intended Purpose(s):		
Work Type: Bore			
Work Status:			
Construct.Method:			
Owner Type:			
Commenced Date: Completion Date:	Final Depth: Drilled Depth:		
Contractor Name:			
Driller:			
Assistant Driller:			
Property:	Standing Water Level		
GWMA: GW Zone:	(m): Salinity Description: Yield (L/s):		
Site Details			
Site Chosen By:			
	County Form A: Licensed:	Parish	Cadastre
Region: 20 - Hunter	СМА Мар:		
River Basin: - Unknown Area/District:	Grid Zone:	Scale:	
Elevation: 0.00 m (A.H.D.) Elevation Unknown Source:	Northing: 6368487.0 Easting: 378090.0	Latitude: Longitude:	32°48'53.5"S 151°41'51.8"E
GS Map: -	MGA Zone: 0	Coordinate Source:	Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
		-		(m)	(m)	Diameter	Diameter		
						(mm)	(mm)		

Water Bearing Zones

From To Thickness WBZ Type (m) (m) (m)	S.W.L. D.D.L (m) (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
---	-------------------------	----------------	----------------------	------------------	--------------------

Geologists Log

Drillers	Log	

From To Thickness Drillers Description Geological Material Comments	
	s
(m) (m) (m)	

Remarks

26101999 orm A emarks HUNE AE CPAN MAG BE S**K**984 30112009 eviewed data - nothing to update.

End of GW079605

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NSW Office of Water Work Summary

GW079591

Licence:	Licence Status:		
	Authorised Purpose(s): Intended Purpose(s):		
Work Type: Bore			
Work Status:			
Construct.Method:			
Owner Type:			
Commenced Date: Completion Date:	Final Depth: Drilled Depth:		
Contractor Name:			
Driller:			
Assistant Driller:			
Property:	Standing Water Level (m):		
GWMA: GW Zone:	Salinity Description: Yield (L/s):		
Site Details			
Site Chosen By:			
	County Form A: Licensed:	Parish	Cadastre
Region: 20 - Hunter	СМА Мар:		
River Basin: - Unknown Area/District:	Grid Zone:	Scale:	
Elevation: 0.00 m (A.H.D.) Elevation Unknown Source:	Northing: 6369241.0 Easting: 379370.0	Latitude: Longitude:	32°48'29.5"S 151°42'41.4"E
GS Map: -	MGA Zone: 0	Coordinate Source:	Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
		-		(m)	(m)	Diameter	Diameter		
						(mm)	(mm)		

Water Bearing Zones

From To Thicknes (m) (m) (m)	s WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
---------------------------------	------------	---------------	---------------	----------------	----------------------	------------------	--------------------

Geologists Log

•		
Drillers	Log	

From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)	-	_	

Remarks

26101999 orm A emarks HUNE AE CPAN MAG BE S**K**916 30112009 eviewed data - nothing to update.

End of GW079591

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NSW Office of Water Work Summary

GW079412

Licence:	Licence Status:		
	Authorised Purpose(s): Intended Purpose(s):		
Work Type: Bore			
Work Status:			
Construct.Method:			
Owner Type:			
Commenced Date: Completion Date:	Final Depth: Drilled Depth:		
Contractor Name:			
Driller:			
Assistant Driller:			
Property:	Standing Water Level		
GWMA: GW Zone:	(III). Salinity Description: Yield (L/s):		
Site Details			
Site Chosen By:			
	County Form A: Licensed:	Parish	Cadastre
Region: 20 - Hunter	СМА Мар:		
River Basin: - Unknown Area/District:	Grid Zone:	Scale:	
Elevation: 0.00 m (A.H.D.) Elevation Unknown Source:	Northing: 6369390.0 Easting: 379499.0	Latitude: Longitude:	32°48'24.7"S 151°42'46.4"E
GS Map: -	MGA Zone: 0	Coordinate Source:	Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Туре	From	То	Outside	Inside	Interval	Details
		-		(m)	(m)	Diameter	Diameter		
						(mm)	(mm)		

Water Bearing Zones

From To Thicknes (m) (m) (m)	s WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
---------------------------------	------------	---------------	---------------	----------------	----------------------	------------------	--------------------

Geologists Log

	•.•	3.	•••		ŝ
Dri	llei	rs	Log]	

From	То	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)			

Remarks

19101999 orm A emarks HUNE AE CPAN MAG BE 295 27112009 eviewed data - nothing to update.

End of GW079412

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REPORT on GEOTECHNICAL INVESTIGATION

PROPOSED GAS STORAGE AREA PROPOSED POWER STATION OLD PUNT ROAD, TOMAGO

Prepared for MACQUARIE GENERATION

Project 39762.01 JUNE 2008



REPORT on GEOTECHNICAL INVESTIGATION

PROPOSED GAS STORAGE AREA PROPOSED POWER STATION OLD PUNT ROAD, TOMAGO

Prepared for MACQUARIE GENERATION

Project 39762.01 JUNE 2008

Douglas Partners Pty Ltd ABN 75 053 980 117

Box 324 Hunter Region Mail Centre NSW 2310 Australia 15 Callisternon Close Warabrook, NEWCASTLE

Phone:02 4960 9600Fax:02 4960 9601newcastle@douglaspartners.com.au





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ATTACHMENTS

Notes Relating to this Report Borehole Logs (Bores 104, 105, 107 to 136) Core Photo Plates Laboratory Test Results Drawing 1 – Test Location Plan Drawing 2 – Geological Long Section Through Centre of Gas Storage Area



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JAW:MRH:sm Project No: 39762.01 P:\39762.01\Docs\39762.01.doc 13 June 2008

REPORT ON GEOTECHNICAL INVESTIGATION PROPOSED GAS STORAGE AREA PROPOSED POWER STATION OLD PUNT ROAD, TOMAGO

1. INTRODUCTION

This report presents the results of a geotechnical investigation for a proposed gas storage area to be constructed in conjunction with a proposed natural gas fired power station, at Lot 2 DP 1043561, Old Punt Road, Tomago. The geotechnical investigation was carried out at the request of Macquarie Generation.

The proposed gas storage area is located between the Pacific Highway and Old Punt Road, north of Tomago Road. The project area is located immediately west of a site (Lot 3) which has previously been the subject of a geotechnical investigation by Douglas Partners for the proposed gas fired power station (Ref 1).

It is understood that the proposed gas storage area is in the design stage, and will include a series of seven parallel pipes, each approximately 368 m long.

A geotechnical investigation was undertaken to provide comments on the following:

- Information on subsurface conditions;
- Recommended footing types and geotechnical design parameters for footing design;



Acid sulphate soil assessment.

For the purpose of the investigation the client supplied the following:

- An aerial photograph with site contours and boundaries;
- A plan showing proposed layout for the development.

The investigation comprised boreholes, laboratory testing, engineering analysis and reporting.

2. PROPOSED DEVELOPMENT

It understood from civil designers for the project, Capital Project Services, that the proposed development includes the following:

- The proposed gas storage facility will cover a plan area of approximately 368 m by 45 m;
- The gas storage area is a series of seven parallel pipes, each approximately 368 m long to be constructed above-ground;
- The pipes will each be 1.4 m in diameter and will be constructed 6 m apart;
- Each pipe will be supported on ten foundations which will be constructed at 36 m centres;
- Each foundation will carry a load of about 55 tonnes per pipe;
- The eastern extent of each pipe will be supported by an anchor foundation which will be also subject to lateral loads equivalent to about 100 tonnes per pipe;
- Surface levels have not yet been confirmed, however while the ground surface beneath the storage area needs to slope at a constant grade, it does not need to be level;
- A compressor will be constructed near the south-eastern corner of the gas storage area;
- The compressor will cover an area of about 20 m by 10 m, and will weigh about 200 tonnes.



3. SITE DESCRIPTION AND REGIONAL GEOLOGY

The site is located on the eastern side of the Pacific Highway, Tomago, west of Old Punt Road, and north of Tomago Road. The site of the proposed gas storage area lies within Lot 2 DP 1043561. The proposed gas fired power station will be located on the site to the west, (Lot 3 DP 1043561).

The site is located on the south-western side of a hill and slopes down to the south-west at about 2° to 3°. Within the project area, site levels generally range from about RL 2 AHD in the west to about RL 8 AHD in the east. The crest of the hill to the north of the site is at about RL 16 m.

Bedrock is exposed in a Pacific Highway road cutting on the north-western boundary of Lot 2. Low-lying areas with thick undergrowth and mature trees, which were relatively wet following rain, are located along the southern boundary of the site.

Vegetation within the project area generally comprised long grass and sparse tall trees. Thicker undergrowth and trees were located in the vicinity of the proposed compressor, however it is understood that, on the basis of site vegetation, this structure may be moved to a new location.

The following photos show select areas of the site.





Photo 1 - Looking east across site towards Bore 118



Photo 2 – Looking west across site towards Bore 112







Photo 3 – Looking north across site from Bore 131



Photo 4 – Looking east across site towards Bore 134

Geotechnical Investigation, Proposed Gas Fired Power Station Old Punt Road, Tomago



Reference to the 1:100,000 Newcastle Coalfields Regional Geology sheet (SH 9231) indicates that the site is underlain by the Permian aged Tomago Coal Measures which typically includes sandstone, siltstone, coal, tuff and carbonaceous claystone and laminated sandstone. The areas to the south of the site are mapped as being underlain by Quaternary deposits, which typically comprise clay, silt, sand and gravel.

4. FIELD WORK

4.1 Methods

The field work was undertaken in the period 1 April 2008 to 8 April 2008 and included the drilling of 32 bores (Bores 104, 105 and 107 to 136). The bores were drilled to depths ranging from about 1.4 m up to 7.2 m. The approximate locations of the bores are indicated on Drawing 1, attached.

The majority of the bores were drilled using a purpose built four wheel drive bobcat mounted drilling rig. Solid flight auger, rotary and NMLC core drilling techniques were utilised during the investigation. Some of the non-cored bores were drilled using a 4WD mounted drilling rig.

The bores were set out by Asquith & de Witt Pty Ltd (ADW), consulting surveyors, using data provided by the designer Capital Project Services (CPS). The intention of the field work programme was to drill bores as follows:

- 11 test bores along the longitudinal centreline of the gas storage area at locations close to the proposed footing locations (i.e. at 36 m intervals along the length of the central pipe). These bores would include a target depth of 3 m of cored rock so that the rock quality can be assessed at footing locations;
- Two parallel rows of 11 bores each (i.e. total of 22) to be located 18 m either side of the inner row of bores; these bores were to target the top of rock level so that a profile of the top of rock could be assessed across the width of the storage area at each footing location;
- Two bores to the top of rock at the proposed compressor location.


Page 7 of 22

ADW staked each of the proposed bore locations and provided MGA coordinates and AHD levels for each location. All test locations were positioned at locations marked by the project surveyors, however following consultation with CPS on site, the two bores for the proposed compressor were abandoned due to difficult access. One bore at the south-west corner of the site was also abandoned due to difficult access.

The subsurface profile in each borehole was logged by a geotechnical engineer from Douglas Partners Pty Ltd (DP) who also took regular samples for laboratory testing and identification purposes. Standard penetration tests (SPT) or undisturbed tube sampling (U50) were carried out at selected depths and locations. NMLC rock coring was undertaken in Bores 105, 108, 111, 114, 117, 121, 123, 126, 129, 132 and 136, which is the row of bores drilled along the structure centreline.

Rock strength descriptions are based on visual and tactile assessment of rock core samples and on laboratory point load testing that was carried out on rock core samples from selected bores and depths. The detailed results are attached and are summarised on the borehole logs.

Temporary standpipes were installed in selected bore locations to allow subsequent measuring of groundwater. An engineer from DP returned to site on 30 May 2008 to measure groundwater levels in the bores.

4.2 Results

The subsurface conditions encountered in the bores are presented in detail in the borehole logs, attached. These should be read in conjunction with the Notes Relating to This Report, also attached, which explain the classification methods and descriptive terms.

The subsurface conditions are generally summarised as follows:



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From (m)	To (m)	Description
0.0	0.05 / 0.7	TOPSOIL: generally dark grey brown silty topsoil with abundant organics; encountered in the majority of bores from the ground surface up to 0.7 m depth, but more generally in the range of about 0.1 m to 0.3 m depth.
0.05 / 0.3	0.15 / 1.0	FIRM CLAYEY SILT/SILTY CLAY: not encountered in Bores 112, 115, 121, 127, 128, 130, 131, 133, 134 and 136.
0.3/0.8	1.2 / 4.0	STIFF or better CLAY / SILTY CLAY: generally stiff to hard clay and/or silty clay was encountered in all bores either underlying the topsoil or the firm clay / silt layer.
1.2/4.2	Termination Depth	BEDROCK: generally siltstone, sandstone or claystone; ranging from extremely low to high strength

Table 1 below summarises the depths to the top of bedrock in each bore, as well as groundwater observations made during drilling and also during the return site visit on 30 May 2008.



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Bore	Surface Level (AHD)	Depth to Top of Bedrock (m)	Depth to Groundwater During Drilling (m)	Depth to Groundwater (30 May 2008) (m)
104	4.79	3.9	2.5	
105	4.39	4.0	3.5	0.7
107	5.12	2.6	NE	1.2
108	4.72	3.0	NA	(e)
109	4.39	3.9	3.5	0.3
110	5.54	3.0	NE	Standpipe damaged
111	4.89	3.35	NA	<u>81</u>
112	4.49	1.2	0.0	-
113	0.2	2.6	NE	
114	5.47	1.2	NA	-
115	4.51	1.35	0.0	
116	6.66	2.6	2.5	-
117	5.82	1.9	NA	
118	4.94	1.4	NE	-
119	6.65	1.7	NE	Standpipe damaged
120	5.11	1.37	NE	Ē
121	5.85	2.03	NA	1.0
122	6.73	1.7	NE	-
123	6.01	2.15	NA	-
124	5.19	1.4	NE	-
125	7.03	1.9	NE	-
126	6.04	1.65	NA	
127	5.47	2.0	NE	-
128	7.04	1.6	NE	-
129	6.14	1.8	NA	7 2
130	5.57	2.2	1.2	0.6
131	7.12	1.6	0.5	0.4
132	6.46	2.2	NA	
133	5.67	2.0	NE	-
134	7.31	2.0	NE	-
135	6.46	1.75	NA	-
136	5.67	1.8	NE	-

Table 1 – Summary of Ground conditions, Bedrock and Groundwater Observations in Bores

Notes to Table 1:

NE – Not Encountered NA – Not applicable – groundwater obscured by drilling fluids Surface Level (AHD) supplied by project Surveyor



5. LABORATORY TESTING

Point Load

Point load strength testing was undertaken on 108 selected rock core samples from the cored bores. The results of point load index testing are attached and are also summarised the borehole logs.

Shrink-Swell and Atterberg Limits

Laboratory testing comprised a total of five shrink-swell index tests to provide information on soil reactivity for site classification purposes. Detailed laboratory report sheets are attached and the results are summarised in Table 2.

Bore	Depth (m)	Description	lss (% per ∆pF)
108	0.5 – 0.8	Silty Clay	3.0
109	1.0 – 1.3	Clay	2.3
111	1.0 – 1.3	Clay	3.8
118	0.5 - 0.8	Clay	3.0
125	0.5 – 0.8	Silty Clay	2.4

Table 2 – Laboratory Results – Shrink-Swell Tests

Notes to Table 2:

lss - Shrink-swell Index

Acid Sulphate Screening Tests

Laboratory testing included 92 acid sulphate screening tests. The results of the screening tests are presented in Table 3 below.





Deres	Sample	Approximate		Screening Test Results			lts
Bore	(m)	(AHD)	Sample Description	pH _F	pH _{FOX}	pH _F - pH _{FOX}	Strength of Reaction ^b
104	0.2	4.6	Clayey Silt*	5.8	3.4	2.4	1
104	0.5	4.3	Silty Clay/Clayey Silt*	5.7	4.0	1.7	1
104	2.5-2.95	2.1	Clay	5.5	4.7	0.8	1
105	0.1	4.3	Silty Clay/Clayey Silt*	6.1	3.2	2.9	1
105	0.5	3.9	Silty Clay	5.7	4.4	1.3	1
105	2.5-2.95	1.7	Clay	5.8	5.3	0.5	1
107	0.2	4.9	Clayey Silt	6.2	4.4	1.8	F
107	0.5	4.6	Clayey Silt	6.2	5.3	0.9	F
107	1.5-1.95	3.4	Silty Clay	5.5	4.8	0.7	1
108	0.1	4.6	Clayey Silt*	5.3	2.7	2.6	1
108	0.4	4.3	Silty Clay/Clayey Silt*	5.5	4.3	1.2	1
108	1-1.45	3.5	Silty Clay	5.1	4.3	0.8	F
108	2.5-2.9	2.0	Clay Grey	5.6	5.4	0.2	1
109	0.2	4.2	Clayey Silt*	6.6	2.6	4.0	1
109	0.5	3.9	Clayey Silt*	6.6	4.1	2.5	1
109	2.5-2.95	1.7	Silty Clay	5.4	4.6	0.8	1
109	4-4.25	0.3	Silty Clay	5.9	5.3	0.6	1
110	0.2-0.3	5.3	Clayey Silt*	6.2	4.6	1.6	F
110	0.5	5.0	Silty Clay	5.5	4.7	0.8	1
110	1-1.45	4.3	Silty Clay	5.2	4.7	0.5	1
110	2.44-2.69	3.0	Silty Clay	5.4	4.7	0.8	1
111	0.5	4.4	Silty Clay	5.3	4.3	1.0	1
111	1	3.9	Clay Brown	5.1	4.5	0.6	1
111	2.5-2.95	2.2	Clay Light	5.5	4.6	0.9	1-2
112	0.1	4.4	Clayey Silt*	5.5	4.7	0.8	1
112	0.5	4.0	Clay	6.2	3.1	3.1	F
113	0.3	6.0	Clayey Silt*	6.0	4.7	1.3	1
113	0.5	5.8	Silty Clay	5.5	4.4	1.1	1
113	1.0	5.3	Silty Clay	5.0	4.6	0.4	1
113	1.5-1.95	4.6	Clay	6.0	5.2	0.8	1
114	0.1	5.4	Clayey Silt*	5.4	3.1	2.4	1
114	0.4	5.1	Silty Clay/Clayey Silt	5.4	3.7	1.6	1
115	0.1	4.4	Clayey Silt*	5.4	5.0	0.5	1
115	0.5	4.0	Clayey Silt*	5.8	4.1	1.7	1
117	0.1	5.72	Clayey Silt*	5.9	3.8	2.1	F
117	0.5	5.3	Silty Clay/Clayey Silt	6.1	4.8	1.3	1
117	1-1.45	4.6	Silty Clay	5.2	4.6	0.6	1
118	0.1	4.8	Sandy Silt*	5.2	4.5	0.7	1
118	1-1.45	3.7	Clay	5.8	3.9	1.9	F

Table 3 – Results of Acid Sulphate Soil Screening Tests

	Sample	Approximate		Screening Test Results			lts
Bore	Depth (m)	Sample RL (AHD)	Sample Description	pH _F	pH _{FOX}	pH _F - pH _{FOX}	Strength of Reaction ^b
120	0.1	5.0	Sandy Silt*	6.0	4.8	1.3	1
120	0.5	4.6	Clay	5.9	4.1	1.8	1
120	1-1.45	3.9	Clay	5.5	4.7	0.8	1
121	0.1	5.8	Clayey Silt*	5.8	3.8	2.0	F
121	0.5	5.35	Silty Clay	5.8	5.0	0.7	F
121	1.0	4.9	Silty Clay	5.7	4.9	0.8	1
121	1-1.45	4.6	Silty Clay	5.8	4.9	0.9	1
122	0.1	6.6	Clayey Silt*	5.4	3.9	1.5	1
122	1-1.45	5.5	Silty Clay	4.9	4.7	0.2	1
123	0.2	5.8	Clayey Silt*	5.9	3.3	2.6	F
123	0.7	5.3	Silty Clay	5.2	4.9	0.3	F
123	1-1.45	4.8	Silty Clay	5.1	4.3	0.9	1
124	0.1	5.1	Sandy Silt*	5.9	5.5	0.4	1
124	0.5	4.7	Clay	6.0	3.9	2.2	F
124	1-1.45	4.0	Clay	5.5	4.8	0.7	1
125	0.2	6.8	Clayey Silt*	5.1	4.0	1.1	1
125	1-1.45	5.8	Clay	5.4	4.8	0.7	1
126	0.2	5.8	Clayey Silt*	6.2	3.0	3.2	1
126	0.7	5.3	Silty Clay	5.5	4.7	0.8	1
126	1-1.45	4.8	Silty Clay	5.2	4.6	0.6	1
127	0.1	5.4	Sandy Silt*	5.6	3.1	2.5	F
127	0.5	5.0	Sandy Silt*	5.9	3.9	2.0	F
127	1.0	4.5	Clay	5.1	4.6	0.5	1
127	1-1.45	4.2	Clay	4.9	4.6	0.4	1
128	0.1	6.9	Clayey Silt*	5.6	3.7	2.0	F
128	0.5	6.5	Clayey Silt*	5.9	3.4	2.6	F
128	1-1.45	5.8	Clay	5.8	4.3	1.6	F
129	0.1	6.0	Clayey Silt*	6.0	3.0	3.0	1
129	0.5	5.6	Silty Clay/Clayey Silt*	5.8	4.3	1.4	1
129	1-1.45	4.9	Silty Clay	4.9	4.3	0.6	1
130	0.1	5.5	Clayey Silt*	5.9	5.4	0.4	1
130	0.5	5.1	Clayey Silt*	5.8	3.4	2.4	F
130	1-1.45	4.3	Clay	5.5	4.6	1.0	1
131	0.1	7.0	Clayey Silt*	5.4	4.7	0.7	1
131	0.5	6.6	Clay	5.9	3.0	2.9	F
131	1-1.45	5.9	Clay	5.9	4.2	1.7	F
132	1-1.45	5.2	Silty Clay	5.2	4.4	0.8	1
133	0.1	5.6	Clayey Silt*	5.2	4.4	0.9	1
133	0.5	5.2	Clay	5.8	4.2	1.7	F
133	1-1.45	4.4	Clay	5.7	4.3	1.4	F

Table 3 – Results of Acid Sulphate Soil Screening Tests (Continued)



	Sample	Approximate			Screen	ing Test Resu	lts
Bore	Depth (m)	Sample RL (m AHD)	Sample Description	pH _F	pH _{FOX}	pH _F - pH _{FOX}	Strength of Reaction ^b
134	0.1	7.2	Clayey Silt*	5.3	4.7	0.6	1
134	0.5	6.8	Clayey Silt*	5.9	3.6	2.3	F
134	1-1.45	6.1	Clay	5.9	4.9	1.0	F
132	0.2	6.3	Silty Clay*	5.5	4.8	0.8	F
132	0.5	6.0	Silty Clay	5.7	4.8	1.0	F
135	0.1	6.4	Clayey Silt*	5.8	3.6	2.2	F
135	0.5	7.0	Silty Clay*	5.6	4.0	1.6	F
135	1.0	5.5	Clay	5.3	4.9	0.5	1
135	1-1.45	5.2	Clay	5.3	4.6	0.7	F
136	0.1	5.6	Clayey Silt*	5.1	4.4	0.6	1
136	0.5	5.2	Clayey Silt*	5.7	3.4	2.4	F
136	0.8	4.9	Clay	5.3	4.6	0.7	1
136	1-1.45	4.4	Clay	5.9	3.5	2.4	F
		QASSIT Action	Criteria	<4 ^c	<3.5	≥1	-

Table 3 – Results of Acid Sulphate Soil Screening Tests (Continued)

Notes to Table 3:

- b Strength of Reaction
- 1 denotes no or slight reaction
- 2 denotes moderate reaction
- 3 denotes high reaction
- 4 denotes very vigorous reaction
- F frothing indicative of organics
- For actual acid sulphate soils (ASS)
- Indicative value only for Potential Acid Sulphate Soils (PASS)

Shaded and Bold results indicate an exceedence of QASSIT criteria (Ref 2)

* with some organics

Full Chromium Suite Acid Sulphate Soil Testing

Based on the results of the screening tests, nine soil samples were selected for detailed laboratory testing, comprising the Full Chromium Suite in accordance with QASSIT guidelines (Ref 2 and 3).

Detailed test results are contained in the attached laboratory report sheets, and are summarised in Table 4 below.



	Comple	Annowingto			Labo	oratory R	esults	
Bore	Depth ^a (m)	Sample RL (AHD)	Sample Description	рН_{КСL}	Scr %S	s-TAA %S	SNAS %S	Net Acidity ^b %S
108	0.4	4.3	Silty Clay/Clayey Silt	4.6	<0.02	0.08	÷	0.08
109	0.2	4.2	Clayey Silt	4.4	<0.02	0.15	<0.02	0.15
112	0.5	4.0	Clay	4.3	<0.02	0.16	<0.02	0.16
118	1.0 - 1.45	3.7	Clay	4.5	<0.02	0.12	-	0.12
123	0.2	5.8	Clayey Silt	4.5	<0.02	0.11	-	0.11
127	0.5	5.0	Sandy Silt	4.6	<0.02	0.11	-	0.11
128	0.5	6.5	Clayey Silt	4.3	<0.02	0.16	<0.02	0.17
131	0.5	6.6	Clay	4.2	<0.02	0.16	0.04	0.19
136	0.5	5.2	Clayey Silt	4.7	<0.02	0.08	- 1 2	0.08
			coarse texture			-	-	0.03 ^c /0.03 ^d
QASSIT Action Criteria		n Criteria	medium texture		-	-	-	0.06 ^c /0.03 ^d
			fine texture	-	-	-	-	0.01 ^c /0.03 ^d

Table 4 – Summary of Detailed Acid Sulphate Soil Testing

Notes to Table 4:

a Depth below ground surface

b Calculated from ABA equation in ASS Laboratory Methods Guidelines (Ref 3)

c Action criteria if less than 1000 tonnes of material is disturbed

d Action criteria if more than 1000 tonnes of material is disturbed

Shaded and Bold results indicate an exceedence of QASSIT criteria (Ref 2) for less than 1000 t disturbed

6. ACID SULPHATE SOIL ASSESSMENT

6.1 Methods

An acid sulphate soil assessment was undertaken with reference to the ASSMAC "Acid Sulphate Soils Manual" (Ref 2) and QASSIT "Soil Management Guidelines" (Ref 3) and comprised the following:

- Review of available acid sulphate risk maps;
- 92 screening tests on selected soil samples for pH in water (pH_F) and pH in hydrogen peroxide (pH_{FOX});
- Nine samples tested for the full chromium suite to assess acid sulphate potential.



Samples collected for the assessment of acid sulphate soil conditions were wrapped in plastic wrap and plastic bags to exclude air and stored and transported on ice. Samples were then refrigerated in the DP laboratory.

6.2 Published Data

Reference to the Acid Sulphate Soil Risk Map for Beresfield (9232N3) indicates that the site lies within an area where the risk of acid sulphate soils transitions from an area of low probability to an area of high probability. The map suggests that the risk increases towards the south from being an area with a low probability of occurrence at depths of greater than 3 m, to an area with high probability of the occurrence of acid sulphate soils at depths of between about 1 m and 3 m.

6.3 Laboratory Testing

The QASSIT guidelines suggest that a soil pH<4 in water is an indicator of actual acid sulphate soils. The results of screening tests therefore suggest the absence of actual acid sulphate soils at the locations and depths tested.

The QASSIT guidelines also suggest that indicators of potential acid sulphate soils (PASS) include the following:

- Soil pH <3.5 in H₂O₂ (i.e. pH_{FOX});
- Drop of 1 pH unit or more between pH_F and pH_{FOX}.

46 of the samples tested exhibited a pH drop of greater than one unit and of these, 14 samples also exhibited a soil pH following oxidation below 3.5.

It is noted that the above test method is a qualitative method only and gives an indication of the intensity of total acidification (pH). The ASSMAC guidelines indicate that peroxide may also oxidise organic matter (in addition to pyrite) to produce acids which are unlikely to form under natural conditions, thus giving falsely high indication of acid sulphate potential.

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6.4 Comments

The results of detailed laboratory testing indicate that potential acid sulphate soils are present on the site and that all of the samples tested exceeded the ASSMAC action criteria, regardless of the quantity of soil to be disturbed.

Therefore, development of the site should be undertaken with reference to an acid sulphate soil management plan.

7. COMMENTS

7.1 Footings

7.1.1 Shallow Footings

It is expected that high level footings such as pads or strips would be the preferred option for support of structural loads.

Pad or strip footings founded within natural stiff to hard clay (encountered at depths below 0.05 m to 1.0 m in all bores) or engineered filling, at a depth of at least 0.5 m may be proportioned for a maximum allowable bearing pressure of 150 kPa. Footings should not be founded on uncontrolled filling.

Pad or strip footings founded within extremely low strength or better bedrock (encountered at depths of between 1.2 m and 4.0 m) may be proportioned for a maximum allowable bearing pressure of 500 kPa. If footings are founded on very low strength or better bedrock, they may be proportioned for a maximum allowable bearing pressure of 1000 kPa. It should be noted however that bands of extremely low strength rock were encountered within the profile to the depths investigated.



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The results of shrink swell testing indicates that moderately to highly reactive clays are present on the site. Design should account for seasonal surface movements (y_s) of up to about 50 mm based on the current profile. This should be further assessed once finished surface levels are known.

7.1.2 Pile Footings

In areas where the rock is deeper or if higher bearing pressures are required, bored concrete or driven timber piles could be used to support the loads. Driven piles or displacement piles will offer the benefit of minimising the amount of soil disturbed during footing construction and hence minimise the quantity of potential acid sulphate soil requiring treatment.

Bored concrete piles founded in the underlying extremely low strength or better bedrock should be proportioned for an allowable end bearing pressure of 700 kPa. For piles founded on very low strength or better bedrock, a maximum allowable end bearing pressure of 1000 kPa may be used. An allowable shaft adhesion of 15 kPa is appropriate for the firm to stiff and very stiff natural clayey soils. For socketing into the extremely low strength or better bedrock, an allowable shaft adhesion of 50 kPa would be appropriate. It should be noted that bands of extremely low strength rock were encountered within the profile for the depths investigated. It should also be noted that piles could be subject to uplift forces from swelling clays.

It is noted that groundwater was encountered at depths as shallow as 0.3 m in the standpipes. Therefore, traditional bored concrete piles may require casing to prevent collapse of the pier hole. If casing is required, shaft adhesion should be ignored. The end bearing pressures should be reduced by 20% if checking of the base cannot be performed during construction. Concrete should be placed by tremie methods if groundwater is present within the pier hole.

Timber piles driven to virtual refusal on rock will approach the structural capacity of the pile. The structural capacity of timber piles is dependent on a number of factors, including the stress grade. The following table shows an extract from a Koppers handbook regarding the structural capacity for softwood timber piles of various diameters. This table should be used as a rough guide only. Reference should be made directly to piling contractors and suppliers regarding the capacities of their products.



Pile Type	Pile Toe Diameter (mm)					
	210	230	250	280	300	
F27 Stress Grade	710	852	1007	1263	1450	
F17 Stress Grade	450	540	683	800	919	

Table 5 - Maximum Safe Loads for Treated Hardwood Piles (kN)

A dynamic pile driving formula, e.g. Hiley formula, should be used to verify the capacity of the piles, and accurate pile driving records should be kept during construction.

Contractors should confirm the capacity of their equipment to install piles to the depths required.

Geotechnical monitoring and inspection of cuttings should be undertaken during pile installation to confirm pile capacities and that the piles have been adequately socketed into suitable rock.

7.2 Lateral Earth Pressures

The following soil parameters are recommended for calculation of lateral earth pressures.



Parameter	Symbol	Firm to Stiff Clayey Soil	Very Stiff or Better Clay or Engineered Fill	Extremely Low to Very Low Strength Rock	Low Strength or Better Rock
Unit Weight (kN/m ³)	γ	18	20	22	22
Effective Cohesion (kPa)	c	0	0	10	10
Effective Friction Angle	¢	20°	25°	30°	30°
Active Earth Pressure Coefficient	Ka	0.5	0.4	0.3	0.25
At-rest Earth Pressure Coefficient	Ko	0.65	0.6	0.5	0.5
Passive Earth Pressure Coefficient	Kp	2.0	2.5	<u> -</u>	-
Passive Earth Pressure (kPa)	P _P	-	۲	200	1000

Table 6 – Lateral Earth Pressure Soil Parameters

A factor of safety of at least 2.5 should be applied to the above factors allowed for in design based on the above earth pressure co-efficients.

7.3 Mine Subsidence

The site is not located within a proclaimed Mine Subsidence District. Previous correspondence with the Mine Subsidence Board (Ref 1) has indicated that the local area has not been undermined, hence the approval of the Mine Subsidence Board will not be required for the proposed development.

7.4 Considerations for Earthquake Loading

Australian Standard AS 1170.4–2007 (Ref 7), indicates the hazard factor (Z) is about 0.11 for the Newcastle Area, which is considered appropriate for Tomago.

Based on the soil profile, a Site Sub-soil Class of C_e is considered to be appropriate for the purpose of earthquake design on the site.



Based on the profile encountered in the bores, DP considers that liquefaction of site soils resulting from a seismic event would be unlikely on this site.

7.5 Site Preparation

Based on DPs' experience on this site and the adjoining power station site, access can prove difficult following wet weather.

It is expected that a wide range of equipment could be required on site during construction.

At a minimum, a gravel hardstand area will be required in areas to be trafficked. It is expected that a 200 mm to 300 mm thick compacted granular bridging layer will provide improved access to the site. This however should be confirmed at the commencement of construction.

7.6 Engineered Filling

Details regarding proposed cuts and fills were not known at this time however they are expected to be minimal. Filling to be placed in areas likely to support structures or other settlement sensitive features should be placed as engineered filling. The gravel bridging layer and hardstand areas should also be placed to the requirements of engineered filling.

The following general procedure is recommended for placement of engineered filling:

- Remove topsoil, uncontrolled filling or deleterious materials;
- Test roll the surface in order to determine any soft zones and assess moisture condition.
 Moisture contents should be in the range 3% OMC (dry) to OMC where OMC is the optimum content at standard compaction;
- Compact the tyned natural subgrade to a dry density ratio of at least 100% Standard. The compacted clay surface should be left exposed for a minimum of time prior to placement of pavement layers and floor slabs, to minimise the occurrence of desiccation cracking;



• Suitable filling should be placed in horizontal layers not exceeding 300 mm loose thickness and compacted to a dry density ratio of at least 100% Standard. Moisture content should be in the range as stated above.

Engineered filling should have a maximum particle size of 150 mm, be free of organics and other deleterious materials, and be well graded.

It is noted that the silty soils were encountered in a number of areas across the site. Silty soils can be difficult to work, particularly when wet. If the soils become wet, they should be tyned and allowed to dry. Tight control of moisture will be required during compaction of these soils.

Geotechnical inspections and testing should be performed during construction.

8. LIMITATIONS

Conditions on site different to those identified during this assessment may exist. Therefore Douglas Partners Pty Ltd (DP) cannot provide unqualified warranties nor does DP assume any liability for site conditions not recorded in the data available for this assessment.

This report and associated documentation and the information herein have been prepared solely for the use of Macquarie Generation and Capital Project Services. Any reliance assumed by other parties on this report shall be at such party's own risk. Any ensuing liability resulting from use of the report by other parties cannot be transferred to DP.

DOUGLAS PARTNERS PTY LTD

Reviewed by:

Julie Wharton Associate

John Harvey Principal



REFERENCES

- 1. Douglas Partners, Report on Geotechnical Investigation, proposed Gas Fired Power Station, Old Punt Road, Tomago, October 2007, Report No 39762.
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- Australian Standard AS 2870-1996, "Residential Slabs and Footings Construction", Standard Association of Australia.
- 6. Australian Standard AS 3798 2007: Guidelines on Earthworks for Commercial & Residential Development
- 7. AS 1170.4-1993 "Earthquake Loads" Standards Australia.



NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, Geotechnical Site Investigations Code. In general, descriptions cover the following properties strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (eg. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

	Undrained
Classification	Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	2550
Stiff	50-100
Very stiff	100-200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

	SPT	CPT
Relative Density	"N" Value	Cone Value
	(blows/300 mm)	(q _c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	1030	515
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descent into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (eg. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water



table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from 'feel' and rate of penetration.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond-tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" — Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

 In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7

as	4, 6, 7
	N = 13

as

 In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm

15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Issued: October 1998

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test 6.4.1.

In the tests, a 35 mm diameter rod with a cone-tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20 mm per second) the information is plotted on a computer screen and at the end of the test is stored on the computer for later plotting of the results.

The information provided on the plotted results comprises: ---

- Cone resistance the actual end bearing force divided by the cross sectional area of the cone — expressed in MPa.
- Sleeve friction the frictional force on the sleeve divided by the surface area — expressed in kPa.
- Friction ratio the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main scale (0—50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve friction to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:--

 q_c (MPa) = (0.4 to 0.6) N (blows per 300 mm)

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

$$q_c = (12 \text{ to } 18) C_u$$

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on soil classification is required, direct drilling and sampling may be preferable.



Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two relatively similar tests are used.

- Perth sand penetrometer a 16 mm diameter flatended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms.

Bore Logs

The bore logs presented herein are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable, or possible to justify on economic grounds. In any case, the boreholes represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

- In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be

the same at the time of construction as are indicated in the report.

 The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Engineering Reports

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- unexpected variations in ground conditions the potential for this will depend partly on bore spacing and sampling frequency
- changes in policy or interpretation of policy by statutory authorities
- the actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes

Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section



is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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AN ENGINEERING CLASSIFICATION OF SEDIMENTARY ROCKS IN THE SYDNEY AREA

This classification system provides a standardized terminology for the engineering description of the sandstone and shales in the Sydney area, but the terms and definitions may be used elsewhere when applicable.

Under this system rocks are classified by Rock Type, Degree of Weathering, Strength, Stratification Spacing, and Degree of Fracturing. These terms do not cover the full range of engineering properties. Descriptions of rock may also need to refer to other properties (e.g. durability, abrasiveness, etc.) where these are relevant.

ROCK TYPE DEFINITIONS

Rock Type	Definition
Conglomerate:	More than 50% of the rock consists of gravel sized (greater than 2mm) fragments
Sandstone:	More than 50% of the rock consists of sand sized (.06 to 2mm) fragments
Siltstone:	More than 50% of the rock consists of silt-sized (less than 0.06mm) granular particles and the rock is not laminated
Claystone:	More than 50% of the rock consists of clay or sericitic material and the rock is not laminated
Shale:	More than 50% of the rock consists of silt or clay sized particles and the rock is laminated

Rocks possessing characteristics of two groups are described by their predominant particle size with reference also to the minor constituents, e.g. clayey sandstone, sandy shale.

DEGREE OF WEATHERING

Term	Symbol	Definition
Extremely Weathered	EW	Rock substance affected by weathering to the extent that the rock exhibits soil properties - i.e. it can be remoulded and can be classified according to the Unified Classification System, but the texture of the original rock is still evident.
Highty Weathered	HW	Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock usually as a result of iron leaching or deposition. The colour and strength of the original fresh rock substance is no longer recognisable.
Moderately Weathered	MW	Rock substance affected by weathering to the extent that staining or discolouration of the rock substance usually by limonite has taken place. The colour and texture of the fresh rock is no longer recognisable.
Slightly Weathered	sw	Rock substance affected by weathering to the extent that partial staining or discolouration of the rock substance usually by limonite has taken place. The colour and texture of the fresh rock is recognisable.
Fresh	Fs	Rock substance unaffected by weathering, limonite staining along joints.
Fresh	Fr	Rock substance unaffected by weathering.

STRATIFICATION SPACING

Term	Separation of Stratification Planes
Thinly laminated	<6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	>2 m

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Society of Rock Mechanics (Reference).

Strength Term	ls(50) MPa	Field Guide	Approx. qu MPa*
Extremely Low:	0.03	Easily remoulded by hand to a material with soil properties	0.7
Very Low:	0.03	May be crumbled in the hand. Sandstone is "sugary" and friable.	24
Low:	0.1	A piece of core 150 mm long x 50 mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.	2.4
Medium:	0.3	A piece of core 150 mm long x 50 mm dia. can be broken by hand with considerable	7
High:	1	A piece of core 150 mm long x 50 mm dia. cannot be broken by unaided hands,	24
Voru	3	can be slightly scratched or scored with knife.	70
High:	10	held hammer. Cannot be scratched with pen knife.	240
Extremely High:		A piece of core 150 mm long x 50 mm dia, is difficult to break with hand held hammer. Rings when struck with a hammer.	

* The approximate unconfined compressive strength (qu) shownin the table is based on an assumed ratio to the point load index of 24:1. This ratio may vary widely.

DEGREE OF FRACTURING

This classification applies to diamond drill cores and refers to the spacing of all types of natural fractures along which the core is discontinuous. These include bedding plane partings, joints and other rock defects, but exclude known artificial fractures such as drilling breaks

Term	Description
Fragmented:	The core is comprised primarily of fragments of length less than 20 mm, and mostly of width less than the core diameter.
Highly Fractured:	Core lengths are generally less than 20 mm - 40 mm with occasional fragments.
Fractured:	Core lengths are mainly 30 mm - 100 mm with occasional shorter and longer sections.
Slightly Fractured:	Core lengths are generally 300 mm - 1000 mm with occasional longer sections and occasional sections of 100 mm - 300 mm.
Unbroken:	The core does not contain any fracture.

REFERENCE

International Society of Rock Mechanics, Commission on Standardisation of Laboratory and Field Tests, Suggested Methods for Determining the Uniaxial Compressive Strength of Rock Materials and the Point Load Strength Index, Committee on Laboratory Tests Document No. 1 Final Draft October 1972

GRAPHIC SYMBOLS FOR SOIL & ROCK

rr.

<u>SOIL</u>

TALUS

			A A A A X X X X X X X X X X X X X X X X		
2 2 2 1 1 1 1 1 1 1 1 1 1 2 1 2 1 2 1 2	ノチンとノタを	1////	+/+// / k		
	111	12.			
		うたいためでした	A TAKADAA A TATA		

BITUMINOUS CONCRETE	BOULDEF	S C
CONCRETE	CONGLO	ME
TOPSOIL	CONGLON	ME
FILLING	SANDSTO	N
PEAT	SANDSTO	N
CLAY	SILTSTON	IE
SILTY CLAY	LAMINITE	
SANDY CLAY	MUDSTON	IE,
GRAVELLY CLAY	COAL	
SHALY CLAY	LIMESTON	١E
SILT		
SILT CLAYEY SILT	METAMOR	PI
SILT CLAYEY SILT SANDY SILT	METAMOR	PI
SILT CLAYEY SILT SANDY SILT SAND	METAMOR	PI
SILT CLAYEY SILT SANDY SILT SAND CLAYEY SAND	METAMOR	PI IYI
SILT CLAYEY SILT SANDY SILT SAND CLAYEY SAND SILTY SAND	METAMOR SLATE, PH ++ GNEISS QUARTZIT	PI IYI
SILT CLAYEY SILT SANDY SILT SAND CLAYEY SAND SILTY SAND GRAVEL	METAMOR SLATE, PH SLATE, PH GNEISS QUARTZIT	
SILT CLAYEY SILT SANDY SILT SAND CLAYEY SAND SILTY SAND GRAVEL SANDY GRAVEL	METAMOR SLATE, PH CANEISS QUARTZIT IGNEOU	PI IYI E
SILT CLAYEY SILT SANDY SILT SAND CLAYEY SAND SILTY SAND GRAVEL SANDY GRAVEL CLAYEY GRAVEL	METAMOR SLATE, PH CANEISS QUARTZIT IGNEOU CANEISS QUARTZIT IGNEOU CANEISS QUARTZIT DOLERITE	

SEDIMENTARY ROCK

ONGLOMERATE RATE RATIC SANDSTONE E FINE GRAINED E COARSE GRAINED CLAYSTONE, SHALE

HIC ROCK

LITTE, SCHIST

ROCK

BASALT

TUFF

P

PORPHYRY





Abbreviation	Meaning
DB	Drill Break
Р	Parting
J	Joint
Fr	Fracture
F	Fault
h	Horizontal
v	Vertical
sh	Subhorizontal
SV	Subvertical
he	Healed
pl	Planar
st	Stepped
un	Undulating
го	Rough
sm	Smooth
sl	Slickensided
ti	Tight
di	Probably drilling induced
fg	Fragmented
Fe	Ironstained
cem	cemented
sty	silty
су	clay
са	calcite
cbs	Carbonaceous
lam	Lamination

ABBREVIATIONS USED IN DISCONTINUITIES COLUMN OF BOREHOLE LOGS

Examples:

- 1. At 62.04 m, P, 30°, un, st, ro, cbs lam At 62.04 m Parting, 30°, undulating, stepped, rough, on carbonaceous siltstone lamination
- 2. At 65.08 m, Fr, 70°, pl, ro, st, fg At 65.08 m, fracture, planar, rough, stepped, fragmented.

Abbreviation	Meaning					
	Lithology					
CL Coal						
MS	Mudstone					
St	Siltstone					
SS	Sandstone					
CBS	Carbonaceous					
lam	Laminations					
bnd	Band					
sm	Seam					
Strength						
EL Str	Extremely low strength					
VL Str	Very low strength					
L Str	Low strength					
M Str	Medium strength					
H Str	High strength					
VH Str	Very high strength					
EH Str	Extremely high strength					
	Weathering					
EW	Extremely weathered					
HW	Highly weathered					
MW	Moderately weathered					
SW	Slightly weathered					
Fr	Fractured					

ABBREVIATIONS USED FOR STRATA DESCRIPTIONS

For thin seams to save space, instead of:

From 93.03m to 93.13m depth, medium strength carbonaceous mudstone band (30mm)

write as

92.08m? MS cbs M Str, (30mm)

where abbreviation order is

Depth, Rock type, qualifier, strength, (weathering optional), thickness.

CLIENT: Macquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 4.79 AHD BORE No: 104 EASTING: 378507.1 NORTHING: 6368522.4 DIP/AZIMUTH: 90°/--

PROJECT No: 39762.01 DATE: 07 Apr 08 SHEET 1 OF 1

	Description	2		Samplin	g & In Situ Testing	- <u>b</u>	Well
Depth (m)	of	Log a	8	apth mple	Results &	Wat	Construction
	Strata	0	F	ă j	Comments		Details
0.05	TOPSOIL - Dark grey silt with abundant organics and some rootlets, M>Wp	(PPÉ	A .	0.2			
0.3	CLAYEY SILT - (Firm) dark grey clayey silt with trace organics, M>>Wp			0.5			
0.7	SILTY CLAY/CLAYEY SILT - (Firm) dark brown sifty clay/clayey sift with trace organics, M>Wp	1.MM		0.0			-
	SILTY CLAY - (Stiff) brown-red silty clay, M>Wp	X		1.0			-1
		11	U50				
		1/1	-pp-	1.4	150 kPa		•
		11					-
2		1/1					-2
2.5	CLAY - Very stiff dark grey clay with interbedded extremity	14		2.5		Ţ	
	weathered siltstone, M <wp< td=""><td></td><td>S, pp</td><td></td><td>3,5,7 N = 12 200 - 250 kPa</td><td></td><td>-</td></wp<>		S, pp		3,5,7 N = 12 200 - 250 kPa		-
3				2.95			-3
							4
							7
4 4.02	CLAYSTONE/SILTSTONE - (Low strength) extremely weathered light grey claystone/siltstone	臣	s	40	20/20mm (no sample)		-4
	Bore discontinued at 4.02m, limit of investigation			4.02			-
							-
							¥.
5							-5
6							-6
	<i>v</i>						
							-

TYPE OF BORING: Solid Flight Auger to 4.0m (tc-bit)

WATER OBSERVATIONS: Free groundwater observed at 2.5m during drilling **REMARKS:**

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PID Photo ionisation detector Standard penetration test nm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa) b Water seep 7 Water level SAMF Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample ADBUX0 Core drilling

CHECKED Initials: Date:





CLIENT: **Macquarie Generation** PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

 SURFACE LEVEL:
 4.39 AHD

 EASTING:
 378512.8

 NORTHING:
 6368539.5

 DIP/AZIMUTH:
 90°/

BORE No: 105 PROJECT No: 39762.01 DATE: 07 Apr 08 SHEET 1 OF 2

Der	1	Description	Degree of Weathering	9	Rock Strength	Fracture	Discontinuities	S	ampl	ing &	In Situ Testing
(m))	of Strata	22230C	Grapt	Wate Wate Wate Wate	Spacing (m) େ ୫ନ ଛଞ	B - Bedding J - Joint S - Shear D - Drill Break	Type	600 800 800 800 800 800 800 800 800 800	do %	Test Results
	0.1	TOPSOIL - Dark grey silt, with abundant organics and some		P		<u>3 00 07</u>		A			Comments
	h	dark brown clayey silt / silt y cLAY - (IIIII) dark brown clayey silt / silty clay, with trace organics, M>Wp		1				A			
1		brown silty clay, with trace organics, M>Wp from 0.5m (firm to stiff)				1 11 11 1 11 11 1 11 11 1 11 11					200 kPa
	ľ	from 1m stiff to very stiff		K				Uso	1		
	1.5	from 1.35m hard, with trace extremely weathered siltstone / sandstone fragments, M <wp< td=""><td></td><td></td><td></td><td></td><td></td><td>рр</td><td></td><td></td><td>>450 kPa</td></wp<>						рр			>450 kPa
2		with interbedded sandy clay layers, M <wp< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></wp<>									
		from 2.5m with interbedded,							-		
		extremely weathered siltstone layers						рр S			4,10,15 N = 25 350 kPa
4 4	0	CLAYSTONE / SILTSTONE - Extremely low strength, extremely		1				S			30, Ref
•	2	weathered, light grey claystone /		· · · · · · · · · · · · _ · / _ /			from 4.2m to 5.3m, Fg at 0.02m to 0.04m intervals				
5								С	100	0	
	F	From 5.3m, extremely low strength		·			from 5.3m to 5.55m, friable				
5.5	5	CORE LOSS - 0.25m	X	\mathbf{X}^{\dagger}		$\mathbf{\nabla}$	5.55m: CORE LOSS: 250mm				
5. 6.	8 5	SILTSTONE - Very low to low strength, highly weathered, light grey siltstone				4	5.88m: P, sh, pl, sm 5.92m: P, sh, pl, sm 5.95m: P, sh, pl, sm	с	84	18	PL(D) = 0.1MP PL(A) = 0.08MF PL(D) = 0.09MF
	s, s fi	SANDSTONE - Very low to low strength, highly weathered, brown fine to medium grained sandstone				ן ו	6.04m; P, sh, pl, sm 6.06m; P, sh, pl, sm 6.14m; P, sh, pl, sm 6.21m; P, sh, pl, sm				PL(A) = 0.08MF PL(D) = 0.04MF PL(A) = 0.14MF PL(D) = 0.18MF

TYPE OF BORING: Solid Flight Auger to 4.2 m (tc-bit), then NMLC Rock coring 7.2m

GED: Harris

CASING: 4.0m

WATER OBSERVATIONS: Free groundwater observed at 3.5m during drilling

REMARKS: PVC Piezometer installed to 3.8m depth, hand slotted from 2.8m to 3.8m depth

A	SAMPLING &	CHECKED	
DBU	Disturbed sample Bulk sample Tube sample (x mm dia)	PID Photo ionisation detector S Standard penetration test	Initials:
WC	Water sample Core drilling	V Shear Vane (kPa) V Water seep F Water level	Date:

Douglas Partners Geotechnics - Environment - Groundwater

CLIENT: Macquarie Generation Proposed Gas Storage Area PROJECT: Old Punt Road, Tomago LOCATION:

SURFACE LEVEL: 4.39 AHD 378512.8 EASTING: NORTHING: 6368539.5 DIP/AZIMUTH: 90°/--

BORE No: 105 PROJECT No: 39762.01 DATE: 07 Apr 08 SHEET 2 OF 2

	Description	Degree of	o	Rock Strength	Fracture	Discontinuities	Se	ampli	ng &	In Situ Testing
전 Depth (m)	of Strata	Meanlening ≧≩§&≈∉	Graph	Et Low Wery Low Medum Medum Kery Hen	Spacing (m)	B - Bedding J - Joint S - Shear D - Drill Breek	Type	Rec. %	RQD %	Test Results & Comments
6.5	SANDSTONE (Continued)					6.24m: P, sh, pl, sm 6.29m: P, sh, pl, sm 6.36m: P, sh, pl, sm 6.43m: P, sh, pl, sm 6.5m: P, sh, pl, sm 6.88m: P, sh, pl, sm 6.88m: P, sh, pl, sm	с	84	18	PL(A) = 0.14MPa PL(D) = 0.1MPa PL(D) = 0.19MPa PL(A) = 0.19MPa
-8	Bore discontinued at 7.2m, limit of investigation					7.06m: P, sh, pl, sm 7.13m: P, sh, pl, sm 7.19m: P, sh, pl, sm				(PL(D) = 0.00MPa
12 										

RIG: Bobcat Mounted Rig

A D B U V C

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 4.0m

TYPE OF BORING: Solid Flight Auger to 4.2 m (tc-bit), then NMLC Rock coring 7.2m WATER OBSERVATIONS: Free groundwater observed at 3.5m during drilling

REMARKS: PVC Piezometer installed to 3.8m depth, hand slotted from 2.8m to 3.8m depth

SAMPLING & IN SITU	J TE	STING LEGEN	D				
Auger sample	pp	Pocket penetrom	oter	(kPa)			
Disturbed sample Bulk sample	S	Standard penetration test					
Tube sample (x mm dta.)	ΡL.	Point load strength (s(50) MPa					
Water sample	V	Shear Vane (kPa)_	2022/04			
Core drilling	⊳	Water seep	1	Water level			

CHECKED Initials: Date:





CLIENT: Macquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 5.12 AHD 378552.7 EASTING: NORTHING: 6368545.2 DIP/AZIMUTH: 90°/-

BORE No: 107 PROJECT No: 39762.01 DATE: 31 Mar 08 SHEET 1 OF 1

	Description	2	San	npling & I	In Situ Testing		Well	
(m)	of	Pe Cog	bth	BIDE	Results &	Wate	Construction	
	Strata	0 P	å	8	Comments		Details	
0.1	TOPSOIL - Dark grey silt with abundant organics, and with some rootlets. M>Wp							
	CLAYEY SILT - (Soft to firm), brown clayey silt, M>>Wp	//// A	0.2			1		
		1111						
		//// *	0.5			11		
0.8		1111	1					
0.8	SILTY CLAY - (Stiff), grey brown mottled orange silty clay,	1/V						
	w/vvp	XX-	- 1.0			-1		
					110 kPa			
		XX	1.35			-		
6		///	- 1.5					
		Man			3,4,7			
		N S. P	'l		N = 11 175 kPa			
		XX	1.96			-2		
		XX				-		
		XX						
		XX						
2.6		1/1/						
2.7	extremely weathered, red brown iron stained sittstone	S	2.7-		20/100 mm			
	Bore discontinued at 2.7m, due to auger refusal		2.8					
			1 1			-3		
						t		
						8		
						-4		
						1		
						12		
						1		
						-		
						-5		
						1		
						-		
						t		
						•		
						-6		
						•		
						ļ		
						- R		

TYPE OF BORING: Solid Flight Auger to 2.7m (tc-bit)

A D B U W C

Initials: Date:

WATER OBSERVATIONS: Free groundwater observed at 2.5m during drilling

REMARKS: PVC piezometer installed to 2.3m depth, hand slotted from 1.3m to 2.3m depth

SAMPLING & IN SITU TESTING LEGEND Auger sample Disturbed sample Bulk sample (Tube sample (x mm dia.) Water sample Core drilling D Pocket penetrometer (kPa) PIO Photo ionisation detector S standard penetration test PL Point load strength (s(50) MPa V Shear Vane (kPa) ▷ Water seep ▼ Water level

CHECKED

Douglas Partners Geotechnics · Environment · Groundwater

CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

SURFACE LEV	EL: 4.72 AHD
EASTING:	378547
NORTHING:	6368528.1
DIP/AZIMUTH:	90°/

BORE No: 108 PROJECT No: 39762.01 DATE: 04 Apr 08 SHEET 1 OF 1

Π		Description	Degree of	0	Rock Strength	Fracture	Discontinuities	Sa	mplin	g & I	n Situ Testing
묍	Depth (m)	of Strata		Log	Wery Low Very High Ex High	Spacing (m)	B-Bedding J-Joint S-Shear D-Drill Breek	Type	Core Rec. %	Rob %	Test Results & Comments
	0.05 0.3 0.6	TOPSOIL - Dark grey silt, with abundant organics and some rootlets, M>Wp CLAYEY SILT - (Firm), dark brown clayey sit with trace organics, M>Wp CLAYEY SILT/SILTY CLAY - (Firm to stiff), brown clayey silt/silty clay with trace organics SILTY CLAY - (Stiff to very stiff), brown red silty clay, M>Wp From 1.15m, grey						A A U ₅₀ PP U ₅₃ PP			350 kPa 200 kPa
2	2.5	CLAY - Hard, grey clay, with some extremely weathered claystone, M <wp< td=""><td></td><td>1</td><td></td><td></td><td></td><td>s</td><td></td><td></td><td>10, 10, 15/100mm</td></wp<>		1				s			10, 10, 15/100mm
	-3 3.0	CLAYSTONE/SILTSTONE - Low to		11			3.0m to 3.2m, Fg	С	100	0	
	- 31 327 	FeO stained claystone/siltstone CORE LOSS CLAYSTONE/SILTSTONE - Extremely low strength to high strength, extremely to highly weathered, light grey iron stained red claystone/siltstone					3.2m: CORE LOSS: 70mm 3.27m to 3.67m, Fg 3.75m: P, sh, un, ro 3.8m: P, sh, h 3.87m: P, sh, h 4.13m to 4.4m, Fg	с	94	0	PL(D) = 0.63MPa PL(A) = 0.25MPa
	-5						4.47m: P, sh, un, ro, Fe 4.56m: P, sh, un, ro, Fe 4.58m: P, sh, un, ro, Fe 4.63m: P, sh, un, ro, Fe 4.7m: P, sh, un, ro, Fe 4.8m: P, sh, un, ro, Fe 4.8m: D, sh, un, ro, Fe 5.4m to 5.35m, friable/clay seam 5.52m to 5.48, friable/clay seam 5.52m to 5.6m, Fg 5.6m to 5.76m, clay seam 5.76m to 6m, Fg	с	100	27	PL(A) = 0.35MPa PL(D) = 0.27MPa PL(A) = 0.07MPa PL(D) = 0.12MPa PL(A) = 0.03MPa
	-6 6,	Bore discontinued at 6.0m, limit of investigation									

TYPE OF BORING: Solid Flight Auger to 3.0m then NMLC rock coring to 6.0m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

DRILLER: Ground Test (Grima)

	SAMPLING &	IN SITU TESTING LEGEND	
A	Auger sample	pp Pocket penetrometer (kPa)	۱ŀ
D	Disturbed sample	PID Photo ionisimion detector	111
B	Bulk sample	S Standard penetration test	11
Ū.	Tube sample (x mm dia.)	PL Point load strength Is(50) MPa	115
Ŵ	Water sample	V Shear Vane (kPa)	11.
С	Core drilling	Water seep ¥ Water level	JL

RIG: Bobcat Mounted Rig



LOGGED: Harris



CASING: 3.0m

CLIENT: Macquarie Generation **PROJECT:** Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 4.39 AHD EASTING: 378541.3 6368511 NORTHING: DIP/AZIMUTH: 90°/--

BORE No: 109 PROJECT No: 39762.01 DATE: 07 Apr 08 SHEET 1 OF 1

Depth	Description	2 도 미		Sam	pling &	In Situ Testing	>		Well	
(m)	of Strata	Grap	Type	Depth	ample	Results & Comments	Wate		Construction	
0.05	TOPSOIL - Dark grey silt with abundant organics and	122			S I			-	Leans	
	CLAYEY SILT - (Firm) dark grey clayey silt with trace organics, M>Wp	1 1 1 1 1	A	0.2						
0.6	SILTY CLAY - (Firm to stiff) brown sity clay, M>>Wp		A	0.5				-		
1.0	SILTY CLAY - Very stiff grey sitty clay with trace interbedded iron stained red sittstone gravel and trace			1.0				-1		
	organics, M>Wp		U _{so}	1.4		350 kPa		-		
2								-2		
	From 2.5m, M <wp< td=""><td></td><td></td><td>2.5</td><td></td><td>3,5.6</td><td></td><td></td><td></td></wp<>			2.5		3,5.6				
0			S	2.95		N = 11 350 kPa		-3		
							T	-		
1				4.0		40 00/000		-4		
4.25	Born discontinued at 4.25m limit of investigation	K/Y	5	4.25-	_	10, 20/100 mm	_	<u>.</u>		
	Solo documentos al 42011, innit or investigation									
								-5		
								-6		

WATER OBSERVATIONS: Free groundwater observed at 3.5m during drilling

REMARKS: PVC piezometer installed to 4.25m depth, hand slotted from 3.25m to 4.25m

SAMPLING & IN SITU TESTING LEGEND Auger sample Disturbed sample Butk sample (Tube sample (x mm dia.) Water sample Core drilling CHECKED
 PD
 Pockst plentformeler (kPa)

 PID
 Photo ionisation detector

 Standard penetration test
 Standard penetration test

 PL
 Point load strength (s(50) MPa

 V
 Shear Vane (kPa)

 >
 Water seep
 Water level
 ADBUWC Initials: Date:



Douglas Partners Geotechnics · Environment · Groundwater

 CLIENT:
 Macquarie Generation

 PROJECT:
 Proposed Gas Storage Area

 LOCATION:
 Old Punt Road, Tomago

 SURFACE LEVEL:
 5.54 AHD

 EASTING:
 378586.8

 NORTHING:
 6368533.8

 DIP/AZIMUTH:
 90°/-

BORE No: 110 PROJECT No: 39762.01 DATE: 31 Mar 08 SHEET 1 OF 1

	Description	2		Sam	pling &	In Situ Testing		Well
Depth (m)	of Strata	Graph Log	Type	Depth	Sample	Results & Comments	Wate	Construction Details
0.05	TOPSOIL - Dark grey silt with abundant organics and with some rootlets, M>Wp CLAYEY SILT - (Firm), dark brown clayey silt with trace organics, M>Wp		A	0.2 0.3				
	SILTY CLAY - (Stiff), dark brown silty clay with trace organics, M>Wp		A	0.5				
-1	From 1.0m, very stiff to hard, with trace fine to medium grained sand , grey-brown mottled red		S, pp	1.0 1.45		1,5,6 N = 11 450 kPa		1
-2	From 2.0m, hard, grey, with trace iron stained red siltstone gravel							2
	2		S	2.44 2.69		10, 20/100 mm		
-3 3.0	Bore discontinued at 3.0m, due to refusal on bedrock	1/1/						3
-4								-4
2 10 10 10 10 10 10 10 10								
								-5
- 6								-6

RIG: 4WD Mounted Rig

DRILLER: Full Bore (A Foody)

LOGGED: Harris

CASING: Uncased

 TYPE OF BORING:
 Solid Flight Auger to 3m, (tc-bit refusal on bedrock)

 WATER OBSERVATIONS:
 No free groundwater observed during drilling

 REMARKS:
 PVC piezometer installed to 2.2m depth, hand slotted from 1.2m to 2.2m depth

 SAMPLING & IN SITU TESTING LEGEND

 A
 Auger sample
 pp
 Pocket penetrometer (kPa)

 D
 Disturbed sample
 PD
 Photo ionisation detector

 B
 Buik sample
 S
 Standard penetration test

 U
 Tube sample (x mm dia.)
 PL
 Point load strength is(50) MPa

 W
 Water sample
 V
 Shear Vane (kPa)

 C
 Core drilling
 >
 Water seep
 ₹

CHECKED Initials: Date:





CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 4.89 AHD

 EASTING:
 378581.1

 NORTHING:
 6368516.7

 DIP/AZIMUTH:
 90°/

BORE No: 111 PROJECT No: 39762.01 DATE: 04 Apr 08 SHEET 1 OF 1

	Donth	Description	Degree of Weathering	Rock Strength	Fracture	Discontinuities	s	iampli	ng &	In Situ Testing
2	(m)	of Strata	Stapl Grap	x Low bery Low hedum figh ery High x High	(m)	B - Bedding J - Joint S - Shear D - Drill Break	Type	Core Sec. %	ROD %	Test Results
	0.1	TOPSOIL - Dark grey silt, with abundant organics and some rootlets, M>Wp		4			A			Comments
	0.46	CLAYEY SILT - (Firm), dark brown clayey silt with trace organics, M>Wo								
	0.65	SILTY CLAY - (Stiff), light brown silty clay, with trace organics					U ₅₀			
-4-	1	CLAY - (Stiff to very stiff), brown-grey mottled red clay, M>Wp					PP A			
							U ₅₀			
	2	From 2.0m, hard, light grey clay, M <wp< td=""><td></td><td></td><td></td><td></td><td>ρρ</td><td></td><td></td><td></td></wp<>					ρρ			
2	3						s	-		7,15,25 N = 40
	3.2	CLAY - (Stiff), clay, M>Wp				From 3.2m to 3.35m,	_			
	3.35	SANDSTONE - Extremely low to medium strength, extremely weathered, grey fine to coarse grained sandstone, with some clay				clay seam From 3.35m to 4.15m, friable intact sandstone with some clay	с	100	84	PL(D) = 0.01MPa PL(D) = 0.31MPa PL(A) = 0.2MPa
-	4.15	CORE LOSS				4.15m: CORE LOSS:				
	4.3	SANDSTONE - Extremely low strength to high strength, extremely weathered to highly weathered, light				From 4.3m to 4.52m, friable/clay seam				
ł		grey-red sandstone			7	4.58m: J, 45°, un, sm, Fg in fill 4.6m: J, 15°, pl, sm			_	PL(D) = 0.23MPa PL(A) = 0.04MPa
	5				ſ	4.67m: P, sh, un, ro-sm 4.74m: P, sh, un, ro 4.9m: J, 20°, un, ro 5.02m: J, 45°, un, ro				PL(D) = 0.39MPa PL(D) = 1.32MPa
						5.3m: J, 15°, pl, sm, Fg in fill 5.4m: J, 30°, un, sm, Fg in fill 5.5m: P, sh, un, ro 5.6m to 6m, Fg				PL(D) = 0.43MPa PL(A) = 0.28MPa PL(D) = 0.17MPa
-6	6.3 -	Bore discontinued at 6.3m, limit of				6.0m to 6.12m, clay seam 6.16m: P, sh, pl, sm 6.26m: P, sh, pl, sm				PL(D) = 0.27MPa PL(A) = 0.15MPa PL(D) = 0.07MPa

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 3.35m

TYPE OF BORING: Solid Flight Auger to 3.2m, then NMLC rock coring to 6.3m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

	SAMPLING &	IN SITU TES	STING LEGEND	CHECKED
A	Auger sample	pp	Pocket penetrometer (kPa)	GILCIGLD
B	Bulk sample	PID	Photo ionisation detector Standard penetration test	Initials:
5	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa	
č	Core drilling	v ⊳	Shear Vane (kPa) Water seep # Water level	Date:



Macquarie Generation CLIENT: PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 4.49 AHD EASTING: 378575.4 6368499.6 NORTHING: DIP/AZIMUTH: 90°/--

BORE No: 112 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

	Description	<u>v</u>		Sam	pling 8	In Situ Testing		Well
료 Depth (m)	of Strata	Graph	Type	Depth	Sample	Results & Comments	▲ Wate	Construction Details
	CLAYEY SILT - Dark brown clayey silt, wet, with some rootlets		A	0.1			ŀ	
- 0.3 	CLAY - (Very stiff) light grey brown clay		A	0.5				
-1	SILTSTONE - (Extremely low to very low strength)		s	1.0		7, 22, 25/80 mm		
-m.	siltstone extremely weathered to highly weathered, light grey siltstone Bore discontinued at 1.38m, refusal	/		-1.38-				
-2							-2	
· · · · · · · · · · · · · · · · · · ·								
•								
3 								
-4 -4							-4	
· · · · · · · · · · · · · · · · · · ·								
5							-5	
-6							-6	

DRILLER: Ground Test (Grima) RIG: Bobcat Mounted Rig

LOGGED: Bear

CASING:

TYPE OF BORING: Solid Flight Auger (tc-bit)

WATER OBSERVATIONS: Free groundwater observed at ground surface (0m) during drilling REMARKS:

SAMPLING & IN SITU TESTING LEGEND p Pocket penetrometer (kPa) Photo ionisation detector S Standard penetration test Point load strongh (k50) MPa V Shear Vane (kPa) Water seep T Water level Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling ADBU¥C

CHECKED Initials: Date:



CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 6.31 AHD

 EASTING:
 378621

 NORTHING:
 6368522.4

 DIP/AZIMUTH:
 90°/-

BORE No: 113 PROJECT No: 39762.01 DATE: 31 Mar 08 SHEET 1 OF 1

enth	Description	알		Sam	pling &	In Situ Testing		Well Construction Details	
m)	of Strata	C an C an	Type	Depth	Sample	Results & Comments	Wate		
	TOPSOIL - Dark gray sit, with abundant organics and some rootlets, M>Wp	m							
0.2	CLAYEY SILT - (Firm) dark brown clayey silt with trace organics. M>Wp		A	0.2					
0.45	SILTY CLAY - (Stiff) brown mottled orange silty clay, M>Wp		A	0.5					
	From 1.0m, stiff to very stiff, brown-red	1/1	A	1.0			-1		
12-	CLAY - Hard, grey mottled red clay, with trace to some extremely weathered reo stained siltstone, M <wp< td=""><td></td><td></td><td>1.5</td><td></td><td>50.19</td><td>-</td><td></td></wp<>			1.5		50.19	-		
			S, pp	1.95		0,9,18 N = 27 ≫450 kPa	-2		
2.6									
	SILTSTONE - (Extremely low strength) extremely weathered, grey siltstone			3.0			-3		
3.25-	Bore discontinued at 3.25m, due to slow auger progress			-3.25-	-	9, 20/100 mm			
							-4		
							-5		
							-6		

 SAMPLING & IN SITU TESTING LEGEND
 CHECKED

 A Auger sample
 pp
 Pocket panetrometar (kPa)
 CHECKED

 D Disturbed sample
 PID
 Photo ionisation detector
 Initials:

 U, Tube sample (x mm dia.)
 PL
 Point load strength (s(50) MPa
 Initials:

 W Water sample
 ∨
 Shard are (kPa)
 Date:



Douglas Partners Geotechnics - Environment - Groundwater

CLIENT: **Macquarie Generation** PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 5.47 AHD EASTING: 378615.3 NORTHING: 6368505.3 DIP/AZIMUTH: 90°/--

BORE No: 114 PROJECT No: 39762.01 DATE: 03 Apr 08 SHEET 1 OF 1

		Description	Degree of o		Rock	Fracture	Fracture	Discontinuities	Se	ampli	In Situ Testing	
뇞	Depth (m)	of Strata	vveamening ≥ ≥ ≥ ≥ ∞ ∝	Graphi Log	Aery Low Aery Low Medkum Kery High Xer High	Wate	Spacing (m)	B - Bedding J - Joint S - Shear D - Drill Breek	Type	Core Rec. %	RQD %	Test Results & Comments
_	0.05	TOPSOIL - Dark grey silt, with abundant organics and some				1			A			
	. 0.2	CLAYEY SILT - (Firm), dark brown clayey silt with trace organics, M>Wo							A			
	0.65	SILTY CLAY/CLAYEY SILT - (Firm), dark brown silty clay/clayey silt with trace organics, M>Wp From 0.5m, stiff		1								-
	- 1.2 - 1.3	SILTY CLAY - (Stiff), brown-red sitty clay with trace medium grained sand, M>Wp		N.					pp S			450 kPa 4,20 refusal
	-	From 1.0m, very stiff, M <wp< td=""><td>11111</td><td>1.12</td><td>ii iii</td><td>l li</td><td></td><td>1.38m: J, 45°, un, ro</td><td></td><td></td><td></td><td>PL (D) - 0 47MPa</td></wp<>	11111	1.12	ii iii	l li		1.38m: J, 45°, un, ro				PL (D) - 0 47MPa
	• • •	SILTSTONE - Extremely low strength, extremely weathered, brown-red siltstone						1.68m: P, sh, pl, ro, Fe				rt(0) - 0.47MPa
	-2	SANDSTONE - Low to medium strength, extremely weathered to highly weathered light grey and red						1.92m: P, sh, pl, ro, Fe				
	* *	iron stained sandstone				1	ľ	2.18m: J, 30°, un, ro, Fe				
-17		From 2.45m, extremely low to low			l d'	l li	11 11	2.46m: P, sh, un, ro	C	95	55	PL(A) = 0.77MPa PL(D) = 0.52MPa
	2	strength					1	2.58m: J, 40°, un, ro, Fe				
	5 5 2					-	-4	2.68m: P, sh, pl, ro 2.77m to 2.78m, friable 2.85m: P, sh, pl, ro, Fe				PL(A) = 0.17MPa PL(D) = 0.07MPa
	-3]			i	f	3.06m: P, sh, pl, ro, Fe 3.23m to 3.49m.				
	8							friable/clay seam				
	- 3.49	CORELOSS		X			>	3.49m: CORE LOSS:	-		_	-
2 14 14		SANDSTONE - Extremely low to low strength, extremely weathered to highly weathered light grey and red imp stained sandstone	4					3.6m to 3.75m, friable/clay seam 3.83m to 4.0m, friable/clay seam				
	-4							maurorciay seam	С	100	63	
	ŝ.					l li		4.12m: P, sh, h 4.22m to 4.32m,				
	24 23 - 1. mark		i i i i i i		ITTTT			friable/clay seam 4.39m: P, sh, pl, ro				PL(A) = 0.2MPa
	- 4,5	Bore discontinued at 4.5m, limit of investigation	11111				n n	4.46m: P, sh, pl, ro 4.48m to 4.5m,				(PC(D) - 0.11mr e
	-							friable/clay seam				
	-5		11111		1111111		11 11					
t			불부범			I						
•			14116				11 I I					
-0												
r.	-		1111		LH QL		11 11					
F			11111		TITT		11 11					
È												
•	-6		1111									
-	-		11111									
1	-						11 11					

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 1.3m

TYPE OF BORING: Solid Flight Auger to 1.2m (tc-bit), rotary to 4.5m then NMLC rock coring to 4.5m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) Photo ionisation detector S Standard penetration test Tem dia.) PL Point Isod Strength is(50) MPa V Shear Vane (kPa) S Water seep # Water level Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling A DBUWO

CHECKED Initials: Date:




CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 4.51 AHD

 EASTING:
 378609.6

 NORTHING:
 6368488.2

 DIP/AZIMUTH:
 90°/-

BORE No: 115 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

Denth	Description	ie a		Sam	pling & I	n Situ Testing		Well
(m)	of Strata	Grapt	Type	Depth	Sample	Results & Comments	A Wate	Construction Details
	CLAYEY SILT - Brown clayey silt, saturated, with some rootlets		A	0.1			ľ	
0.55	SILTY CLAY - Stiff to very stiff orange brown mottled grey brown silty clay, M>Wp		A	0.5			-	
1.35-			pp _S_	1.0 1.2		150 - 300 kPa 2,7,25 N = 32	-1	
1.5	SANDSTONE - (Extremely low to very low strength) extremely weathered to highly weathered, light grey mottled orange brown sandstone	<u></u>	_	1.45				
	bore discontinued at 1.5m, rerusar						-2	111
							-3	
			_				2 10 10 10 10	
							-5	
							•	
							-6	

TYPE OF BORING: Solid Flight Auger (tc-bit)

WATER OBSERVATIONS: Free groundwater observed at ground surface (0m) during drilling REMARKS:

 SAMPLING & IN SITU TESTING LEGEND

 A Auger sample
 pp
 Pocket penetrometer (kPa)

 D Disturbed sample
 PID Photo ionisation detector

 Bulk sample
 S Standard penetration test

 U, Tube sample
 V

 Water sample
 V

 C Core drilling
 V





CLIENT: **Macquarie Generation** PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 6.66 AHD EASTING: 378655.1 6368511 NORTHING: DIP/AZIMUTH: 90°/--

BORE No: 116 PROJECT No: 39762.01 DATE: 31 Mar 08 SHEET 1 OF 1

anth	Description			Sam	pling & I	in situ resting	- Je	Well	
epth m)	of Strata	Grap	Type	Depth	Sample	Results & Comments	Wat	Constructio Details	'n
	TOPSOIL - Drk grey silt with abundant organics and some rootlets, M>Wp			0.2					
0.3 0.4	CLAYEY SILT - (Firm to stiff) dark brown clayey silt with \trace organics, M>Wp		Â	0.5				-	
	SILTY CLAY - Stiff, brown-red silty day, M>Wp							- 	
	From 1.0m, very stff		А, рр*	1.0		250 kPa		-1	
1.5	SANDY CLAY - Hard, grey brown mottled red sandy clay, (extremely weathered sandstone), M>Wp			1.5		3,4,11			
			5	1.95		N ≈ 15 >450 kPa		-2	
2.6 2.7	SILTSTONE - (Extremely low to very low strength)		S	2.6 2.7		20/100 mm			_
	Bore discontinued at 2.7m, refusal							-3	
								-	
								-4	
								-	
								E .	
								-5	
								-	
								E.	
								- -	
								•	
								-6	

- SAME Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample
- ADBUWC Core drilling
- SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PD Photo ionisation detector Standard penetration test rm dia.) PL Point load strength (s(50) MPa V Shear Vane (kPa) b Water seep ¥ Water level

Initials: Date:





CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 5.82 AHD

 EASTING:
 378649.4

 NORTHING:
 6368493.9

 DIP/AZIMUTH:
 90°/-

BORE No: 117 PROJECT No: 39762.01 DATE: 03 Apr 08 SHEET 1 OF 1

Γ	Donth	Description	Degree of Weathering	<u>s</u>	Rock Strength	5	Fracture	Discontinuities	S	ampli	ing &	In Situ Testing
R	(m)	of Strata	AM M & 2 H	Grapt	Ex Low Very Low Medkum High Very High Ex High	Wate	Spacing (m)	6 - Bedding J - Joint S - Shear D - Drill Break	Type	Core %	ROD %	Test Results &
	0.0	TOPSOIL - Dark grey silt, with abundant organics and some (rootlets, M>Wp CLAYEY SILT - (Firm), dark brown clayey silt with trace oganics, M>Wp SILTY CLAY/CLAYEY SILT - (Firm to stiff), dark brown mottled orange silty clay/clayey silt with trace organics, M>Wp SILTY CLAY. (Stiff) brown and oils							A			Contraction
	- 1.8	clay, M>Wp							S, pp	•		2,2,3 N = 5 120 - 175 kPa
-	-2	CORE LOSS CLAYSTONE - Extremely low strength, extremely weathered grey, friable claystone		\times		l		1.8m: CORE LOSS: 100mm 1.9m to 2.06m, friable	с	78	0	
	2.25	CORE LOSS SILTSTONE - Medium to high strength, with some extremely low strength bands, highly weathered.		×		I	3	2.0m to 2.25m, friable 2.25m: CORE LOSS: 90mm 2.34m to 2.43m, Fg 2.5m: 1.60° un m Fe	с	78	0	
	• •3 • •	fragmented to highly fractured, light grey iron stained siltstone From 2.8m, low to medium strength with some very low strength bands						2.6m; P, sh, un, ro, Fe 2.66m; P, sh, un, ro, Fe 2.66m; P, sh, un, ro, Fe 2.66m to 2.82m, Fg 2.9m; J, sv, un, ro, organics 3.0m to 3.13m, Fg at 0.02m From 3.13m to 3.33m, J, sv, ir, clay lined, trace organics 3.45m; J, 45°, ir, clay lined, trace organics 3.52m; J, 45°, ir, clay lined, trace organics 3.56m to 3.6m En clay	С	100	90	PL(D) = 0.88MPa PL(D) = 1MPa PL(D) = 0.57MPa
	4	From 4.1m, sandstone/siltstone						seam 3.6m to 3.9m, Fr, sv, ir 3.9m to 4.15m, Fg From 4.15m to 4.4m, Fr, sv 4.5m: J, 45°, h 4.52m to 4.56m, Fg 4.66m to 4.72m, Fg				PL(D) = 1MPa PL(D) = 0.2MPa PL(A) = 0.67MPa PL(D) = 0.95MPa
	5 5.1	Bore discontinued at 5.1m, limit of investigation						5m: J, 70° to sv, h, trace organics				, цо) - 0.34MPa PL(A) = 0.34MPa <u>PL(D) = 0.76MPa</u>
-												

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 1.8m

TYPE OF BORING: Solid Flight Auger to 1.8m, then NMLC rock coring to 5.1m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids

REMARKS:

A	Auger sample	SITU TESTING LEGEND	CHECKED
D	Disturbed sample	PID Photo ionisation detector	Initials:
B	Bulk sample	S Standard penetration test	
U	Tube sample (x mm dia.)	PI Point (and strength (#(50) MRe	
W	Water sample	V Shear Vane (kPa)	et Date:
C	Core drilling	▷ Water seep ₹ Water lev	



 CLIENT:
 Macquarie Generation

 PROJECT:
 Proposed Gas Storage Area

 LOCATION:
 Old Punt Road, Tornago

 SURFACE LEVEL:
 4.94 AHD

 EASTING:
 378643.7

 NORTHING:
 6368476.9

 DIP/AZIMUTH:
 90°/

BORE No: 118 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

of Strata	물망						
Stiata	5 U	Type	Depth	Sample	Results & Comments	Wate	Construction Details
SANDY SILT - Dark brown fine to medium grained sandy silt, saturated, with some rootlets	•	A	0.1				
CLAY - Very stiff red brown mottled grey brown clay, M>Wp		U _{se}	0.5		320 - 400 kPa		
CLAY - Stiff orange brown mottled grey brown clay, M>Wp		S, pp	0.8 1.0		1,1,5 N = 6		1
SANDSTONE - (Extremely low to low strengt), light grey sandstone			1.45		120 - 180 kPa		
From 2.3m, increased drilling resistance			25				2
Bore discontinued at 2.58m, refusal		_s_	-2.58-		23/80mm		
							-3
							-4
							-5
							-6
	CLAY - Very suit red brown motiled grey brown clay, M>Wp CLAY - Stiff orange brown motiled grey brown clay, M>Wp SANDSTONE - (Extremely low to low strengt), light grey sandstone From 2.3m, increased drilling resistance Bore discontinued at 2.58m, refusal	CLAY - Very suit red brown motiled grey brown clay, M>Wp CLAY - Stiff orange brown motiled grey brown clay, M>Wp SANDSTONE - (Extremely low to low strengt), light grey sandstone From 2.3m, increased drilling resistance Bore discontinued at 2.58m, refusal	CLAY - Very stir red brown motiled grey brown day, M>Wp CLAY - Stiff orange brown motiled grey brown day, M>Wp SaNDSTONE - (Extremely low to low strengt), light grey sandstone From 2.3m, increased drilling resistance Bore discontinued at 2.58m, refusal	CLAY - Very stir red brown motiled grey brown clay, M>Wp 0.5 0.8 0.5 0.8 0.5 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9	CLAY - Very sur red brown motiled grey brown clay. M>Wp 0.5 0.8 1.0 CLAY - Stiff orange brown motiled grey brown clay. M>Wp 1.0 S, pp 1.45 SANDSTONE - (Extremely low to low strengt), light grey sandstone 5 2.5 Bore discontinued at 2.58m, refusal	CLAY - Very still red brown motiled grey brown clay. MP-Wp CLAY - Still orange brown motiled grey brown clay. MP-Wp SANDSTONE - (Extremely low to low strengt), light grey and stone From 2.3m, increased drilling resistance Bore discontinued at 2.58m, refusal CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance Bore discontinued at 2.58m, refusal CLAY - Still orange brown motiled grey brown clay. CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown clay. CLAY - Still orange brown motiled grey brown clay. From 2.3m, increased drilling resistance CLAY - Still orange brown motiled grey brown motiled gre	CLAY - Very suit red brown motiled grey brown clay, W-Wp 05 08 08 08 01 10 1.15 N = 8 120-400 MPa 10 1.15 N = 8 120-400 MPa 10 1.15 N = 8 120-180 MPa 120-180 MPa 120-180 MPa 145 120-180 MPa 145 120-180 MPa 145 120-180 MPa 145 145 145 145 145 145 145 145 145 145

RIG: Bobcat Mounted Rig DRII TYPE OF BORING: Solid Flight Auger (tc-bit)

DRILLER: Ground Test (Grima)

st (Grima) LOGGED: Bear

CASING:

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS:

SAMPLING & IN SITU TESTING LEGEND A Auger sample pp Pocket penetrometer (kPa) D Disturbed sample PID Photo ionisation detector B Butk sample S Standard penetration test U, Tube sample (xmm dia.) PL Point load strength 1s(50) MPa W water sample V Standard penetration test C Core drilling Water seep ¥ Water level





CLIENT: **Macquarie Generation PROJECT:** Proposed Gas Storage Area

LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 6.65 AHD 378689.3 EASTING: NORTHING: 6368499.6 DIP/AZIMUTH: 90°/--

BORE No: 119 PROJECT No: 39762.01 DATE: 31/03 & 04/04/08 SHEET 1 OF 1

Γ			Description	2		San	npling &	In Situ Testing	1.	Wall
R	(m)	(n)	of Strata		Type	Depth	ample	Results & Comments	Water	Construction
E	. 0	.05	TOPSOIL - Dark grey silt with abundant organics and	î t		-	0)		+	
-		0.4	CLAYEY SILT - Firm to stiff, dark brown clayey silt with trace organics, M>Wp							
9	-		SILTY CLAY/ CLAYEY SILT - Stiff, brown mottled yellow-orange silty clay/ clayey silt, with trace organics							
	- 10	0.9	From 0.8m, stiff							
	-1		SILTY CLAY - Very stiff, brown-red silty clay, M>Wp	X						-1
		1.3-	SILTY CLAY - Stiff, light brown mottled orange silty clay, M>Wp	4/		15				
		1.6	CLAYSTONE/SILTSTONE - (Extremely low strength) extremely weathered, light grey claystone/siltstone	1-1	s	1.75	_	7, 20/100 mm		
	2		bore discontinued at 1.011, due to y-bit refusal							-2
-										#
		1								
-*										
-	3									-3
										-
-										
ŀ	4									
										-
-										
	5	t								
-										
										-6
RIG: TYP	4W(E OF	D M	ounted Rig DRILLER: Full Bore (A Turner) RING: Solid Flight Auger to 1 Sm (vabit refused)		LOC	GED	Harris	1	CAS	ING:
REN	ER C	BS S:	ERVATIONS: No free groundwater observed during drilling PVC piezometer intalled to 1.6m hand slotted from 0.6m	to 1.6	im					
A	Auger s	ample	SAMPLING & IN SITU TESTING LEGEND		CHEC	KED				
D B U W	Disturbe Bulk san Tube sa	nple mple	nple PD Photo ionitation detector Standard penetration test (x mm dia.) PL Point load strongh ts(50) MPa	Initia	als:			Dol	Iđ	las Partners
Ċ	Core dri	ling	V Snear Vane (kPa) ▷ Water seep ∓ Water level	Date	9:			Geotech	- J	• Environment • Groundwater

CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 5.11 AHD

 EASTING:
 378677.9

 NORTHING:
 6368465.5

 DIP/AZIMUTH:
 90°/-

BORE No: 120 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

	Description	2		Sam	pling &	In Situ Testing	-	Well
Depth (m)	of Strata	Graph	Type	Depth	Sample	Results & Comments	Wate	Construction Details
2 2	SANDY SILT - Dark brown fine to medium grained sandy silt, wet with trace rootlets	•	A	0.1				
0.3	CLAY - (Firm to stiff) grey brown mottled orange brown clay with some sand and trace gravel, M>Wp		A	0.5				-
0.7 1	CLAY - Stiff, grey brown mottled red-orange clay, M>Wp			1.0				-1
1.37			S, pp			1,2,7 N = 9 120 - 180 kPa		
	SANDSTONE - (Extremely low to very low strength) extremely weathered to highly weathered, light grey sandstone			1.45				
	From 1.8m, increased drilling resistance							
-4	Dore discontinued at 2.011, refusal							-4
-5								-5

RIG: Bobcat Mounted Rig DRILLER: Ground Test (Grima) TYPE OF BORING: Solid Flight Auger (tc-bit) LOGGED: Bear

CASING:

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS: 2.8m PVC standpipe installed, to 2.0m deep, 1.4m slotted

 SAMPLING & IN SITU TESTING LEGEND

 A
 Auger sample
 pp
 Pocket penetrometer (kPa)

 D
 Disturbed sample
 PID
 Photo ionisation detector

 B
 Buik sample
 Standard penetration feat

 U
 Tube sample (x mm dia.)
 PL
 Point load strength 1st(50) MPa

 W water sample
 V
 Shart Aren (kPa)

 C
 Core drilling
 >
 Water seep



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CLIENT: Macquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 5.85 AHD 378683.6 6368482.6 EASTING: NORTHING: DIP/AZIMUTH: 90°/-

BORE No: 121 PROJECT No: 39762.01 DATE: 03 Apr 08 SHEET 1 OF 1

Death	Description	Degree of Weathering	.9	Rock Strength	Fracture	Discontinuities	S	ampli	ng &	In Situ Testing
(m)	of Strata	8 1 8 8 8 8 8 8 1 8 1 8 1 8 1 8 1 8 1 8	Grapt	Br Low Bry Low Medum Mery High Arry High Arry High	(m)	8 - Bedding J - Joint S - Shear D - Drill Breek	Type	Core Rec. %	Rob %	Test Results
0.05	TOPSOIL - Dark brown silt topsoil with some clay and some organics, humid		Ŵ				A			Commonia
	CLAYEY SILT - (Stiff), dark brown clayey silt with trace organics, M <wp SILTY CLAY - (Stiff), brown silty clay with trace organics, M>Wp</wp 						A			
1	From 1m, stiff to very stiff						SPT pp			1,2,3 N = 5 210 kPa
1.9	CORELOSS									
2 2.03	SANDSTONE - Low to medium strength, highly weathered, light grey fine grained sandstone with interbedded clay seams		\times			1.9m: CORE LOSS: 130mm 2.03m to 2.9m, Fg at 0.01m to 0.04m				PL(A) = 0.5MF PL(A) = 0.78M PL(D) = 0.36M
3						2.75m: P, sh, cy sm 1 <mark>0mm</mark> thick	С	95	0	
3.14	CLAYSTONE - extremely low to low strength, extremely weathered to highly weathered light brown-red claystone				ις II.	3.05m: P, sh, un, ro 3.15m to 3.24m, Fg 3.24m to 3.4m, friable cy 160mm thick 3.4m to 3.5m, Fg at				PL(D) = 0.13N
	From 3.24m, extremely low strength, extremely weathered, friable clay seams					0.01m intervals 3.5m to 3.54m, cy sm 3.54m to 3.66m, Fg at 0.01m intervals 3.66m to 3.73m, cy sm 3.8m to 3.85m, cy sm 3.85m to 4.14m, Fg 4.14m to 4.26m, cy sm	с	100	30	PL(A) = 0MF PL(D) = 0.03M
						4.34m: P, sh, cy sm 5mm thick 4.43m: P, sh, pl, sm, cy sm 4.6m: J, 60°, h, cy lined 4.66m: P, sh, un, cy infill 4.75m: J, 60°, h 4.76m: P, sh, et sm cy				
		5			4	sm 3mm thick 44.92m: J, 60°, h 5.0m to 5.1m, cy sm 5.1m to 5.23m, Fg 5.3m: J, 50°, h 5.33m to 5.38m, Fg 5.38m to 5.34m, cy sm 5.55m to 5.51m, cv sm	с	85	0	
5.85 6.0	CORE LOSS Bore discontinued at 6.0m, limit of investigation		×			5.6m: J, 45°, pl, sm, Fg & cy infill 10mm thick 5.74m: P, sh, un, sm, Fg, cy, sm 10 mm thick 5.85m: CORE LOSS: 150mm				

DRILLER: Ground Test (Grima) LOGGED: Harris TYPE OF BORING: Solid Flight Auger to 1.9m (v-bit) then NMLC rock coring to 6.0m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids **REMARKS:**

SAMPLING	& IN SITU TESTING LEGEND	CHECKED
A Auger sample	pp Pocket penetrometer (kPa)	OTICOTED
B Bulk sample	S Standard penetration test	Initials:
W Water sample (x mm dia.)	PL Point load strength Is(50) MPa	
C Core drilling	▷ Water seep	Date:



CASING: 1.9m

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Macquarie Generation CLIENT: PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 6.73 AHD 378723.4 EASTING: 6368488.2 NORTHING: DIP/AZIMUTH: 90°/--

BORE No: 122 PROJECT No: 39762.01 DATE: 04 Apr 08 SHEET 1 OF 1

	Description	2		Sam	pling &	In Situ Testing		Well
권 Depth (m)	of Strata	Graph Log	Type	Depth	Sample	Results & Comments	Wate	Construction Details
0.0	TOPSOIL - Dark grey silt with abundant organics and some rootlets, M>Wp	1	A	0.1				
0.3	CLAYEY SILT - Firm, dark brown clayey silt with trace organics, M>Wp		-					
	SILTY CLAY - Stiff, light brown silty clay, M>Wp	VY	U50	0.5				
	From 0.8m, very stiff	1/1	рр	0.8		310 kPa		-
			S	1.0		2,2,4 N = 6		
		1/y		1.45		N-0		
	SANDSTONE - (Extremely low to very high strength)	XX		1.7				
1.9	extremely weathered, brown sandstone	_ <u></u>	~	-1.9-				
-2	Bore discontinued at 1.9m, limit of investigation							-2
								-
								-3
3								
								-4
								-
-5								-5
-6								-6
t t								

RIG: Bobcat Mounted Rig DRILLER: Ground Test (Grima) TYPE OF BORING: Solid Flight Auger (tc-bit)

LOGGED: Harris

CASING:

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS: SAMPLING & IN SITU TESTING LEGEND

Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

A D B U W C

pp Pocket penetrometer (kPa) PID Photo ionisation detector S Standard penetration test PL Point load strength Is(50) MPa ∨ Shear Vane (kPa) ▷ Water seep ¥ Water level





CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 6.01 AHD

 EASTING:
 378717.7

 NORTHING:
 6368471.2

 DIP/AZIMUTH:
 90°/

BORE No: 123 PROJECT No: 39762.01 DATE: 02 Apr 08 SHEET 1 OF 1

	Denth	Description	Degree of Weathering	2	Rock Strength	5	Fracture	Discontinuities	1	Sampl	ing &	In Situ Testing
R	(m)	of Strata	MA MA S & H	Grapi	Ex Low Very Low Medum High Very High Ex High	Wate	(m)	B - Bedding J - Joint S - Shear D - Dritt Breek	Type	Core Sore	ROD %	Test Results
	0.1	TOPSOIL - Dark grey silt with abundant organics and some rootlets, M>Wp CLAYEY SILT - Soft to firm, dark brown clayey silt with trace organics, M>Wp From 0.5m, firm SILTY CLAY - Stiff, brown mottled orange silty clay, M>Wp From 1.0m, stiff to very stiff				p			A A S, p			2,3,3 N = 6 150 kPa to 220 kPa
	2.15	SANDSTONE - Medium to high strength, highly weathered, brown fine to medium grained sandstone From 2.5m, very low to low strength with some extremely low strength bands		<u>1</u> 2				2.19m: P, sh, pl, ro 2.24m: P, sh, pl, ro 2.3m: P, sh, pl, ro 2.3m: P, sh, pl, ro 2.46m: P, sh, pl, ro 2.51m: P, sh, pl, ro 2.65m: P, sh, pl, ro 2.69m: P, sh, pl, ro 2.9m: P, sh, pl, ro 2.9m: P, sh, pl, ro 2.9m: J, 60°, un, ro 3.4m: J, 60°, un, sm, clay lined 3.43m to 3.47m, clay seam 40mm thickness 3.64m: P, sh, pl, sm 3.85m: J, 60°, un, sm, clay lined 4.0m to 4.45m, Fg	С	90	32	PL(A) = 1.14MPa PL(A) = 0.8MPa PL(D) = 0.06MPa PL(A) = 0.12MPa PL(D) = 0.16MPa PL(D) = 0.02MPa
	4.45	CORE LOSS	5	$\overline{\mathbf{X}}$	\		$\overline{}$	4.45m: CORE LOSS: 250mm				
5	4.7 4.75 4.9	SANDSTONE - Low strength, highly weathered, brown sandstone CORE LOSS		X	L L	AL A		4.75m: CORE LOSS: 150mm 4.9m to 5.13m, Fg	с	63	0	
6	5.15	strength, highly weathered brown fine to medium grained sandstone Bore discontinued at 5.15m, limit of investigation						5.13m to 5.15m, clay seam 20mm thickness				

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 2.15m

TYPE OF BORING: Solid Flight Auger to 2.15m, then NMLC rock coring to 5.15m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

A	Auger sample	IN SITU TESTING LEGEND	CHECKED
B U	Disturbed sample Bulk sample Tube sample (x mm dia.)	PID Photo ionisation detector S Standard penetration test Pi Point loud streamth is(50) MPa	Initials:
W C	Water sample Core drilling	V Shear Vane (kPa) V Water seep # Water level	Date:



Macquarie Generation CLIENT: PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 5.19 AHD EASTING: 378712.1 NORTHING: 6368454.1 DIP/AZIMUTH: 90°/--

BORE No: 124 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

	T	Description	Q		Sam	pling &	In Situ Testing	Ι.	Well
nd De (r	epth m)	of	Graph	Type	Depth	ample	Results & Comments	Wate	Construction Details
 		SANDY SILT - Dark brown fine to medium grained sandy silt, with some rootlets, wet		A	0.1	UN IN			
	0.3	CLAY - Firm, grey brown mottled orange-brown clay with some sand and trace gravel, M>Wp		_ А	0.5		340 - 360 kPa		
-1	0.7	CLAY - Stiff, grey brown mottled reddy orange clay, M>Wp		pp.	0.8 1.0				-1
	1.4 -			S			2,3,7 N = 10		-
2 e 2 e 1 e		SANDSTONE - (Extremely low to very low stemgth) extremely weathered to highly weathered, light grey sandstone, increasing drilling resistance			1.45				-
-2	1.8-	Bore discontinued at 1.8m, refusal							-2
-						*			
- 3									-3
e4.									-
•									
-4									-4
-									
-									
-5									-5
-									4 4 7
-6									-6
-7-									

RIG: Bobcat Mounted Rig

ADBUWC

Core drilling

DRILLER: Ground Test (Grima)

TYPE OF BORING: Solid Flight Auger (tc-bit)

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS:

SAMPLING & IN SITU TESTING LEGEND J TESTING LEGEND pp Pocket penetormeter (kPa) PID Phote ionisation detector S standard genetration test PL Point load strength (s(50) MPa V Shear Vane (kPa) ⊳ Water seep ¥ Water level Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Com deline

Initials: Date:



LOGGED: Bear



CASING:

CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 7.03 AHD

 EASTING:
 378757.6

 NORTHING:
 6368476.9

 DIP/AZIMUTH:
 90°/-

BORE No: 125 PROJECT No: 39762.01 DATE: 4-8/04/08 SHEET 1 OF 1

Jonth	Description	÷ E		Sam	pling &	In Situ Testing	-	Well
(m)	of	Srapl	ype	epth	mple	Results &	Wate	Construction
	Strata	1 VAX	1	ă	S	Comments		Details
0.1	some rootlets, M>Wp	11		0.2			-	
0.4	CLAYEY SILT - Dark brown clayey silt with trace rootlets, wet	11/1	^	0.2				
0.7	SILTY CLAY - Stiff, light brown siltty clay, M>Wp	1/1	Un	0.5				
0.7	CLAY - Stiff to very stiff, grey-brown mottled orange-brown clay, M>Wp		-su pp	8.0		150 kPa		
				1.0		224	-1	
			S, pp	1.45		N = 7 220 - 300 kPa	-	
1.9	SANDSTONE - (Extremely low to very low strength)							
21	orange-brown sandstone	[]			_		-2	
							-3	
							-5	

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS:

	SAMPLING & I	N SITU TESTING LEGEND	CHECKED	
D B U	Disturbed sample Bulk sample Tube sample (x mm dis.)	PID Photo ionisation detector S Standard penetration test PID Photo ionisation detector	Initials:	
WC	Water sample Core drilling	V Shear Vane (kPa) D Water seep 7 Water level	Date:	



CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

SURFACE LEVEL: 6.04 AHD EASTING: 378751.9 NORTHING: 6368459.8 DIP/AZIMUTH: 90°/-- BORE No: 126 PROJECT No: 39762.01 DATE: 02 Apr 08 SHEET 1 OF 1

			Description	Degree of	0	Rock	Fracture	Discontinuities	Sa	ampli	ng &	In Situ Testing
R	Dep (m)	th	of Strata	vveatnening	Graphi	Very Low Very Low Madium Negh Ex High Ex High	Spacing (m) 등 응답 용량	B-Bedding J-Joint S-Shear D-Drill Breek	Type	Rec. %	as 8	Test Results & Comments
9		0.1	TOPSOIL - Dark grey silt, with abundant organics and some rootlets, M>Wp						A			
		0.6	CLAYEY SILT - (Soft to firm), dark brown clayey silt with trace organics, M>Wp From 0.5m, (firm), M>Wp				$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		A			
	-1		SILTY CLAY - (Stiff) brown mottled orange silty day, M>Wp		X							
-					1				SPT, pp			1,2,4 N = 6 150 kPa
		1.5	From 1.45m, hard, M <wp< td=""><td></td><td>K</td><td></td><td></td><td>1.5m: CORE LOSS:</td><td></td><td>-</td><td>-</td><td></td></wp<>		K			1.5m: CORE LOSS:		-	-	
ŀ	1	.65	CORE LOSS		(150mm				
	-2		SANDSTONE - Low to medium strength, extremely weathered to highly weathered, light brown sandstone					sh, un, ro, at 0.01m to 0.04m intervals				PL(A) = 0.69MPa PL(A) = 0.15MPa PL(A) = 0.8MPa PL(A) = 0.5MPa
	-			4			┙	2.35m to 2.4m, friable				
			from 2.45m, extremely low to very low strength					2.62m: P, sh, h				PL(A) = 0.03MPa PL(D) = 0.05MPa
	-3							2.9m to 3.08m, friable	с	92	53	
			From 3.6m, very low to low strength with some extremely low strength bands					3.51m to 3.56m, friable 3.6m to 3.62m, friable				
	-4		barus	5				4.0m to 4.03m, friable clay seam 4.1m to 4.11m, clay seam 4.24m; P. sh. ol. cs.lam				PL(A) = 0.04MPa PL(A) = 0.04MPa
	2	4.5	Bore discontinued at 4.5m, limit of	9			57	4.43m to 4.47m, stiff clay seam	1	-	+	
			investigation									
	-5			1161								
	2											
-												
9	-											
•	- -											

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 1.5m

TYPE OF BORING: Solid Flight Auger to 1.5m (v-bit) then NMLC rock coring to 4.5m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

Γ	SAMPLING &	IN SITU TESTING LEGEND	CHECKED		
AD BUWC	Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling	PD Photo ionisation detector S Standard penetration test PL Point load strength 1s(50) MPa V Shear Vane (NPa) D Water seep ¥ Water level	Initials: Date:	D	Douglas Partners Geotechnics - Environment - Groundwater

CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

SURFACE LEVEL: 5.47 AHD EASTING: 378746.2 NORTHING: 6368442.7 DIP/AZIMUTH: 90°/-

BORE No: 127 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

Depth	Description	OF D		Sam	pling &	In Situ Testing		Well
(m)	of Strata	Grap	Type	Depth	Sample	Results & Comments	Wat	Construction Details
	SANDY SILT - Dark brown fine to medium grained sandy silt with trace gravel, wet, with some rootlets	• • •	A	0.1			-	
0.7	CLAY - Stiff, light brown mottled grey-brown clay, M>Wp		А S, pp	0.5 1.0 1.45		2.2.5 N = 7 140 - 200 kPa		
2.0	SANDSTONE - (Extremely low to very low strength) extremely weathered to highly weathered, light grey brown sandstone From 2.4m, increased drilling resistance						-2	
2.30	Bore discontinued at 2.56m, refusal		=°=	2.56		22704) mm	-3	
							1000 1000 1000 1000 1000 1000 1000 100	
							-5	
							-6	

TYPE OF BORING: Solid Flight Auger (tc-bit)

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS:

A	Auger sample	N SITU TESTING LEGEND	CHECKED
B	Disturbed sample Bulk sample Tube sample (x mm dis.)	PID Photo ionisation detector S Standard penetration test	Initials:
W C	Water sample Core drilling	V Shear Vane (kPa) V Water seep T Water level	Date:



CLIENT: Macquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 7.04 AHD EASTING: 378791.7 NORTHING: 6368465.5 DIP/AZIMUTH: 90°/--

BORE No: 128 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

	Description	<u>.</u>	<u> </u>	Sam	pling &	In Situ Testing	-	Well
료 Depth (m)	of Strata	Graph Log	Type	Depth	Sample	Results & Comments	Wate	Construction Details
4	CLAYEY SILT - Dark brown clayey silt, wet, with some rootlets		A	0.1				
0.55	CLAY - Stiff, light brown clay		A	0.5				
1 	From 0.9m, grey-brown mottled reddy-orange		S, pp	1.0		22.3 N=5	-1	
	SANDSTONE - (Extremely low to very low strength)			1.45		120 - 140 KMa		
- 1.9 	orange brown mottled light grey sandstone Bore discontinued at 1.9m, refusal						-2	
-3							-3	
4							-4	
							-5	
							-6	

LOGGED: Bear

CHECKED

Initials:

Date

CASING:

Douglas Partners Geotechnics · Environment · Groundwater

DRILLER: Ground Test (Grima) RIG: Bobcat Mounted Rig TYPE OF BORING: Solid Flight Auger (tc-bit)

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS:

SAMPLING & IN SITU TESTING LEGEND pp Product perfetrometer (kPa) PID Proto ionisation detector Standard penetration test phi toad strength (s(50) MPa V Shear Vare (kPa) V Shear Vare (kPa) Water seep ¥ Water level SAMF Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling



CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 6.14 AHD

 EASTING:
 378786

 NORTHING:
 6368448.4

 DIP/AZIMUTH:
 90°/-

BORE No: 129 PROJECT No: 39762.01 DATE: 02 Apr 08 SHEET 1 OF 1

		Description	Degree of Weathering	2	Rock Strength	Τ	Fracture	Discontinuities	S	ampl	ing &	In Situ Testing
R	(m)	of Strata	a f a s z e	Graph	Very Low Very Low Very High Very High	0.01	Spacing (m) 응문 응원	B-Bedding J-Joint S-Shear D-Drill Break	Type	e Se	do [%]	Test Results
	0.05	TOPSOIL - Dark grey silt with abundant organics and some rootlets, M>Wp							A			
	0.75	CLAYEY SILT - (Firm), dark brown clayey silt with trace organics, M>Wp SILTY CLAY/ CLAYEY SILT - (Firm to stiff), brown silty clay/ clayey silt with trace organics, M>Wp							A			
	1	SILTY CLAY - Stiff to very stiff, light brown mottled red silty clay, M>Wp							S, pp	- P		1,2,2 N = 4 200 kPa
F	1.65	CORE LOSS	W	\leq		₩		1.65m: CORE LOSS:	-	-	-	
	1.8 2	SANDSTONE - Low to high strength, with some extremely low strength bands, highly weathered, light grey fine grained sandstone, with interbedded extremely low to medium strength layers						150mm From 1.8m to 2.64m, p, s, sh, un, ro at 0.02m to 0.05m intervals				PL(A) = 1.28MPa PL(A) = 0.97MPa
						1000						PL(A) = 1.04MPa
	3						L L	3.13m: P, sh, pl, ro-sm 3.3m: P, sh, pl, ro-sm 3.36m: P, sh, pl, ro-sm 3.55m: J, 50°, pl, un, ro-sm	с	95	47	PL(A) = 0.15MPa PL(A) = 0.16MPa PL(D) = 0.42MPa
	1				÷,			3.82m to 3.83m, friable 3.9m to 3.95m, clay seam 50mm thick				PL(A) = 0.21MPa PL(D) = 0.23MPa PL(D) = 0.2MPa
Ē							F	4.28m: P, sh, pl, ro 4.34m: P, sh, pl, ro				PL(A) = 0.02MPa
1.11	4.65	Bore discontinued at 4.65m, limit of investigation										
- 5												
-6												
2.42												

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 1.65m HQ

TYPE OF BORING: Solid Flight Auger to 1.6m (v-bit) then NMLC rock clay to 4.65m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

SAMPLING & IN S	TU TE	STING LEGEND	CHECKED
ger sample	00	Pocket penetrometer (kPa)	UTILOTICE
iturbed sample Ik sample be samole (x mm (ka)	PID S PI	Photo ionisation detector Standard penetration test Point (oad strength (s(50) MPa	Initials:
iter sample re drilling	V N	Shear Vane (kPa) Water seen	Date:
	SAMPLING & IN SI autoed sample be sample (x mm dia.) ter sample (x mm dia.) ter cample	SAMPLING & IN SITU TE por sample po k sample PID k sample (x mm dia.) PL ter sample (x mm dia.) V ter sample (x mm dia.) V ter sample (x mm dia.) V	SAMPLING & IN SITU TESTING LEGEND aurbed sample pocket penetrometer (kPa) hurbed sample PD Photo ionisation detector k sample S Standard penetration test os sample (x mm dia.) PL Point load strength is(50) MPa ter sample V Shoar Vane (kPa) b Water saen 3 Water level



CLIENT: **Macquarie Generation** PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 5.57 AHD EASTING: 378780.4 6368431.3 NORTHING: DIP/AZIMUTH: 90°/-

BORE No: 130 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

-	Description	i i		Sam	pling &	In Situ Testing		Well
Depth (m)	of Strata	Grapt	Type	Depth	ample	Results & Comments	Wate	Construction Details
	CLAYEY SILT - Dark brown clayey silt with trace sand and gravel, wet, some rootlets		A	0.1				
0.6	CLAY - Stiff, orange brown mottled grey brown clay, M>Wp		U _{et}	0.8		160 - 190 kPa		-
			S, pp	1.45		140 - 180 kPa		
2								-2
2.2	SANDSTONE - (Extremely low to very low strength) sandstone							-
3								-3
L								-4
в								-6
2. Pobe	not Mounted Rig DDI I ED: Ground Test (G	irima)	10	OGGE	D: Be	ar	CA	SING:

TYPE OF BORING: Solid Flight Auger (tc-bit) WATER OBSERVATIONS: Free groundwater observed at 1.2m during drilling

REMARKS: 3.0m PVC standpipe installed, to 2.4m deep, 1.0m slotted

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PID Photo ionisation detector Standard penetration teet nm dis.) PL Point load strength is(50) MPa V Shear Vane (kPa) b Water seep 7 Water level Auger sample Disturbed sample Bulk sample Tube sample (x mm dis.) Water sample Core drilling ADBUWC

CHECKED Initials: Date:





CLIENT: Macquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

LASTING: 378825.9 NORTHING: 6368454.1 DIP/AZIMUTH: 90°/--SURFACE LEVEL: 7.12 AHD

BORE No: 131 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

		Description	<u>.0</u>		San	pling &	In Situ Testing		Well
2 (i	m)	of Strata	Grapt	Type	Depth	Sample	Results & Comments	Wate	Construction Details
4		CLAYEY SILT - Dark brown clayey silt with trace sand and some rootlets, wet	1111	A	0.1	07			
	0.5	CLAY - Stiff gray brown clay, MSWo		_A_	0.5			Ţ	-
-				U ₅₀	0.8		no recovery		
-1					1.0				-1
				S	1.46		1,2,4 N = 6		
-	1.6	SANDSTONE - (Extremely low to very low strength)	4		1.40				-
-2	1.8	Bore discontinued at 1.8m, refusal							-2
10 W									
50 80 80									
-3									-3
-									
4									-4
-									
-5									
									70 70 47
-6									-6
-									
G: BO	obcat	Mounted Rig DRILLER: Ground Test (Grim	na)	LOC	GED	Bear		CAS	SING:
ATER	OBS	ERVATIONS: Free groundwater observed at 0.5m during Installed 3.0m PVC standpipe, to 1.8m deep. ~ 1.0 slo	drilling tted						
Auge	r sample	SAMPLING & IN SITU TESTING LEGEND		CHEC	KED				
Bulk Tube Wate	sample sample sample or sample drilling	Impe PID Phote ionisation detector S Standard penetration test (x mm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa)	Initi	ials:		-		ug	las Partners

Macquarie Generation CLIENT: Proposed Gas Storage Area PROJECT: LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 6.46 AHD 378820.2 EASTING: NORTHING: 6368437 DIP/AZIMUTH: 90°/-

BORE No: 132 PROJECT No: 39762.01 DATE: 01 Apr 08 SHEET 1 OF 1

Π		Description	Degree of	Q	Rock Strength		Fracture	Discontinuities	Sa	mplir	ıg & I	in Situ Testing
R	Depth (m)	of Strata		Graph	Ex Low Very Hean Very Hean Ex Han	100	Spacing (m) 왕문 영울	B - Bedding J - Joint S - Shear D - Drill Breek	Type	Core Rec. %	DD %	Test Results & Comments
	0.05 0.15	TOPSOIL - Dark grey silt with abundant organics and some rootlets, M>Wp CLAYEY SILT - (Firm), dark brown clayey silt with trace organics, M>Wp SILTY CLAY - (Stiff), brown silty clay, with trace organics, M>Wp SILTY CLAY - (Stiff to very stiff), brown-red, silty clay, M>Wp			<u>3</u>	00			A A S, pp	~ <u>~</u>		220 kPa 3,3,5 N = 8
	- 2.2	SANDSTONE - Low to high strength, with some very low strength bands, highly weathered light grey fine gravel sandstone						2.22m; P, sh, un, ro 2.29m to 2.45m, Fg 2.55m to 2.8m, P, sh at 0.02m intervals 2.95m; Fr, sv, sm 3.12m; P, sh, pl, ro 3.32m; P, sh, pl, ro 3.63m; P, sh, pl, ro 3.63m; P, sh, pl, ro 3.7m; P, sh, pl, ro	с	100	0	PL(A) = 0.72MPa $PL(A) = 0.84MPa$ $PL(D) = 1.05MPa$ $PL(A) = 0.19MPa$ $PL(A) = 0.65MPa$ $PL(D) = 0.31MPa$ $PL(A) = 0.19MPa$ $PL(A) = 0.19MPa$ $PL(A) = 0.7MPa$ $PL(A) = 0.36MPa$ $PL(A) = 0.01MPa$
	-5-5-	Bore discontinued at 5.2m, limit of investigation				the line line and the line was been been been been been been been bee		4.5m: P, sh, pl, ro, FeO 4.68m: J, 45°, un, ro, FeO 5.13m: P, sh, pl, ro, feO 5.14m: P, sh, pl, ro, feO				PL(A) = 0.72MPa PL(A) = 0.57MPa PL(D) = 0.46MPa PL(A) = 0.27MPa PL(A) = 0.07MPa

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 2.2m HQ

TYPE OF BORING: Solid Flight Auger to 2.2m, then NMLC rock coring to 5.2m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

SAMPLING & IN SITU TESTING LEGEND Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample A D B U W C

Core drilling

J TESTING LEGEND pp. Pocket penetrometer (kPa) PID Photo ionisation detector Standard genetration test PL. Point load strength (s(50) MPa v Shear Vane (kPa) p Water seep ¥ Water level

CHECKED Initials: Date:





CLIENT: Macquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Old Punt Road, Tomago

SURFACE LEVEL: 5.67 AHD 378814.5 6368419.9 EASTING: NORTHING: DIP/AZIMUTH: 90°/-

BORE No: 133 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

Depth	Description	iệ 🗖		Sam	pling &	In Situ Testing		Well	
(m)	of Strata	Grap	Type	Depth	Sample	Results & Comments	Wate	Construction Details	n
	CLAYEY SILT - Brown clayey silt with trace sand and gravel, wet, some roots		A	0.1				-	
0.3	CLAY - Stiff, orange brown mottled grey brown clay, M>Wp		A	0.5					
			S, pp	1.0		2.3.5 N = 8 140 - 190 kPa		-1	
				1.45		140 - 150 NF 8			
2.0 2.1	SANDSTONE - (Extremely low to low strength) orange brown sandstone Bore discontinued at 2.1m. refusal	<u> </u>						2	
								-	
								-3	
								-4	
								-5	
								-6	

1 REMARKS:

A	Auger sample	IN SITU TESTING LEGEND	CHECKED	
D B	Disturbed sample Bulk sample Tube sample (x mm dia)	PID Photo ionisation detector S Standard penetration test	Initials:	
₩ C	Water sample Core drilling	V Shear Vane (kPa) V Water seep Ŧ Water level	Date:	INV



R

 CLIENT:
 Macquarie Generation

 PROJECT:
 Proposed Gas Storage Area

 LOCATION:
 Old Punt Road, Tomago

 SURFACE LEVEL:
 7.31 AHD

 EASTING:
 378860

 NORTHING:
 6368442.7

 DIP/AZIMUTH:
 90°/-

BORE No: 134 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

	Description	<u>.</u>		Sam	pling &	In Situ Testing		Well
Depth (m)	of Strata	Graph	Type	Depth	Sample	Results & Comments	Wate	Construction Details
*	CLAYEY SILT - Dark brown clayey silt, trace sand, wet, some rootlets		A	0.1				
- 0.6	CLAY - Stiff to very stiff, light brown clay							
1 1	From 1.0m, grey-brown mottled orange-brown		S, pp	1.0		2,3,5 N = 8 150 - 250 kPa		-1
				1.45				
-2 2.0	SANDSTONE - (Extremely low strength) extremely weathered, orange brown sandstone, increasing drilling resistance							-2
-m 2.3	At 2.2m, light grey	<u></u>						
	Bore discontinued at 2.3m, refusal							• • •
- 3								-3
								*
-4								-4
								-
-11-								-
								-
-5								-5
								-
-04-								-
								-
								-6
- 0								
	×.							
t t							_	

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima) LOGGED: Bear

CASING:

TYPE OF BORING: Solid Flight Auger (tc-bit)

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS:

SAMPLING & IN SITU TESTING LEGEND A Auger sample pp Pocket penetrometer (kPa) D Disturbed sample PID Photo ionisation detector B Buk sample S Standard penetration test U Tube sample (x mm dia.) PL Point load strength Is(50) MPa W Water sample V Shear Vane (kPa) C Core drilling > Water seep ¥

CHECKED Initials: Date:





CLIENT:Macquarie GenerationPROJECT:Proposed Gas Storage AreaLOCATION:Old Punt Road, Tomago

 SURFACE LEVEL:
 6.46 AHD

 EASTING:
 378854.4

 NORTHING:
 6368425.6

 DIP/AZIMUTH:
 90°/-

BORE No: 135 PROJECT No: 39762.01 DATE: 01 Apr 08 SHEET 1 OF 1

	Dooth	Description	Degree of Weathering	è	Rock Strength	Fracture	Discontinuities	S	ampli	ng &	In Situ Testing
R	(m)	of Strata	******	Grapt Log	X Low Bry Low Bolum Br Hah	(m) (m)	B - Bedding J - Joint S - Shear D - Drill Breek	Type	SC College	åå	Test Results
	0.03	TOPSOIL - Dark grey silt with abundant organics and some rootiets, M>Wp CLAYEY SILT - (Firm), dark brown clayey silt with trace organics, M>Wp SILTY CLAY - (Stiff), brown silty clay with trace organics, M>Wp CLAY - (Very stiff to hard), brown-red clay, M>Wp						A A S, pp			3,3,4 N = 7 > 450 kPa
	1.75 1.77 2.12 3 3 4 4	SANDSTONE - Low strength, highly weathered light grey fine grained sandstone CORE LOSS SANDSTONE - Medium to high strength, highly weathered light grey fine grained sandstone From 2.7m, low to medium strength with some extremely low and very low strength bands Bore discontinued at 4.8m, limit of investigation					1.77m: CORE LOSS: 350mm 2.44m: P, sh, pl, ro 2.52m: P, sh, pl, ro 2.55m to 2.62m, Fg 2.73m: P, sh, pl, ro, clay smear 2.59m to 2.62m, Fg 3.12m: P, sh, un, sm, clay smear 2.74m to 2.84m, Fg 3.12m: P, sh, un, ro-sm 3.16m: P, sh, pl, clay lined 1mm thick 3.53m: P, sh, pl, clay lined 1mm thick 3.53m: P, sh, pl, clay 1.62m: P, sh, pl, sm, cs tan 3.87m: J, 50°, pl, ro-sm 4.2m: P, sh, pl, sm 4.2m: P, sh, pl, sm 4.2m: P, sh, pl, sm 4.2m: P, sh, pl, sm 4.52m: Pl, sh, pl, ro-sm, cs tan 4.75m: J, 60°, pl, ro	с	89	27	PL(A) = 0.26MPa PL(A) = 0.54MPa PL(D) = 0.54MPa PL(D) = 0.54MPa PL(D) = 1.23MPa PL(A) = 1.04MPa PL(A) = 0.32MPa PL(A) = 0.12MPa PL(A) = 0.14MPa PL(A) = 0.16MPa PL(D) = 0.16MPa

RIG: Bobcat Mounted Rig

DRILLER: Ground Test (Grima)

LOGGED: Harris

CASING: 1.75m

TYPE OF BORING: Solid Flight Auger to 1.75m (V-bit) then NMLC coring to 4.8m WATER OBSERVATIONS: Groundwater observations obscured due to drilling fluids REMARKS:

A Auger sa	SAMPLING & I	N SITU TE	STING LEGEND	CHECKED
D Disturbe B Bulk sam U Tube sar	d sample sple mple (x mm dia)	PiD	Photo ionisation detector Standard penetration test	Initials:
W Water sa C Core dril	ing	Δ <	Shear Vane (kPa) Water seep 7 Water level	Date:



SURFACE LEVEL: 5.67 AHD EASTING: 378848.7 NORTHING: 6368408.6 DIP/AZIMUTH: 90°/-- BORE No: 136 PROJECT No: 39762.01 DATE: 08 Apr 08 SHEET 1 OF 1

	Description	i i		Sam	ipling &	In Situ Testing	-	Well
Depth (m)	of Strata	Graph	Type	Depth	Sample	Results & Comments	Wate	Construction Details
	CLAYEY SILT - Dark brown clayey silt with some sand and rootlets, wet		A	0.1				
0.7		1111	A U _n n pp ^s	0.5		150 - 170 kPa		
-1	CLAY - Stiff grey-brown mottled orange-brown clay, M>Wp, trace rootlets			0.8 1.0				-1
			S, pp	1.45		2.2.3 N = 5 140 - 200 kPa		
- 1.8-	SANDSTONE - (Extremely low strength) extremely							
-2	weathered, Igiht brown sandstone							-2
21	Bore discontinued at 2.1m, refusal			1				-
-3								-3
• • • • • • • • • • • • • • • • •								
-6								-6

RIG: Bobcat Mounted Rig DRILLER: Ground Test (Grima) TYPE OF BORING: Solid Flight Auger (tc-bit)

CLIENT:

PROJECT:

Macquarie Generation

LOCATION: Old Punt Road, Tomago

Proposed Gas Storage Area

LOGGED: Bear

CASING:

WATER OBSERVATIONS: No free groundwater observed during drilling REMARKS:

SAMPLING & IN SITU TESTING LEGEND A Auger sample pp Pocket penetrometer (kPa) D Disturbed sample PID Photo ionisation detector B Bulk sample S Standard penetration test U Tube sample (x mm dia.) PL Point load strength is(50) MPa W Water sample V Shear Vane (kPa) C Core drilling D Water seep













GEOTECHNICAL INVESTIGATION PROPOSED GAS STORAGE AREA TOMAGO	PROJECT 39762.01	PLATE 3







Douglas Partners Geotechnics - Environment - Broundwater





		XZ
	Douglas Partners	det -
PROJECT PROPOSED PROJECT NUMBER: 397	GAS STORAGE AREA 782 01	E have
DATE: APAIL 2009 BORE: (35 BORE: 135	TO 4.80 m	
PROMINY'S IN		
10 B/H 135 39762-01 START	175 m	CORE LOSS 0 35
2 CORE LOSS 0 35 m	13 18	the second of
	the state of the	
	and the second s	END 4:8m
Bore 135 –	1.75 m to 4.8 m	
	PROJECT	PLAT

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Macquarie Generation Proposed Gas Storage Area CLIENT: Macquarie Gene PROJECT: Proposed Gas S LOCATION: Tomago TEST METHOD: AS 4133.4.1

9/04/2008 39762 01 JRC DATE: PROJECT NO : TESTED BY :

BORE: SHEET

INTERPRETED ROCK	STRENGTH
POINT LOAD INDEX	Diametrai (D)
POINT LOAD INDEX	haeo Axtal (A)

DEPTH (m)

	The second	Т	Т	Т	Т	Т	Т	Т	Т	Т	T	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Г	Π	Т	Т	Т	٦		
INTERPRETED	STRENGTH		V LOW	V LOW	VION	VION	- ON	LOW	LOW	LOW	-OW	VI DW	V LUVV	LOW																							Ders
POINT LOAD				80.0		0.04		ato		010	010	800	2012																								IGIAS PArtr Vis Enviorment Snu
POINT LOAD	la a			An n	0.08		014	r o		0 14	r		0 10	0.13											T												Geoleadh
FAILURE	(IXI)	105	0.20	0.18	0.18	0.10	0.41	0.46	0.76	030	0.40	0.16	0.63	000																						· CHECKED hitiais	Date
Depth (D)	(uuu)	51	51	35	34	51	46	51	£1	35	5 1	2	44																							damente damente d	
DIMENSIONS Min. Width (W)	(mm)			51	51		5			2			51																							w ed ew dameter d	H Point Land
TEST TYPE Axiai (A),	Diametral (D)	0	Q	A	A	D	A	a	Q	A	Q	0	•																							CHECK 031 Equivalent core	Ø. = J.
DESCRIPTION		Siltstone	Siltstone	Siltstone	Sandstone																							Nametral Test: CK 1 > 0.5 d annered for a con damate CK 2 > 0.5 d annered for a con damate	Loore diameter: V Point Load								
(m)		5.84	5.94	5.94	6.14	6.17	628	6.33	6.85	6.85	7.04	712	7 12																							CHE CHE distriction loadpe d's dataoo	Equivalent

CLIENT: Maxuarie Generation PROJECT: Proposed Gas Storage Area LOCATION : Tomago TEST METHOD: AS 4133.4.1

9/04/2008 39762.01 JRC DATE: PROJECT NO : TESTED BY :

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BORE:	SHEET:

STRENGTH	MEDIUM	LOW	row	MEDIUM	TOW	N LOW	EXT LOW													tners
INDEX I ^{ta} no Diametral (D)	0.63	0.25	0.27		0.12	*														oualas Par
INDEX Iem Axiai (A)				0.35		0.07	0.03													M
READING (KN)	1.63	0.65	0.70	0.74	0.32	0.25	0.08													CHECKED Initials
Depth (D) (mm)	ŝ	51	51	31	51	56	44													M(e) - con
Min. Width (W) (mm)				51		51	51													Axial Teet: Point BW < d < W ce diameter: d
Axial (A), Diametral (D)	C		0	A	. 0	A														CHECK 0: Equivalent co
DESCRIPTION	Clavetone/ Silictone	Clavetone/ Silistone	Clavstone/ Siltstone	Clavstone/Siltstone	Clavstone/Siltstone	Clavetone/Siltetone	Clavstone/Silktone													Ammetrial To act: (0) × 2 + 0.5 (d) (0) × 2 + 0.5 (d) (0) × 2 + 0.5 (d) (1) × 2 + 0.5
Ē	40 0	200	4 6.7	1.00	4.67	467	5.03													DI CHE L = detecte from load po

CLIENT : Maquarie Generation PROJECT : Proposed Gas Storage Area LOCATION : Tomago TEST METHOD: AS 4133.4.1

9/04/2008 39762.01 JRC DATE: PROJECT NO : TESTED BY :

BORE: SHEET:

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Axiel (A) Axiel (A) Diametral (D) Diametral (D) 51 0.03 - 0.01 EXT LOW 41 0.54 0.20 - 0.01 EXT LOW 51 0.55 - 0.23 LOW EXT LOW 51 0.55 - 0.23 LOW EXT LOW 51 0.15 - 0.23 LOW EXT LOW 51 0.15 - 0.23 LOW EXT LOW 51 0.13 - 0.33 LOW EXT LOW 51 0.13 - 0.33 LOW LOW 51 0.13 - 0.13 - LOW 51 0.13 - 0.15 - LOW 51 0.13 - - - LOW 51 0.13 - - - LOW 52 0.14 - - - LOW 53 0.13 <th>Axial (A) Axial (A) Diametral (D) Diametral (D) 51 0.03 - 0.01 EXT LOW 51 0.55 - 0.01 EXT LOW 51 0.55 - 0.01 EXT LOW 51 0.55 - 0.01 EXT LOW 51 0.15 0.20 - 0.01 MEDIUM 51 0.12 0.04 - 0.03 HIGH 51 0.12 0.28 - 0.03 HIGH 51 0.11 0.28 - 0.03 HIGH 51 0.13 - 0.03 - U.UOW 51 0.13 - 0.01 - U.OW 51 0.13 - 0.01 - U.OW 51 0.13 - - U.OW - 61 0.15 - - U.OW - 61 0.15 - - -<th>Atoli (A) Atoli (A) Diametral (D) Diametral (D) 51 0.03 - 0.01 EXT LOW 42 0.03 - 0.01 EXT LOW 51 0.054 0.20 - 0.01 51 0.059 - 0.03 LOW 51 0.15 0.04 - 0.03 51 0.12 - 0.33 LOW 51 0.12 - 0.33 HIGH 51 0.12 - 0.33 HIGH 51 0.13 - 0.33 HIGH 51 0.17 - 0.03 HIGH 51 0.13 - 0.01 LOW 51 0.13 - 0.01 LOW 51 0.13 - LOW LOW 51 0.14 0.15 - LOW 51 0.13 - LOW - 51 0.14</th></th>	Axial (A) Axial (A) Diametral (D) Diametral (D) 51 0.03 - 0.01 EXT LOW 51 0.55 - 0.01 EXT LOW 51 0.55 - 0.01 EXT LOW 51 0.55 - 0.01 EXT LOW 51 0.15 0.20 - 0.01 MEDIUM 51 0.12 0.04 - 0.03 HIGH 51 0.12 0.28 - 0.03 HIGH 51 0.11 0.28 - 0.03 HIGH 51 0.13 - 0.03 - U.UOW 51 0.13 - 0.01 - U.OW 51 0.13 - 0.01 - U.OW 51 0.13 - - U.OW - 61 0.15 - - U.OW - 61 0.15 - - - <th>Atoli (A) Atoli (A) Diametral (D) Diametral (D) 51 0.03 - 0.01 EXT LOW 42 0.03 - 0.01 EXT LOW 51 0.054 0.20 - 0.01 51 0.059 - 0.03 LOW 51 0.15 0.04 - 0.03 51 0.12 - 0.33 LOW 51 0.12 - 0.33 HIGH 51 0.12 - 0.33 HIGH 51 0.13 - 0.33 HIGH 51 0.17 - 0.03 HIGH 51 0.13 - 0.01 LOW 51 0.13 - 0.01 LOW 51 0.13 - LOW LOW 51 0.14 0.15 - LOW 51 0.13 - LOW - 51 0.14</th>	Atoli (A) Atoli (A) Diametral (D) Diametral (D) 51 0.03 - 0.01 EXT LOW 42 0.03 - 0.01 EXT LOW 51 0.054 0.20 - 0.01 51 0.059 - 0.03 LOW 51 0.15 0.04 - 0.03 51 0.12 - 0.33 LOW 51 0.12 - 0.33 HIGH 51 0.12 - 0.33 HIGH 51 0.13 - 0.33 HIGH 51 0.17 - 0.03 HIGH 51 0.13 - 0.01 LOW 51 0.13 - 0.01 LOW 51 0.13 - LOW LOW 51 0.14 0.15 - LOW 51 0.13 - LOW - 51 0.14
52 0.03 · 0.01 Extlow 61 0.79 · 0.20 · 0.01 Extlow 61 0.054 0.20 · 0.23 100 · 61 0.05 · 0.02 · 0.23 100 61 0.15 0.06 · 0.23 100 · 61 0.15 0.04 · 0.23 100 61 0.12 · 0.33 · · 61 0.15 · 0.24 · · 61 0.13 · 0.23 · · 61 0.13 · 0.27 0.29 · 61 0.15 · 0.07 · · 61 0.13 · · · · · 61 0.14 · · · · · · 61 0.14 · <	52 0.03 · 0.01 Extlow 61 0.79 · 0.31 MEDIUM 61 0.05 0.20 · 0.31 MEDIUM 61 0.15 0.20 · 0.31 MEDIUM 61 0.15 0.04 · 0.3 Low 61 0.15 0.04 · 0.33 Low 61 1 · 0.33 · Low 61 0.14 · 0.33 · Low 61 0.7 0.28 · 0.39 MEDIUM 61 0.7 0.28 · Low Low 61 0.19 · 0.27 Low Low 61 0.19 · 0.17 Low Low 61 0.19 · 0.17 Low Low 61 0.19 · · Low Low 61 0.16	52 003 ·· 001 Extlow 61 0.79 ·· 0.31 MEDIUM 61 0.56 ·· 0.20 ·· 0.01 61 0.56 ·· 0.20 ·· 0.20 VLOW 61 0.15 0.04 ·· 0.23 LOW 61 0.15 0.04 ·· VLOW 61 0.1 ·· 0.33 MEDIUM 61 0.1 ·· 0.33 MEDIUM 61 0.1 ·· 0.33 ·· VLOW 61 0.1 ·· 0.33 ·· VLOW 61 0.1 ·· 0.33 ·· VLOW 61 0.1 ·· 0.2 ·· VLOW 61 0.1 ·· ·· ·· VLOW 61 0.1 ·· ·· ·· ·· 61 0.1 ·· ·· <t< td=""></t<>
61 0.29 · 0.31 MEDIUM 42 0.54 0.20 · 1 · 0.00 61 0.15 0.05 0.02 · 1 · LOW 61 1 · 0.03 0.03 · · LOW 61 1 · · 0.33 · · LOW 61 1 · · 0.33 · · LOW 51 0.71 · · 0.33 · · LOW 51 0.71 · · 0.37 · · LOW 51 0.71 · · 0.37 · · LOW 51 0.13 · · · · · LOW 61 0.13 · · · · · LOW 61 0.13 · · · · ·	51 079 - 031 MEDIUM 42 0.54 0.20 - 0.03 - Low 51 1 0 0.5 - 0.23 Low Low 51 1 0 0.2 0.03 - 0.3 Low 51 1 0 0.2 0.3 - 0.3 MEDIUM 51 1.12 0.28 - 0.3 MEDIUM 51 0.71 0.75 - 1.00 1.00 51 0.71 0.75 - 1.00 1.00 1.00	61 0.79 - 0.31 MEDIUM 42 0.64 0.20 - 0.03 1000 51 0.15 0.00 - 0.23 1000 51 1 0 0.03 - 0.00 - 0.00 51 1 0 0.03 - 0.33 MEDIUM 51 1.12 - 0.23 - 1.000 51 0.21 0.28 - 0.33 MEDIUM 51 0.21 0.28 - 0.00 1.000 51 0.21 0.28 - 0.00 1.000 51 0.01 0.01 - 0.01 1.000 51 0.01 0.01 0.01 - 0.01 1.000 51 0.01 0.01 0.01 0.01 1.000 1.000 51 0.01 0.01 0.01 0.01 1.000 1.000 51
42 0.54 0.20 - 1 Low 61 0.15 0.04 0.23 Low 1 61 1 1 0.0 - 0.03 McDuM 61 1.12 0.04 0.03 McDuM - 0.00 61 1.12 0.01 0.23 1.03 McDuM 61 0.12 0.23 McDuM - 0.01 - 1.00 61 0.12 0.23 0.17 0.23 McDuM - - 0.00 - 1.00 61 0.13 - 0.13 - 0.01 -	42 0.54 0.20 - 1 100 61 0.15 0.00 - 0.03 LOW 61 1 0.0 - 0.03 MEDUM 61 1.12 - 0.03 MEDUM 61 1.12 - 0.03 MEDUM 61 0.17 0.28 - 0.01 61 0.12 - 0.03 MEDUM 61 0.12 - 0.03 MEDUM 61 0.01 - 0.02 - 1.00V 61 0.01 - 0.01 - 1.00V 61 0.01 - 0.01 - 1.00V 61 0.01 - 0.01 - 1.00V 61 0.01 0.01 0.01 - 1.00V 61 0.01 0.01 0.01 - 1.00V 61 0.01 0.01 0.01 -	42 0.24 0.20 - 1 - 1 - 1 - 1 - 1 - 1 0.00 5 1 0.00 5 1 0.00 5 1 0.00 5 1 0.00 5 1 0.00 5 1 0.00 5 1 0.00 5 1 0.00 5 1 0.01 0
61 0.05 - 0.23 LOW 61 0.15 0.04 - 0.23 LOW 61 132 - 0.33 MEDUM 61 1.12 - 0.33 MEDUM 61 0.1 0.28 - 0.43 MEDUM 61 0.1 0.28 - 0.43 MEDUM 61 0.1 0.28 - 0.43 MEDUM 61 0.1 0.27 0.07 - 0.07 61 0.19 - 0.15 - 0.07 61 0.19 - 0.07 - 0.07 61 0.19 - 0.15 - 0.09 61 0.15 - 0.07 - 0.09 61 0.15 - 0.07 - 0.09 61 0.15 - 0.07 - 0.09 61 0.15 - - <td>51 069 - 023 LOW 51 1 0 - 0 - LOW 51 1 3 - - 033 MEDUM 51 1 2 - 0 - - 0 51 1 1 - - 0 - 1 - - VLOW 51 0 0 - 0 - 0 - 1 - - - - VLOW 51 0 0 - 0 0 - 0 -</td> <td>61 0.69 - 0.23 LOW 61 0.15 0.04 - 0.23 NLOW 51 1.12 - 0.33 MEDUM 51 1.12 - 0.33 MEDUM 51 0.71 0.28 - 0.13 51 0.71 0.28 - 0.17 51 0.71 0.28 - 0.17 61 0.13 - 0.27 LOW 51 0.19 - 0.17 LOW 44 0.41 0.15 - LOW 45 0.41 - 0.15 - LOW 44 0.41 0.15 - - LOW 45 0.41 - - - LOW 46 0.41 - - - LOW 47 0.41 - - - LOW 48 0.41 - -</td>	51 069 - 023 LOW 51 1 0 - 0 - LOW 51 1 3 - - 033 MEDUM 51 1 2 - 0 - - 0 51 1 1 - - 0 - 1 - - VLOW 51 0 0 - 0 - 0 - 1 - - - - VLOW 51 0 0 - 0 0 - 0 -	61 0.69 - 0.23 LOW 61 0.15 0.04 - 0.23 NLOW 51 1.12 - 0.33 MEDUM 51 1.12 - 0.33 MEDUM 51 0.71 0.28 - 0.13 51 0.71 0.28 - 0.17 51 0.71 0.28 - 0.17 61 0.13 - 0.27 LOW 51 0.19 - 0.17 LOW 44 0.41 0.15 - LOW 45 0.41 - 0.15 - LOW 44 0.41 0.15 - - LOW 45 0.41 - - - LOW 46 0.41 - - - LOW 47 0.41 - - - LOW 48 0.41 - -
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51 1 - 038 MEDIUM 51 3.39 - 1.32 HIGH 51 1.32 - 1.32 HIGH 51 0.71 0.28 - 0.43 MEDIUM 51 0.71 0.28 - 0.43 MEDIUM 51 0.7 - 0.07 LOW MEDIUM 61 0.43 - 0.07 LOW MEDIUM 44 0.19 - 0.07 LOW MEDIUM 44 0.19 - 0.07 LOW MEDIUM 44 0.14 0.15 - UOW MEDIUM 44 0.14 0.15 - UOW MEDIUM 44 0.14 0.15 - LOW MEDIUM 44 0.14 0.15 - LOW MEDIUM 44 0.14 0.15 - LOW MEDIUM 44 0.15	51 1 · 039 MEDIUM 51 339 · 132 HIGH 51 0.71 0.28 · 0.43 MEDIUM 51 0.74 · 0.33 · MEDIUM 51 0.74 · 0.7 LOW MEDIUM 51 0.71 · 0.27 LOW MEDIUM 51 0.79 · 0.07 LOW MEDIUM 44 0.41 0.15 · 0.07 LOW 54 0.41 0.15 · UOW · LOW 54 0.41 0.15 · · UOW · LOW 54 0.41 0.15 · · UOW · LOW · LOW 54 0.41 0.15 · · · LOW · LOW · LOW · LOW · LOW · ·	51 1 · 039 MEDIUM 51 132 · 132 HIGH 51 0.71 0.28 · 0.43 MEDIUM 51 0.71 0.28 · 0.7 LOWUM 51 0.74 · 0.7 LOWUM 51 0.44 · 0.7 LOWUM 61 0.19 · 0.07 LOWUM 44 0.19 · 0.15 · LOWUM 14 0.15 · 0.07 LOWUM I/OWUM 14 0.15 · 0.07 LOWUM I/OWUM 14 0.15 · 0.07 LOWUM I/OWUM I/OWUM 14 0.15 · I/OWUM I/OW
51 339 - 132 HIGH 51 0.71 0.28 - 0.43 MEDIUM 51 0.71 0.28 - 1.00 1.00 51 0.7 0.28 - 0.13 LOW 51 0.7 - 0.07 LOW 61 0.19 - 0.07 LOW 44 0.41 0.15 - 100 100 44 0.41 0.15 - 100 100 44 0.41 0.15 - 100 100 44 0.41 0.15 - 100 100 44 0.41 - -	51 339 - 132 HIGH 51 0.12 - 0.43 MEDIUM 51 0.12 - 0.03 MEDIUM 51 0.1 0.28 - 0.10 51 0.1 - 0.27 LOW 51 0.19 - 0.07 LOW 44 0.41 0.15 - 0.07 VLOW 44 0.41 0.15 - 0.07 VLOW 44 0.41 0.15 - 0.07 VLOW 44 0.41 0.15 - 1.00 VLOW <td>51 339 - 1.32 HIGH 51 0.11 0.2 0.43 MEDIUM 51 0.7 0.2 0.1 UOW 51 0.7 0.2 1.0 WEDIUM 51 0.7 0.7 UOW 0.1 UOW 51 0.19 - 0.07 UOW UOW 51 0.019 - 0.07 UOW UOW 61 0.15 - 0.07 UOW UOW 61 0.16 0.16 - UOW UOW UOW 61 0.16 -</td>	51 339 - 1.32 HIGH 51 0.11 0.2 0.43 MEDIUM 51 0.7 0.2 0.1 UOW 51 0.7 0.2 1.0 WEDIUM 51 0.7 0.7 UOW 0.1 UOW 51 0.19 - 0.07 UOW UOW 51 0.019 - 0.07 UOW UOW 61 0.15 - 0.07 UOW UOW 61 0.16 0.16 - UOW UOW UOW 61 0.16 -
51 112 - 043 MEDIUM 39 0.71 0.28 - 1.00 51 0.74 0.28 - 1.00 51 0.13 - 0.23 - 1.00 51 0.13 - 0.07 - 1.00 51 0.13 - 0.07 - 1.00 44 0.15 - 0.07 - 1.00 1 0.15 - 0.07 - 1.00 1 0.15 - 0.07 - 1.00 1 0.15 - 0.15 - 1.00 1 0.15 - - 1.00 1.00 1 0.15 - - 1.00 1.00 1 0.15 - - 1.00 1.00 1 0.15 - - 1.00 1.00 1 0.15 - - 1.00 </td <td>51 112 - 043 MEDIUM 39 0.71 0.28 - 1.0W 51 0.74 0.28 - 1.0W 51 0.74 - 0.07 1.0W 51 0.04 - 0.07 1.0W 54 0.19 - 0.07 1.0W 44 0.41 0.15 - 1.0W 6 0.15 - 0.07 1.0W 6 0.15 - 0.07 1.0W 6 0.15 - 0.15 - 1.0W 6 - 0.15 - - 1.0W 6 - - -<!--</td--><td>51 112 - 043 MEDIUM 39 0.71 0.28 - 1000 51 0.74 0.28 - 1000 51 0.74 - 0.27 1000 51 0.03 - 0.07 1000 51 0.04 - 0.07 1000 44 0.41 0.15 - 1000 1 0.15 - 0.07 1000 1 0.15 - 0.07 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1001 1001 1 0.15 - 1001 1001 1 - - 1001 1001 1 - -</td></td>	51 112 - 043 MEDIUM 39 0.71 0.28 - 1.0W 51 0.74 0.28 - 1.0W 51 0.74 - 0.07 1.0W 51 0.04 - 0.07 1.0W 54 0.19 - 0.07 1.0W 44 0.41 0.15 - 1.0W 6 0.15 - 0.07 1.0W 6 0.15 - 0.07 1.0W 6 0.15 - 0.15 - 1.0W 6 - 0.15 - - 1.0W 6 - - - </td <td>51 112 - 043 MEDIUM 39 0.71 0.28 - 1000 51 0.74 0.28 - 1000 51 0.74 - 0.27 1000 51 0.03 - 0.07 1000 51 0.04 - 0.07 1000 44 0.41 0.15 - 1000 1 0.15 - 0.07 1000 1 0.15 - 0.07 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1001 1001 1 0.15 - 1001 1001 1 - - 1001 1001 1 - -</td>	51 112 - 043 MEDIUM 39 0.71 0.28 - 1000 51 0.74 0.28 - 1000 51 0.74 - 0.27 1000 51 0.03 - 0.07 1000 51 0.04 - 0.07 1000 44 0.41 0.15 - 1000 1 0.15 - 0.07 1000 1 0.15 - 0.07 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1007 1000 1 0.15 - 1001 1001 1 0.15 - 1001 1001 1 - - 1001 1001 1 - -
39 0.71 0.28 * LOW 51 0.13 - 0.17 LOW 51 0.19 - 0.07 LOW 44 0.41 0.15 - 0.07 14 0.15 - 0.07 LOW 14 0.15 - 0.15 - LOW 14 0.15 - 0.15 - LOW 14 0.15 - - 10.16 LOW 14 0.15 - - 10.16 LOW 14 0.15 - - 10.01 LOW 14 0.15 - - 10.16 LOW 14 - - - 10.16 LOW 14 - - </td <td>39 0.71 0.28 * Low 51 0.44 • 0.17 Low 51 0.19 • 0.07 Low 44 0.41 0.15 • Low 45 0.41 0.15 • 10W 46 0.41 0.15 • 10W 47 0.41 0.15 • 10W 48 0.41 0.15 • 10W 49 0.41 0.15 • 10W 49 0.41 0.15 • 10W 41 0.41 0.15 • 10W 41 0.41 0.15 • 10W 41 0.15 • • 10W 41 0.15 • • 10W 41 • • • 10W 42 • • • 10W 44 • • •</td> <td>39 0.71 0.28 × Low 51 0.44 × 0.17 Low 51 0.13 × 0.27 Low 44 0.41 0.15 × 0.07 10 0.15 × 0.07 Low 11 0.15 × 100W VLOW 12 0.41 0.15 × 10W 14 0.15 × 10W 10W 14 1 1 1 1 14 1 1 1 1 15 1 1 1 1 14 1 1 1 1</td>	39 0.71 0.28 * Low 51 0.44 • 0.17 Low 51 0.19 • 0.07 Low 44 0.41 0.15 • Low 45 0.41 0.15 • 10W 46 0.41 0.15 • 10W 47 0.41 0.15 • 10W 48 0.41 0.15 • 10W 49 0.41 0.15 • 10W 49 0.41 0.15 • 10W 41 0.41 0.15 • 10W 41 0.41 0.15 • 10W 41 0.15 • • 10W 41 0.15 • • 10W 41 • • • 10W 42 • • • 10W 44 • • •	39 0.71 0.28 × Low 51 0.44 × 0.17 Low 51 0.13 × 0.27 Low 44 0.41 0.15 × 0.07 10 0.15 × 0.07 Low 11 0.15 × 100W VLOW 12 0.41 0.15 × 10W 14 0.15 × 10W 10W 14 1 1 1 1 14 1 1 1 1 15 1 1 1 1 14 1 1 1 1
51 044 - 017 LOW 51 0.13 - 0.27 LOW 45 0.41 - 0.07 LOW 46 0.41 0.15 - LOW 46 0.41 0.15 - LOW 46 0.41 0.15 - LOW 47 0.15 - - LOW 48 0.41 0.15 - LOW 49 0.41 0.15 - LOW 49 0.41 0.15 - LOW 49 1 1 1 1 49 1 1 1 1 1 49 1 1 1 1 1 49 1 1 1 1 1 49 1 1 1 1 1 49 1 1 1 1 1 49	51 D44 ·· 017 LOW 51 0.01 ·· 0.27 LOW 45 0.41 ·· 0.07 · LOW 45 0.41 0.15 · UNW 45 0.41 0.15 · UNW 45 0.41 0.15 · UNW 46 0.41 0.15 · UNW 41 0.15 · · · UNW 41 0.15 · · · · UNW 41 0.15 · · · · · · 42 · <td>51 D44 ·· 017 LOW 51 0.01 ·· 0.07 ·· LOW 45 0.01 ·· 0.07 ·· LOW 46 0.01 ·· 0.07 ·· LOW 46 0.01 ·· 0.07 ·· LOW 47 0.01 ·· ·· ·· LOW 48 0.041 ·· ·· ·· LOW 49 0.041 ·· ·· ·· LOW 40 ·· ·· ·· ·· LOW 41 ·· ·· <</td>	51 D44 ·· 017 LOW 51 0.01 ·· 0.07 ·· LOW 45 0.01 ·· 0.07 ·· LOW 46 0.01 ·· 0.07 ·· LOW 46 0.01 ·· 0.07 ·· LOW 47 0.01 ·· ·· ·· LOW 48 0.041 ·· ·· ·· LOW 49 0.041 ·· ·· ·· LOW 40 ·· ·· ·· ·· LOW 41 ·· ·· <
51 0.7 0.27 LOW 44 0.41 0.15 VLOW 44 0.41 0.15 VLOW 1 0.15 VLOW 1 0.15 VLOW 1 0.15 1 0.15 1 0.15 1 0.15 1 1 1 1 1 1 1 1 1 1 1 1	51 0.7 . 0.27 LOW 44 0.41 . 0.07 . VLOW 44 0.41 0.15 . . VLOW 1 0.15 1 0.15 1 1 1 1 1 1 1 1 1 1 1 1 1	51 0.7 - 0.27 LOW 44 0.41 - 0.07 VLOW 44 0.41 0.15 - VLOW 1 0.15 - 0.07 VLOW 1 0.15 - 1 VLOW 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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44 015 · LOW	44 015 · LOW	44 041 045 040 040 040 040 040 040 040 040 040

CLIENT: Macquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Tomago TEST METHOD: AS 4133.4.1

39762 01 JRC DATE: Project no : Tested BY :

BORE: SHEET:

()) Douglas Partners Geoechnics - Environment - Erverburder Darbe Point Load Equivalent core diameter: 5 Point Load 力 < $L = d_{\text{Barries}} tom load point to near a the write of the state o$

CLIENT : Macquarie Generation PROJECT : Proposed Gas Storage Area LOCATION : Tomago TEST METHOD: AS 4133.4.1

9/04/2008 39762 01 JRC DATE: PROJECT NO : TESTED BY :

BORE: SHEET:

OAD INTERPRETED	STRENGTH	0	MEDIUM	HIGH	MEDIUM	HIGH	TOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM												
		Axial (A) Diametral	0.88	- 1.00	- 0.57	1.00	020	- 0.76	0.34	. 0.95	0.67												
FAILURE PC	(KN)		2 28	2.58	1.46	2.58	0.51	1.95	0.77	2.45	1.78												
Depth (D)	(uuu)		51	51	51	51	51	51	34	51	42												Load W(0) = core
Min. Width (W)	(uu)								51		51												A xial Test: Point
Axial (A),	Diametral (D)	c				0		0	A	0	A												
DESCRIPTION		Cilmano	SIISTORE	Slistone	Siltstone	Siltstone/Sandstone	Siltstone/Sandstone	Sittstone/Sandstone	Siltstone/Sandstone	Siltstone/Sandstone	Siltstone/Sandstone												Diametral Test; $d(\Phi) = \cos diameter$ J Point Load
(m)		1 EA	200	200	3.35	4.42	445	4.90	4.90	4.86	4 86												

Macquarie Generation Proposed Gas Storage Area Tomago 3. AS 4133 4.1 CLIENT: PROJECT: LOCATION: TEST METHOD: A

9/04/2008 39762.01 JRC DATE: PROJECT NO : TESTED BY :

BORE: SHEET:

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ROCK STRENGTH	MEDIUM	MEDIUM	MEDIUM	LOW	EXT LOW	VLOW														n ers ^{nudwalei}
INDEX Isan Diametral (D)		•	0.36	0.13		0.03														uglas Part Mics Eminameni - En
INDEX Iseo Axial (A)	0.50	0.78			0.00															
READING (KN)	1,31	1.61	0.93	0.34	0.00	0.09														CHECKED Initiala Data
Depth (D) (mm)	41	30	51	51	34	51														Manage (6) // proj
Min. Width (W) (mm)	51	51			51															Axtal Test: 9.W < d < W re damate: 4. Ξ.W Point Load
Axial (A), Diametral (D)	4	A		0	A	٩														CHECK 0 CHECK 0 Equivalent or
DESCRIPTION	Samistrine	Sandstrine	Sandstone	Sandstone	Clavstone	Clavstone														Dametral Test HECK L > 05 d point news the end point news the end through damethin d = d
(m) (m)	2.0	0000	P2 6	2 10	2 58	4 07	201													L = diance from vost. CH d = data

CLIENT : Macquarte Generation PROJECT : Proposed Gas Storage Area LOCATION : Tomago TEST METHOD: AS 4133.4.1

ROCK

DEPTH

9/04/2008 39762.01 JRC DATE: PROJECT NO : TESTED BY :

BORE:

123

	INTERP
1 OF 1	POINT LOAD INDEX
SHEET:	POINT LOAD INDEX
	FAILURE

			Г	Г	Г	Т	Т	Т	Т	Т	1	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	T	Т	Т	Т	Т	Т	Т	Г	Π	Π	Т	Т	Т	Т	٦			
INTERPRETED	STRENGTH		HGH	VIDW	MEDIUM	I DIM	LOW		EXILOW	V LOW																														LOT U Dehvater
POINT LOAD	Inue A	Diametral (D)	100	0.06		016		000	100	0.04																													whee Davie	ius - Enrionnen' - Gru
POINTLOAD	la _e	Axial (A)	1.14	10	0.80		0 12	0- H																																Geolecti
FAILURE	(KN)		3.15	0.15	223	0.38	0.34	0.05	0.44	0.11																												CHECKED	1	
Depth (D)	(uuu)		44	51	44	49	45	5	R1	5																												W(T) = Care	/	(O) M
DIMENSIONS Min. Width (W)	(mm)		51		51		50																															W < d < W		H Point Land
TEST TYPE Axial (A).	Diametrai (D)		A	0	A	D	A	9	0	2																												CHECK 03	Equivalent con	0.4
ROCK DESCRIPTION			Sandstone																												d(0) a constituenties			toole daments						
(m)			223	227	2.27	2.64	2.54	2.71	3.6																														d= detan	in a second s

ę.

CLIENT : Macquarte Generation PROJECT : Proposed Gas Storage Area LOCATION : Tomago TEST METHOD: AS 4133.4.1

9/04/2008 39762.01 JRC DATE: PROJECT NO : TESTED BY :

BORE: SHEET:

126 10F1

NTERPRETED	STRENGTH		MEDIUM	LOW	MEDIUM	MEDIUM	V LOW	EXT LOW	VLOW	VLOW															ŞIŞ	Tivaler
POINTLOAD		Diametral (D)			-		0.05																		uglas Partne	inics - Enriconnent - Grand
POINT LOAD		Axial (A)	0.69	0.15	0.80	0.50		0.03	10.0	0.04																Ceoler
FAILURE	KEADING	dana!	161	0.44	2.03	1.17	0.12	0.07	0.15	0.12															CHECKED Initials Date	
	Cepth (D) (mm)	down at the second	35	49	39	35	50	38	63	51																New 101
DIMENSIONS	Min. Width (W)	(51.	51	51	51		8	20	51															Axial Teat: 3.W × da Teat: 3.W × da W 4. ± W	TT Point Load
TEST TYPE	Axial (A), Diametral (D)		4	A	A	A	٥	A	A	A																
ROCK	DESCRIPTION		Sandstone															Diametral Test: ECK L 2 05 d point neare free an point neare free an (0) = con demete point load	Point Load							
DEPTH	íE,		185	1 95	0	217	27	77	4 19	4.30	2														CH CH CH CH CH CH CH CH CH CH CH CH CH C	and
POINT LOAD TEST REPORT

CLIENT : Macquarie Generation PROJECT : Proposed Gas Storage Area LOCATION : Tomago TEST METHOD: AS 4133.4.1

9/04/2008 39762.01 JRC DATE: PROJECT NO : TESTED BY :

BORE: SHEET:

129	1 OF 1

INTERPRETED	STRENGTH		HIGH	MEDIUM	HIGH	TOW	TOW	AFFLUA	I DIM	IOW	TOW	FXTIOW													Iers advæter
POINT LOAD	tan v	Diametral (D)						042	0.23		0.20												Î	T	uglas Partn wis Environment Snu
POINT LOAD	and and a	Axial (A)	1.28	0.97	1.04	0.15	0.16			0.21		0.02													Dor George
FAILURE	(KN)		3.42	2.63	2.57	0.42	0.41	1.09	06	0.63	0.52	0.05													CHECKED Initiale Date
Danth (D)	(mm)		42	43	38	44	41	51	51	50	61	37													Manado (0) //
DIMENSIONS Min. Width (M)	(mm)		51	51	51	51	51			61		51										0			Wear And Point A
TEST TYPE Axial (A).	Diametral (D)		A	A	A	A	A	a	Q	A	٥	A													CHECK 03 Equivalent corr
ROCK DESCRIPTION			Sandstone													ametral Test: $d(\Phi) = \cos \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$									
DEPTH (m)			2 08	2.16	2.60	3.04	3 14	3.18	4.05	4 05	4.12	4 15													DA CHEA CHEA CHEA CHEA CHEA CHEA CHEA CHE

POINT LOAD TEST REPORT

LOCATION : Tomago TEST METHOD: AS 4133.4.1 Macquarie Proposed G CLIENT : PROJECT : LOCATION :

DATE: PROJECT NO : TESTED BY :

INTERPRETED ROCK STRENGTH

POINT LOAD INDEX Diametral (D)

POINT LOAD Axial (A)

FAILURE READING (KN)

Cepth (D) (mm)

DIMENSIONS Min. Width (W) (mm)

TEST TYPE Axial (A), Diametral (D)

DESCRIPTION

DEPTH

E

Sandstone

Siltstone Silstone

2.52 251

MEDIUM

1.05

0.72

2.46 2.16 0.52 079

51

S

0.84

5 4 40 23 51 39 34 **51** 30 5 5

51

4 0 4 4

Sillstone Sillstone Sandstone

2.52 3.07 3.45 3.45 3.45 3.71

Sandstone

Sandstone

Siltstone Siltstone

5

0.31

0.65 0.19

1.09

200

0.52 0.45 1.23 0.02

HIGH MEDIUM LOVU LOVU LOVU LOVU LOVU MEDIUM MEDIUM MEDIUM

0.17

0.01

0.36 0.49

0.82

5

5 5 5 5

4 V LOW

0.07

0.27 4

0.83

5

٥ ۵ A

4

Sandstone

5.15

Sandstone Sandstone Sandstone

4.05 4.05 4.17 4.17 4.94 4.95 4.95 5.15

MEDIUM

0.46

.

0.72 0.57

2.26 1.18 1.18 0.18

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Generation	Gas Storage Area	

9/04/2008	39762 01	JRC

132	1 OF 1
BORE:	SHEET:

Douglas Partners Geogramment - Environment - Environment -
6

Point Load W(@) =)	D' A
Axial Test: CHECK 0.3W < d < W	Equivalent core diameter.	0.= 4. <u>d</u> .W
Point Lond		











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POINT LOAD TEST REPORT

CLIENT: Maquarie Generation PROJECT: Proposed Gas Storage Area LOCATION: Tomago TEST METHOD: AS 4133.4.1

9/04/2008 39762 01 JRC DATE: PROJECT NO : TESTED BY :

BORE: SHEET:

135	1 OF 1
ü	

INTERPRETED ROCK STRENGTH	TOW	MEDILIM	MEDIUM	MEDILIM	HIGH	HGH	MEDILIM	MEDILIM	I DW	I OIM	VIDIA	I OW													lers návate:
POINT LOAD INDEX Immetral (D)			0.59	0.54		1 23		0.35				0.16	0.20	0											iglas Partn vis Environment Strue
POINT LOAD INDEX Ise Axial (A)	0.26	25.0			1.04		0.32		0.12	0 14	60.0														Dou Geolechi
FAILURE READING (KN)	0.72	1.69	1.51	14	2.14	3.17	1.1	091	0.28	032	0.30	040	0.52												CHECKED Initials Date
Depth (D) (mm)	44	52	51	51	30	51	58	51	36	34	5 9	51	51												(D) M
DIMENSIONS Min. Width (W) (mm)	51	51			51		52		51	51	23														Axial Teet: W cd cW e diameter d d d d diameter d d d d diameter d d d d d d d d d d d d d d d d d d d
Axial (A), Diametral (D)	A	A	D	D	A	٥	A	D	A	A	A	0	D										-		CHECK 0.3 Equivalent cor
DESCRIPTION	Sandstone												Bit metral Tot: G(b) = core demeter Point Load ECK $L > 0.5 d$ $d(b) = core demeter P(c) ECK L > 0.5 d d(c) = core demeter P(c) ECK L > 0.5 d d(c) D(c) ECK D(c) D(c) D(c) $												
(L)	2.18	222	2.23	227	2.44	247	2.94	3.23	3 23	3.51	3.54	3.55	4.55												CHE 2 = daunce tom lead pr d = duant Equivalent



SWELL TEST

15 Callisternon Close Warabrook 2310 Phone (02) 4960 9600 Fax: (02) 4960 9601 newcastle@douglaspartners.com.au

RESULT OF SHRINK-SWELL INDEX DETERMINATION

Client :	Macquarie Generation	Project No. :	39762.01
		Report No. :	N08-083
Project :	Proposed Gas Fired Powerstation	Report Date :	24/04/2008
		Date Sampled :	4/04/2008
Location :	Tomago	Date of Test:	21/04/2008
Test Location :	Bore 108		
Depth / Layer :	0.5 - 0.8m	Page:	1 of 1

CORE SHRINKAGE TEST

Shrinkage - air dried	5.4 %	Pocket penetrometer reading at initial moisture content	300 kPa
Shrinkage - oven dried	5.5 %	De elect per etterpreter reading	150 kDa
	A 121 O/	Pocket penetrometer reading	IDU KPd
Significant inert inclusions	NII %	at final moisture content	
Extent of cracking	SC	Initial Moisture Content	24.3 %
Extent of soil crumbling	Nil %	Final Moisture Content	23.6 %
Moisture content of core	22.6 %	Swell under 25kPa	-0.1 %



SHRINK-SWELL INDEX Iss 3.0% per ∆ pF

Description:	Silty CLAY - Brown red	
Test Method(s):	AS 1289.7.1.1 - 2003, AS 1289.2.1.1 - 2005	
Sampling Method(s):	AS 1289.1.3.1-1999	
Extent of Cracking:	UC - Uncracked	HC - Highly cracked
	SC - Slightly cracked	FR - Fractured
Remarks:	MC - Moderately cracked	

Note that NATA accreditation does not cover

the performance of pocket penetrometer readings



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025

Approved Signatory:

Tested:	LB
Checked:	DB



SWELL TEST

15 Callistemon Close Warabrook 2310 (02) 4960 9600 Phone Fax (02) 4960 9601 newcastle@douglaspartners.com.au

RESULT OF SHRINK-SWELL INDEX DETERMINATION

Client :	Macquarie Generation	Project No. :	39762.01
a second second second		Report No. :	N08-083a
Project :	Proposed Gas Fired Powerstation	Report Date :	24/04/2008
		Date Sampled :	4/04/2008
Location :	Tomago	Date of Test:	21/04/2008
Test Location :	Bore 109		
Depth / Layer :	1.0 - 1.3m	Page:	1 of 1

CORE SHRINKAGE TEST

Shrinkage - air dried	4.1 %	Pocket penetrometer reading at initial moisture content	300 kPa
Shrinkage - oven dried	4.2 %		
Significant inert inclusions	Nil %	Pocket penetrometer reading at final moisture content	220 kPa
Extent of cracking	UC	Initial Moisture Content	17.4 %
Extent of soil crumbling	Nil %	Final Moisture Content	21.3 %
Moisture content of core	18.7 %	Swell under 25kPa	-0.3 %



SHRINK-SWELL INDEX Iss 2.3% per \triangle pF

Description:
Test Method(s):
Sampling Method(s):
Extent of Cracking:

CLAY-Grey mottled red with some fine to medium grained sand AS 1289.7.1.1 - 2003, AS 1289.2.1.1 - 2005 AS 1289.1.3.1-1999

UC - Uncracked

MC - Moderately cracked

SC - Slightly cracked

HC - Highly cracked FR - Fractured

Remarks:

Note that NATA accreditation does not cover the performance of pocket penetrometer readings



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Approved Signatory:

00000.	
Checked: I	DB



SWELL TEST

15 Callisternon Close Warabrook 2310 Phone (02) 4960 9600 Fax: (02) 4960 9601 newcastle@douglaspartners.com.au

RESULT OF SHRINK-SWELL INDEX DETERMINATION

Client :	Macquarie Generation	Project No. : Report No. :	39762.01 N08-083b
Project :	Proposed Gas Fired Powerstation	Report Date :	24/04/2008
		Date Sampled :	4/04/2008
Location :	Tomago	Date of Test:	21/04/2008
Test Location :	Bore 111		
Depth / Layer :	1.0 - 1.3m	Page:	1 of 1

CORE SHRINKAGE TEST

Shrinkage - air dried	6.7 %	Pocket penetrometer reading at initial moisture content	155 kPa
Shrinkage - oven dried	6.9 %	Pocket penetrometer reading	140 kPa
Significant inert inclusions	Nil %	at final moisture content	140 10 4
Extent of cracking	UC	Initial Moisture Content	26.2 %
Extent of soil crumbling	Nil %	Final Moisture Content	27.7 %
Moisture content of core	25.1 %	Swell under 25kPa	0.0 %



SHRINK-SWELL INDEX Iss 3.8% per △ pF

Description:	CLAY-Brown grey mottled red	
Test Method(s):	AS 1289.7.1.1 - 2003, AS 1289.2.1.1 - 2005	
Sampling Method(s):	AS 1289.1.3.1-1999	
Extent of Cracking:	UC - Uncracked SC - Slightly cracked	HC - Highly cracked FR - Fractured
Remarks:	MC - Moderately cracked	

Note that NATA accreditation does not cover the performance of pocket penetrometer readings

NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025 Approved Signatory:

Tested:	LB
Checked:	DB



SWELL TEST

15 Callistemon Close Warabrook 2310 Phone (02) 4960 9600 Fax: (02) 4960 9601

newcastle@douglaspartners.com.au

RESULT OF SHRINK-SWELL INDEX DETERMINATION

Client :	Macquarie Generation	Project No. :	39762.01
		Report No. :	N08-083c
Project :	Proposed Gas Fired Powerstation	Report Date :	24/04/2008
		Date Sampled :	4/04/2008
Location :	Tomago	Date of Test:	21/04/2008
Test Location :	Bore 118		
Depth / Layer :	0.5 - 0.8m	Page:	1 of 1

CORE SHRINKAGE TEST

Shrinkage - air dried	5.4 %	Pocket penetrometer reading	240 kPa
Shrinkage - oven dried	5.5 %	at initial moisture content	
Significant inert inclusions	Nil %	Pocket penetrometer reading at final moisture content	120 kPa
Extent of cracking	MC	Initial Moisture Content	30.8 %
Extent of soil crumbling	5.0 %	Final Moisture Content	30.3 %
Moisture content of core	30.3 %	Swell under 25kPa	-0.2 %



SHRINK-SWELL INDEX Iss 3.0% per △ pF

Description: Test Method(s): Sampling Method(s): Extent of Cracking:

CLAY-red brown mottled grey brown

AS 1289.7.1.1 - 2003, AS 1289.2.1.1 - 2005

AS 1289.1.3.1-1999

UC - Uncracked

SC - Slightly cracked

MC - Moderately cracked

HC - Highly cracked FR - Fractured

Note that NATA accreditation does not cover the performance of pocket penetrometer readings



Remarks:

NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025

Approved Signatory:

Tested: LB Checked: DB



15 Callistemon Close Warabrook 2310 Phone (02) 4960 9600 Fax: (02) 4960 9601

newcastle@douglaspartners.com.au

RESULT OF SHRINK-SWELL INDEX DETERMINATION

Client :	Macquarie Generation	Project No. :	39762.01
		Report No. :	N08-083d
Project :	Proposed Gas Fired Powerstation	Report Date :	24/04/2008
		Date Sampled :	4/04/2008
Location :	Tomago	Date of Test:	21/04/2008
Test Location :	Bore 125		
Depth / Layer :	0.5 - 0.8m	Page:	1 of 1

CORE SHRINKAGE T	EST	SWELL TEST		
Shrinkage - air dried	4.1 %	Pocket penetrometer reading at initial moisture content	230 kPa	
Shrinkage - oven dried	4.3 %			
		Pocket penetrometer reading	200 kPa	
Significant inert inclusions	Nil %	at final moisture content		
Extent of cracking	SC	Initial Moisture Content	25.2 %	
Extent of soil crumbling	5.0 %	Final Moisture Content	27.8 %	
Moisture content of core	22.6 %	Swell under 25kPa	-0.1 %	



SHRINK-SWELL INDEX Iss 2.4% per ∆ pF

Decerintion:	Silby CLAV Light brown	
Description.	Sity CLAT-Light brown	
Test Method(s):	AS 1289.7.1.1 - 2003, AS 1289.2.1.1 - 2005	
Sampling Method(s):	AS 1289.1.3.1-1999	
Extent of Cracking:	UC - Uncracked	HC - Highly cracked
	SC - Slightly cracked	FR - Fractured
Remarks:	MC - Moderately cracked	

Note that NATA accreditation does not cover the performance of pocket penetrometer readings

NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025 Approved Signatory:

Tested: LB Checked: DB

CERTIFICATE OF ANALYSIS With Order EB0805703 Page 1 of 4 Olient E00005703 Page 1 of 4 Client E00005703 Page 1 of 4 Client E00005703 Page 1 of 4 Client E00005103 Page 1 of 4 Client E00005103 Page 1 of 4 Actessa E0000000 Enternel Enternel Enternel Actessa Enternel Enternel Enternel Enternel Enternel Enternel<	CERTIFICATE OF ANALYSIS With Orier EB0805703 Page 1 of 4 With Orier EB0805703 Page 1 of 4 Clean BoUICLAS PARTNERS PT/LTD Laboration Laboration 1 of 4 Clean BoUICLAS PARTNERS PT/LTD Laboration Laboration Environmental Dhalon Brithates Clean DOUCLAS PARTNERS PT/LTD Cleans Laboration Laboration Laboration Clean DOUCLAS PARTNERS PT/LTD Clean Laboration Laboration Laboration Clean DOUCLAS PARTNERS PT/LTD Clean Clean Served Stand Stress Sand of CLD Australia 4053 Clean Served Stand Stress Sand Laboration Environmental Dhalon Brithates Environmental Dhalon Brithates Clean Served Stand Stress Sand Laboration Environmental Dhalon Brithates Environmental Dhalon Brithates Clean Served Stand Stress Sand Laboration Environmental Dhalon Brithates Environmental Dhalon Brithates Fereines Served Stand Stress Sand Laboration Environmental Dhalon Brithates Environmental Dhalon Brithates Clean Served Stand Stress Sand Laboration Envinonmental Dhalon Brithates		ental Division			∢
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				32 Shan	d Street Stafford QLD Australia 4053	



Page 2 of 4 Work Order EB0805703 Client DOUGLAS PARTNERS PTY LTD Project 39762.01 TOMAGO

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

A = This result is computed from individual analyte detections at or above the level of reporting

ANC not required because pH KCI less than 6.5

Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.6 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'right dry weight' to 'rig/m3 in-eitu soli', multiply 'reported results' x 'wet buik density of soli in tim3'.



3 of 4	EB0805703	DOUGLAS PARTNERS PTY LTD	39762.01 TOMAGO	
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Analytical Results

SUD-Matrix: SOIL		5	ent sample ID	B108/0.4	B109/0.2	B112/0.5	B118/1-1.45	B123/0.2
	ซิ	ent sampl	ing date / time	[01-MAY-2008]	[01-MAY-2008]	[01-MAY-2008]	[01-MAY-2008]	[01-MAY-2008]
Compound	CAS Number	LOR	Unit	EB0805703-001	EB0805703-002	EB0805703-003	EB0805703-004	EB0805703-005
EA033-A: Actual Acidity				States and a				
pH KCI (23A)	1	0.1	pH Unit	4.6	4.4	43	46	46
Titratable Actual Acidity (23F)	1	5	mole H+ / t	50	92	8	0°4	0.4
suffidic - Thratable Actual Acidity (s-23F)	1	0.02	% pyrite S	0.08	0.15	0.16	040	00
EA033-B: Potential Acidity				THE REAL PROPERTY OF			4	
Chromium Reducible Sulfur (22B)	.1	0.02	\$S	<0.02	<0.02	<0.02	<0.02	w v
acidity - Chromium Reducible Sulfur	1	10	mole H+/t	<10	<10	0 ¹ 2	<10	20.02
(a-22B)							2,	2
EA033-D: Retained Acidity			Concession of	A SULLAR STATE				
Net Acid Soluble Sulfur (20Je)	I	0.02	s%	ł	<0.02	<0.02		
acidity - Net Acid Soluble Sulfur (a-20J)	1	10	mole H+/t	1	<10	<10		E (i
sulfidic - Net Acid Soluble Sulfur (s-20J)	I	0.02	% pyrite S	1	<0.02	<0.02		1
KCI Extractable Sulfur (23Ce)	ł	0.02	s%	I	<0.02	<0.02		Ê
HCI Extractable Sulfur (20Be)	1	0.02	% %	1	<0.02	<0.02	1	
EA033-E: Acid Base Accounting								
ANC Fineness Factor	1	0.5		1.6	1.6	1.5	15	
Net Acidity (sulfur units)	I	0.02	% S	0.08	0.15	0.16	012	2.5
Net Acidity (acidity units)	1	10	mole H+ / t	60	85	98	74	20
Liming Rate	1	÷	kg CaCO3/t	4	7	7		8
							>	

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4 of 4 EB0805703	DOUGLAS PARTNERS PTY LTD	39762.01 TOMAGO	9
Page Work Order	Client	Project	Analytical Resul

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SURVEY INFORMATION

1. THE SURVEY IS ON GROUND MAP GRID OF AUSTRALIA (MGA). BASED ON SSM 28490 – E379293.565 N6369114.337

IMPORTANT NOTES

PACIFIC

ISSUE TO CLIENT

No REVISION

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