LOCHARD ENERGY

MAY 2022

WINTON ENERGY RESERVE 1 FACILITY

GEOTECHNICAL FACTUAL REPORT

Question today
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Winton Energy Reserve 1 Facility
Geotechnical Factual Report

Lochard Energy

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REV	DATE	DETAILS
A	14/12/21	Draft Geotechnical Factual Report
B	10/01/22	Final Geotechnical Factual Report
B2	17/01/22	Final Geotechnical Factual Report (issued with incorporation of comments made by client on previous submission)
C	18/05/22	Final – updated project description

	NAME	DATE	SIGNATURE
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Approved by:	George Bazeley	18/05/22	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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1 INTRODUCTION

1.1 BACKGROUND

Lochard Energy (Iona Operations) Pty Ltd, an energy infrastructure company based in Australia, is seeking to develop the land for an energy hub at 386 Lee Road, Winton (the subject site). The proposed energy hub is known as Winton Energy Reserve 1 facility (the project).

The project will utilise hybrid technology with Li-Ion batteries and fast-start high-efficiency duel-fuel gas reciprocating engines and will comprise:

- A 200-megawatt (MW) Gas-Powered Generator (GPG) facility and adjoining ~200 metre (m) gas pipeline including metering station.
- A Battery Energy Storage System (BESS) facility. The BESS facility will supply and absorb 200MW real power with 400-megawatt-hour (MWh) energy storage capacity.
- A single electrical substation for both battery and GPG which then feeds into the local network.\
- A ~3 kilometre (km) 220-kilovolt (kV) underground transmission line from the Glenrowan Terminal Station (GTS) to the subject site. The transmission line will cross the Hume Freeway and follow the existing AusNet easement northwest from the GTS. It will then head east within the road reserve of Lee Road before entering the subject site.

The project is located approximately 9 km north east of Benalla and 175 km north east of Melbourne within the Rural City of Benalla (Local Government Area). A concept layout plan for the project is provided at Figure 1.1.

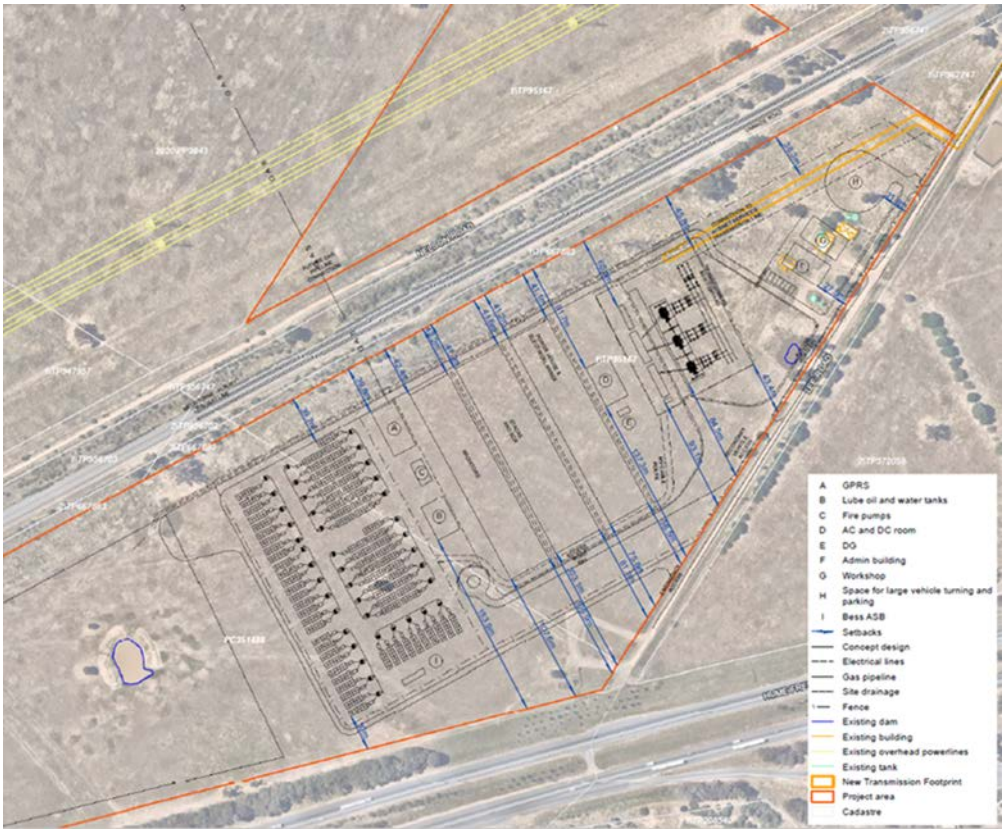

Figure 1.1 – Concept layout plan

1.2 SITE DESCRIPTION

The site is situated on the Hume Highway, between Benalla and Wangaratta, Victoria.

The site is generally flat but with some farm dams and is mostly vegetated by grass as seen in Figure 1.2.

Figure 1.2 Site Location

2 REGIONAL GEOLOGY AND GROUNDWATER

2.1 PUBLISHED REGIONAL GEOLOGY

A review of the GeoVic website 1:250,000 geology layers and 1:50,000 geological map of Winton (map sheet 8124-IV Zone 55), indicates that the site is likely to be underlain (as shown in Figure 2.1) by tertiary aged sedimentary deposits of the Shepparton Formation (Nws) comprising clay, sand, silt and poorly-sorted gravel.

Due to the site's proximity to geological boundaries, the Shepparton Formation may be underlain by the following geology:

Cobbannah Group (–c) - "sandstone quartzitic, thick to thin bedded, fine to coarse grained, pale grey; siltstone massive to bedded, commonly bioturbated, grey to pale colours"

Bendoc Group (–b) - "black shale, cherty shale, stripy thin-bedded sandstone and siltstone, laminated siltstone"

Figure 2.1 Regional Geology

2.2 REGIONAL GROUNDWATER

A review of Visualising Victoria's Groundwater Website (2021) from the Department of Environmental, Land, Water and Planning indicates that groundwater in the vicinity of the site could be between less than 5m deep and up to 10m deep in localised areas on site.

It should be noted that groundwater levels are subject to seasonal and climatic variations, and that perched water may be present depending on the extent of permeable layers within the subsurface profile.

2.3 ACID SULFATE SOILS

Based on a review of the Australian Soil Resource Information System (ASRIS), it is unlikely that the site is underlain by Acid Sulfate Soils (ASS).

ASRIS lists the site as having an 'low probability of occurrence' (a confidence level of 4) for ASS in the near-surface materials of the natural soil profile.

3 GEOTECHNICAL INVESTIGATIONS

3.1 PRELIMINARIES

A Dial Before You Dig enquiry was completed prior to site works for each borehole and test pit location. The proposed investigation locations were reviewed against the DBYD plans, allowing for any potential conflicts with existing utilities to be identified, and relocations made as deemed necessary. A professional service locator from Access Utility Engineering was engaged to undertake clearance of the investigation locations, primarily using a Cable Avoidance Tool (CAT) and 2D Ground Penetration Radar (GPR). Borehole and test pit locations were marked and coordinates were recorded in the GDA94 Zone 55 coordinate system using a hand-held GPS with ±5 m horizontal accuracy. A site figure showing the approximate investigation locations is provided in Appendix A.

3.2 BOREHOLES

A total of four (4) boreholes were completed between 8 November 2021 and 9 November 2021. Boreholes were advanced via auger, washboring and HQ diamond coring drilling techniques using a truck mounted Comacchio MC-T7 drilling rig owned and operated by Rockwell Drilling under supervision by WSP.

Standard Penetration Tests (SPTs) in accordance with AS1289.6.3.1 were undertaken using a split-spoon sampler at nominal 1.5 m intervals. Borehole logs are presented in Appendix B along with photographs of the recovered rock core samples. Approximate borehole coordinates, locations and termination depths are presented in Table 3.1 below.

Table 3.1 Summary of Borehole Locations

BOREHOLE ID	LOCATION	EASTING (m)	NORTHING (m)	TERMINATION DEPTH (mBGL)
BH01	Proposed BESS area (battery storage)	419173	5960344	6.5
BH02	Proposed Fuel Tanks	419275	5960423	15.5
BH03	Proposed Powerhouse	419444	5960434	15.0
BH04	Proposed Transformers & Sub-station	419514	5960557	10.0

Upon completion, the boreholes were backfilled with drill cuttings and tamped in place at the surface.

3.3 TEST PITS

A total of fifteen (15) test pits were excavated on 11 and 12 November 2021. Test pits were excavated using a Komatsu PC40 MR fitted with a rock toothed bucket, owned and operated by Duncans Plumbing Pty Ltd under supervision by WSP.

DCP tests were undertaken in accordance with AS1289.6.3.2 immediately adjacent to selected test pits to provide an indication of subsurface material strength. Test pit logs and DCP results are presented in Appendix B along with explanatory notes and photographs of the excavations. Approximate test pit coordinates and termination depths are presented in Table 3.2.

Table 3.2 Summary of Test Pit and DCP Test Locations

BOREHOLE NUMBER	EASTING (m)	NORTHING (m)	TEST PIT TERMINATION DEPTH (mBGL)
TP01	419409	5960335	3.0

BOREHOLE NUMBER	EASTING (m)	NORTHING (m)	TEST PIT TERMINATION DEPTH (mBGL)
TP02	419346	5960228	3.1
TP03	419275	5960287	3.0
TP-SA-01	419031	5960331	3.0
TP-SA-02	419143	5960167	3.1
TP-SA-03	418987	5960202	3.0
TP-SA-04	418854	5960221	3.0
TP-SA-05	418955	5960103	3.0
TP-SA-06	418818	5960074	3.0
TP-SA-07	418710	5960128	3.1
TP-SA-08	418614	5960002	3.1
TP-SA-09	418499	5960066	3.0
TP-SA-10	418429	5959960	3.0
TP-SA-11	418324	5959863	3.0
TP-SA-12	418174	5959885	3.0

3.4 SUBSURFACE CONDITIONS

Based on the investigation findings, variability in the ground profile was observed across the site. A summary of the encountered subsurface materials is presented in Table 3.3. The subsurface conditions encountered are consistent with the published geology. Reference should be made to the individual test pit and borehole logs presented in Appendix B.

Table 3.3 Summary Subsurface Profile

DEPTH RANGE ENCOUNTERED	DESCRIPTION	CONSISTENCY / DENSITY	GEOLOGICAL ORIGIN
0.0 – 0.4	TOPSOIL: Silt	Stiff to Hard	Topsoil
0.4 – 13.5	CLAY; medium to high plasticity	Stiff to Hard^^	Shepparton Formation
4.0 – 8.6	SAND/ Clayey SAND	Very Dense*	Residual soil of the Cobbannah Group
4.0 – 15.0	SANDSTONE: highly to extremely weathered, medium strength	N/A^	Cobbannah Group

* Only encountered in BH03, TP02.

^ Not encountered in any test pits

^^ Encountered in TP-SA-01, TP-SA-09 as Firm to Very Stiff

3.5 GROUNDWATER OBSERVATIONS

No free groundwater was encountered during drilling of the boreholes and excavating the test pits. It should be noted that groundwater could not be fully assessed in the boreholes as water was added during the wash boring and coring of the rock.

Fluctuation of groundwater levels may occur due to rainfall, weather conditions and seasonal changes.

3.6 GEOTECHNICAL LABORATORY TESTING

Representative soil samples were collected from selected test pits and boreholes and sent to a NATA-accredited laboratory for the following tests:

- 3 x 4-day soaked CBR tests on bulk samples collected from test pits.
- 4 x Atterberg limits (including liquid limit, plastic limit, plasticity index and linear shrinkage) as per AS 1289 3.1.1, 3.2.1, 3.3.1, 3.4.1
- 4 x Particle size distribution (PSD) as per AS 1289 3.6.1
- 8 x Soil moisture content as per AS 1289 2.1.1
- 4 x Aggressivity (including pH, Sulphate, Chloride).
- 4 x Electrical conductivity

A summary of the geotechnical laboratory testing carried out is presented in Table 3.4. The laboratory test result certificates are presented in Appendix C. References to the testing procedures adopted are shown on the laboratory test certificates.

Table 3.4 Geotechnical Laboratory Test Results

BOREHOLE NUMBER	SAMPLE DEPTH (mBGL)	CBR (%)	ELECTRICAL CONDUCTIVITY (µS/cm)	MOISTURE CONTENT (%)	PARTICLE SIZE DISTRIBUTION			CONSISTENCY LIMITS			
					Gravel (%)	Sand (%)	< 75 µm (%)	LL (%)	PL (%)	PI (%)	LS (%)
TP01	0.50 – 1.00	1.5	-	-	-	-	-	-	-	-	-
TP02	0.50 – 1.00	4.5	-	-	-	-	-	-	-	-	-
TP03	0.50 – 1.00	2.5	-	-	-	-	-	-	-	-	-
BH01	1.45 – 1.95	-	372	16.6	-	-	-	-	-	-	-
BH01	2.50 – 3.00	-	-	14.3	2.0	12.3	85.7	43	12	31	10
BH01	4.00 – 4.50	-	-	20.5	0.8	8.0	91.2	56	15	41	8.5
BH01	4.50 – 4.95	-	-	22.6	-	-	-	-	-	-	-
BH02	1.40 – 1.85	-	221	-	-	-	-	-	-	-	-
BH03	1.50 – 1.95	-	520	23.3	-	-	-	-	-	-	-
BH03	2.50 – 3.00	-	-	16.6	7.4	7.8	84.8	58	16	42	8
BH03	5.50 – 6.00	-	-	7.2	31.0	36.7	32.3	26	14	12	4.5
BH03	4.50 – 4.73	-	-	14.5	-	-	-	-	-	-	-
BH04	1.50 – 1.95	-	593	-	-	-	-	-	-	-	-

mBGL = metres below ground level; LL = Liquid Limit; PL = Plastic Limit; PI = Plasticity Index; LS = Linear Shrinkage; ND = Not determined; NP = Non-plastic

3.7 AGGRESSIVITY TESTING

The results of the aggressivity testing are presented in Table 3.5. The laboratory test certificates for the chemical testing are presented in Appendix C.

Table 3.5 Aggressivity Test Results

BOREHOLE	SAMPLE DEPTH (mBGL)	pH	SULPHATE AS SO_4^{2-} (mg/kg)	CHLORIDE (mg/kg)
BH01	1.45 – 1.95	8.9	230	560
BH02	1.40 – 1.85	8.5	150	910
BH03	1.50 – 1.95	7.6	370	380
BH04	1.50 – 1.95	6.4	360	1270

3.8 ELECTRICAL RESISTIVITY TESTING

Soil resistivity testing was undertaken by WSP's in-house specialist engineers. The testing was carried out at 3 locations using an approximately 50m x 50m grid. Test results are provided in Appendix D.

The location of the tests were in close proximity to boreholes BH01 (BESS); BH03 (Powerhouse) & BH04 (Transformer & Substation).

4 REFERENCES

- ASRIS website, accessed 12 November 2021, <http://www.asris.csiro.au/>
- Earth Resources – GeoVic website, accessed 12 November 2021, https://gsv.vic.gov.au/sd_weave/anonymous.html
- Visualising Victoria's Groundwater website, Department of Environment, Land, Water and Planning, accessed 12 November 2021,
- Geological Survey of Victoria, Winton (mapsheet 8124-IV) 1:50,000, Geological Survey of Victoria. 1978.

5 LIMITATIONS

This Report is provided by WSP Australia Pty Limited (*WSP*) to Lochard Energy (*Client*) in response to specific instructions from the Client and in accordance with WSP's proposal under the Consultancy Agreement between WSP and the Client signed 10-9-2019.

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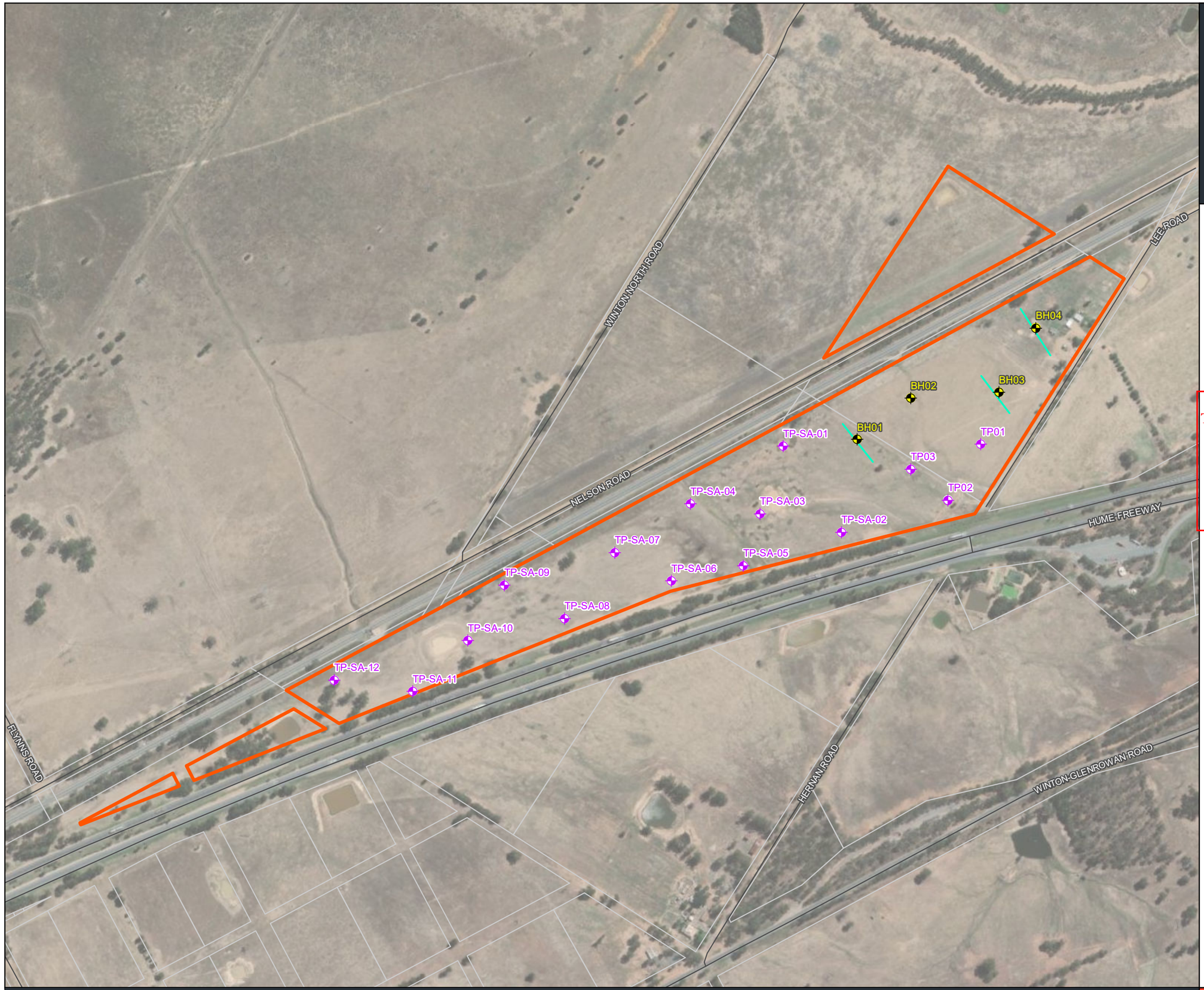
Appendix A

Site Figure



Lochard Energy
Winton Energy Reserve 1 Facility

Preliminary Geotechnical Investigation

Legend

- Borehole Location
- Test Pit Location
- Vertical Electrical Sounding (VES) Survey
- Road
- Cadastre
- Site Boundary

0 150 300 Meters

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:7,000 Date: 14-Dec-21

Data sources: DELWP, WSP 2021

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Appendix B

Engineering Borehole and Test Pit Logs

Explanatory Notes - Engineering Logs

Engineering logs have been prepared in accordance with AS1726:2017 “Geotechnical Site Investigations” and as defined below.

DRILLING/EXCAVATION METHODS

Symbol	Term
AS	Auger Screwing
EX	Excavation
HA	Hand Auger
NMLC/HMLC	Diamond Core –triple tube
NQ/HQ/PQ	Diamond Core – wireline
PC	Percussion
PCB	Poly Carbonised Diamond Bit
PT	Push Tube
RAB	Rotary Air Blast
RC	Reverse Circulation
S	Sonic drill
VB	Vibrocoring
WB	Washbore with blade
WR	Washbore with roller (tricone)

SUPPORT

C Casing
M Drill mud
Nil No support

WATER

Partial water loss Water inflow

Complete water loss

Water level at date shown

NFGWO No Free Groundwater Observed
The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit.

NFGWE No Free Groundwater Encountered
The borehole/test pit was dry soon after excavation. Inflow may have been observed had the borehole/test pit been left open for a longer period.

FIELD TEST (Soil borehole and test pit logs)

DM Dilatometer test
HB Hammer bounce
OT Other test (eg. plate load test)
PE Permeability test
PM Pressuremeter test
PP Pocket penetrometer
SPT Standard penetration test
SV Shear vane test

SAMPLE (Soil borehole and test pit logs)

B Bulk disturbed sample
D Disturbed sample
PT Push tube
SPT SPT sample
U50 Undisturbed sample in 50mm diameter tube
U75 Undisturbed sample in 75mm diameter tube

GRAPHIC LOG – see later

TOTAL CORE RECOVERY (Rock logs only)

$$TCR\ (\%) = \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100$$

ROCK QUALITY DESIGNATION (Rock logs only)

$$RQD\ (\%) = \frac{\Sigma \text{Length of sound core pieces} > 100\text{mm}}{\text{Length of core run}} \times 100$$

GROUP SYMBOL (Soil borehole and test pit logs)

Soils are classified to reflect their primary and significant secondary component/characteristic using the classification symbols described in AS1726-2017, summarised as follows.

Symbol	Major division	Typical names
GW, GP	GRAVEL	Gravel & gravel-sand mixtures, little/no fines
GM		Gravel-silt & gravel-sand-silt mixtures
GC		Gravel-clay & gravel-sand-clay mixtures
SW, SP	SAND	Sand & gravel-sand mixtures, little/no
SM		Sand-silt mixtures
SC		Sand-clay mixtures
ML	SILT & CLAY (low & medium plasticity)	Inorganic silt/clayey fine sand or silt
CL, CI		Inorganic clay, gravelly clay, sandy clay
OL		Organic silt
MH	SILT & CLAY (high plasticity)	Inorganic silt
CH		Inorganic clay, high plasticity
OH		Organic clay, med-high plasticity, organic silt
Pt	Highly organic soil	Peat, highly organic soil

FIELD DESCRIPTION

Soil and rock materials described to AS1726-2017. The description of percentage of cobbles and boulders in a soil may be limited by sample size.

MOISTURE CONDITION

Coarse grained soils and rocks
Dry (D), Moist (M) or Wet (W).
Estimated based on appearance and feel.

Cohesive soils

MC<PL	Moist, dry of plastic limit
MC≈PL	Moist, near plastic limit
MC>PL	Moist, wet of plastic limit
MC≈LL	Wet, near liquid limit
MC>LL	Wet, wet of liquid limit

Estimated based on judgement

COHESIVE SOILS - CONSISTENCY

The consistency of a cohesive soil is assessed by tactile means or field measurement of undrained shear strength.

A Hand Penetrometer may be used in the field or the laboratory to provide approximate assessment of unconfined compressive strength of cohesive soils (kPa) as follows:

Strength	Symbol	Indicative undrained shear strength (kPa)	Hand Penetrometer Reading (kPa)
Very Soft	VS	≤ 12	< 25
Soft	S	>12 and ≤ 25	25 to 50
Firm	F	> 25 and ≤ 50	50 to 100
Stiff	St	>50 and ≤ 100	100 to 200
Very Stiff	VSt	> 100 and ≤ 200	200 to 400
Hard	H	>200	> 400
Friable	Fr	-	-

COHESIONLESS SOILS - RELATIVE DENSITY

Relative density terms are used to describe silty and sandy material, and these are usually based on resistance to drilling penetration or the Standard Penetration Test (SPT) ‘N’ values.

The Standard Penetration Test (SPT) is carried out in accordance with AS 1289, 6.3.1. For completed tests the number of blows required to drive the split spoon sampler 300 mm is recorded as the N value. For incomplete tests the number of blows and the penetration beyond the seating depth of 150 mm are recorded. If the 150 mm seating penetration is not achieved the number of blows to achieve the measured penetration is recorded. SPT correlations may be subject to corrections for overburden pressure and equipment type.

Term	Symbol	Density Index	N Value (blows /0.3 m)	DCP (blows /100mm
Very Loose	VL	0 to 15	0 to 4	0 to 1
Loose	L	15 to 35	4 to 10	1 to 2
Medium Dense	MD	35 to 65	10 to 30	2 to 5
Dense	D	65 to 85	30 to 50	5 to 10
Very Dense	VD	>85	>50	>10

SOIL STRUCTURE

Soil structure is described to AS 1726-2017 if visible and present.

SOIL / ROCK ORIGIN

The geological origin of the soil or rock is presented as an interpretation of the geological and geomorphological setting. Origin cannot be deduced on the basis of material appearance and properties alone and is therefore limited by the availability of supporting geological information

ROCK MATERIAL WEATHERING

Rock weathering is described mainly using the following abbreviations and definitions used in AS1726.

Term	Symbol	Definition
Residual soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition of individual minerals or colour changes.

If differentiation between highly and moderately weathered rock is not practicable, then Distinctly Weathered (DW) is used as defined in AS1726:2017.

INFERRED ROCK STRENGTH

Rock strength is inferred based on field assessment, Point Load Index or Uniaxial Compressive Strength as follows:

Term	Symbol	UCS (MPa)	Point Load Index $Is_{(50)}$ (MPa)
Very Low	VL	0.6 to 2	0.03 to 0.1
Low	L	2 to 6	0.1 to 0.3
Medium	M	6 to 20	0.3 to 1
High	H	20 to 60	1 to 3
Very High	VH	60 to 200	3 to 10
Extremely High	EH	>200	>10

● Diametral Point Load Index test
■ Axial Point Load Index test
◆ Uniaxial Compressive Strength test

strength test data is indicated on a dual PL/UCS column due to space constraints only. No correlation between the two values is to be inferred

DEFECT SPACING/BEDDING SPACING (Rock)

Measured at right angles to defects of same set or bedding.

Term	Defect Spacing	Bedding
Extremely closely spaced	<6 mm 6 to 20 mm	Thinly Laminated Laminated
Very closely spaced	20 to 60 mm	Very Thin
Closely spaced	0.06 to 0.2 m	Thin
Moderately widely spaced	0.2 to 0.6 m	Medium
Widely spaced	0.6 to 2 m	Thick
Very widely spaced	>2 m	Very Thick

DEFECT DESCRIPTION (Rock)

Symbol	Term	Symbol	Term
Bg	Bedding	DB	Drill Break
Pt	Parting	Se	Seam
Cn	Contact	SZ	Sheared Zone
Bd	Boundary	CZ	Crushed Zone
Jt	Joint	F	Fault
Fo	Foliation	Vn	Vein
C	Cleavage		

DEFECT ORIENTATION (Rock)

Dip measured relative to the horizontal plane in vertical boreholes and relative to core axis in inclined boreholes.

DEFECT ROUGHNESS AND SHAPE (Rock)

Roughness	Description	Roughness	Description
Sm	Smooth	Po	Polished
Ro	Rough	Sl	Slickensided
VRo	Very Rough		
Shape	**Description**	**Shape**	**Description**
Pl	Planar	Cu	Curved
Un	Undulating	Vu	Vuggy
Ir	Irregular	St	Stepped

COATING OR INFILLING (Rock)

Abbreviation	Description	Abbreviation	Description
Cln	Clean	Co	Coal
Cg	Coating	Cr	Crushed rock
In	infill	Fe	Limonite/ironstone
Sn	Stain	Fl	Feldspar
Vr	Veneer	Gp	Gypsum
Ca	Calcite	Mn	Manganese
Ch	Chlorite	Py	Pyrite
Cl	Clay	Qz	Quartz

Graphic Symbols — Soils and Rocks

Typical symbols for soils and rocks are as follows. Combinations of these symbols may be used to indicate mixed materials such as clayey sand.

SOIL SYMBOLS

Main components

 CLAY

 SILT

 SAND

 GRAVEL

 BOULDERS / COBBLES

 TOPSOIL

 PEAT

Minor components

 CLAYEY

 SILTY

 SANDY

 GRAVELLY

OTHER MATERIAL SYMBOLS

 FILL

 BITUMEN

 CONCRETE

ROCK SYMBOLS

Sedimentary Rocks

 SANDSTONE

 SILTSTONE

 CLAYSTONE, MUDSTONE

 SHALE

 COAL

 LIMESTONE

 CONGLOMERATE

Igneous rocks

 GRANITE

 BASALT

 UNDIFERENTIATED IGNEOUS

Metamorphic rocks

 SLATE, PHYLLITE, SCHIST

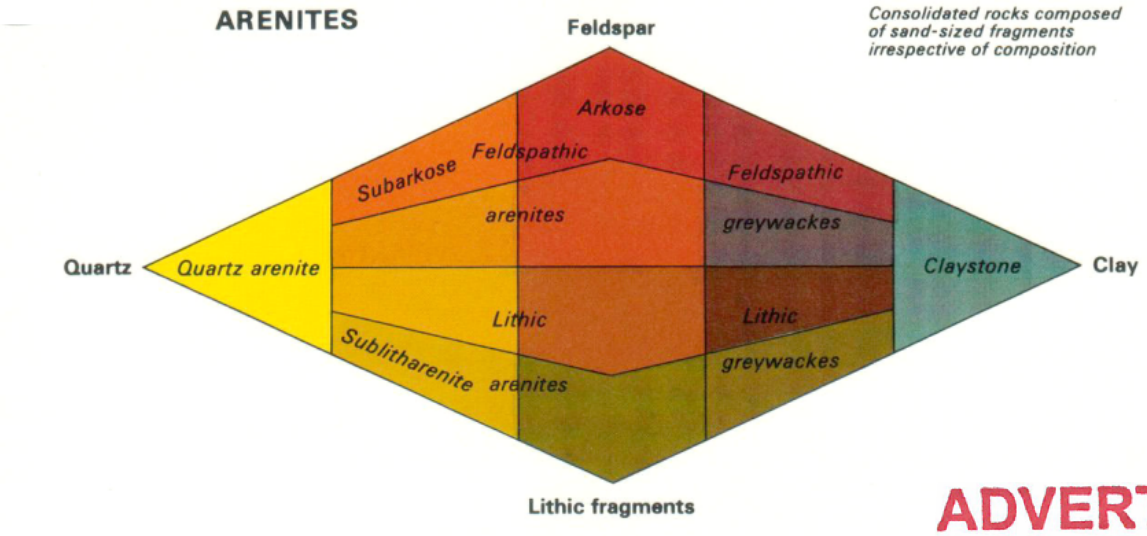
 GNEISS

 QUARTZITE

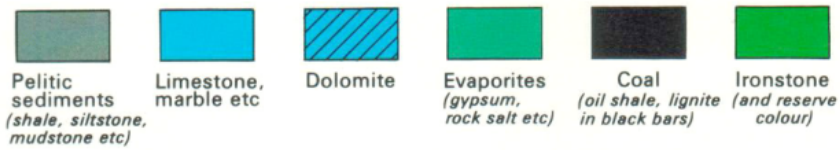
Colour Scheme — Soils and Rocks

The soil and rock colour schemes presented on the logs and fences have been derived from those below. The rock colour scheme is taken from Geoscience Australia's predecessor, the Bureau of Mineral Resources (BMR).

SEDIMENTARY ROCKS

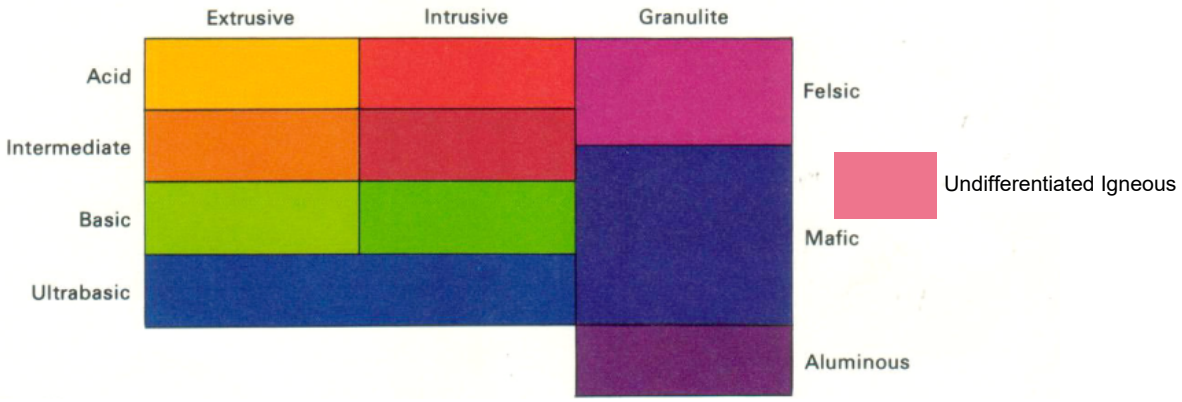


OTHER SEDIMENTARY ROCKS



METAMORPHIC ROCKS

IGNEOUS AND HIGH GRADE METAMORPHIC ROCKS



SOIL COLOUR SCHEME

Unclassified - see log
Organic soil, peat
Clay dominated
Silt dominated
Silty sand to sandy silt
Sand dominated
Gravel dominated

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH01

SHEET : 1 OF 2

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419173 N 5960344 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWE		0.0					SAND; low plasticity, brown, trace root fibers.	W<PL	VS S F ST VST FB VL L MD D VD H		5 10 15 20 25	TOPSOIL BH01-001_0.50-1.00m
								CI-CH	CLAY; medium to high plasticity, brown, trace fine to coarse grained sand, trace fine grained gravel.	W<PL				SHEPPARTON FORMATION
				0.5		B								
				1.0		U63								BH01-002_1.00-1.45m
				1.5	SPT 6, 10, 14 N*=24	SPT								BH01-003_1.45-1.90m
				2.0										
				2.5		B								BH01-004_2.50-3.00m
				3.0	SPT 4, 7, 11 N*=18	SPT			3.0m: grey with red-brown, trace fine to medium grained sand, trace fine grained gravel					BH01-005_3.00-3.45m
				3.5										
				4.0		B								BH01-006_4.00-4.50m
				4.5	SPT 6, 10, 14 N*=24	SPT			4.5m: trace fine grained sand					BH01-007_4.50-4.95m
									4.9m: grey and red-brown with orange-brown					

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH01

SHEET : 2 OF 2

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419173 N 5960344 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWE		5.5		B		CI-CH	CLAY; medium to high plasticity, brown, trace fine to coarse grained sand, trace fine grained gravel.	W<PL				SHEPPARTON FORMATION BH01_008_5.50-6.00m
				6.0	SPT 4, 9, 11 N*=20	SPT			6.0m: trace fine grained gravel					BH01-009_6.00-6.45m
				6.5					END OF BOREHOLE AT 6.50 m Target depth					

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH02

SHEET : 1 OF 4

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419275 N 5960423 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWE		0.0				ML	SILT; low plasticity, brown, trace root fibers.	W<PL			5 10 15 20 25	TOPSOIL
				0.5		B		CH	CLAY; high plasticity, brown, trace fine grained gravel.	W<PL				SHEPPARTON FORMATION BH02-001_0.50-1.00m
				1.0		U63								BH02-002_1.00-1.40m
				1.5	SPT 4, 7, 10 N*=17	SPT			1.4m: brown and grey, trace fine to coarse grained sand, trace fine grained gravel					BH02-003_1.40-1.85m
				2.0										BH02-004_2.00-2.50m
				2.5										
				3.0	SPT 4, 6, 9 N*=15	SPT			3.0m: grey and red-brown					BH02-005_3.00-3.45m
				3.5										
				4.0										BH02-006_4.00-4.50m
				4.5	SPT 7, 11, 14 N*=25	SPT								BH02-007_4.50-4.95m

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH02

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419275 N 5960423 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD) / DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWE	5.5				CH	CLAY; high plasticity, brown, trace fine grained gravel.	W<PL				SHEPPARTON FORMATION
			6.0	SPT 6, 6, 7 N*=13	SPT		CL	CLAY; low plasticity, grey with orange-brown, with fine to medium grained sand.	W>PL				BH02-008_6.00-6.45m
			6.5										
			7.0										
			7.5	SPT 4, 7, 8 N*=15	SPT		CH	CLAY; high plasticity, grey with orange-brown and red-brown, trace fine to medium grained sand.	W<PL				BH02-009_7.50-7.95m
			8.0										
			8.5										
			9.0	SPT 5, 7, 10 N*=17	SPT			9.0m: grey and pale-brown, trace fine to coarse grained sand, trace fine grained gravel					BH02-010_9.00-9.45m
			9.5										

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH02

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419275 N 5960423 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD) / DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWE	10.5	SPT 6, 9, 12 N*=21	SPT		CH	CLAY; high plasticity, grey with orange-brown and red-brown, trace fine to medium grained sand.	W<PL				SHEPPARTON FORMATION BH02-011_10.50-10.95m
			11.0										
			11.5										
			12.0	SPT 7, 12, 16 N*=28	SPT			12.0m: grey with red-brown, trace fine to medium grained sand					BH02-012_12.00-12.45m
			12.5										
			13.0										
			13.5	SPT 8, 13, 19 N*=32	SPT			13.5m: grey and red-brown with pale orange-brown					BH02-013_13.50-13.95m
			14.0										
			14.5										

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH02

SHEET : 4 OF 4

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419275 N 5960423 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWE			SPT 8, 16, 22 N*=38	SPT		CH	CLAY; high plasticity, grey with orange-brown and red-brown, trace fine to medium grained sand.	W<PL				SHEPPARTON FORMATION BH02-014_15.00-15.45m
				15.5					END OF BOREHOLE AT 15.50 m Target depth					

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH03

SHEET : 1 OF 4

Client:	**Lochard Energy**	Date Commenced:	**8-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**8-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419444 N 5960434 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWO		0.0				ML	SILT; low plasticity, brown, trace root fibers.	W<PL				TOPSOIL
				0.5				CH	CLAY; high plasticity, brown, trace fine to coarse grained sand, trace fine to medium grained gravel.	W<PL				SHEPPARTON FORMATION
				1.0										
				1.5	SPT 4, 6, 7 N*=13	SPT								BH03-001_1.50-1.95m
				2.0										
				2.5		B								BH03-002_2.50-3.00m
				3.0	SPT 4, 7, 9 N*=16	SPT			3.0m: grey with red-brown, trace fine to coarse grained sand					BH03-003_3.00-3.45m
				3.5										
				4.0				SP	Gravelly Clayey SAND; fine to coarse grained, pale grey, pale orange-brown and brown, poorly graded, sub-rounded, fine to medium grained grained gravel, low plasticity clay, interbedded with high plasticity clay layers (approx. 10%) and cemented sandstone layers (approx 10%) up to 100 mm thick.	D				RESIDUAL SOIL OF COBBANNAH GROUP
				4.5	SPT 10, 17/80mm HB N*=R	SPT								BH03-004_4.50-4.73m

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH03

SHEET : 2 OF 4

Client:	**Lochard Energy**	Date Commenced:	**8-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**8-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419444 N 5960434 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWO		5.5		B		SP	Gravelly Clayey SAND; fine to coarse grained, pale grey, pale orange-brown and brown, poorly graded, sub-rounded, fine to medium grained grained gravel, low plasticity clay, interbedded with high plasticity clay layers (approx. 10%) and cemented sandstone layers (approx 10%) up to 100 mm thick.	D				RESIDUAL SOIL OF COBBANNAH GROUP BH03-005_5.50-6.00m
				6.0	SPT 4, 30/110mm HB N*=R	SPT		SW	SAND; fine to coarse grained, pale grey, pale orange-brown and brown, well graded, sub-rounded, with clay, trace fine to medium grained, sub-rounded gravel, interbedded with iron-cemented sandstone layers (approx. 20%) up to 200 mm.	D				BH03-006_6.00-6.26m
				6.5										
				7.0										
WB	Nil			7.5	SPT 30/100mm HB N*=R	SPT		SP	Clayey SAND; fine to medium grained, grey with pale orange-brown, poorly graded, sub-rounded, trace fine to coarse grained gravel.	D				BH03-007_7.50-7.60m
				8.0										
				8.5					SANDSTONE: fine grained, grey, red-brown and orange-brown, bedding at 50 degrees, highly weathered, medium strength					COBBANNAH GROUP
				9.0	SPT 30/20mm HB N*=R	SPT			REFER TO CORED BOREHOLE LOG					
				9.5										

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

CORED BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH03

SHEET : 3 OF 4

Client:	**Lochard Energy**	Date Commenced:	**8-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**8-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419444 N 5960434 MGA94 55**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	TOTAL CORE RECOVERY (TCR)	RQD	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	SOIL/ROCK MATERIAL FIELD DESCRIPTION	WEATHERING	INFERRED STRENGTH AND STRENGTH TEST MPa ($Is_{(50)}$/UCS) VL 0.1 / 2, L 0.3 / 6, M 1 / 20, H 3 / 60, VH 10 / 200, EH	AVERAGE DEFECT SPACING (mm) <20, 20-60, 60-200, 200-600, 600-2000, >2000	STRUCTURE AND ADDITIONAL OBSERVATIONS
						5.5						
						6.0						
						6.5						
						7.0						
						7.5						
						8.0						
						8.5						
						9.0		START CORING AT 9.10m				
HQ	Nil	NFGWO	125	32		9.5		(COBBANNAH GROUP)	HW			9.1m: CZ 9.25m: Jt, 5°, Pl, Ro, Sn FeO 9.5m: CZ 9.61m: CZ 9.66m: Jt x3, 40°, Pl, Ro, Sn FeO 9.75m: CZ 9.93m: CZ
			100	0								

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

CORED BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH03

SHEET : 4 OF 4

Client:	**Lochard Energy**	Date Commenced:	**8-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**8-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419444 N 5960434 MGA94 55**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	TOTAL CORE RECOVERY (TCR)	RQD	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	SOIL/ROCK MATERIAL FIELD DESCRIPTION	WEATHERING	INFERRED STRENGTH AND STRENGTH TEST MPa ($Is_{(50)}$/UCS) VL 0.1 / 2, L 0.3 / 6, M 1 / 20, H 3 / 60, VH 10 / 200, EH	AVERAGE DEFECT SPACING (mm) <20, 20-60, 60-200, 200-600, 600-2000, >2000	STRUCTURE AND ADDITIONAL OBSERVATIONS
HQ	Nil	NFGWO	100	0		10.5		(COBBANNAH GROUP)	HW			10m: Jt x20, 5 - 70°, Pl, Ro, Sn FeO
												10.27m: Jt x10, 10 - 70°, Pl-Un, Ro, Sn FeO
												10.47m: Se
												10.51m: Jt x2, 30 - 60°, Pl, Ro, Sn FeO
									XW			10.57m: Se
			100	0		11.0			HW			10.83m: Jt x4, 10 - 70°, Pl, Ro, Sn FeO
												11.1m: Jt x10, 30 - 60°, Pl, Ro, Ve FeO, clay
			38	12		11.5		CORE LOSS 0.80m (11.20-12.00) CORE LOSS				
						12.0		(COBBANNAH GROUP)	HW			12m: CZ
												12.29m: Jt x4, 10 - 40°, Pl, Ro, Sn FeO
												12.33m: Vn, 70°, quartz
												12.35m: CZ
			100	0		12.5						12.61m: Jt x15, 5 - 70°, Pl, Ro, Sn FeO
												12.91m: CZ
						13.0						12.95m: CZ
												13.12m: Jt x20, 5 - 80°, Pl-Un, Ro, Sn FeO
			100	0		13.5						13.37m: CZ
												13.54m: Jt x1, 50°, Pl, Ro, Sn FeO
												13.68m: Jt x10, 45°, Pl, Ro, Sn FeO
						14.0						13.88m: Jt x20, 45 - 90°, Pl, Ro, Sn FeO
												14m: Jt x6, 10 - 45°, Pl-Un, Ro, Sn FeO
			100	28		14.5						14.48m: Jt x10, 30 - 60°, Pl-Un, Ro, Sn FeO
												14.86m: Vn, 70°, quartz
												14.93m: DB

END OF BOREHOLE AT 15.00 m
Target depth

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BH03 Depth Range: 9.00 - 13.00 m

WSP
Telephone:
Facsimile:
Email:

TITLE

Lochard Energy
386 Lee Rd, Winton VIC
Winton Energy Reserve 1 Facility
Winton Energy Reserve 1 Facility

DRAWN MdW	DATE 14-Dec-21
CHECKED RK	DATE 13-Dec-21
SCALE Not To Scale	A4
PROJECT No PS125526	FIGURE No 1/2

BH03 Depth Range: 13.00 - 15.00 m

wsp

Telephone:
Facsimile:
Email:

TITLE	Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility
DRAWN	MdW
DATE	14-Dec-21
CHECKED	RK
DATE	13-Dec-21
SCALE	Not To Scale
	A4
PROJECT No	PS125526
FIGURE No	2/2

BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH04

SHEET : 1 OF 3

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419514 N 5960557 MGA94 55**

Borehole Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	Nil	NFGWO		0.0					SILT; low plasticity, brown, trace root fibers.	W<PL				TOPSOIL
								CI-CH	CLAY; medium to high plasticity, brown.	W<PL				SHEPPARTON FORMATION
				0.5										
				1.0		B								BH04-001_1.00-1.50m
				1.5	SPT 3, 4, 6 N*=10	SPT			1.5m: trace fine to coarse grained sand, trace fine to medium grained, angular sandstone gravel					BH04-002_1.50-1.95m
				2.0		B			2.0m: pale grey, brown and pale orange-brown					BH04-003_2.00-2.50m
				2.5		U63		CH	CLAY; medium plasticity, pale grey with pale brown, trace fine to coarse grained angular sandstone gravel.	W<PL				BH04-004_2.50-2.80m
														BH04-005_2.80-3.15m
				3.0	SPT 12, 24, 11/50mm HB N*=R	SPT								
				3.5										
				4.0					SANDSTONE; fine grained, red-brown, orange-brown and grey, highly weathered, medium strength					COBBANNAH GROUP
				4.5	SPT 30/130mm HB N*=R	SPT								BH04-006_4.50-4.63m
									REFER TO CORED BOREHOLE LOG					

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

CORED BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH04

SHEET : 2 OF 3

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419514 N 5960557 MGA94 55**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	TOTAL CORE RECOVERY (TCR)	RQD	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	SOIL/ROCK MATERIAL FIELD DESCRIPTION	WEATHERING	INFERRED STRENGTH AND STRENGTH TEST MPa ($Is_{(50)}$/UCS) VL 0.1 / 2, L 0.3 / 6, M 1 / 20, H 3 / 60, VH 10 / 200, EH	AVERAGE DEFECT SPACING (mm) <20, 20-60, 60-200, 200-600, 600-2000, >2000	STRUCTURE AND ADDITIONAL OBSERVATIONS
						0.5						
						1.0						
						1.5						
						2.0						
						2.5						
						3.0						
						3.5						
						4.0						
						4.5		START CORING AT 4.70m				
HQ	Nil	NFGWO	100	0				(COBBANNAH GROUP)	HW			4.7m: CZ

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

CORED BOREHOLE ENGINEERING LOG

BOREHOLE NO.

BH04

SHEET : 3 OF 3

Client:	**Lochard Energy**	Date Commenced:	**9-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**9-11-21**
Borehole Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Drill Model/Mounting:	**Comacchio MC-T 7/ Truck**	Hole Angle:	**-90°**	Surface RL:	
Borehole Diameter:		Bearing:	**---**	Co-ords:	**E 419514 N 5960557 MGA94 55**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	TOTAL CORE RECOVERY (TCR)	RQD	RL (m AHD)	DEPTH (m)	GRAPHIC LOG	SOIL/ROCK MATERIAL FIELD DESCRIPTION	WEATHERING	INFERRED STRENGTH AND STRENGTH TEST MPa ($Is_{(50)}$/UCS) VL 0.1 / 2, L 0.3 / 6, M 1 / 20, H 3 / 60, VH 10 / 200, EH	AVERAGE DEFECT SPACING (mm) <20, 20-60, 60-200, 200-600, 600-2000, >2000	STRUCTURE AND ADDITIONAL OBSERVATIONS
HQ	Nil	NFGWO	100	0		5.5		(COBBANNAH GROUP)	HW			4.9m: Jt x6, 5°, Pl, Ro, Sn-Ve FeO, clay 5.12m: Jt x2, 60°, Pl, Ro, Sn-Ve FeO, clay 5.3m: CZ 5.46m: CZ
								CORE LOSS 0.25m (5.55-5.80) CORE LOSS				
			72	0		6.0		(COBBANNAH GROUP)	HW			5.8m: CZ 6.15m: Jt x2, 5 - 45°, Pl-Un, Ro, Sn FeO, clay 6.2m: CZ 6.33m: Vn, 70°, 10 mm, quartz 6.36m: Se, gravel
						6.5		CORE LOSS 0.85m (6.45-7.30) CORE LOSS				
			42	0		7.0						
						7.5		(COBBANNAH GROUP)	HW			7.3m: CZ 7.32m: Jt x5, 10°, Pl, Ro, Sn FeO 7.5m: Jt x2, 50°, Pl, Ro, Sn FeO
			100	0		8.0						7.62m: Jt x7, 10°, Pl, Ro, Sn FeO 7.78m: CZ 7.9m: CZ 8m: CZ 8.3m: Jt x1, 45°, Un, Ro, Sn FeO 8.33m: CZ 8.38m: Se, gravelly clay 8.34m: Jt x10, 5 - 80°, Pl, Ro, Sn FeO
			100	54		9.0		Bedding dipping at 50 degrees	MW			
						9.5			HW			9.57m: CZ 9.79m: CZ 9.78m: Jt x10, 5°, Pl, Ro, Sn FeO
			100	20				END OF BOREHOLE AT 10.00 m Target depth				

This borehole log should be read in conjunction with WSP's accompanying explanatory notes.

BH04 Depth Range: 4.00 - 8.00 m

WSP
Telephone:
Facsimile:
Email:

TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21	
	CHECKED: RK	DATE: 13-Dec-21	
	SCALE: Not To Scale		A4
	PROJECT No: PS125526	FIGURE No: 1/2	

BH04 Depth Range: 8.00 - 10.00 m

wsp

Telephone:
Facsimile:
Email:

TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21	
	CHECKED: RK	DATE: 13-Dec-21	
	SCALE: Not To Scale		A4
	PROJECT No: PS125526	FIGURE No: 2/2	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP01

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**11-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**11-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.30 m**	Bearing:	**---**	Co-ords:	**E 419409 N 5960335 MGA94 55**

Test Pit Information | **Field Material Description**

METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL				TOPSOIL
								CH	CLAY; high plasticity, brown, trace fine grained hematite gravel.	W<PL				SHEPPARTON FORMATION
				0.5		B								TP01-001_0.50-1.00m
				1.0					1.2m: brown with grey					
				1.5										
				2.0					2.20m: trace fine grained sand					
				2.5					2.5m: brown and grey					
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP01 - 1 Depth Range: 0.00 - 3.00 m

TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21	
	CHECKED: RK	DATE: 13-Dec-21	
	SCALE: Not To Scale		A4
	PROJECT No: PS125526	FIGURE No: 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP02

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**11-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**11-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.45 m**	Bearing:	**---**	Co-ords:	**E 419346 N 5960228 MGA94 55**

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibre.	W<PL				TOPSOIL
								CI-CH	CLAY; medium to high plasticity, brown, trace root fibre.	W<PL				SHEPPARTON FORMATION
				0.5		B			0.4m: brown, grey and red-brown					TP02-001_0.50-1.00m
				1.0					1.0m: trace fine to medium grained sand					
				1.5					1.5m: brown, grey and orange-brown, trace fine to coarse grained sand					
				2.0					2.0m: trace fine to coarse grained sand, trace fine to medium grained angular sandstone gravel					
				2.5				SW	SAND; fine to coarse grained, grey and red-brown, well graded, sub-rounded, trace fine to medium grained, angular sandstone gravel.	D				RESIDUAL SOIL OF COBBANNAH GROUP
				3.0					END OF TEST PIT AT 3.10 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP02 - 1 Depth Range: 0.00 - 3.10 m

TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21	
	CHECKED: RK	DATE: 13-Dec-21	
	SCALE: Not To Scale		A4
	PROJECT No: PS125526	FIGURE No: 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP03

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**11-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**11-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.45 m**	Bearing:	**---**	Co-ords:	**E 419275 N 5960287 MGA94 55**

Test Pit Information | **Field Material Description**

METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL				TOPSOIL
								CH	CLAY; high plasticity, brown, trace root fibres.	W<PL				SHEPPARTON FORMATION
				0.5										
				1.0										
				1.5					1.5m: grey and brown with orange-brown					
				2.0					2.0m: trace fine to coarse grained sand, trace fine grained gravel					
				2.5					2.5m: grey, brown and orange-brown					
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP03 - 1 Depth Range: 0.00 - 3.00 m

TITLE	Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21
		CHECKED: RK	DATE: 13-Dec-21
		SCALE: Not To Scale	A4
		PROJECT No: PS125526	FIGURE No: 1/1

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-01

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**11-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**11-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 419031 N 5960331 MGA94 55**

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL				TOPSOIL
								CH	CLAY; high plasticity, brown, trace root fibres.	W<PL				SHEPPARTON FORMATION
				0.5					0.4m: trace fine to coarse grained gravel, trace fine to coarse grained sand					
				1.0					1.0m: grey, orange-brown and brown, trace fine grained sand					
				1.5					1.5m: red-brown and grey					
				2.0										
				2.5					2.5m: red-brown and grey with orange-brown					
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-01 - 1 Depth Range: 0.00 - 3.00 m

wsp	TITLE Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN MdW / DATE 14-Dec-21 CHECKED RK / DATE 13-Dec-21 SCALE Not To Scale / A4 PROJECT No PS125526 / FIGURE No 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-02

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**11-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**11-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 419143 N 5960167 MGA94 55**

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD) / DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO	0.0				ML	Topsoil: Sandy SILT; low plasticity, pale brown, fine grained sand, trace root fibres.	W>PL				TOPSOIL
			0.5				CH	CLAY; high plasticity, brown with grey, trace root fibres.	W>PL				SHEPPARTON FORMATION
			1.0				CI	CLAY; medium plasticity, orange-brown and brown, trace fine grained sand.	W>PL				
			1.5				CI-CH	CLAY; medium to high plasticity, browna with dark brown, trace organic fragments up to 20mm.					
			2.0				CI	CLAY; medium plasticity, brown and grey, trace fine to coarse grained sand, trace fine to medium grained hematite gravel.	W>PL				
			2.5					2.5m: brown and grey					
			3.0					END OF TEST PIT AT 3.10 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-02 - 1 Depth Range: 0.00 - 3.10 m

TITLE	Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21
		CHECKED: RK	DATE: 13-Dec-21
		SCALE: Not To Scale	A4
		PROJECT No: PS125526	FIGURE No: 1/1

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-03

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**11-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**11-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418987 N 5960202 MGA94 55**

Test Pit Information							Field Material Description								
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, pale grey, trace root fibres.	W<PL				TOPSOIL
				0.5				CH	CLAY; high plasticity, brown, trace root fibres.	W<PL				SHEPPARTON FORMATION
				1.0				CI-CH	CLAY; medium to high plasticity, red-brown, trace fine to coarse grained sand, trace fine to medium grained subangular gravel. 1.2m: brown, dark browna nd red-brown, trace fine to medium grained sand 1.5m: brown and grey	W<PL				
				1.5										
				2.0										
				2.5										
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-03 - 1 Depth Range: 0.00 - 3.00 m

TITLE	Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21
		CHECKED: RK	DATE: 13-Dec-21
		SCALE: Not To Scale	A4
		PROJECT No: PS125526	FIGURE No: 1/1

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-04

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**11-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**11-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418854 N 5960221 MGA94 55**

Test Pit Information							Field Material Description								
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; pale brown, trace root fibres.	W<PL				TOPSOIL
								ML	Topsoil: Clayey SILT; low plasticity, pale grey, trace root fibres.	W<PL				
								CH	CLAY; high plasticity, brown, trace root fibres.	W<PL				SHEPPARTON FORMATION
				0.5				CI	Sandy CLAY; medium plasticity, orange-brown, fine to medium grained sand.	W<PL				
				1.0				CI-CH	CLAY; medium to high plasticity, brown and dark brown, trace fine to coarse grained sand, trace organic fragments up to 2mm in size.	W<PL				
				1.5					1.6m: browna nd grey with dark grey. trace fine to coarse grained sand, trace fine to coarse graine rounded gravel					
				2.0					2.0m: brown and grey					
				2.5										
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-04 - 1 Depth Range: 0.00 - 3.00 m

wsp	TITLE Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN MdW / DATE 14-Dec-21 CHECKED RK / DATE 13-Dec-21 SCALE Not To Scale / A4 PROJECT No PS125526 / FIGURE No 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-05

SHEET : 1 OF 1

Client:	Lochard Energy	Date Commenced:	11-11-21
Project:	Winton Energy Reserve 1 Facility	Date Completed:	11-11-21
Test Pit Location:	386 Lee Rd, Winton VIC	Recorded By:	DRB
Project Number:	PS125526	Log Checked By:	RK

Excavation Method:	Komatsu PC40 MR	Hole Angle:	-90°	Surface RL:	
Dimensions:	0.50 m	Bearing:	---	Co-ords:	E 418955 N 5960103 MGA94 55

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.5				ML	Topsoil: SILT; low plasticity, pale grey, trace root fibres.	W<PL				TOPSOIL
								CI-CH	CLAY; medium to high plasticity, brown, trace root fibres.	W<PL				SHEPPARTON FORMATION
				1.0				CH	CLAY; high plasticity, brown and red-brown, trace fine to coarse grained sand.	W<PL				
				1.5					1.0m: brown					
				2.0					1.5m: red-brown and brown					
				2.5										
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-05 - 1 Depth Range: 0.00 - 3.00 m

wsp	TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21
		CHECKED: RK	DATE: 13-Dec-21
		SCALE: Not To Scale	A4
		PROJECT No: PS125526	FIGURE No: 1/1

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-06

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**12-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**12-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418818 N 5960074 MGA94 55**

Test Pit Information | **Field Material Description**

METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL			5 10 15 20 25	TOPSOIL
								CH	CLAY; high plasticity, grey, trace fine grained hematite gravel, trace root fibres.					SHEPPARTON FORMATION
				0.5					1.7m: brown, trace fine to coarse grained sand, trace fine to medium grained ematite gravel					
				1.0										
				1.5					1.5m: grey with orange-brown					
				2.0					2.0m: grey with orange-browna nd red-brown					
				2.5					2.5m: grey and orange-brown					
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-06 - 1 Depth Range: 0.00 - 3.00 m

wsp	TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21
		CHECKED: RK	DATE: 13-Dec-21
		SCALE: Not To Scale	A4
		PROJECT No: PS125526	FIGURE No: 1/1

WSP_LIB_7.9.4.GLB GrfcTbl DG PHOTO TEST PIT PHOTO 1 PER PAGE PS125526_LOCHARD_WINTON_ENERGY.GPJ <<DrawingFile>> 14-Dec-2021 10:11 10.02.00.04 Datgel CPT Tool gINT Add-In

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-07

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**12-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**12-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418710 N 5960128 MGA94 55**

Test Pit Information							Field Material Description								
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, pale grey, trace root fibres.	W<PL				TOPSOIL
								CH	CLAY; high plasticity, brown, trace root fibres.	W<PL				SHEPPARTON FORMATION
				0.5					0.5m: trace fine to medium grained mematite gravel					
				1.0					0.9m: trace fine to medium grained sand, trace fine grained hematite gravel					
				1.5										
				2.0					2.0m: grey and brown, trace fine grained sand					
				2.5										
				3.0				CI	Sandy CLAY; medium plasticity, orange-brown, grey and brown, fine to coarse grained sand, trace fine to medium grained su-rounded gravel.	W<PL				
									END OF TEST PIT AT 3.10 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-07 - 1 Depth Range: 0.00 - 3.10 m

wsp	TITLE Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN MdW / DATE 14-Dec-21 CHECKED RK / DATE 13-Dec-21 SCALE Not To Scale / A4 PROJECT No PS125526 / FIGURE No 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-08

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**12-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**12-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418614 N 5960002 MGA94 55**

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL				TOPSOIL
								CH	CLAY; high plasticity, brown, trace fine grained hematite gravel, trace root fibres.	W<PL				SHEPPARTON FORMATION
				0.5					0.8m: brown with grey, trace fine to medium grained hematite gravel					
				1.0										
				1.5					1.5m: brown and grey, trace fine grained sand					
				2.0					2.0m: grey with red-brown					
				2.5					2.6m: grey and red-brown					
				3.0					END OF TEST PIT AT 3.10 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-08 - 1 Depth Range: 0.00 - 3.10 m

TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21	
	CHECKED: RK	DATE: 13-Dec-21	
	SCALE: Not To Scale		A4
	PROJECT No: PS125526	FIGURE No: 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-09

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**12-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**12-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418499 N 5960066 MGA94 55**

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (FB VL L MD D VD / VS S F ST VST H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL				TOPSOIL
								CH	CLAY; high plasticity, brown with grey, trace fine grained hematite gravel, trace organic fragments up to 5mm.	W<PL				SHEPPARTON FORMATION
				0.5						W<PL				
				1.0					1.0m: brown with dark brown					
				1.5					1.5m: grey and brown, trace fine grained sand, trace fine to medium grained gravel	W<PL				
				2.0										
				2.5					2.6m: trace fine to medium grained sand, trace fine to medium grained gravel					
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-09 - 1 Depth Range: 0.00 - 3.00 m

wsp	TITLE Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN MdW / DATE 14-Dec-21 CHECKED RK / DATE 13-Dec-21 SCALE Not To Scale / A4 PROJECT No PS125526 / FIGURE No 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-10

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**12-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**12-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418429 N 5959960 MGA94 55**

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL				TOPSOIL
									CLAY; high plasticity, brown, trace coarse grained sand, trace fine grained hematite gravel, trace root fibres.	W<PL				SHEPPARTON FORMATION
				0.5										
				1.0					1.2m: brown with dark brown					
				1.5					1.6m: brown with pale grey, trace fine grained sand					
				2.0					1.9m: pale grey and pale brown					
				2.5										
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-10 - 1 Depth Range: 0.00 - 3.00 m

wsp	TITLE Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN MdW / DATE 14-Dec-21 CHECKED RK / DATE 13-Dec-21 SCALE Not To Scale / A4 PROJECT No PS125526 / FIGURE No 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-11

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**12-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**12-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418324 N 5959863 MGA94 55**

Test Pit Information							Field Material Description								
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H; FB VL L MD D VD)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.0				ML	Topsoil: SILT; low plasticity, brown, trace root fibres.	W<PL				TOPSOIL
								CH	CLAY; high plasticity, brown, trace fine grained hematite gravel, trace roots and root fibres.					SHEPPARTON FORMATION
				0.5					0.5m: trace fine to medium grained sand, no roots					
				1.0										
				1.5										
				2.0					2.0m: brown and grey with dark brown					
				2.5					2.7m: grey and orange, with fine to medium grained sand					
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-11 - 1 Depth Range: 0.00 - 3.00 m

TITLE: Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN: MdW	DATE: 14-Dec-21	
	CHECKED: RK	DATE: 13-Dec-21	
	SCALE: Not To Scale		A4
	PROJECT No: PS125526	FIGURE No: 1/1	

TEST PIT ENGINEERING LOG

TEST PIT NO.

TP-SA-12

SHEET : 1 OF 1

Client:	**Lochard Energy**	Date Commenced:	**12-11-21**
Project:	**Winton Energy Reserve 1 Facility**	Date Completed:	**12-11-21**
Test Pit Location:	**386 Lee Rd, Winton VIC**	Recorded By:	**DRB**
Project Number:	**PS125526**	Log Checked By:	**RK**

Excavation Method:	**Komatsu PC40 MR**	Hole Angle:	**-90°**	Surface RL:	
Dimensions:	**0.50 m**	Bearing:	**---**	Co-ords:	**E 418174 N 5959885 MGA94 55**

Test Pit Information							Field Material Description							
METHOD	SUPPORT	WATER	RL (m AHD)	DEPTH (m)	FIELD TEST	SAMPLE	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	POCKET PENETROMETER (kPa)	DCP RESULTS (BLOWS/ 100mm) (5 10 15 20 25)	STRUCTURE AND ADDITIONAL OBSERVATIONS
EX	Nil	NFGWO		0.5				ML	Topsoil: SILT; low plasticity, pale brown.	W<PL				TOPSOIL
				1.0				CH	CLAY; high plasticity, brown, trace fine grained hematite gravel.	W<PL				SHEPPARTON FORMATION
				1.5					1.1m: pale grey, with fine grained hematite gravel, trace organic fragments up to 5mm					
				2.0					1.6m: grey					
				2.5				CI	Sandy; fine to medium grained sand.	W<PL				
				3.0					END OF TEST PIT AT 3.00 m					

This test pit log should be read in conjunction with WSP's accompanying explanatory notes.

TP-SA-12 - 1 Depth Range: 0.00 - 3.00 m

wsp	TITLE Lochard Energy 386 Lee Rd, Winton VIC Winton Energy Reserve 1 Facility Winton Energy Reserve 1 Facility	DRAWN MdW / DATE 14-Dec-21 CHECKED RK / DATE 13-Dec-21 SCALE Not To Scale / A4 PROJECT No PS125526 / FIGURE No 1/1	

Appendix C

Laboratory Test Results

Soils testing - Particle size distribution & consistency limits test report

Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1, 3.4.1 & AS 1726:2017 Section 6.1

GOLDER MEMBER OF WSP

Test request #:	TRM21-0734	**Lab sample ID:**	LMEL2021112148
Client:	Lochard Winton Energy Pty Ltd		
Client address:	285 Waarre Rd, Port Campbell VIC 3269		
Project ID:	21501089	**Lab report ref.:**	LMEL_21074530
Project name:	Lochard Winton Energy	**Exploratory Hole**	BH01
Project reference:		**Loc. ref.:**	Geotechnical Site Investigation

Golder Associates Pty Ltd
MELBOURNE GEOTECHNICAL LABORATORY
Building 7, Botanicca Corporate Park
570 - 588 Swan Street
Richmond, Victoria 3121

Sample depth (m): 2.50 - 3.00
Client sample ref: BH01-004

Specimen description: (AS 1726:2017 Section 6.1)
Sampling: Tested as received

PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1

Sieve Size	Passing	LB S	UB S
125 mm	100%		
75 mm	100%		
63 mm	100%		
53 mm	100%		
37.5 mm	100%		
26.5 mm	100%		
19 mm	100%		
13.2 mm	100%		
9.5 mm	100%		
6.7 mm	100%		
4.75 mm	100%		
2.36 mm	98%		
1.18 mm	96%		
600 µm	95%		
425 µm	95%		
300 µm	94%		
212 µm	93%		
150 µm	91%		
75 µm	86%		

(CI) CLAY, medium plasticity, brown, trace fine to coarse grained sand, trace fine grained gravel

Easting (m)	Northing (m)	Level (m)

Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
	Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
Result:	14.3% As Rcvd.	43%	12%	31%	10.0%	Curling
LB S:						-
UB S:						-

Att. preparation method: Dry sieved **LSM length (mm):** 255

Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK
Preparation of specimen and testing performed on sample supplied to the laboratory

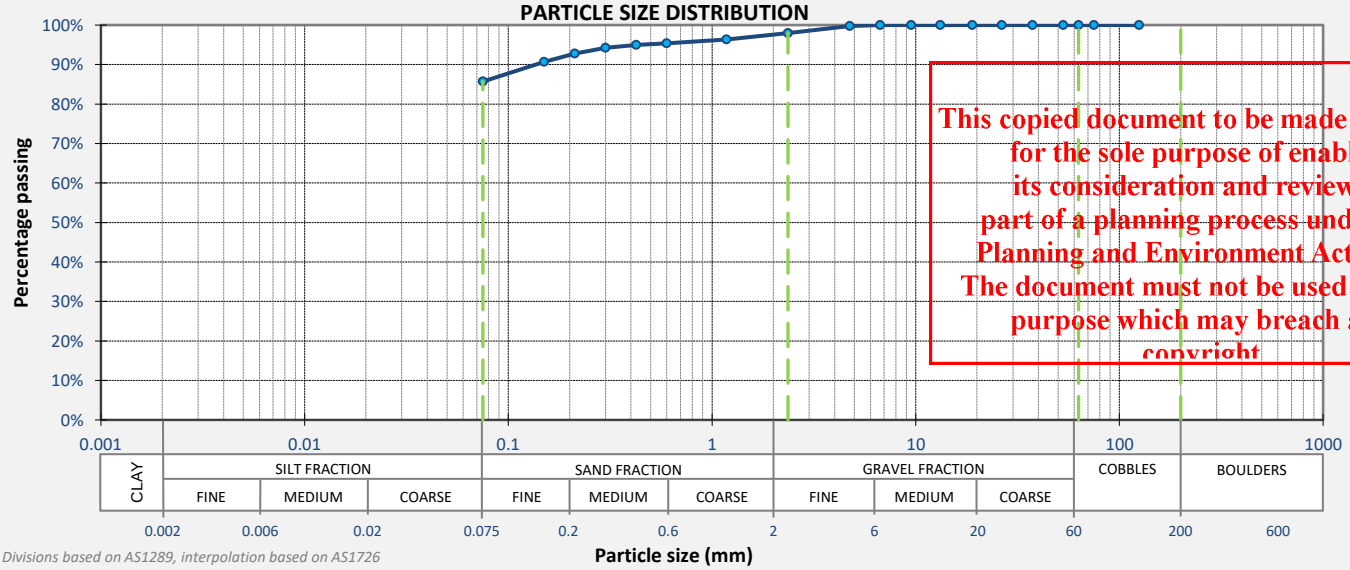
Definitions:
LB S = Lower bound specification
LSM = Linear shrinkage mould
UB S = Upper bound specification
N/A = Not applicable
ND = Not determined; SIB = Slip in bowl
NO = Not obtainable; NP = Non plastic

GRADING SUMMARY

Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)
85.7%	12.3%	2.0%	0.0%

*Proportions based on guidance in AS1726-2017 Section 6.1.4.2

PARTICLE SIZE DISTRIBUTION



Divisions based on AS1289, interpolation based on AS1726

Testing by: JV **Dates:** 10/12/21 - 13/12/21 **Results reviewed by:** DGiltinan **Date reported:** 13/12/2021

Cert. ref.: 21501089_BH01_TRM21-0734_PSD_21112148_Rep21074530

Approved signatory:

NATA

NATA accreditation number: 1961 - Site:1250 - Melbourne
Accredited for compliance with ISO/IEC 17025 - Testing

David Giltinan - Senior Technician

For issue

Phone: +61 (03) 8862 3500 **Fax:** +61 (03) 8862 3501 **E-mail:** melbgeolab@golder.com.au **Web:** www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1, 3.4.1 & AS 1726:2017 Section 6.1

GOLDER MEMBER OF WSP

Test request #:	TRM21-0734	**Lab sample ID:**	LMEL2021112149
Client:	Lochard Winton Energy Pty Ltd		
Client address:	285 Waarre Rd, Port Campbell VIC 3269		
Project ID:	21501089	**Lab report ref.:**	LMEL_21074531
Project name:	Lochard Winton Energy	**Exploratory Hole**	BH01
Project reference:		**Loc. ref.:**	Geotechnical Site Investigation

Golder Associates Pty Ltd
MELBOURNE GEOTECHNICAL LABORATORY
Building 7, Botanicca Corporate Park
570 - 588 Swan Street
Richmond, Victoria 3121

Sample depth (m): 4.00 - 4.50
Client sample ref: BH01-006

Specimen description: (AS 1726:2017 Section 6.1) **Sampling:** Tested as received

PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1

(CH) CLAY, high plasticity, brown, trace fine to coarse grained sand

Easting (m) | Northing (m) | Level (m)

Sieve Size	Passing	LB S	UB S
125 mm	100%		
75 mm	100%		
63 mm	100%		
53 mm	100%		
37.5 mm	100%		
26.5 mm	100%		
19 mm	100%		
13.2 mm	100%		
9.5 mm	100%		
6.7 mm	100%		
4.75 mm	100%		
2.36 mm	99%		
1.18 mm	99%		
600 µm	98%		
425 µm	98%		
300 µm	97%		
212 µm	96%		
150 µm	94%		
75 µm	91%		

Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
	Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
Result:	20.5% As Rcvd.	56%	15%	41%	8.5%	Curling
LB S:						-
UB S:						-

Att. preparation method: Dry sieved **LSM length (mm):** 255

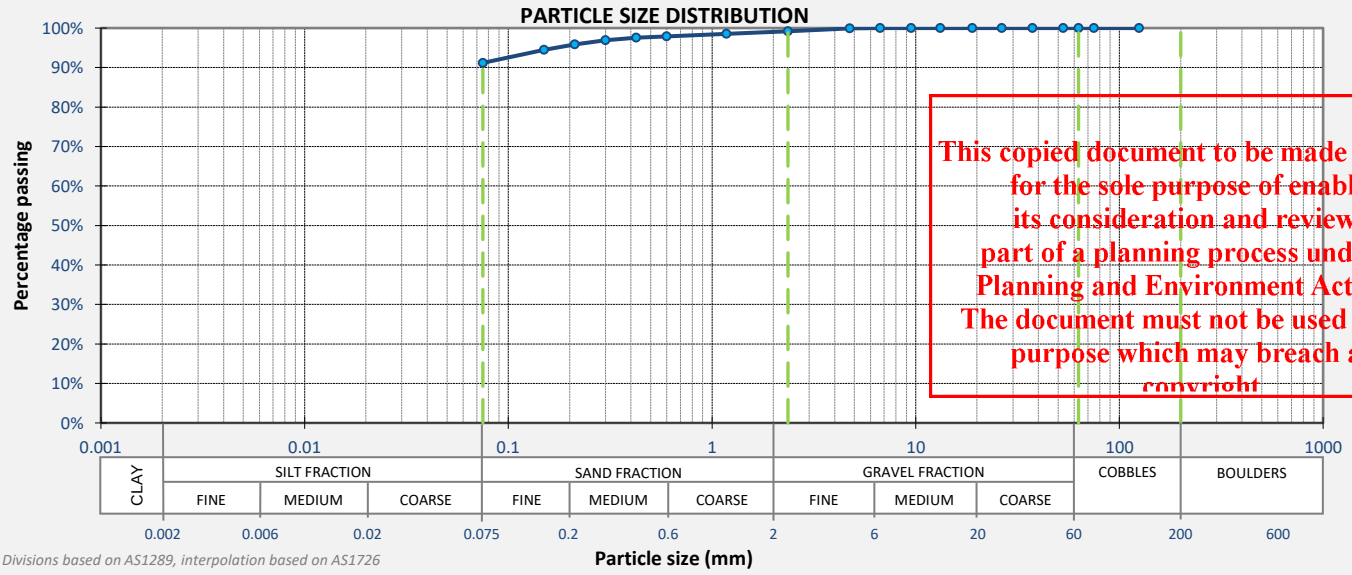
Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK
Preparation of specimen and testing performed on sample supplied to the laboratory

Definitions:
LB S = Lower bound specification
LSM = Linear shrinkage mould
UB S = Upper bound specification
N/A = Not applicable
ND = Not determined; SIB = Slip in bowl
NO = Not obtainable; NP = Non plastic

GRADING SUMMARY

Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)
91.2%	8.0%	0.8%	0.0%

*Proportions based on guidance in AS1726-2017 Section 6.1.4.2



Divisions based on AS1289, interpolation based on AS1726

Testing by: JV **Dates:** 10/12/21 - 13/12/21 **Results reviewed by:** DGiltinan **Date reported:** 13/12/2021

Cert. ref.: 21501089_BH01_TRM21-0734_PSD_21112149_Rep21074531

Approved signatory:

NATA

NATA accreditation number: 1961 - Site:1250 - Melbourne
Accredited for compliance with ISO/IEC 17025 - Testing

David Giltinan - Senior Technician

For issue

Phone: +61 (03) 8862 3500 **Fax:** +61 (03) 8862 3501 **E-mail:** melbgeolab@golder.com.au **Web:** www.golder.com.au

Soils testing - Particle size distribution & consistency limits test report

Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1, 3.4.1 & AS 1726:2017 Section 6.1

GOLDER MEMBER OF WSP

Test request #:	TRM21-0734	**Lab sample ID:**	LMEL2021112150
Client:	Lochard Winton Energy Pty Ltd		
Client address:	285 Waarre Rd, Port Campbell VIC 3269		
Project ID:	21501089	**Lab report ref.:**	LMEL_21074532
Project name:	Lochard Winton Energy	**Exploratory Hole**	BH03
Project reference:		**Loc. ref.:**	Geotechnical Site Investigation

Golder Associates Pty Ltd
MELBOURNE GEOTECHNICAL LABORATORY
Building 7, Botanicca Corporate Park
570 - 588 Swan Street
Richmond, Victoria 3121

Sample depth (m): 2.50 - 3.00
Client sample ref: BH03-002

Specimen description: (AS 1726:2017 Section 6.1)
Sampling: Tested as received

PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1

(CH) CLAY, high plasticity, brown, trace fine to coarse grained sand, trace fine to medium grained gravel

Sieve Size	Passing	LB S	UB S
125 mm	100%		
75 mm	100%		
63 mm	100%		
53 mm	100%		
37.5 mm	100%		
26.5 mm	100%		
19 mm	100%		
13.2 mm	100%		
9.5 mm	100%		
6.7 mm	98%		
4.75 mm	96%		
2.36 mm	93%		
1.18 mm	90%		
600 µm	89%		
425 µm	89%		
300 µm	88%		
212 µm	88%		
150 µm	87%		
75 µm	85%		

Easting (m)	Northing (m)	Level (m)

Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
	Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
Result:	16.6% As Rcvd.	58%	16%	42%	8.0%	Curling
LB S:						-
UB S:						-

Att. preparation method: Dry sieved **LSM length (mm):** 250

Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK
Preparation of specimen and testing performed on sample supplied to the laboratory

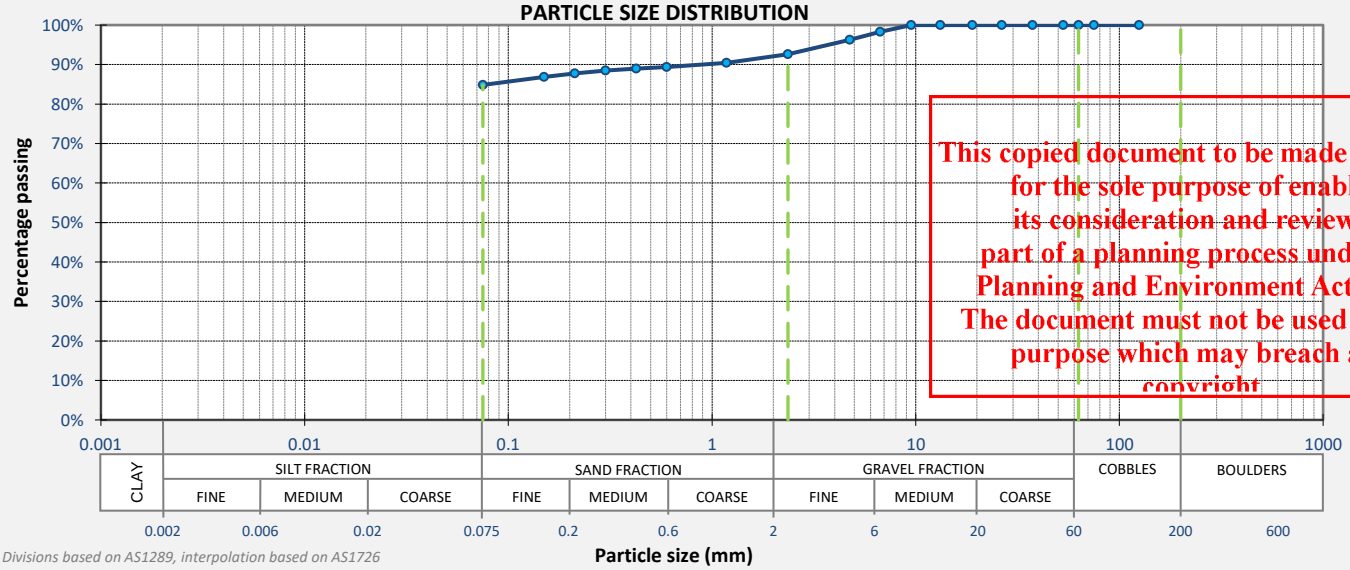
Definitions:
LB S = Lower bound specification
LSM = Linear shrinkage mould
UB S = Upper bound specification
N/A = Not applicable
ND = Not determined; SIB = Slip in bowl
NO = Not obtainable; NP = Non plastic

GRADING SUMMARY

Fines	Sand*	Gravel*	Cobbles*
(<75 µm)	(>75 µm - <2.36 mm)	(>2.36 mm - <63 mm)	(>63mm - <200 mm)
84.8%	7.8%	7.4%	0.0%

*Proportions based on guidance in AS1726-2017 Section 6.1.4.2

PARTICLE SIZE DISTRIBUTION



Divisions based on AS1289, interpolation based on AS1726

Testing by: JV **Dates:** 10/12/21 - 13/12/21 **Results reviewed by:** DGiltinan **Date reported:** 13/12/2021

Cert. ref.: 21501089_BH03_TRM21-0734_PSD_21112150_Rep21074532

Approved signatory:

NATA

NATA accreditation number: 1961 - Site:1250 - Melbourne
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL ONLY BE REPRODUCED IN FULL

David Giltinan - Senior Technician

For issue

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Soils testing - Particle size distribution & consistency limits test report

Standard method (by sieving)

AS1289.3.6.1, 2.1.1, 3.1.2, 3.2.1, 3.3.1, 3.4.1 & AS 1726:2017 Section 6.1

GOLDER MEMBER OF WSP

Test request #:	TRM21-0734	**Lab sample ID:**	LMEL2021112151
Client:	Lochard Winton Energy Pty Ltd		
Client address:	285 Waarre Rd, Port Campbell VIC 3269		
Project ID:	21501089	**Lab report ref.:**	LMEL_21074533
Project name:	Lochard Winton Energy	**Exploratory Hole**	BH03
Project reference:		**Loc. ref.:**	Geotechnical Site Investigation

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Building 7, Botanicca Corporate Park
570 - 588 Swan Street
Richmond, Victoria 3121

Sample depth (m): 5.50 - 6.00
Client sample ref: BH03-005

Specimen description: (AS 1726:2017 Section 6.1)
Sampling: Tested as received

PARTICLE SIZE DISTRIBUTION AS 1289.3.6.1

(SC) Gravelly Clayey SAND, fine to coarse grained, brown, low plasticity fines, fine to medium grained gravel

Sieve Size	Passing	LB S	UB S
125 mm	100%		
75 mm	100%		
63 mm	100%		
53 mm	100%		
37.5 mm	100%		
26.5 mm	100%		
19 mm	100%		
13.2 mm	98%		
9.5 mm	91%		
6.7 mm	86%		
4.75 mm	80%		
2.36 mm	69%		
1.18 mm	60%		
600 µm	54%		
425 µm	51%		
300 µm	48%		
212 µm	44%		
150 µm	39%		
75 µm	32%		

Easting (m)	Northing (m)	Level (m)

Method:	AS 1289.2.1.1	AS 1289.3.1.2	AS 1289.3.2.1	AS 1289.3.3.1	AS 1289.3.4.1	
	Moisture content	1 point Liquid limit	Plastic limit	Plasticity index	Linear shrinkage	Curling/ Crumbling/ Cracking
Result:	7.2% As Rcvd.	26%	14%	12%	4.5%	Cracking
LB S:						-
UB S:						-

Att. preparation method: Dry sieved **LSM length (mm):** 255

Specimen history/notes: Compliance check AS 1289.1.1 - Clause 5.7 - Table 1 - OK
Preparation of specimen and testing performed on sample supplied to the laboratory

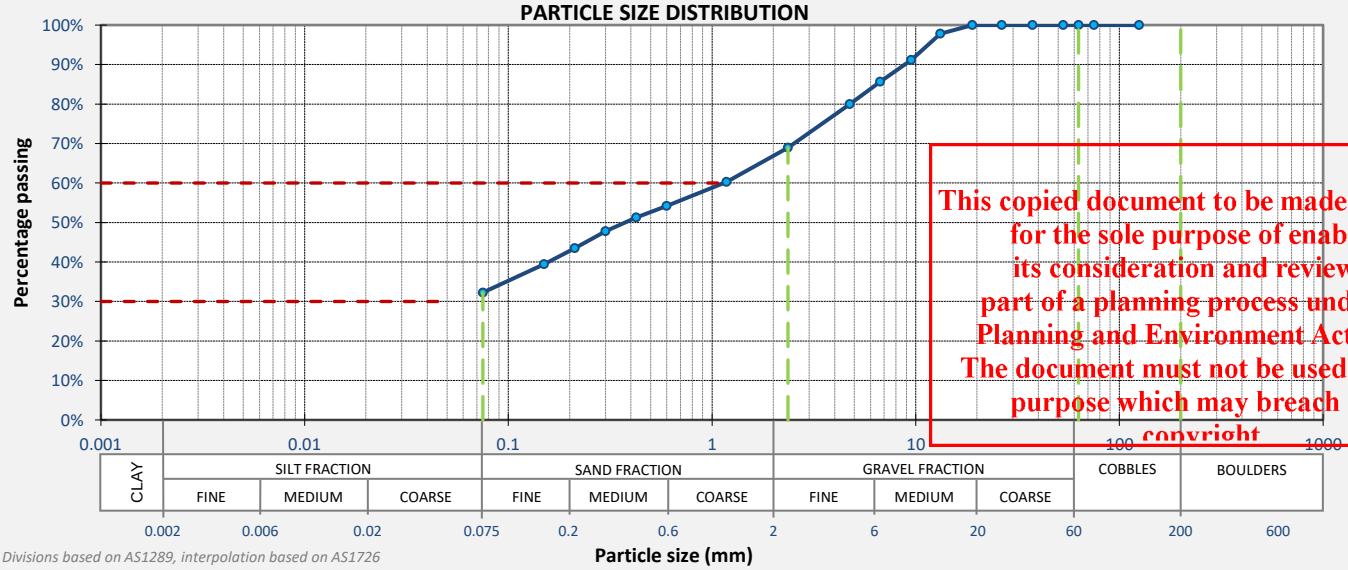
Definitions:
LB S = Lower bound specification
LSM = Linear shrinkage mould
UB S = Upper bound specification
N/A = Not applicable
ND = Not determined; SIB = Slip in bowl
NO = Not obtainable; NP = Non plastic

GRADING SUMMARY

Fines (<75 µm)	Sand* (>75 µm - <2.36 mm)	Gravel* (>2.36 mm - <63 mm)	Cobbles* (>63mm - <200 mm)
32.3%	36.7%	31.0%	0.0%

*Proportions based on guidance in AS1726-2017 Section 6.1.4.2

PARTICLE SIZE DISTRIBUTION



Divisions based on AS1289, interpolation based on AS1726

Testing by: JV **Dates:** 10/12/21 - 13/12/21 **Results reviewed by:** DGiltinan **Date reported:** 13/12/2021

Cert. ref.: 21501089_BH03_TRM21-0734_PSD_21112151_Rep21074533

Approved signatory:

NATA

NATA accreditation number: 1961 - Site:1250 - Melbourne
Accredited for compliance with ISO/IEC 17025 - Testing

David Giltinan - Senior Technician

For issue

Phone: +61 (03) 8862 3500 **Fax:** +61 (03) 8862 3501 **E-mail:** melbgeolab@golder.com.au **Web:** www.golder.com.au

Soils testing - Determination of the moisture content of soil

Oven drying method (standard method)

AS 1289.2.1.1-2005

GOLDER
MEMBER OF WSP

Test request ID:	**TRM21-0734**	**Lab sample IDs:**	2021112144-2021112147
Client:	Lochard Winton Energy Pty Ltd		
Client address:	285 Waarre Rd, Port Campbell VIC 3269		
Project ID:	**21501089**	**Lab report ref.:**	LMEL_21074857

Golder Associates Pty Ltd
MELBOURNE GEOTECHNICAL LABORATORY
Building 7, Botanicca Corporate Park
570 - 588 Swan Street
Richmond, Victoria 3121

Project name: Lochard Winton Energy

Location: -

Project reference:

TEST REPORT - SUMMARY OF ANALYSIS

Lab sample ID	Exploratory hole reference	Sample depth (m)	Specimen reference	Specimen description *(Based on visual and tactile assessment)*	Moisture content
LMEL2021112144	BH01	1.45	BH01-003	(CI/CH)CLAY,high plasticity,grey	16.6%
		1.95			As Rcvd.
LMEL2021112146	BH01	4.50	BH01-007	(CH)CLAY,high plasticity,grey	22.6%
		4.95			As Rcvd.
LMEL2021112145	BH03	1.50	BH03-001	(CH)CLAY,high plasticity,brown	23.3%
		1.95			As Rcvd.
LMEL2021112147	BH03	4.50	BH03-004	(CL)CLAY,low plasticxity,grey/pale brown	14.5%
		4.73			As Rcvd.

Notes: *Preparation of specimen and testing performed on sample supplied to the laboratory*

Definitions:
ND = Not determined

Specimen prepared by: JM
Result reviewed by: GSamaradiwakara

Test performed by: JM
Date reported: **23/12/2021**

Cert. ref.: **21501089_TRM21-0734_SMC_2021112144-2021112147_LMEL_21074857**

Approved signatory:

NATA accreditation number: 1961 - Site:1250 - Melbourne
Accredited for compliance with ISO/IEC 17025 - Testing

Gayani Samaradiwakara - Senior Laboratory Engineer

Phone: +61 (03) 8862 3500 **Fax:** +61 (03) 8862 3501 **E-mail:** melbgeolab@golder.com.au **Web:** www.golder.com.au

Soils testing - Determination of the California Bearing Ratio of a soil

Standard laboratory method for a remoulded specimen (Soaked)

AS 1289.6.1.1-2014

GOLDER MEMBER OF WSP

Test request #:	**TRM21-0734**	**Lab sample ID:**	LMEL2021112141	**Golder Associates Pty Ltd**	
Client:	Lochard Winton Energy Pty Ltd			**MELBOURNE GEOTECHNICAL LABORATORY**	
Client address:	285 Waarre Rd, Port Campbell VIC 3269			Building 7, Botanicca Corporate Park 570 - 588 Swan Street Richmond, Victoria 3121	
Project ID:	**21501089**	**Lab report ref.:**	LMEL_21074854		
Lab project name:	**Lochard Winton Energy**	**Exploratory Hole**	**TP01**	**Sample depth (m):**	0.50 - 1.00
				Client sample ref.:	TP01-001
Project reference:		**Loc. ref.:**	-		
Specimen description: (Based on visual and tactile assessment)	(CH) CLAY, high plasticity, brown			**Sampled by:**	**Client**
				Sampled type:	**1**

SPECIMEN PREPARATION - SUMMARY OF COMPACTION AND MOISTURE CONTENT TEST RESULTS

Initial moisture content:	**25.3% As rcvd.**
Compaction method:	AS1289.5.1.1-2017 Standard
Maximum dry density (t/m^3):	**1.63**
Optimum moisture content:	**24.0%**
Oversize material (>19mm):	-
Compaction moisture content:	**24.2%**

Note on compaction:

No oversize material was retained on the 19mm sieve

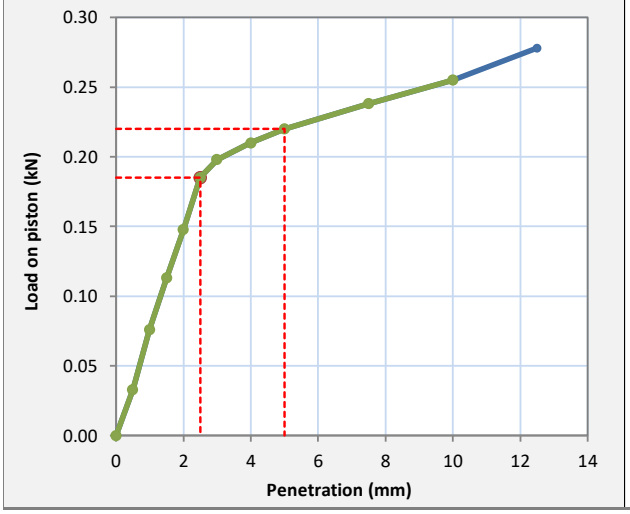
Notes on test:

Specimen remoulded to a target of 98% SMDD @ OMC

Notes on compaction test

SUMMARY OF CALIFORNIA BEARING RATIO TEST RESULT

Penetration (mm):		0.0	0.5	1.0	1.5	2.0	**2.5**	3.0	4.0	**5.0**	7.5	10.0	12.5	**Correction:**
Load (kN)	**Original**	0.00	0.03	0.08	0.11	0.15	0.19	0.20	0.21	0.22	0.24	0.26	0.28	
	Corrected	0.00	0.03	0.08	0.11	0.15	0.19	0.20	0.21	0.22	0.24	0.26		



Dry density t/m^3	before soaking:	**1.59**
	after soaking	**1.56**
Density ratio	before soaking	**98.0%**
	after soaking	**95.5%**
Moisture ratio at compaction:		**101.0%**
Duration of soaking (days):		**4**
Surcharge applied (kg):		**4.5**
Moisture content top 30mm:		**35.3%**
Moisture content remainder:		**25.1%**
Swell after soaking:		**2.5%**
Bearing ratio at 2.5mm penetration:		**1.5%**
Bearing ratio at 5.0mm penetration:		**1.0%**

Penetration (mm) **2.5** **CBR Value** **1.5%**

Definitions:

ND = Not determined

Specimen prepared by: YHL **Tested by:** YHL **On:** 21/12/21

Results reviewed by: NL **Date reported:** **22/12/21**

Cert. ref.: 21501089_TP01_TRM21-0734-CBRS_21112141_Rep-21074854 **Approved signatory:**

NATA

NATA accreditation number: 1961 - Site:1250 - Melbourne

Accredited for compliance with ISO/IEC 17025 - Testing

Nick Lobb - Senior Technician

Phone: +61 (03) 8862 3500 **Fax:** +61 (03) 8862 3501 **E-mail:** melbgeolab@golder.com.au **Web:** www.golder.com.au

This test was carried out in accordance with AS 1289.6.1.1-2014. Test results relate only to the specimens tested.

Soils testing - Determination of the California Bearing Ratio of a soil

Standard laboratory method for a remoulded specimen (Soaked)

AS 1289.6.1.1-2014

GOLDER
MEMBER OF WSP

Test request #:	**TRM21-0734**	**Lab sample ID:**	LMEL2021112142	**Golder Associates Pty Ltd**	
Client:	Lochard Winton Energy Pty Ltd			**MELBOURNE GEOTECHNICAL LABORATORY**	
Client address:	285 Waarre Rd, Port Campbell VIC 3269			Building 7, Botanicca Corporate Park 570 - 588 Swan Street Richmond, Victoria 3121	
Project ID:	**21501089**	**Lab report ref.:**	LMEL_21074855		
Lab project name:	**Lochard Winton Energy**	**Exploratory Hole**	**TP02**	**Sample depth (m):**	0.50 - 1.00
				Client sample ref.:	TP02-001
Project reference:		**Loc. ref.:**	-		
Specimen description: (Based on visual and tactile assessment)	(CL) CLAY, low plasticity, grey, with fine to medium grained gravel			**Sampled by:**	**Client**
				Sampled type:	**2**

SPECIMEN PREPARATION - SUMMARY OF COMPACTION AND MOISTURE CONTENT TEST RESULTS

Initial moisture content:	**13.0% As rcvd.**
Compaction method:	AS1289.5.1.1-2017 Standard
Maximum dry density (t/m^3):	**1.73**
Optimum moisture content:	**16.5%**
Oversize material (>19mm):	-
Compaction moisture content:	**16.5%**

Note on compaction:

No oversize material was retained on the 19mm sieve

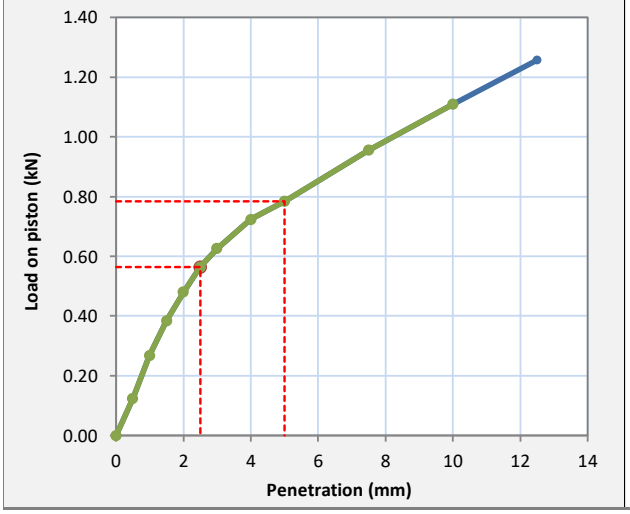
Notes on test:

Specimen remoulded to a target of 98% SMDD @ OMC

Notes on compaction test

SUMMARY OF CALIFORNIA BEARING RATIO TEST RESULT

Penetration (mm):		0.0	0.5	1.0	1.5	2.0	**2.5**	3.0	4.0	**5.0**	7.5	10.0	12.5	**Correction:**
Load (kN)	**Original**	0.00	0.12	0.27	0.39	0.48	0.56	0.63	0.72	0.78	0.96	1.11	1.26	
	Corrected	0.00	0.12	0.27	0.39	0.48	0.56	0.63	0.72	0.78	0.96	1.11		



Dry density t/m^3	before soaking:	**1.70**
	after soaking	**1.68**
Density ratio	before soaking	**98.0%**
	after soaking	**96.5%**
Moisture ratio at compaction:		**100.0%**
Duration of soaking (days):		**4**
Surcharge applied (kg):		**4.5**
Moisture content top 30mm:		**23.5%**
Moisture content remainder:		**19.4%**
Swell after soaking:		**1.5%**
Bearing ratio at 2.5mm penetration:		**4.5%**
Bearing ratio at 5.0mm penetration:		**4.0%**

Penetration (mm) **2.5** **CBR Value** **4.5%**

Definitions:
ND = Not determined

Specimen prepared by: YHL **Tested by:** YHL **On:** 21/12/21
Results reviewed by: NL **Date reported:** **22/12/21**

Cert. ref.: 21501089_TP02_TRM21-0734-CBRS_21112142_Rep-21074855 **Approved signatory:**

NATA

NATA accreditation number: 1961 - Site:1250 - Melbourne

Accredited for compliance with ISO/IEC 17025 - Testing

Nick Lobb- Senior Technician

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Soils testing - Determination of the California Bearing Ratio of a soil

Standard laboratory method for a remoulded specimen (Soaked)

AS 1289.6.1.1-2014

GOLDER MEMBER OF WSP

Test request #:	**TRM21-0734**	**Lab sample ID:**	LMEL2021112143	**Golder Associates Pty Ltd**	
Client:	Lochard Winton Energy Pty Ltd			MELBOURNE GEOTECHNICAL LABORATORY	
Client address:	285 Waarre Rd, Port Campbell VIC 3269			Building 7, Botanicca Corporate Park 570 - 588 Swan Street Richmond, Victoria 3121	
Project ID:	**21501089**	**Lab report ref.:**	LMEL_21074548		
Lab project name:	**Lochard Winton Energy**	**Exploratory Hole**	**TP03**	**Sample depth (m):**	0.50 - 1.00
				Client sample ref.:	TP03-001
Project reference:		**Loc. ref.:**	-		
Specimen description: (Based on visual and tactile assessment)	(CH) CLAY, high plasticity, brown			**Sampled by:**	
				Sampled type:	**3**

SPECIMEN PREPARATION - SUMMARY OF COMPACTION AND MOISTURE CONTENT TEST RESULTS

Initial moisture content:	**24.2% As rcvd.**
Compaction method:	AS1289.5.1.1-2017 Standard
Maximum dry density (t/m^3):	**1.58**
Optimum moisture content:	**24.5%**
Oversize material (>19mm):	-
Compaction moisture content:	**24.6%**

Note on compaction:

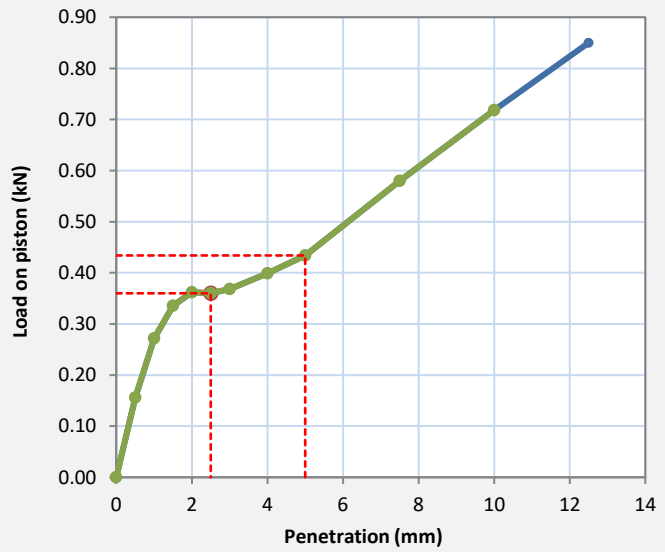
No oversize material was retained on the 19mm sieve

Notes on test:

Notes on compaction test

SUMMARY OF CALIFORNIA BEARING RATIO TEST RESULT

Penetration (mm):		0.0	0.5	1.0	1.5	2.0	**2.5**	3.0	4.0	**5.0**	7.5	10.0	12.5	**Correction:**
Load (kN)	**Original**	0.00	0.16	0.27	0.34	0.36	0.36	0.37	0.40	0.43	0.58	0.72	0.85	
	Corrected	0.00	0.16	0.27	0.34	0.36	0.36	0.37	0.40	0.43	0.58	0.72		



Dry density t/m^3	before soaking:	**1.55**
	after soaking	**1.53**
Density ratio	before soaking	**98.0%**
	after soaking	**96.5%**
Moisture ratio at compaction:		**100.5%**
Duration of soaking (days):		**4**
Surcharge applied (kg):		**4.5**
Moisture content top 30mm:		**29.4%**
Moisture content remainder:		**24.8%**
Swell after soaking:		**1.5%**
Bearing ratio at 2.5mm penetration:		**2.5%**
Bearing ratio at 5.0mm penetration:		**2.0%**

Penetration (mm) **2.5** **CBR Value** **2.5%**

Definitions:

ND = Not determined

Specimen prepared by: JM **Tested by:** YHL **On:** 13/12/21

Results reviewed by: DGiltinan **Date reported:** **14/12/21**

Cert. ref.: 21501089_TP03_TRM21-0734_CBRS_21112143_Rep-21074548 **Approved signatory:**

NATA

NATA accreditation number: 1961 - Site:1250 - Melbourne

Accredited for compliance with ISO/IEC 17025 - Testing

David Giltinan - Senior Technician

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2125119**	Page	: 1 of 3
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Melbourne
Contact	: GOLDER CONTACT	Contact	: Scott Richardson
Address	: PO BOX 6079 RICHMOND VIC, AUSTRALIA 3122	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 8862 3500	Telephone	: +61-3-8549 9600
Project	: 21501089	Date Samples Received	: 13-Dec-2021 10:45
Order number	: Project Number 21501089	Date Analysis Commenced	: 14-Dec-2021
C-O-C number	: ----	Issue Date	: 17-Dec-2021 17:41
Sampler	: ----		
Site	:		
Quote number	: EN/002		
No. of samples received	: 8		
No. of samples analysed	: 4		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, 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 insufficient 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Corrosion assessment for Concrete and Steel piles in soil per Australian Standard AS2159-2009 uses a combination of soil and groundwater data (Tables 6.4.2 C & 6.5.2 C). In the absence of groundwater data, assessment has been made against soil criteria only. Refer to AS2159-2009 section 6.4 for further interpretation of corrosion assessment. ALS is not NATA accredited for Corrosion Assessment comments
- EA167: Soil Condition A – High permeability soils (e.g. sands and gravels) which are in groundwater
- EA167: Soil Condition B – Low permeability soils (e.g. silts and clays) or all soils above groundwater
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH01-003_1.45-1.95 Aggresivity	BH02-003_1.40-1.85 Aggresivity	BH03-001_1.50-1.95 Aggresivity	BH04-002_1.50-1.95 Aggresivity	----
			Sampling date / time	03-Dec-2021 00:00	03-Dec-2021 00:00	03-Dec-2021 00:00	07-Dec-2021 00:00	----
Compound	CAS Number	LOR	Unit	EM2125119-001	EM2125119-002	EM2125119-003	EM2125119-004	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.9	8.5	7.6	6.4	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	372	221	520	593	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	12.8	15.8	18.5	17.8	----
EA080: Resistivity								
Resistivity at 25°C	----	1	ohm cm	2690	4520	1920	1690	----
EA167: Corrosion Classification (per AS2159-2009)								
Ø Exposure Classification - Concrete Piles Soil Condition A	----	-	-	Mild	Mild	Mild	Mild	----
Ø Exposure Classification - Concrete Piles Soil Condition B	----	-	-	Non Aggressive	Non Aggressive	Non Aggressive	Non Aggressive	----
Ø Exposure Classification - Steel Piles Soil Condition A	----	-	-	Mild	Mild	Moderate	Moderate	----
Ø Exposure Classification - Steel Piles Soil Condition B	----	-	-	Non Aggressive	Non Aggressive	Mild	Mild	----
ED040S: Soluble Major Anions								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	230	150	370	360	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	560	910	380	1270	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2125119**	Page	: 1 of 3
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Melbourne
Contact	: GOLDER CONTACT	Contact	: Scott Richardson
Address	: PO BOX 6079 RICHMOND VIC, AUSTRALIA 3122	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 8862 3500	Telephone	: +61-3-8549 9600
Project	: 21501089	Date Samples Received	: 13-Dec-2021
Order number	: Project Number 21501089	Date Analysis Commenced	: 14-Dec-2021
C-O-C number	: ----	Issue Date	: 17-Dec-2021
Sampler	: ----		
Site	:		
Quote number	: EN/002		
No. of samples received	: 8		
No. of samples analysed	: 4		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, 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 insufficient 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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA002: pH 1:5 (Soils) (QC Lot: 4074579)									
EM2124892-006	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.6	8.6	0.0	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 4074578)									
EM2124892-006	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	229	226	1.3	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4074671)									
EM2125003-003	Anonymous	EA055: Moisture Content	----	0.1	%	27.4	25.3	8.2	0% - 20%
EM2125117-001	Anonymous	EA055: Moisture Content	----	0.1	%	26.2	25.8	1.1	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 4074577)									
EM2124892-006	Anonymous	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	90	60	37.9	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 4074580)									
EM2124892-006	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	10	20	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA002: pH 1:5 (Soils) (QCLot: 4074579)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.8	101
				----	7 pH Unit	100	99.3	101
EA010: Conductivity (1:5) (QCLot: 4074578)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1413 µS/cm	99.5	94.5	105
ED040S: Soluble Major Anions (QCLot: 4074577)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	----	----	----	----
ED045G: Chloride by Discrete Analyser (QCLot: 4074580)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	104	85.5	120
				<10	5000 mg/kg	101	85.5	120

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 4074580)							
EM2124892-007	Anonymous	ED045G: Chloride	16887-00-6	2000 mg/kg	120	93.0	125

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2125119**	Page	: 1 of 5
Client	: **GOLDER ASSOCIATES**	Laboratory	: Environmental Division Melbourne
Contact	: GOLDER CONTACT	Telephone	: +61-3-8549 9600
Project	: 21501089	Date Samples Received	: 13-Dec-2021
Site	:	Issue Date	: 17-Dec-2021
Sampler	: ----	No. of samples received	: 8
Order number	: Project Number 21501089	No. of samples analysed	: 4

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved							
BH01-003_1.45-1.95 - Aggresivity, BH03-001_1.50-1.95 - Aggresivity	BH02-003_1.40-1.85 - Aggresivity,	14-Dec-2021	10-Dec-2021	**4**	----	----	----
EA010: Conductivity (1:5)							
Soil Glass Jar - Unpreserved							
BH01-003_1.45-1.95 - Aggresivity, BH03-001_1.50-1.95 - Aggresivity	BH02-003_1.40-1.85 - Aggresivity,	14-Dec-2021	10-Dec-2021	**4**	----	----	----

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA002: pH 1:5 (Soils)								
Soil Glass Jar - Unpreserved (EA002)								
BH01-003_1.45-1.95 - Aggresivity, BH03-001_1.50-1.95 - Aggresivity	BH02-003_1.40-1.85 - Aggresivity,	**03-Dec-2021**	**14-Dec-2021**	10-Dec-2021	×	**14-Dec-2021**	14-Dec-2021	✓
Soil Glass Jar - Unpreserved (EA002)								
BH04-002_1.50-1.95 - Aggresivity		**07-Dec-2021**	**14-Dec-2021**	14-Dec-2021	✓	**14-Dec-2021**	14-Dec-2021	✓
EA010: Conductivity (1:5)								
Soil Glass Jar - Unpreserved (EA010)								
BH01-003_1.45-1.95 - Aggresivity, BH03-001_1.50-1.95 - Aggresivity	BH02-003_1.40-1.85 - Aggresivity,	**03-Dec-2021**	**14-Dec-2021**	10-Dec-2021	×	**14-Dec-2021**	11-Jan-2022	✓
Soil Glass Jar - Unpreserved (EA010)								
BH04-002_1.50-1.95 - Aggresivity		**07-Dec-2021**	**14-Dec-2021**	14-Dec-2021	✓	**14-Dec-2021**	11-Jan-2022	✓
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)								
BH01-003_1.45-1.95 - Aggresivity, BH03-001_1.50-1.95 - Aggresivity	BH02-003_1.40-1.85 - Aggresivity,	**03-Dec-2021**	**----**	----	----	**14-Dec-2021**	17-Dec-2021	✓
Soil Glass Jar - Unpreserved (EA055)								
BH04-002_1.50-1.95 - Aggresivity		**07-Dec-2021**	**----**	----	----	**14-Dec-2021**	21-Dec-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED040S: Soluble Major Anions							
Soil Glass Jar - Unpreserved (ED040S) BH01-003_1.45-1.95 - Aggresivity, BH02-003_1.40-1.85 - Aggresivity, BH03-001_1.50-1.95 - Aggresivity	**03-Dec-2021**	**14-Dec-2021**	31-Dec-2021	✓	**16-Dec-2021**	11-Jan-2022	✓
Soil Glass Jar - Unpreserved (ED040S) BH04-002_1.50-1.95 - Aggresivity	**07-Dec-2021**	**14-Dec-2021**	04-Jan-2022	✓	**16-Dec-2021**	11-Jan-2022	✓
ED045G: Chloride by Discrete Analyser							
Soil Glass Jar - Unpreserved (ED045G) BH01-003_1.45-1.95 - Aggresivity, BH02-003_1.40-1.85 - Aggresivity, BH03-001_1.50-1.95 - Aggresivity	**03-Dec-2021**	**14-Dec-2021**	31-Dec-2021	✓	**15-Dec-2021**	11-Jan-2022	✓
Soil Glass Jar - Unpreserved (ED045G) BH04-002_1.50-1.95 - Aggresivity	**07-Dec-2021**	**14-Dec-2021**	04-Jan-2022	✓	**15-Dec-2021**	11-Jan-2022	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Chloride Soluble By Discrete Analyser	ED045G	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chloride Soluble By Discrete Analyser	ED045G	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride Soluble By Discrete Analyser	ED045G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Resistivity (1:5)	EA080	SOIL	In house: Calculated from Electrical Conductivity
Corrosion Classification for Steel and Concrete Piles	* EA167	SOIL	In house: Exposure classification is determined according to Australian Standard AS2159-2009.
Major Anions - Soluble	ED040S	SOIL	In house: Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.

Preparation Methods	Method	Matrix	Method Descriptions
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Appendix D

Electrical Resistivity Test Results

Wenner Electrical Resistivity Test Results

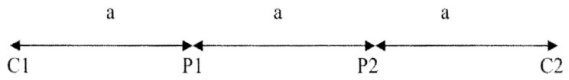
Project Name	Earth Resistivity Testing					
Project/Phase/Task	21501089/1000/***		****			
Client	WSP/Lochard Winton Energy - Benalla					
Test ID						
Location	BH-01_BESS					
Date	11/11/2021		**Time**	8:30		
Coordinates (sounding centre)	**UTM WGS84**	**E:419177 Lat:-36.498872**		**N:5960338 Lon: 146.097533**		
Orientation	**Sounding A:**	N/W 287 degree west	**Sounding B:**			
Equipment	meggar		**Serial No.**	081108/1110	**Calibration date:**	10/11/2021
Rainfall (current and recent)	NIL (Recent unknown)					
Terrain and Soil Conditions	Dry soil/loam grassy					
Remarks	Sounding A is 90 degree to Rail lines and .5mtr south of BH-01					

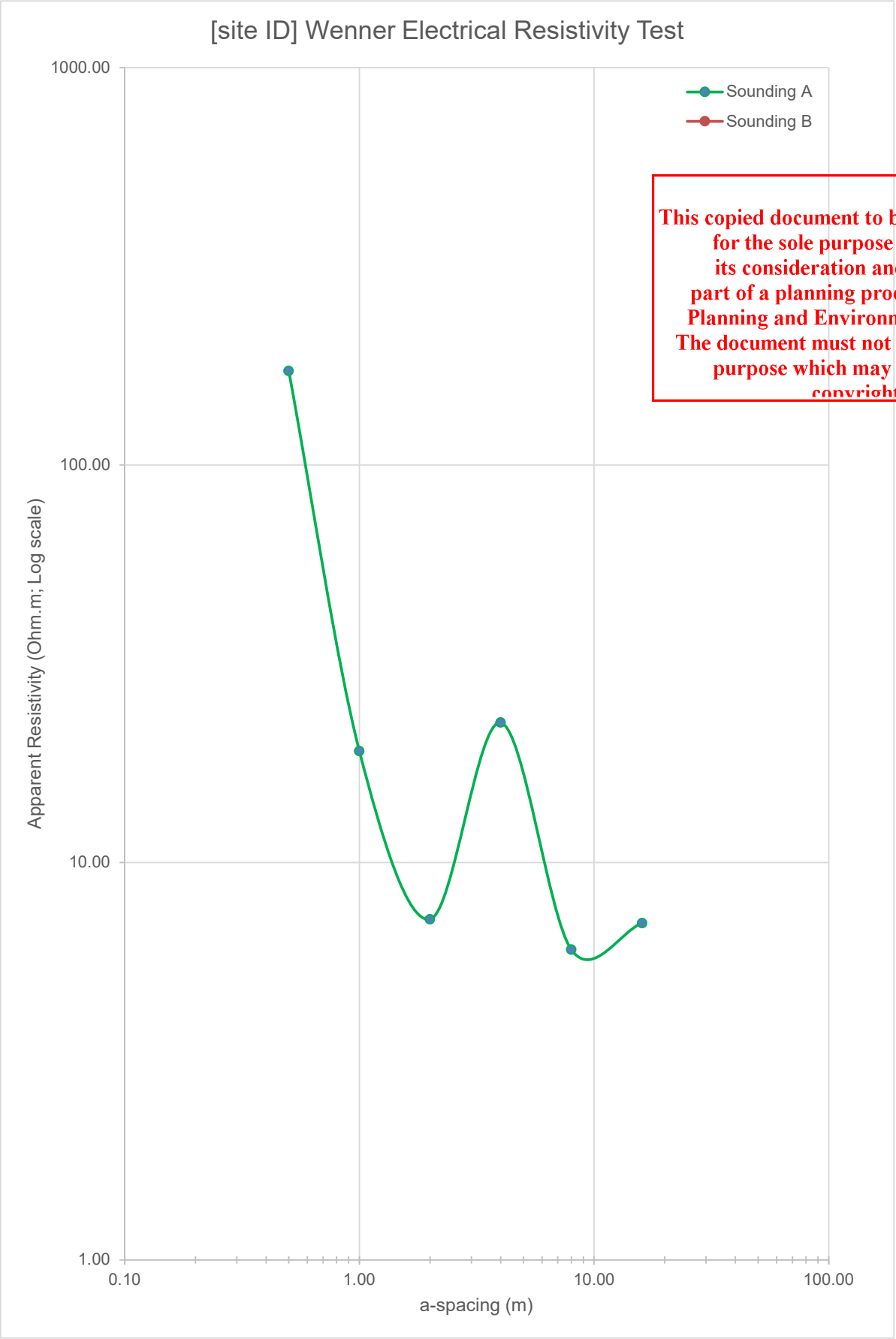
Pin Spacing "a" (m)	* Pin Depth "b" (cm)	Pin distances in metres based on two measuring tapes extended out from centre of sounding				Resistivity Meter Reading 1 (Ω)	Resistivity Meter Reading 2 (Ω)	Resistivity Meter Reading 3 (Ω)	Average Reading "R" (Ω)	Apparent Resistivity (Ω.m)	Comment
		C1 (black)	P1 (red)	P2 (orange)	C2 (yellow)						
SOUNDING A											
0.50	5	0.750	0.250	0.250	0.750	54.00	54.00	54.00	54.00	**172.57**	
1.00	8	1.500	0.500	0.500	1.500	3.00	3.00	3.00	3.00	**19.06**	
2.00	10	3.000	1.000	1.000	3.000	0.57	0.57	0.57	0.57	**7.19**	
4.00	12	6.000	2.000	2.000	6.000	1.04	1.32	0.32	0.89	**22.49**	
8.00	12	12.000	4.000	4.000	12.000	0.12	0.12	0.12	0.12	**6.03**	
16.00	12	24.000	8.000	8.000	24.000	0.07	0.07	0.07	0.07	**7.04**	
32.00	12	48.000	16.000	16.000	48.000	0.05	0.06	0.05	0.05	**10.72**	

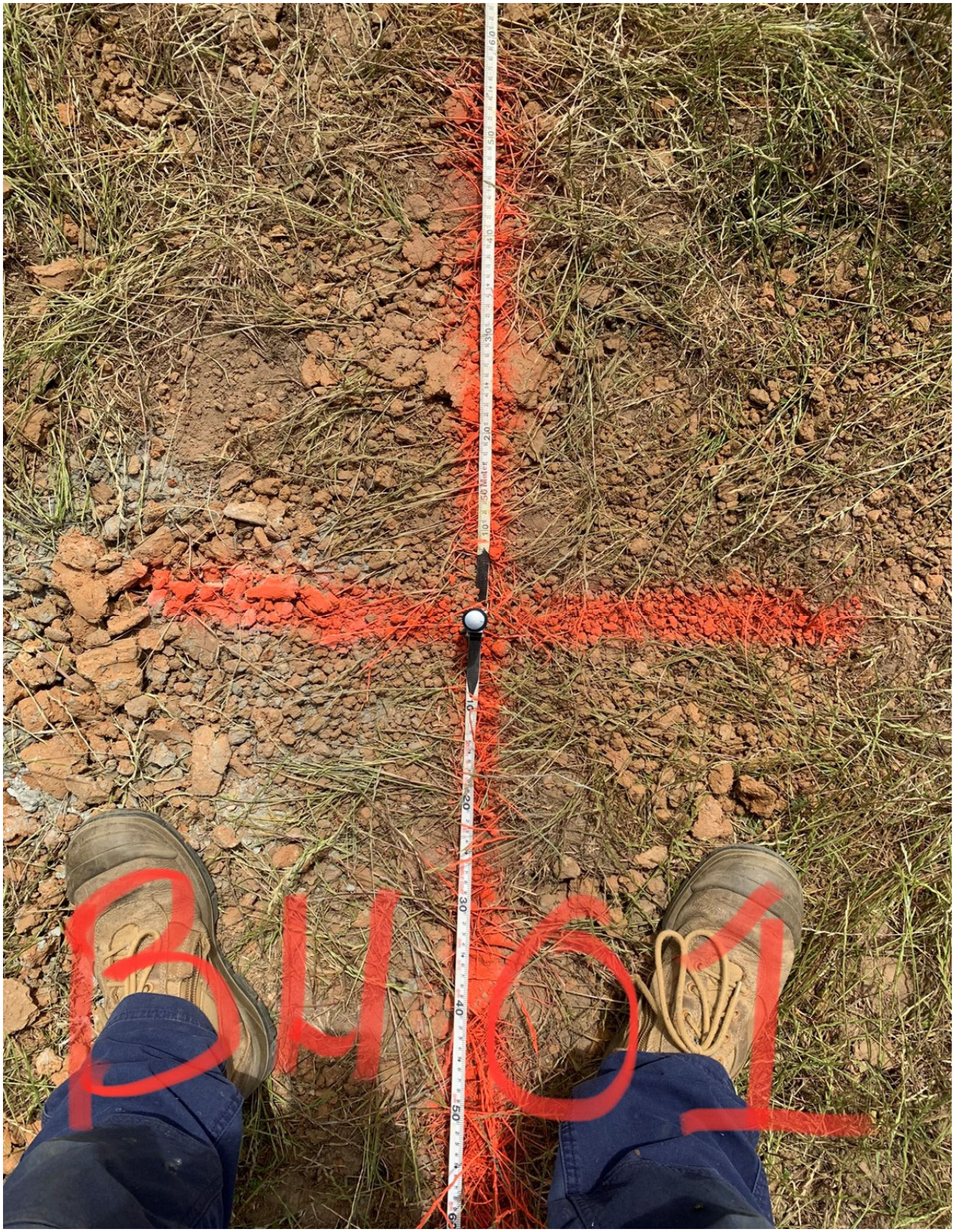
Tested By: HJ Computed By: KB Checked By: ZT

* Based on the ASTM Standard G 57 electrode depth has to be 1/20 of minimum electrode spacing, typically 50 mm for "a" = 1 m. If "a" is < 1 m then measure and record pin depths

Wenner Array







Wenner Electrical Resistivity Test Results

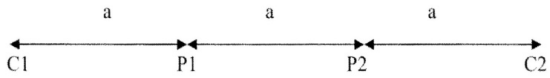
Project Name	Earth Resistivity Testing				
Project/Phase/Task	21501089/1000/***		****		
Client	WSP/Lochard Winton Energy - Benalla				
Test ID					
Location	BH-03_powerhouse				
Date	11/11/2021		**Time**	8:30	
Coordinates (sounding centre)	**UTM WGS84**	**E:419442 Lat:-36.498088**		**N:5960428 Lon: 146.100494**	
Orientation	**Sounding A:**	N/W 287 degree west	**Sounding B:**		
Equipment	meggar		**Serial No.** 081108/1110	**Calibration date:**	10/11/2021
Rainfall (current and recent)	NIL (Recent unknown)				
Terrain and Soil Conditions	Dry soil/loam grassy				
Remarks	Sounding A is 90 degree to Rail lines and 7mtrs east of BH-03				

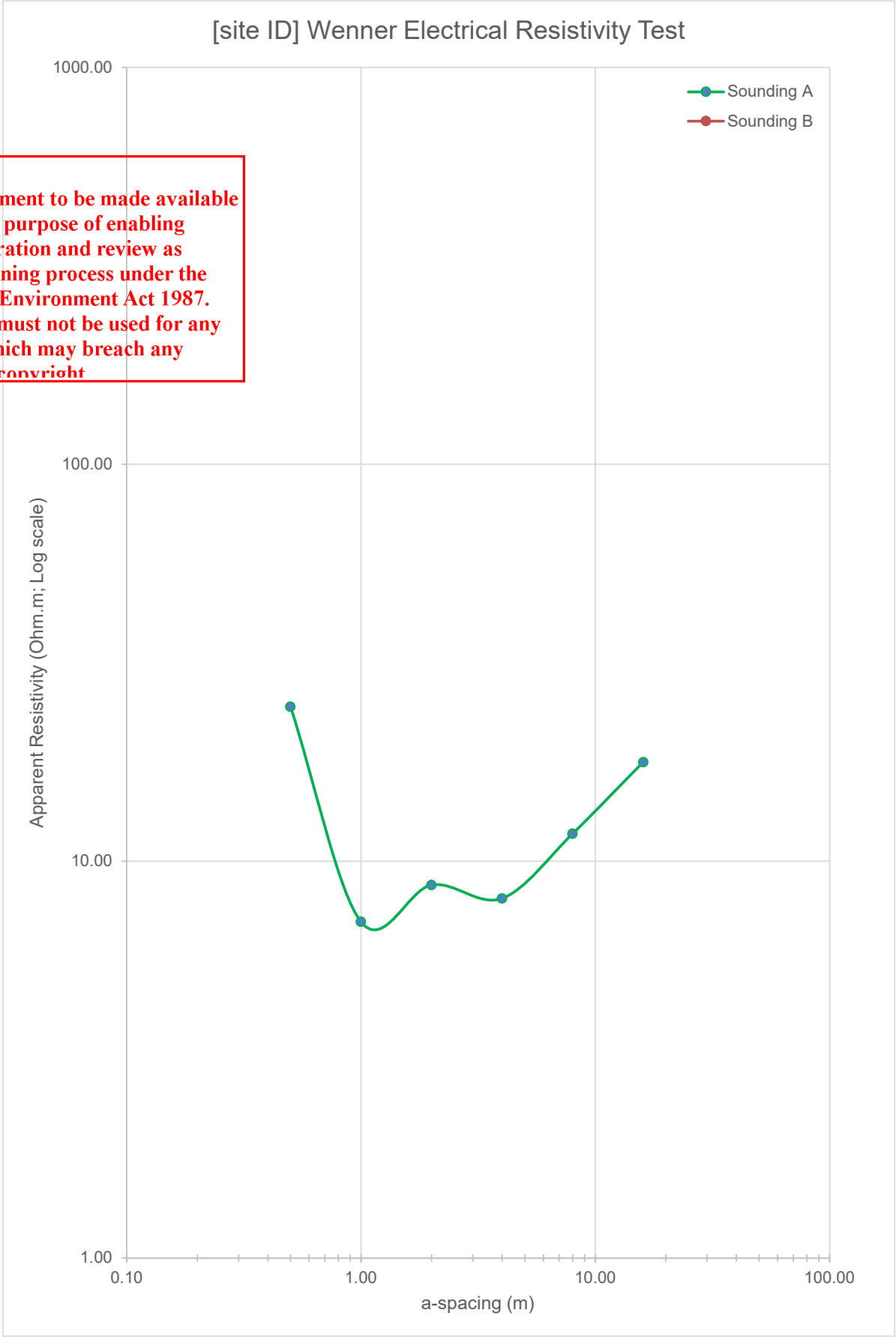
Pin Spacing "a" (m)	* Pin Depth "b" (cm)	Pin distances in metres based on two measuring tapes extended out from centre of sounding				Resistivity Meter Reading 1 (Ω)	Resistivity Meter Reading 2 (Ω)	Resistivity Meter Reading 3 (Ω)	Average Reading "R" (Ω)	Apparent Resistivity (Ω.m)	Comment
		C1 (black)	P1 (red)	P2 (orange)	C2 (yellow)						
SOUNDING A											
0.50	5	0.750	0.250	0.250	0.750	10.00	6.00	7.00	7.67	**24.50**	
1.00	8	1.500	0.500	0.500	1.500	1.11	1.10	1.11	1.11	**7.03**	
2.00	10	3.000	1.000	1.000	3.000	0.98	0.58	0.51	0.69	**8.71**	
4.00	12	6.000	2.000	2.000	6.000	0.32	0.32	0.32	0.32	**8.06**	
8.00	12	12.000	4.000	4.000	12.000	0.24	0.23	0.23	0.23	**11.73**	
16.00	12	24.000	8.000	8.000	24.000	0.18	0.18	0.17	0.18	**17.76**	
32.00	12	48.000	16.000	16.000	48.000	0.54	0.59	0.60	0.58	**115.95**	

Tested By: HJ Computed By: KB Checked By: ZT

* Based on the ASTM Standard G 57 electrode depth has to be 1/20 of minimum electrode spacing, typically 50 mm for "a" = 1 m. If "a" is < 1 m then measure and record pin depths

Wenner Array





Wenner Electrical Resistivity Test Results

Project Name	Earth Resistivity Testing				
Project/Phase/Task	21501089/1000/***		****		
Client	WSP/Lochard Winton Energy - Benalla				
Test ID					
Location	BH-04_transformer_sub_station				
Date	11/11/2021		**Time**	8:30	
Coordinates (sounding centre)	**UTM WGS84**	**E:419516 Lat:-36.496988**		**N:5960551 Lon:146.101333**	
Orientation	**Sounding A:**	N/W 319 degree	**Sounding B:**		
Equipment	meggar		**Serial No.**	081108/1110	**Calibration date:** 10/11/2021
Rainfall (current and recent)	NIL (Recent unknown)				
Terrain and Soil Conditions	Dry soil/loam grassy				
Remarks	Sounding A is 90 degree to Rail lines and .5mtr south of BH-04				

Pin Spacing "a" (m)	* Pin Depth "b" (cm)	Pin distances in metres based on two measuring tapes extended out from centre of sounding				Resistivity Meter Reading 1 (Ω)	Resistivity Meter Reading 2 (Ω)	Resistivity Meter Reading 3 (Ω)	Average Reading "R" (Ω)	Apparent Resistivity (Ω.m)	Comment
		C1 (black)	P1 (red)	P2 (orange)	C2 (yellow)						
SOUNDING A											
0.50	5	0.750	0.250	0.250	0.750	8.00	8.00	8.00	8.00	**25.57**	
1.00	8	1.500	0.500	0.500	1.500	0.85	0.85	0.86	0.85	**5.42**	
2.00	10	3.000	1.000	1.000	3.000	0.47	0.47	0.47	0.47	**5.93**	
4.00	12	6.000	2.000	2.000	6.000	0.33	0.32	0.32	0.32	**8.14**	
8.00	12	12.000	4.000	4.000	12.000	0.30	0.30	0.29	0.30	**14.92**	
16.00	12	24.000	8.000	8.000	24.000	0.22	0.21	0.22	0.22	**21.78**	
32.00	12	48.000	16.000	16.000	48.000	0.17	0.16	0.16	0.16	**32.84**	

Tested By: HJ Computed By: KB Checked By: ZT

* Based on the ASTM Standard G 57 electrode depth has to be 1/20 of minimum electrode spacing, typically 50 mm for "a" = 1 m. If "a" is < 1 m then measure and record pin depths

Wenner Array