



GEOTECHNICAL INVESTIGATION FOR KYABRAM FAUNA PARK

Zoos Victoria
Elliott Avenue, PARKVILLE 3052

V430
23 April 2025

Victorian Geotechnical Services Pty Ltd
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23 April 2025

Zoos Victoria
Elliott Avenue
PARKVILLE VIC 3052

Attention: Ryan McDonough

Dear Ryan

RE: GEOTECHNICAL INVESTIGATION for KYABRAM FAUNA PARK

This letter presents our geotechnical report for the above project. Three copies of the report are presented for your information.

If you have any questions relating to this report or if we can be of further assistance, please do not hesitate to contact the undersigned.

For and on behalf of

VICTORIAN GEOTECHNICAL SERVICES PTY LTD

PETER NOONAN

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Victorian Geotechnical Services Pty Ltd
Zoos Victoria

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1 INTRODUCTION

At the request of Zoos Victoria Pty Ltd, a geotechnical investigation has been conducted at the site of a proposed new development area within the Kyabram Fauna Park located at 75 Lake Road, Kyabram

The investigation has been conducted for the purpose of assessing typical subsurface conditions at the site, and consequently providing comments and recommendations on foundation design parameters.

2 FIELD INVESTIGATION

The field investigation and sampling was conducted on 14th and 15th April 2025 and involved the drilling of 20 boreholes to a depth of 3.0 metres. Insitu testing and sampling was conducted at regular intervals during borehole advancement.

Insitu testing and sampling was conducted at regular intervals during borehole advancement.

The approximate locations of the boreholes are shown on Figure 1 whilst the engineering borehole logs are included in Appendix 1.

The field work was performed by a Geotechnical Engineer who logged the subsurface materials encountered and supervised sampling and testing.

3 SITE CONDITIONS

The site is located at 75 Lake Road, Kyabram. The site is relatively flat and is currently unoccupied. The development of the area is proposed.

The Geological Survey Map of Victoria, Wangaratta Sheet show the site to be located on Tertiary aged deposits, with this being generally confirmed by the field data.

The typical soil profile encountered at the site is as follows:

- **FILL:SILTY CLAY, SANDY GRAVEL, CLAYEY SILT and/or natural TOPSOIL: CLAYEY SILT/SILTY CLAY, SILTY CLAY:** medium to high plasticity clays, low plasticity silts, fine to medium sands and gravels, grey and brown, dry to moist, stiff or medium dense and typically extending to depths ranging from 0.20 metres to 0.45 metres.

Overlying

- **SILTY CLAY (CH):** high plasticity, brown and grey, dry to moist, very stiff and extending to the borehole termination depth of 3.00 metres

Some minor variations to the above typical soil profile were encountered at the site reference should be made to the appended borehole logs for a full description of subsurface conditions at each borehole location.

Neither a groundwater table or seepage inflows were encountered during the investigation,

4 ENGINEERING RECOMMENDATIONS

4.1 Building Foundations

It is understood that the proposed development may include new buildings/structures and carpark/access road pavements.

Details of the proposed footing systems are unknown, however, for the purpose of this report it is assumed that the construction will be founded on either a stiffened raft slab or pad and strip footings. Based on the results of the field investigation, foundations for the proposed buildings should be founded as follows:

- **SILTY CLAY (CH):** high plasticity, brown and grey, dry to moist, very stiff and typically encountered at depths ranging from 0.20 to 0.45 metres below existing surface levels.

An allowable bearing pressure of 100kPa would be available for edge and loadbearing beams of a stiffened raft slab founded in the above manner, whilst pad and strip footings similarly founded may be proportioned for allowable bearing pressures of 175kPa and 150kPa respectively.

Internal stiffening beams and slab panels may be founded on the existing fill materials provided proofrolling is conducted to confirm suitability at the time. Any obviously softened zones detected during the proofrolling process should be removed and replaced with a suitably compacted granular material.

For the above founding depths and materials and subsequent allowable bearing pressures, settlements are expected to be less than 20mm.

Insofar as a Site Classification in accordance with the AS2870-2011 is applicable, the site would be classified as **CLASS M** (AS2870-2011).

Although the augerhole data indicates that site conditions are relatively uniform, variations in site conditions may occur in areas of the site not specifically covered by the field investigation. The base of all footings excavations should therefore be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials.

4.2 Earthquake Loading

The subsurface profile consists of predominately very stiff Silty Clay materials. As such a site sub-soil classification, Class C_e can be adopted for this site in accordance with AS 1170.4- 2007 "Structural Design Actions Part 4: Earthquake actions in Australia".

4.3 Pavement Recommendations

As part of the development it is understood that flexible and rigid pavements may be constructed at the site and that they will be subject to both light and medium duty traffic corresponding to assumed design traffic loadings (DTL's) of 1×10^4 and 1×10^5 ESAs respectively. Light duty pavements would be applicable for carparking areas only whilst medium duty pavements would be applicable for access roads.

Based on the field data and subject to the following recommendations on subgrade preparation, a design CBR value of 3.0 is considered appropriate for the subgrade **SILTY CLAY** materials at this site. The CBR value relates to the current minimum insitu value and previous experience with similar materials.

Pavement designs considered suitable for the projected traffic loadings and a design subgrade CBR value of 3 are as follows:

- **Flexible Pavements**

Design Traffic Loading (ESA's)	1 x 10 ⁴	1 x 10 ⁵
Asphalt (mm)	40	40
Base Course (mm)	100	100
Sub-base course (mm)	<u>160</u>	<u>260</u>
Total Thickness (mm)	300	400

- **Concrete Pavements**

Design Traffic Loading (ESA's)	1 x 10 ⁴	1 x 10 ⁵
Concrete Thickness (mm)	150	175
Sub-base Course (mm)	100	100

The above recommendations for concrete pavements assume a characteristic 28-day flexural concrete strength of 3.5 MPa.

Compaction standards applied to the above pavement construction should be as follows:

- Basecourse 100% Modified (AS 1289.5.2.1)
- Subbase 98% Modified (AS 1289.5.2.1)
- Subgrade 97% Standard (AS 1289.5.1.1)

Prior to pavement construction the exposed subgrade should be proofrolled to ensure a relatively uniform strength subgrade is achieved. Any obviously softened areas detected during the proofrolling process should be removed and replaced with a suitably compacted granular material.

It should be noted that the FILL and CLAYEY SILT materials encountered in some locations may become unworkable and untrafficable if they become saturated as the result of prolonged exposure to periods of rainfall and their removal may be required if saturation of these materials occurs. Seepage inflows presumable associated with surface runoff were encountered in these material and as a result these materials may be unworkable and untrafficable in their current form and their removal may be required

4.4 Suitability of site won materials for use as fill

The natural and fill materials on site typically consist of SILTY CLAY, CLAYEY SILT, and, SANDY GRAVEL FILL and/or natural CLAYEY SILT and SILTY CLAY materials. With the exception of the CLAYEY SILT materials, the remaining materials would generally be suitable for use as engineered fill provided they are properly moisture conditioned and compacted. The CLAYEY SILT materials are considered unsuitable for use as engineered fill materials due to their perceived sensitivity to changes in moisture content and subsequent difficulties in compaction. It is recommended that the fill materials are compacted in accordance with Australian Standard AS 3798 – 2007.

4.5 Retaining Walls

It is understood that the construction of new retaining walls may be required and in this regard it is assumed they will comprise cantilever type retaining walls. Assuming the retaining walls are to be backfilled using a granular ($\Phi = 30^\circ$) material, retaining wall design should be based on an active earth pressure coefficient, K_A , of 0.3.

This earth pressure distribution assumes that adequate drainage is provided behind the walls such that no hydrostatic pressure build up occurs. If drainage is not provided behind the walls, then hydrostatic pressures will need to be added to the above earth pressure distribution for the full height of the retained ground.

The earth pressure distribution presented above applies where there are no buildings or other structures (such as underground services) located within the zone of influence of the excavation. Where adjacent building footings or underground services are located within the zone of influence of the excavation further information should be sought from VicGeo.

4.6 Excavation Conditions

Excavation of the FILL and natural CLAYEY SAND, SILTY CLAY materials will be readily achievable using conventional earthmoving equipment.

Temporary and permanent batter slopes in the FILL and natural CLAYEY SILT and CLAYEY SAND materials should not be steeper than 3H:1V. Temporary batter slopes excavated in the SILTY CLAY materials should not be steeper than 1H:1V.

The surficial FILL, CLAYEY SILT and CLAYEY SAND materials were identified as potential soft spots, especially considering the seepage inflows recorded in these materials and allowance should be included for remediation/removal of these materials in order to maintain site trafficability

It should be noted that as the excavation proceeds, inspections should be carried out by an VicGeo geotechnical engineer to confirm that there are no unfavourably aligned soil structures, for example fissures with slickensides or similar, in which case, a flatter batter or more substantial shoring would be required.

5 APPLICABILITY

Recommendations and opinions contained in this report are based on the interpretation of borehole logs at point locations and information from published geological maps. The nature and continuity of the subsoil away from the test locations are inferred, but it must be appreciated that actual conditions could vary from the assumed geotechnical model. If conditions other than those described are encountered, VicGeo should be engaged to assess whether the recommendations should be revised. The attached "Limitations of Report" provides additional information in the uses and limitations of this report.

6 REFERENCES

1. AS2870 – 2011 Residential Slabs and Footings Construction
2. Geological Survey of Victoria (1997), Queenscliff 1:250,000 map sheet, Department of Natural Resources and Environment, Victoria

Limitations of Report

These notes have been prepared to assist in the interpretation and understanding of the limitations of this report.

Project specific criteria

The report has been developed on the basis of unique project specific requirements as understood by Victorian Geotechnical Services Pty Ltd (vicGEO) and applies only to the site investigated. Project criteria are typically identified in the Client brief and the associated proposal prepared by vicGEO and may include risk factors arising from limitations on scope imposed by the Client.

The report should not be used without further consultation if significant changes to the project occur. No responsibility for problems that might occur due to changed factors will be accepted without consultation.

Subsurface variations with time

Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. In the event of significant delays in the commencement of a project, further advice should be sought.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and at the time they are taken. All available data is interpreted by professionals to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, as it is virtually impossible to provide a definitive subsurface profile which includes all the possible variabilities inherent in soil and rock masses.

Report recommendations

The report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until earthworks and/or foundation construction is almost complete and therefore the report recommendations can only be regarded as preliminary. Where variations in conditions are encountered, further advice should be sought.

Specific purposes

This report is provided for the exclusive use of the party to whom it is addressed only for this specific project and purpose as described in the report. It should not be used for other projects or by a third party. Any reliance assumed by third parties on this report shall be at the parties own risk. Any ensuing liability resulting from use of the report by third parties cannot be transferred to VicGeo. This report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by others

vicGEO will not be responsible for interpretations of site data or the report findings by others involved in the design and construction process. Where any confusion exists, clarification should be sought from vicGEO.

Report integrity

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Geoenvironmental issues

This report does not cover issues of site contamination unless specifically required to do so by the client. In the absence of such a request, vicGEO take no responsibility for such issues.

Figures



CLIENT		KYABRAM FAUNA PARK		
MELBOURNE ZOO				
VICGEO		JOB NO	SCALE	FIG. 1
		V430	NTS	

Appendix 1

Borehole Logs

Soil Type, Particle Size and Unified Soil Classification Group Symbols

Major Divisions		Symbols	Subdivision	Particle Size	USC Symbol	Typical Names
Coarse Grained Soils (More than half of material is larger than 0.075mm)	Boulders			>200mm		
	Cobbles			63mm – 200mm		
	Gravels (more than half of coarse fraction is larger than 2.36mm)	G	Coarse	20mm – 63mm	GW	Well graded gravels
			Medium	6mm – 20mm	GP	Poorly graded gravels
			Fine	2.36mm – 6mm	GM	Silty gravels
	Sands (more than half of coarse fraction is smaller than 2.36mm)	S	Coarse	0.6mm – 2.36mm	GC	Clayey gravels
			Medium	0.2mm – 0.6mm	SW	Well graded sands
			Fine	0.075mm – 0.2mm	SP	Poorly graded sands
Fine Grained Soils (more than half of material is smaller than 0.075mm)	Silts	M		< 0.075mm	SM	Silty sands
					SC	Clayey sands
	Clays	C			ML	Inorganic silts of low plasticity
					MH	Inorganic silts of high plasticity
					CL	Inorganic clay of low plasticity
					CI	Inorganic clay of medium plasticity
					CH	Inorganic clay of high plasticity
	Organic	O			OL	Organic silts of low plasticity
					OH	Organic clay of high plasticity
					Pt	Peat and other highly organic soils

Moisture Condition

Symbol	Term	Field Assessment
D	Dry	Clay and silt are hard, friable, powdery, well dry of plastic limit. Sands and gravels are cohesionless, free running
M	Moist	Feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere
W	Wet	Feels cool, darkened in colour. Cohesive soils weakened, free water forms on hands when handling. Granular soils cohere

Soil Plasticity

Symbol	Term	Field Assessment
LP	Low Plasticity	Cannot be rolled into threads when moist
MP	Medium Plasticity	Can be rolled into threads when moist. Shows some shrinkage on drying
HP	High Plasticity	Can be rolled into threads when moist. Considerable shrinkage on drying. Greasy to touch. Cracks in dry material

Cohesive Soils – Consistency Terms

Symbol	Term	Field Assessment	Undrained Shear Strength
VS	Very Soft	Exudes between fingers when squeezed	< 12kPa
S	Soft	Can be moulded by light finger pressure	12kPa – 25kPa
F	Firm	Can be moulded by strong finger pressure	25kPa – 50kPa
St	Stiff	Cannot be moulded by fingers. Can be indented by thumb	50kPa – 100kPa
VSt	Very Stiff	Can be indented by thumb nail	100kPa – 200kPa
H	Hard	Difficult to indented by thumb nail	> 200kPa

Granular Soil – Density

Symbol	Term	Field Assessment	SPT N – Value	Density Index (%)
VL	Very Loose	Foot imprints easily	< 4	< 15
L	Loose	Can be excavated with spade. 50mm peg easily driven	4 – 10	15 – 35
MD	Medium Dense	Shovelling difficult	10 – 30	35 – 65
D	Dense	Needs pick for excavation. 50mm peg hard to drive	30 – 50	65 – 85
VD	Very Dense	Picking difficult	> 50	> 85
C	Cemented	Cemented, indurated or large size particles	> 50	N / A

Ground Water		Sampling & Testing	
*	Not observed	U63	Undisturbed Sample, 63mm diameter
	Observed water level (with date shown)	D	Disturbed Sample
	Observed water inflow (with date shown)	SPT N*	Standard Penetration Test + Sample, figure = results
	Observed water outflow (with date shown)	V	Vane Shear Test, figure = result (kPa)
R	Refer report for details	PP	Pocket Penetrometers Test, figure = result (kPa)
		DCP	Dynamic Cone Penetrometers Test, figure = blows/100mm
		E	Environmental Sample

Rock Strength

Symbol	Term	Point Load Index $IS_{(50)}$ (MPa)	Field Assessment
EL	Extremely Low	$IS_{(50)} < 0.03$	Easily remoulded by hand to a material with soil properties
VL	Very Low	$0.03 \leq IS_{(50)} < 0.1$	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; pieces up to 30mm thick can be broken by finger pressure
L	Low	$0.1 \leq IS_{(50)} < 0.3$	Easily scored with knife; indentations 1mm to 3mm after firm blows with pick point; core 150mm long and 50mm diameter can be broken by hand; sharp edges of core friable
M	Medium	$0.3 \leq IS_{(50)} < 1.0$	Readily scored with knife; core 150mm long and 50mm diameter can be broken by hand with difficulty
H	High	$1.0 \leq IS_{(50)} < 3.0$	Core 150mm long and 50mm diameter cannot be broken by hand but can be broken by single firm blow of pick; rock rings under hammer
VH	Very High	$3.0 \leq IS_{(50)} < 10$	Hand held specimen breaks with pick after more than one blow; rock rings under hammer
EH	Extremely High	$10 \leq IS_{(50)}$	Specimen requires many pick blows to break intact rock, rock rings under hammer

Rock Weathering Classification

Symbol	Term	Description
RS	Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported
EW	Extremely Weathered	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident
HW	Highly Weathered	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
MW	Moderately Weathered	Significant colour change compared with fresh rock, but not completely through rock fabric; substantial loss of lustre; rock fabric preserved.
SW	Slightly Weathered	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fs	Fresh Stained	Rock substance unaffected by weathering but staining visible along defects
Fr	Fresh	No signs of decomposition or staining

Degree of Fracturing

Term	Description
Fragmented	Fragments of < 20mm
Highly Fractured	Core lengths of 20mm – 40mm with some fragments
Fractured	Core lengths of 40mm – 200mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200mm – 1000mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000mm

Stratification Spacing

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

Rock Quality Designation (RQD):

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$RQD \% = \frac{\text{Cumulative length of 'sound' core sections} \geq 100\text{mm long}}{\text{Total drilled length of section being assessed}}$$

(where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.)

Core Recovery:

Core recovery is calculated for each core run. Core recovery is the total length of core, rock or soil, recovered expressed as a percentage of the total length of the core run.



Victorian Geotechnical Services

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ENGINEERING BOREHOLE LOG

Borehole no. 1

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 14/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: SILTY CLAY, high plasticity, some fine to medium gravels, brown SILTY CLAY (CL), medium plasticity, brown SILTY CLAY (CH), high plasticity, brown	0.50 1.00 1.50 2.00 2.50 3.00		*	D D D/M M	St St VSt	FILL V = 140+ kPa V = 140+ kPa V = 140+ kPa V = 140+ kPa		D	-
BH1 - Terminated @ 3.00 metres	3.50 4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 2

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 14/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: SANDY GRAVEL, fine to medium sands and gravels, grey			*	D	MD	FILL		D	-
FILL: SILTY CLAY, medium plasticity, brown				D	St	FILL			
SILTY CLAY (CL), medium plasticity, brown				D	St				
SILTY CLAY (CH), high plasticity, pale brown and grey	0.50			D/M	VSt	V = 140+ kPa			
medium to high plasticity	1.00			M/D		V = 140+ kPa			
becoming high plasticity	1.50					V = 140+ kPa			
	2.00			M		V = 140+ kPa			
	2.50								
	3.00					V = 140+ kPa			
BH2 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 3

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 14/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : Not measured					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown			*	D	St			D	-
SILTY CLAY (CH), high plasticity, red brown				D/M	VSt				
	0.50								
becoming medium plasticity pale brown and grey				D		V = 140+ kPa			
	1.00								
						V = Refusal			
becoming high plasticity				M/D					
	1.50								
						V = 140+ kPa			
	2.00								
						V = 140+ kPa			
	2.50								
	3.00					V = 140+ kPa			
BH3 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 4

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 14/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : Not measured					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: SILTY CLAY, medium plasticity, brown			*	D	St			D	-
SILTY CLAY (CH), high plasticity, red brown				D/M	VSt				
	0.50					V = 140+ kPa			
becoming medium plasticity brown and grey	1.00			D		V = Refusal			
becoming high plasticity	1.50					V = 140+ kPa			
	2.00					V = Refusal			
	2.50								
	3.00					V = Refusal			
BH4 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 5
Sheet no. 1 of 1
Job no. V430

Client : MELBOURNE ZOO		Date : 14/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
MULCH: 50mm			*					D	-
SILTY CLAY (CL), medium plasticity, brown	0.25m			M	St				
SILTY CLAY (CH), high plasticity, red brown	0.50			M	VSt	V = 140+ kPa			
becoming medium to high plasticity brown and grey	1.00					V = 140+ kPa			
becoming high plasticity	1.50					V = 140+ kPa			
	2.00					V = 115 kPa			
	2.50								
	3.00					V = 135 kPa			
BH5 - Terminated @ 3.00 metres	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 6

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 14/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : Not measured					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: SILTY CLAY (CL), medium plasticity, brown	0.25m		*	D	St			D	-
SILTY CLAY (CH), high plasticity, red brown	0.50			M	VSt				
				M/D		V = 140+ kPa			
becoming medium plasticity brown and grey	1.00			D					
						V = Refusal			
becoming high plasticity	1.50			D/M					
						V = 140+ kPa			
	2.00								
						V = Refusal			
	2.50								
	3.00					V = 140+ kPa			
BH6 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 7

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 14/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : Not measured					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown	0.25m		*	D	St			D	-
SILTY CLAY (CH), high plasticity, red brown becoming brown becoming medium to high plasticity becoming high plasticity	0.50 1.00 1.50 2.00 2.50 3.00			D/M D	VSt	V = 140+ kPa V = Refusal V = 140+ kPa V = Refusal			
BH7 - Terminated @ 3.00 metres	3.50 4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 8

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown	0.25m		*	D	St			D	-
SILTY CLAY (CH), high plasticity, brown	0.50			D/M	VSt	V = 140+ kPa			
becoming medium to high plasticity brown and grey	1.00			D		V = Refusal			
becoming high plasticity	1.50			D/M		V = 140+ kPa			
	2.00					V = Refusal			
	2.50			M					
	3.00					V = 140+ kPa			
BH8 - Terminated @ 3.00 metres	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 9

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown			*	D	St			D	-
SILTY CLAY (CL), medium plasticity, brown				D	St				
SILTY CLAY (CH), high plasticity, brown				D/M	VSt				
	0.50			M		V = 140+ kPa			
becoming medium to high plasticity	1.00					V = 140+ kPa			
becoming high plasticity	1.50					V = 140+ kPa			
	2.00					V = 122 kPa			
	2.50								
	3.00					V = 135 kPa			
BH9 - Terminated @ 3.00 metres	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 10

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: SILTY CLAY, medium plasticity, brown			*	D	St	FILL		D	-
SILTY CLAY (CL), medium plasticity, brown				D	St				
SILTY CLAY (CH), high plasticity, brown and pale brown	0.50			D/M	VSt				
				M		V = 140+ kPa			
	1.00								
				M/D		V = 140+ kPa			
becoming medium to high plasticity pale brown and grey	1.50			D		V = Refusal			
becoming high plasticity	2.00					V = Refusal			
	2.50								
				D/M					
	3.00					V = 140+ kPa			
BH10 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 11

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : Not measured					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: SILTY CLAY, medium plasticity, some fine to medium gravels, brown and grey	0.35m		*	D	St	FILL		D	-
SILTY CLAY (CH), high plasticity, brown	0.50			M	VSt	V = 140+ kPa			
becoming medium to high plasticity pale brown and grey	1.00			M/D		V = 140+ kPa			
	1.50					V = Refusal			
	2.00					V = 140+ kPa			
becoming high plasticity	2.50			M					
	3.00					V = 140+ kPa			
BH11 - Terminated @ 3.00 metres	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 12

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown			*	D	St			D	-
SILTY CLAY (CL), medium plasticity, brown				D	St				
SILTY CLAY (CH), high plasticity, pale brown	0.50			D/M	VSt				
				M		V = 140+ kPa			
	1.00					V = 140+ kPa			
becoming pale brown and grey	1.50					V = 140+ kPa			
	2.00					V = 130 kPa			
	2.50								
	3.00					V = 140+ kPa			
BH12 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 13

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown			*	D	St			D	-
SILTY CLAY (CL), medium plasticity, brown	←0.25m			D	St				
SILTY CLAY (CH), high plasticity, pale brown	0.50			D	VSt				
becoming medium plasticity				D/M		V = 140+ kPa			
	1.00			D					
becoming high plasticity						V = Refusal			
	1.50			M					
						V = 140+ kPa			
	2.00								
						V = 140+ kPa			
	2.50								
	3.00					V = 132 kPa			
BH13 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 14
Sheet no. 1 of 1
Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
TOPSOIL: CLAYEY SILT, low plasticity, brown			*	D	St			D	-
SILTY CLAY (CL), medium plasticity, brown	←0.25m			D	St				
SILTY CLAY (CH), high plasticity, brown	0.50			D/M	VSt				
				M		V = 140+ kPa			
becoming medium to high plasticity	1.00			D					
						V = 140+ kPa			
becoming high plasticity	1.50			M					
pale brown and grey						V = 140+ kPa			
	2.00								
						V = 140+ kPa			
	2.50								
	3.00					V = 140+ kPa			
BH14 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 15

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: CLAYEY SILT, low plasticity, some fine to medium gravels, brown			*	D	St	FILL		D	-
SILTY CLAY (CL), medium plasticity, pale brown	0.45m			D	St				
SILTY CLAY (CH), high plasticity, brown				D/M	VSt	V = Refusal			
becoming medium plasticity pale brown	1.00			D		V = 140+ kPa			
becoming high plasticity pale brown and grey	1.50			M		V = 140+ kPa			
	2.00					V = 140+ kPa			
	2.50								
	3.00					V = 140+ kPa			
BH15 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 16

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: CLAYEY SILT, low plasticity, brown			*	D	St	FILL		D	-
FILL: SANDY GRAVEL, fine to medium sands and gravels, grey				D	MD	FILL			
SILTY CLAY (CH), high plasticity, red brown				D/M	VSt				
	0.50			M		V = 140+ kPa			
becoming brown									
becoming medium plasticity	1.00			M/D		V = 140+ kPa			
becoming high plasticity	1.50					V = Refusal			
becoming pale brown and grey	2.00					V = Refusal			
	2.50								
	3.00					V = 140+ kPa			
BH16 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 17

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidril		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: SILTY CLAY, medium plasticity, brown			*	D	St	FILL		D	-
CLAYEY SILT (ML), low plasticity, brown				D	St				
SILTY CLAY (CH), high plasticity, red brown	0.50			D/M	VSt	V = 140+ kPa			
becoming medium to high plasticity brown	1.00			M		V = Refusal			
becoming high plasticity pale brown and grey	1.50			M/D		V = 140+ kPa			
	2.00					V = Refusal			
	2.50								
	3.00					V = Refusal			
BH17 - Terminated @ 3.00 metres	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 18

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: CLAYEY SILT, low plasticity, some fine to medium gravels, brown			*	D	St	FILL		D	-
SILTY CLAY (CL), medium plasticity, pale brown	0.35m			D	St				
SILTY CLAY (CH), high plasticity, red brown	0.50			M/D	VSt	V = 140+ kPa			
				M					
becoming medium plasticity pale brown	1.00			M/D		V = 140+ kPa			
becoming high plasticity	1.50					V = 140+ kPa			
	2.00					V = 140+ kPa			
				M					
	2.50								
	3.00					V = 130 kPa			
BH18 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 19

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: CLAYEY SILT, low plasticity, some fine to medium gravels, brown			*	D	St	FILL		D	-
SILTY CLAY (CL), medium plasticity, brown				D	St				
SILTY CLAY (CH), high plasticity, brown				M/D	VSt				
	0.50			M		V = 140+ kPa			
	1.00			M/D		V = 140+ kPa			
becoming medium to high plasticity									
becoming high plasticity									
pale brown	1.50			M		V = 140+ kPa			
	2.00					V = 140+ kPa			
	2.50								
	3.00					V = 140+ kPa			
BH19 - Terminated @ 3.00 metres									
	3.50								
	4.00								



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ENGINEERING BOREHOLE LOG

Borehole no. 20

Sheet no. 1 of 1

Job no. V430

Client : MELBOURNE ZOO		Date : 15/04/2025							
Project : KYABRAM FAUNA PARK		Logged By : CS							
Location : 75 LAKE ROAD, KYABRAM									
Drill model : Ezidrill		Slope 90 deg		RL Surface : <i>Not measured</i>					
Hole diameter : 100mm		Bearing - deg		Datum : -					
Material Description	Depth (m)	Graphic log	Water	Moisture condition	Consistency density, index	Structure, additional observations	Notes Samples Tests	Method	Support
FILL: CLAYEY SILT, low plasticity, some fine to medium gravels, brown	0.50		*	D	St	FILL		D	-
SILTY CLAY (CL), medium plasticity, brown				D	St				
SILTY CLAY (CH), high plasticity, brown and grey				D/M	VSt				
				M	V = 140++ kPa				
becoming pale brown				M/D	V = 140+ kPa				
	1.00								
	1.50					V = 140+ kPa			
becoming medium to high plasticity	2.00					V = Refusal			
	2.50								
	3.00					V = 140+ kPa			
BH20 - Terminated @ 3.00 metres	3.50								
	4.00								