

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1 – To be submitted with Development Application

Development Application for _____
Name of Applicant

Address of site 100A Wakehurst Parkway, Elanora Heights

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, Ben White on behalf of White Geotechnical Group Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 31/8/20 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least \$10million.

I:

Please mark appropriate box

- ☒ have prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- ☐ have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with Section 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.
- ☐ have examined the site and the proposed development/alteration in detail and I am of the opinion that the Development Application only involves Minor Development/Alteration that does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- ☐ have examined the site and the proposed development/alteration is separate from and is not affected by a Geotechnical Hazard and does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- ☐ have provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

Report Title: Geotechnical Report 100A Wakehurst Parkway, Elanora Heights
Report Date: 31/8/20


Author: BEN WHITE

Author's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD

Documentation which relate to or are relied upon in report preparation:

Australian Geomechanics Society Landslide Risk Management March 2007.
White Geotechnical Group company archives.

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature 
Name Ben White
Chartered Professional Status MScGEOLAusIMM CP GEOL
Membership No. 222757
Company White Geotechnical Group Pty Ltd

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements for Geotechnical Risk Management Report for Development Application

Development Application for	_____
	Name of Applicant
Address of site	<u>100A Wakehurst Parkway, Elanora Heights</u>

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).


Geotechnical Report Details:

Report Title: Geotechnical Report <u>100A Wakehurst Parkway, Elanora Heights</u>
Report Date: <u>31/8/20</u>
Author: <u>BEN WHITE</u>
Author's Company/Organisation: <u>WHITE GEOTECHNICAL GROUP PTY LTD</u>

Please mark appropriate box

- ☒ Comprehensive site mapping conducted 18/8/20
(date)
- ☒ Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)
- ☒ Subsurface investigation required
 - ☐ No Justification _____
 - ☒ Yes Date conducted 18/8/20
- ☒ Geotechnical model developed and reported as an inferred subsurface type-section
- ☒ Geotechnical hazards identified
 - ☒ Above the site
 - ☒ On the site
 - ☐ Below the site
 - ☐ Beside the site
- ☒ Geotechnical hazards described and reported
- ☒ Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
 - ☒ Consequence analysis
 - ☒ Frequency analysis
- ☒ Risk calculation
- ☒ Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.
- ☒ Design Life Adopted:
 - ☒ 100 years
 - ☐ Other _____
specify
- ☒ Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified
- ☒ Additional action to remove risk where reasonable and practical have been identified and included in the report.
- ☐ Risk assessment within Bushfire Asset Protection Zone.

I am aware that Pittwater Council will rely on the Geotechnical Report, to which this checklist applies, as the basis for ensuring that the geotechnical risk management aspects of the proposal have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.


Signature _____

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL INVESTIGATION:

New Inclined lift at **100A Wakehurst Parkway, Elanora Heights**

1. Proposed Development

- 1.1** Construct a new inclined lift.
- 1.2** Details of the proposed development are shown on 1 drawing prepared by P.R. Kings and Sons, drawing number 1, dated 29/7/2020.

2. Site Description

- 2.1** The site was inspected on the 18th of August, 2020.
- 2.2** This residential property is on the high side of the road and has a S aspect. It is located on the moderate to steeply graded lower reaches of a hillslope. The natural slope rises at an angle of $\sim 13^\circ$ from the downhill property boundary before increasing in grade to an angle of $\sim 32^\circ$ on the natural rock slope before reaching the bottom of a sandstone cliff face that is estimated to be at least $\sim 8\text{m}$ high. The slope below the property decreases in grade and the slope above the property gradually decreases in grade.
- 2.3** The property is accessed by a concrete right of carriageway (ROW) which runs up the slope to a parking area and garage (Photos 1 & 2). Uphill of the garage is a large sandstone boulder in a stable position (Photo 3). The part three storey concrete and steel clad house is supported by concrete block walls, formed concrete walls and steel posts (Photos 4 & 5). The supporting walls and posts stand vertical and show no significant signs of movement. Each level of the house has been cut into the slope on the uphill side (Photo 6). The cuts are supported by formed concrete retaining walls up to $\sim 2.3\text{m}$ high and in good condition. A suspended timber deck in good condition extends off the E side of the house. Medium Strength Hawkesbury Sandstone bedrock

steps up the slope beside the house (Photo 7). Another timber deck is located uphill of the house (Photo 8). Large dislodged sandstone joint blocks are sitting in stable positions on the slope next the deck. Uphill of the deck is sandstone cliff face that is estimated to be at least ~8m high (Photos 8 to 10). No significant geological defects were observed on the exposed rock face that could affect its stability. No signs of slope instability that could have occurred since the site was developed were observed on the property. The adjoining neighbouring properties were observed to be in good order as seen from the street and subject property.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by Hawkesbury Sandstone. It is described as a medium to coarse grained quartz sandstone with very minor shale and laminite lenses.

4. Subsurface Investigation

One auger hole was put down to identify the soil materials. Six Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. The locations of the tests are shown on the site plan. It should be noted that a level of caution should be applied when interpreting DCP test results. The test will not pass through hard buried objects so in some instances it can be difficult to determine whether refusal has occurred on an obstruction in the profile or on the natural rock surface. This is not expected to be an issue for this site. But due to the possibility that the actual ground conditions vary from our interpretation there should be allowances in the excavation and foundation budget to account for this. We refer to the appended "Important Information about Your Report" to further clarify. The results are as follows:

TEST RESULTS ON NEXT PAGE

AUGER HOLE 1 (~RL12.1) – AH1 (photo 11)

Depth (m)	Material Encountered
0.0 to 0.1	FILL , sandy soil, dark brown, fine to medium grained, damp.
0.1 to 0.5	FILL , sand, grey, damp, medium grained.
0.5 to 1.1	SILTY SAND , dark brown and grey, moist, fine to medium grained.

Refusal @ 1.1m, auger grinding on rock. No watertable encountered.

DCP TEST RESULTS – Dynamic Cone Penetrometer						
Equipment: 9kg hammer, 510mm drop, conical tip.				Standard: AS1289.6.3.2 - 1997		
Depth(m) Blows/0.3m	DCP 1 (~RL10.0)	DCP 2 (~RL12.1)	DCP 3 (~RL15.1)	DCP 4 (~RL16.5)	DCP 5 (~RL20.0)	DCP 6 (~RL23.2)
0.0 to 0.3	3F	3	#	15	#	F
0.3 to 0.6	20	4		#		1
0.6 to 0.9	19	4				2
0.9 to 1.2	7	6				#
1.2 to 1.5	9	#				
1.5 to 1.8	13					
1.8 to 2.1	27					
2.1 to 2.4	#					
2.4 to 2.7						
	Refusal @ 2.1m	Refusal @ 1.1m	Rock exposed at surface	Refusal @ 0.2m	Rock exposed at surface	Refusal @ 0.7m

#refusal/end of test. F=DCP fell after being struck showing little resistance through all or part of the interval.

DCP Notes:

DCP1 – Refusal @ 2.1m, DCP bouncing, dark brown soil on moist tip.

DCP2 – Refusal @ 1.1m, DCP bouncing, white sandstone fragments on moist tip.

DCP3 – Rock exposed at surface

DCP4 – Refusal @ 0.2m, white sandstone fragments on moist tip.

DCP5 – Rock exposed at surface

DCP6 – Refusal @ 0.7m, DCP bouncing, white impact dust on dry tip.

5. Geological Observations/Interpretation

The surface features of the block are controlled by the underlying sandstone bedrock that steps down the property forming sub-horizontal benches between the steps. Where the grade is steeper, the steps are larger and the benches narrower. Where the slope eases, the opposite is true. The rock is overlain by fill, silty sands and clays that fill the bench step formation. Fill provides a near level lawn area on the downhill side of the property. In the test locations the depth to rock ranged from exposed at the surface to a depth of ~2.1m below. Note that due to the large number of dislodged boulders in the profile interpreting bedrock depth on this site is difficult with hand tools. See Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

Normal ground water seepage is expected to move over the buried surface of the rock and through the cracks in the rock.

Due to the slope and elevation of the block, the water table in the location is expected to be many metres below the proposed works.

7. Surface Water

No evidence of surface flows were observed on the property during the inspection. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours. Due to the steep slope above this is expected to flow at high velocities.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property that could impact the subject property. The moderate to steep slope that falls across the property and continues above is a potential hazard (**Hazard One**). The sandstone cliff face that rises above the property is a potential hazard (**Hazard Two**).

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The moderate to steep slope that falls across the property and continues above failing and impacting on the property.	The sandstone cliff face above the property failing and impacting on the property.
LIKELIHOOD	'Unlikely' (10^{-4})	'Rare' (10^{-5})
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Medium' (20%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Low' (2×10^{-6})
RISK TO LIFE	9.1×10^{-7} /annum	8.3×10^{-7} /annum
COMMENTS	This level of risk is 'ACCEPTABLE' provided the recommendations in Section 13 are carried out.	This level of risk is 'ACCEPTABLE'.

(See Aust. Geomech. Jnl. Mar 2007 Vol. 42 No 1, for full explanation of terms)

9. Suitability of the Proposed Development for the Site

The proposed development is suitable for the site. No geotechnical hazards will be created by the completion of the proposed development provided it is carried out in accordance with the requirements of this report and good engineering and building practice.

10. Stormwater

No significant stormwater runoff will be created by the proposed development.

11. Excavations

Apart from those for footings and minor levelling, no excavations are required.

12. Foundations

Extending up the slope following the line of the proposed lift the slope materials vary from clays to Medium Strength Rock. Where rock is present footings can be supported off level pads cut into the rock. Where clay is present (on the downhill landing of the proposed lift)

pads can be cut to a minimum depth of 0.6m from the downhill side of the foundation. A maximum allowable bearing pressure of 1000kPa can be assumed for footings on Medium Strength Sandstone and a maximum allowable bearing pressure of 200kPa can be assumed for footings on the firm to stiff clays of the natural profile.

NOTE: If the contractor is unsure of the footing material required it is more cost effective to get the geotechnical professional on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over excavation in clay like shaly rock but can be valuable in all types of geology.

13. Inspections

The client and builder are to familiarise themselves with the following required inspection as well as council geotechnical policy. We cannot provide geotechnical certification for the Occupation Certificate if the following inspection has not been carried out during the construction process.

- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment is still onsite and before steel reinforcing is placed or concrete is poured.

White Geotechnical Group Pty Ltd.



Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist



Photo 1

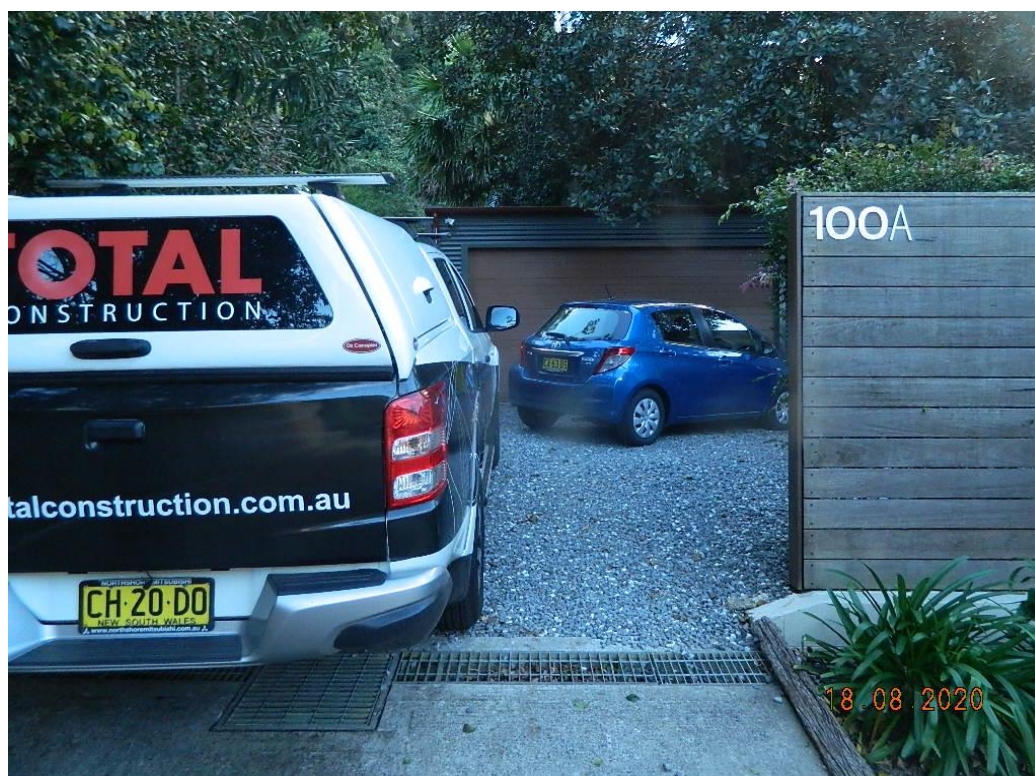


Photo 2



Photo 3

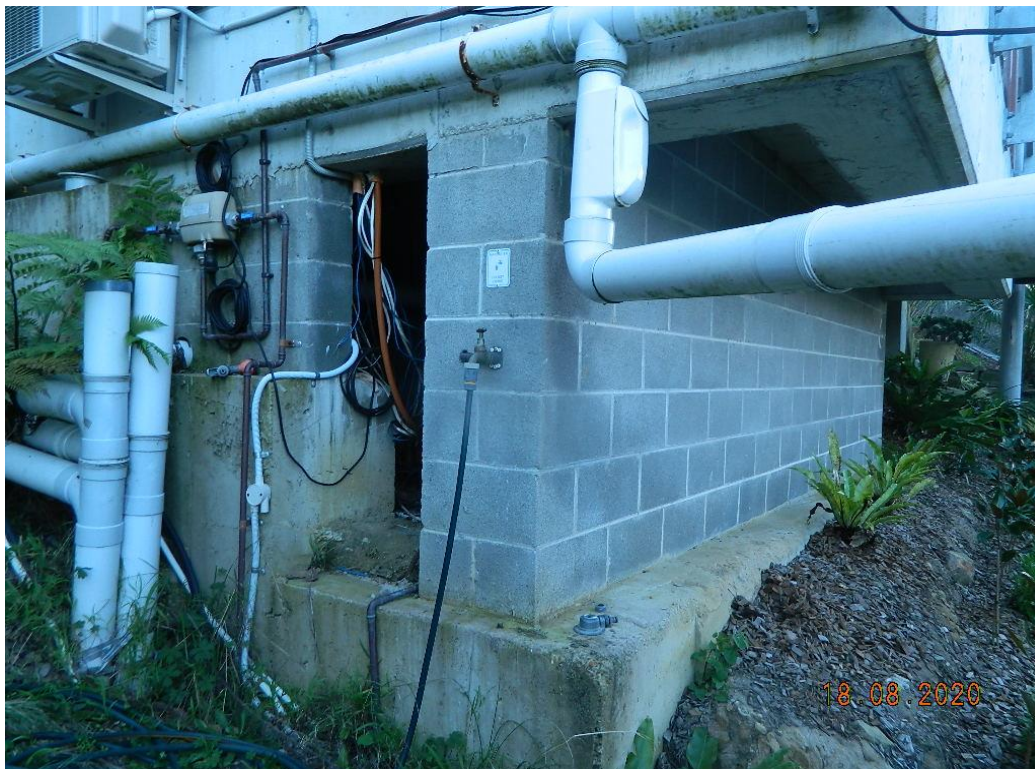


Photo 4



Photo 5

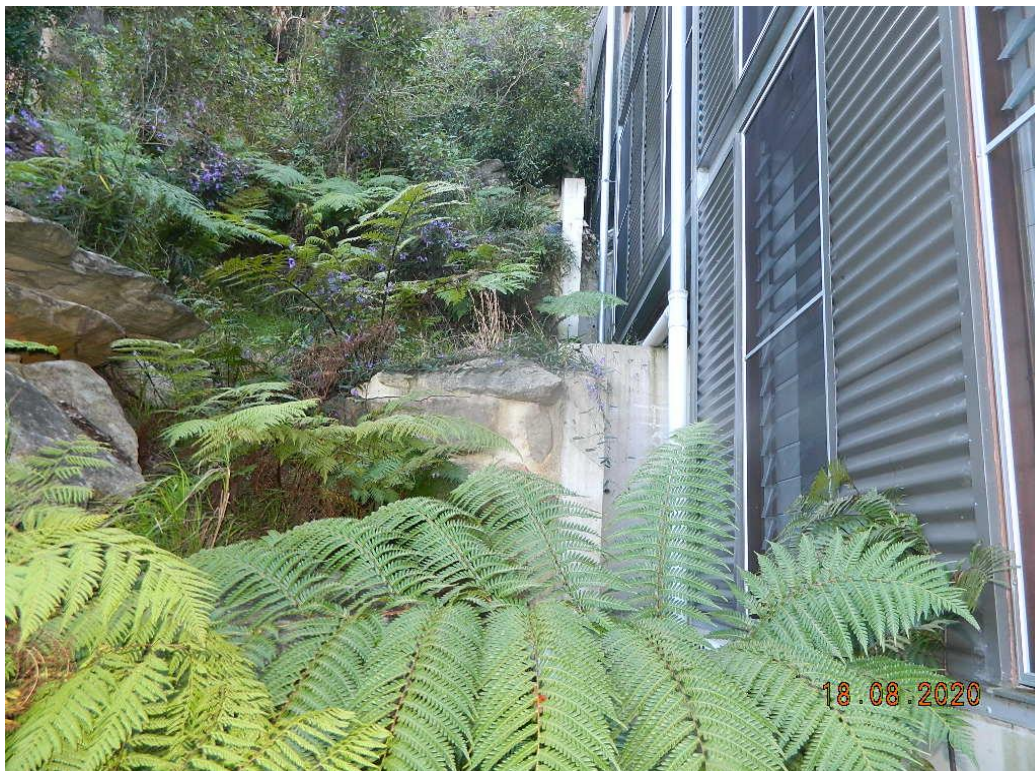


Photo 6



Photo 7

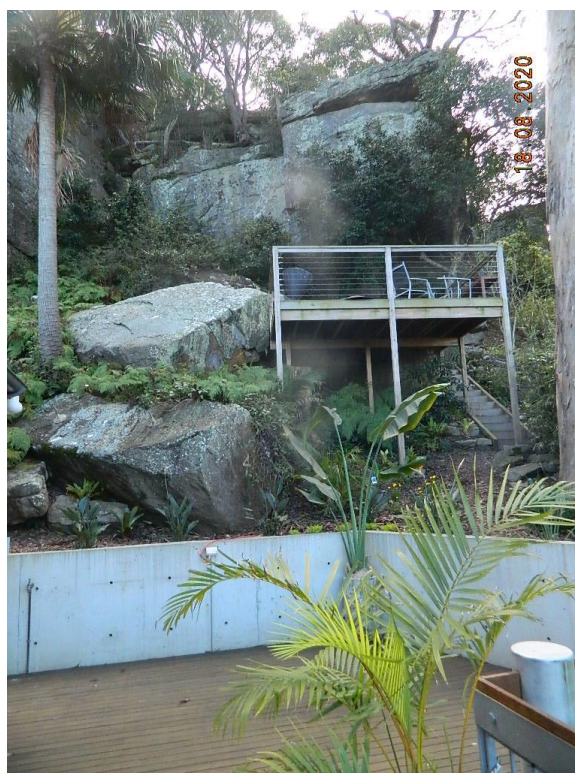


Photo 8

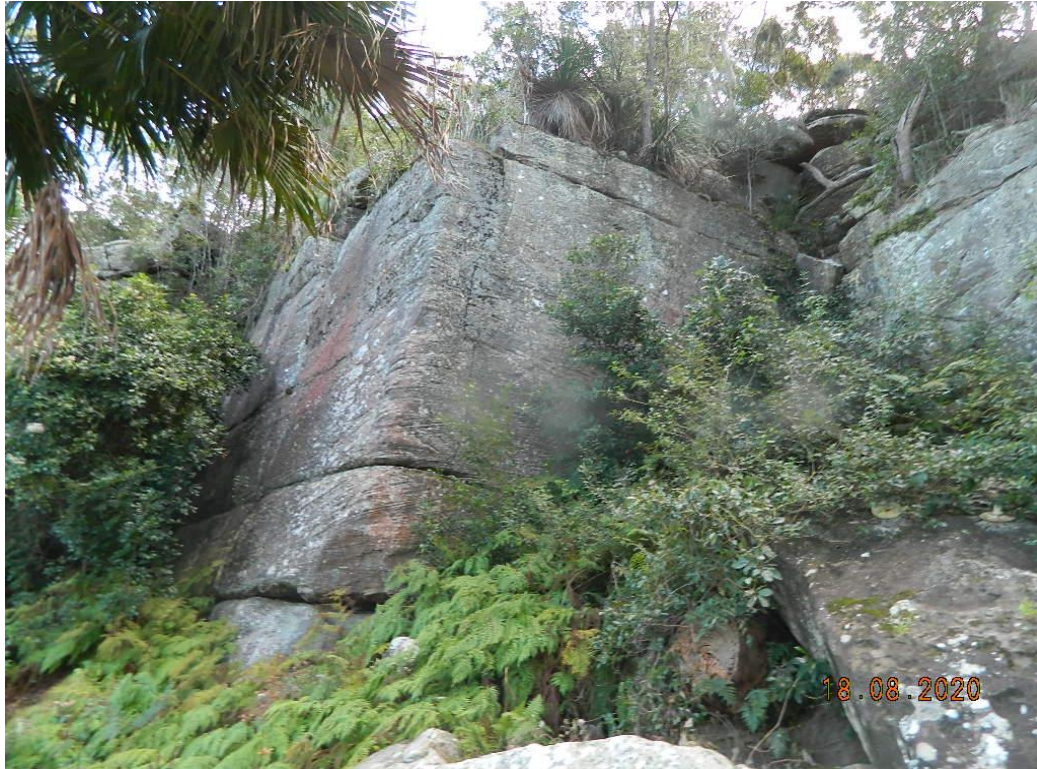


Photo 9

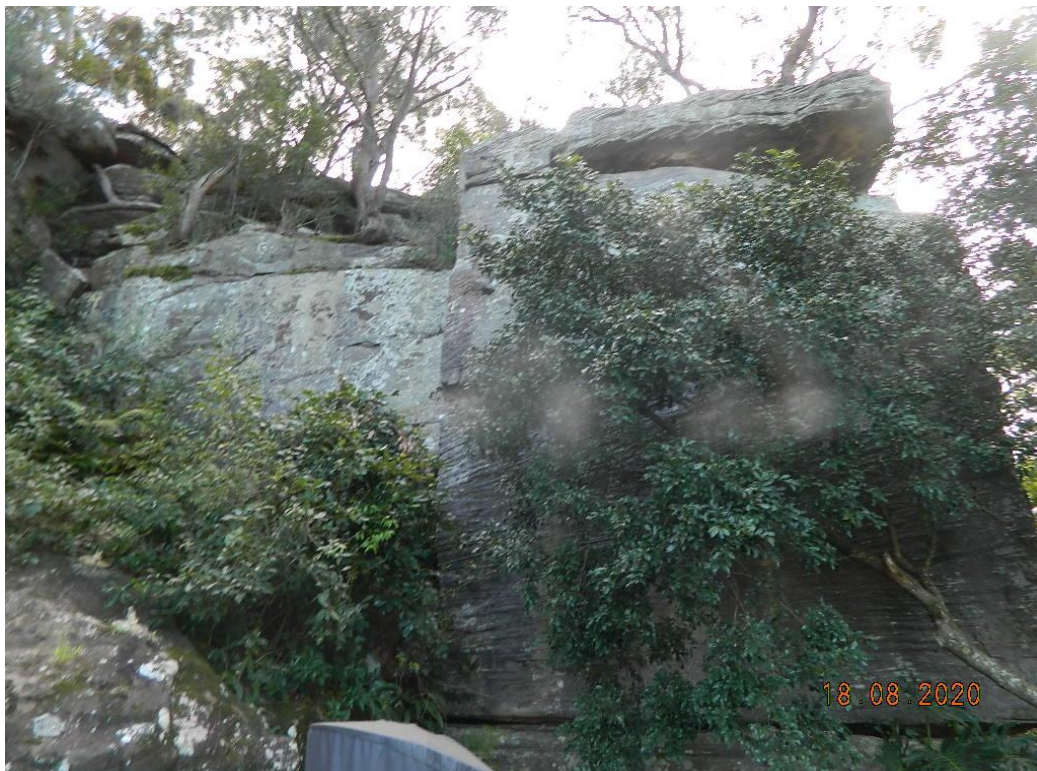


Photo 10



Photo 11: AH1 – Downhole is from top to bottom

Important Information about Your Report

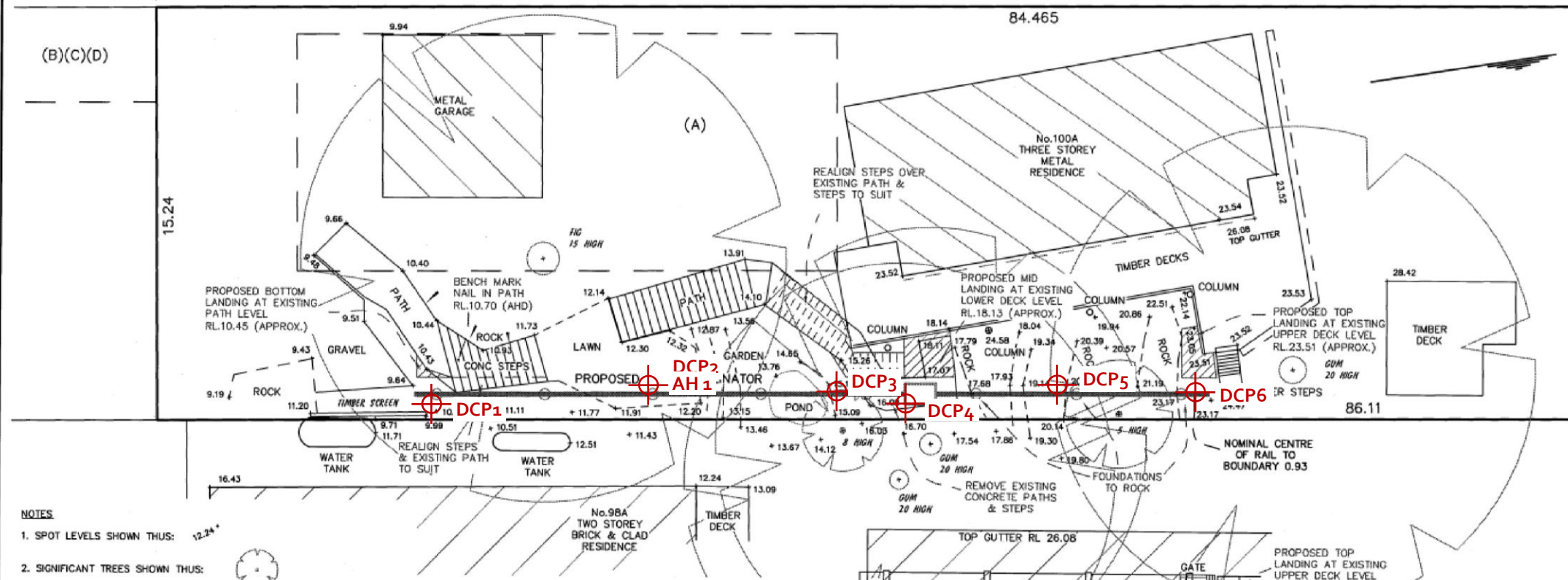
It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures on the site or by budget and time constraints of the client. Additionally, the test themselves, although chosen for their suitability for the particular project, have their own limiting factors. The testing gives accurate information at the location of the test, within the confines of the test's capability. A geological interpretation or model is developed by joining these test points using all available data and drawing on previous experience of the geotechnical consultant. Even the most experienced practitioners cannot determine every possible feature or change that may lie below the earth. All of the subsurface features can only be known when they are revealed by excavation. As such, a Geotechnical report can be considered an interpretive document. It is based on factual data but also on opinion and judgement that comes with a level of uncertainty. This information is provided to help explain the nature and limitations of your report.

With this in mind, the following points are to be noted:

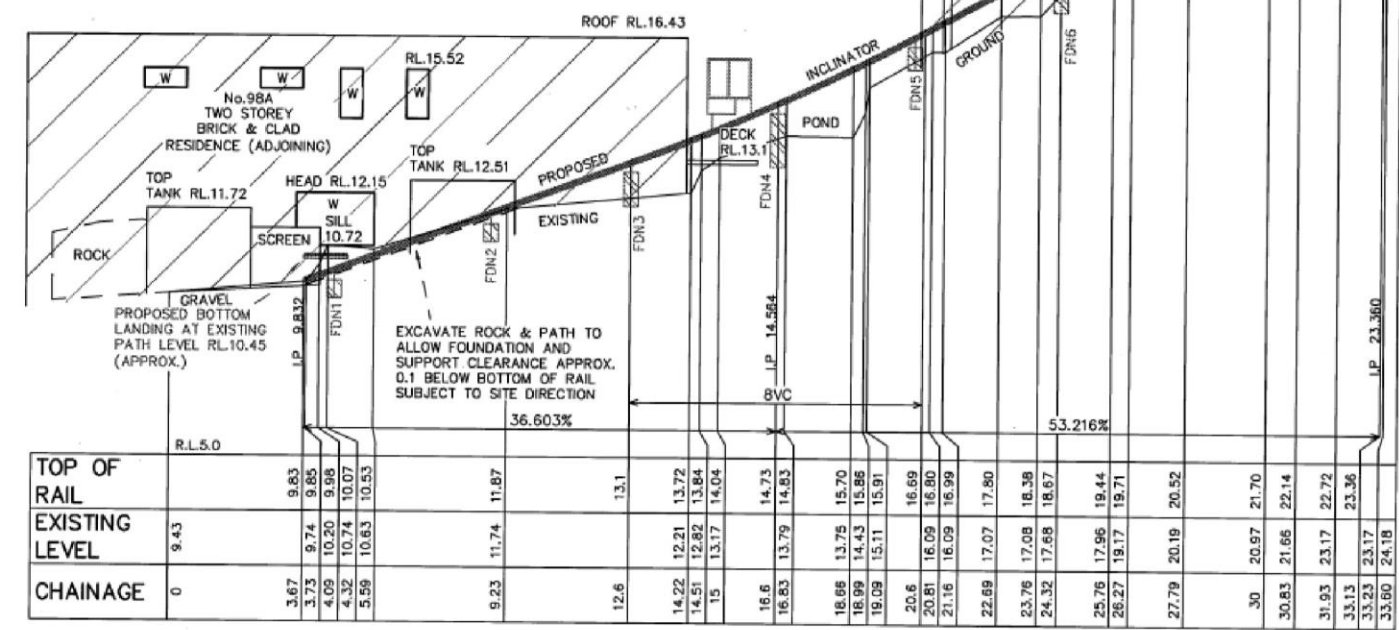
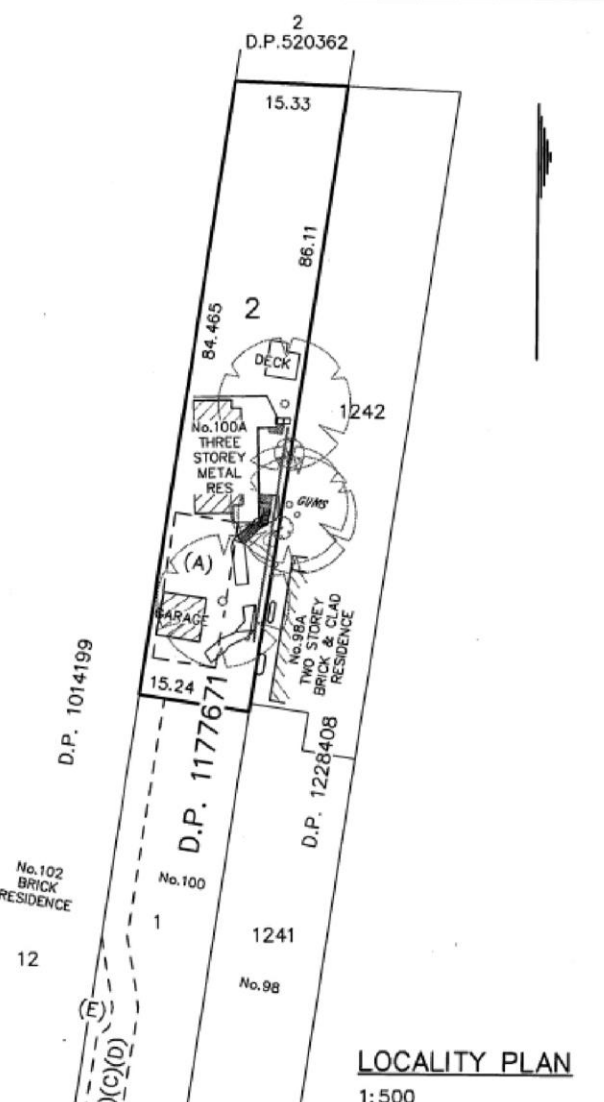
- If upon the commencement of the works the subsurface ground or ground water conditions prove different from those described in this report, it is advisable to contact White Geotechnical Group immediately, as problems relating to the ground works phase of construction are far easier and less costly to overcome if they are addressed early.
- If this report is used by other professionals during the design or construction process, any questions should be directed to White Geotechnical Group as only we understand the full methodology behind the report's conclusions.
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.
- This report should not be applied to any other project other than that outlined in section 1.0.
- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.
- It is common for the design and construction process to be adapted as it progresses (sometimes to suit the previous experience of the contractors involved). If alternative design and construction processes are required to those described in this report, contact White Geotechnical Group. We are familiar with a variety of techniques to reduce risk and can advise if your proposed methods are suitable for the site conditions.

SITE PLAN – showing test locations

PLAN
1:100



- NOTES**
- SPOT LEVELS SHOWN THUS: 12.24
 - SIGNIFICANT TREES SHOWN THUS:
 - THE SPREAD OF EACH TREE IS INDICATIVE ONLY AND CANNOT BE SHOWN ACCURATELY WITHOUT VERY DETAILED FURTHER SURVEY. THE SHAPE AND SIZE OF SPREAD OF THE TREE MAY VARY DUE TO LACK OF UNIFORMITY OF THE BRANCHES, TRUNK AND OTHER REASONS.
 - VISIBLE SERVICES ONLY HAVE BEEN LOCATED BY SURVEY.
 - BOUNDARIES PLOTTED ARE ACCURATE FOR D.A. PURPOSES. BOUNDARY INFORMATION HAS BEEN COMPILED FROM INFORMATION SHOWN ON PLANS ON PUBLIC RECORD AT OFFICE OF N.S.W. LAND REGISTRY SERVICES.
 - THE EASTERN BOUNDARY ADJACENT TO THE PROPOSED INCLINATOR SHOULD BE MARKED ON THE GROUND PRIOR TO THE COMMENCEMENT OF ANY WORK ON SITE.



INCLINATOR SPECIFICATION

TRACK LENGTH: NOM. 13.77 METRES AT 20.10 DEGREES & NOM. 18.72 METRES AT 28.02 DEGREES
CAPACITY: FOUR PERSONS OR 272 KG.
CONTROL: 24 VOLT CONTROLS FROM EACH LANDING AND ON THE CAR, MARKED UP, DOWN AND STOP
FOUNDATIONS: AS SPECIFIED IN DRAWING NO. 4356-S1 TO S5 BY ROONEY & BYE P/L
LOCATIONS TO BE CONFIRMED ON SITE
4.5 MAX. INCLINED DISTANCE BETWEEN FOUNDATIONS AT DESIGN GRADE

THE EASTERN BOUNDARY SHOULD BE MARKED ON THE GROUND PRIOR TO THE COMMENCEMENT OF ANY WORK ON SITE.

INCLINATOR LANDING AND CLEARANCE DETAILS

EACH LANDING MUST COMPLY WITH THE FOLLOWING CRITERIA.

- THE GAP BETWEEN LANDING SILLS AND THE LIFT MUST BE BETWEEN 100 AND 120mm
- ALL OTHER OBJECTS INCLUDING LANDING GATES AND HANDRAILS MUST BE AT LEAST 225 MM AWAY FROM THE LIFT.
- THE LANDING MUST BE LEVEL WITH THE FLOOR OF THE LIFT WHEN IT IS AT THE LANDING.
- THE LANDING MUST BE A MINIMUM 600mm X 600mm.
- THE LANDING MUST BE WELL ILLUMINATED.
- LANDING CONTROL STATIONS MUST BE LOCATED ON THE LANDINGS SO THAT ALL OTHER LANDINGS ARE VISIBLE WHEN SOMEONE IS OPERATING THE CONTROLS ON THE LANDING.
- MINIMUM END CLEARANCE AT TOP AND BOTTOM STATIONS TO BE 450mm
- WHERE A LANDING IS NOT LESS THAN 600mm ABOVE GROUND LEVEL, THE OUTSIDE EDGES OF THE LANDING SHALL BE GUARDED BY HANDRAILS BETWEEN 1050 TO 1200mm ABOVE THE LANDING AND MID RAILS BETWEEN 450 TO 600mm ABOVE THE LANDING.

- EASEMENTS & RESTRICTIONS:**
- RESTRICTION ON THE USE OF LAND (DP 1177671)
 - RIGHT OF CARRIAGEWAY 3.5, 5 WIDE & VARIABLE WIDTH (DP 1177671)
 - EASEMENT FOR SERVICES 3.5, 5 WIDE & VARIABLE WIDTH (DP 1177671)
 - EASEMENT TO DRAIN WATER 3.5, 5 WIDE & VARIABLE WIDTH (DP 1177671)
 - EASEMENT FOR SERVICES 1.5 WIDE & VARIABLE WIDTH (DP 1177671)

INCLINATOR LONG SECTION 1:100 HOR 1:100 VER



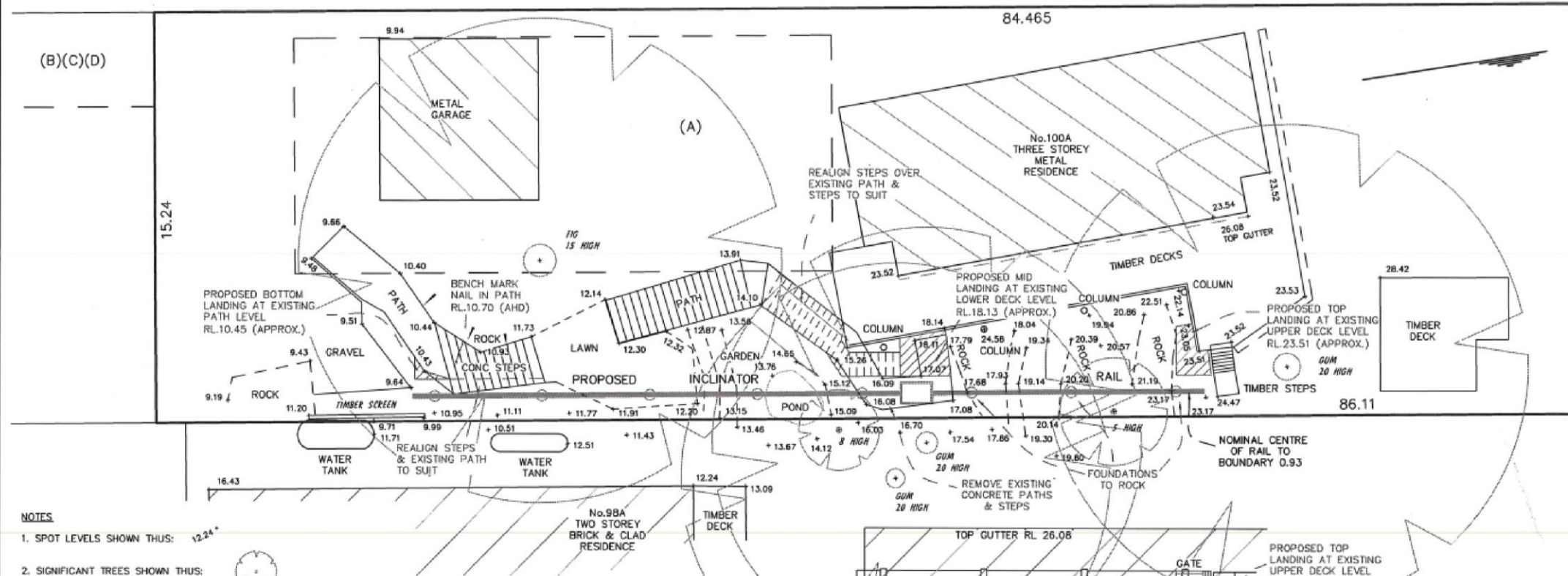
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DESIGN BY YSCO GEOMATICS 4/114 HAMPDEN ROAD ARTARMON NSW 2064 Phone. (02) 9419 8222	Reduction Ratio AS SHOWN. Datum A.H.D.	AMENDMENTS Date	A	B	C	D	Date JULY 29 2020 REGISTERED SURVEYOR	P. R. KING & SONS PTY. LTD. 155 VICTORIA ROAD MARRICKVILLE 2204 A.C.N. 000 134 547	OWNER S. DUNCAN & S. GIBSON ADDRESS 100A WAKEHURST PARKWAY ELANORA HEIGHTS	LGA NORTHERN BEACHES PLAN No. 3620/1 DA No.	DESIGN OF PROPOSED INCLINATOR WITHIN LOT 2 D.P. 1177671 SHEET No.1 OF 1 SHEETS

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

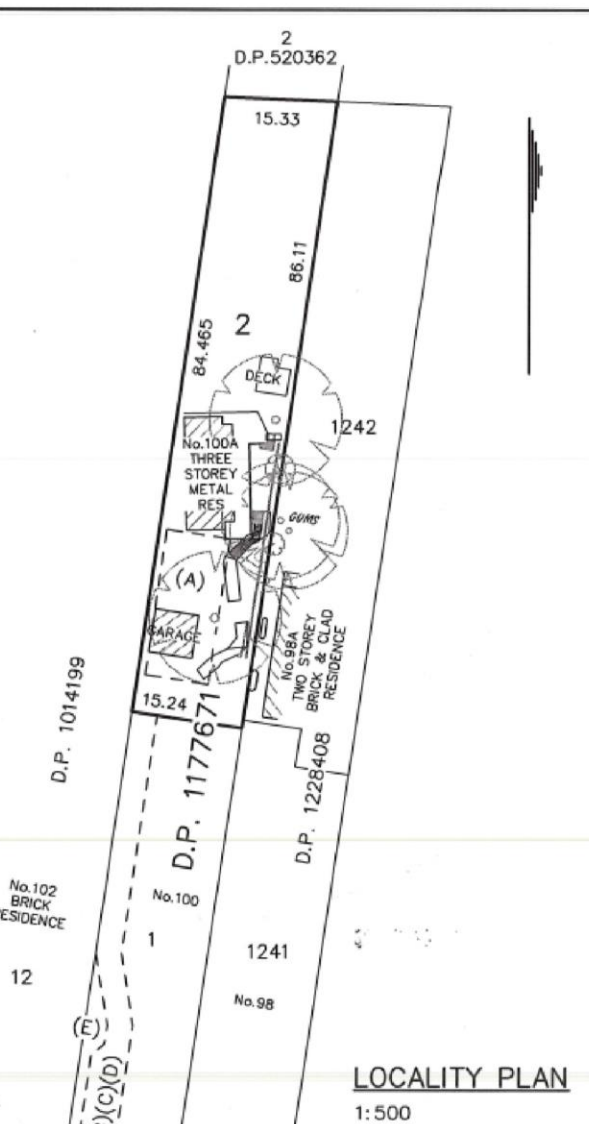
PLAN

1:100

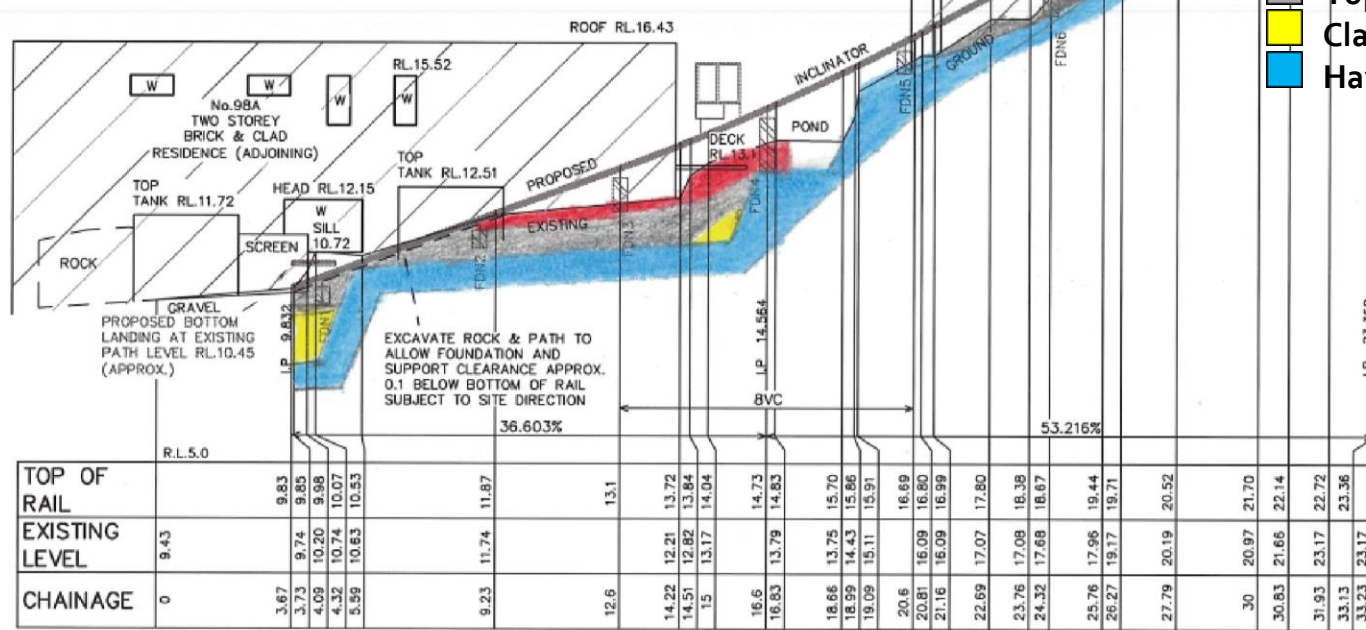


NOTES

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- Fill
- Topsoil and Silty Sand
- Clay
- Hawkesbury Sandstone – Medium Strength



INCLINATOR LONG SECTION

1:100 HOR 1:100 VER

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- EASEMENT FOR SERVICES 1.5 WIDE & VARIABLE WIDTH (DP 1177671)



DIAL BEFORE YOU DIG
SHOULD BE CONTACTED
PRIOR TO ANY EXCAVATION ON SITE

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SURVEY BY
CALC BY

YSCO GEOMATICS
4/114 HAMPDEN ROAD
ARTARMON NSW 2064
Phone. (02) 9419 8222

Reduction Ratio
AS SHOWN.
Datum
A.H.D.

AMENDMENTS	A	B	C	D
Date				
REGISTERED SURVEYOR				

**P. R. KING & SONS
PTY. LTD.**
155 VICTORIA ROAD MARRICKVILLE 2204
A.C.N. 000 134 547

OWNER S. DUNCAN & S. GIBSON
ADDRESS 100A WAKEHURST PARKWAY
ELANORA HEIGHTS

LGA NORTHERN BEACHES
PLAN No. 3620/1
DA No.

**DESIGN OF PROPOSED INCLINATOR
WITHIN LOT 2 D.P. 1177671**

SHEET No.1
OF 1 SHEETS

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

