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

Development Application for _____
Name of Applicant

Address of site 25 The Outlook, Bilgola Plateau

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 01/07/20 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 **25 The Outlook, Bilgola Plateau**

Report Date: 01/07/20

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 25 The Outlook, Bilgola Plateau

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 **25 The Outlook, Bilgola Plateau**

Report Date: 01/07/20

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **26/05/20**
(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 **26/05/20**

☒ 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:

Alterations and Additions at **25 The Outlook, Bilgola Plateau.**

1. Proposed Development

1.1 Construct a new paved terrace and timber deck under the existing deck on the downhill side of the house.

1.2 Various internal and external alterations to the existing house.

1.3 Demolish the existing studio on the downhill side of the property.

1.4 Construct two new lawns on the downhill side of the property by filling to a maximum depth of ~1.1m.

1.5 Details of the proposed development are shown on 9 drawings prepared by Rama Architects. Drawing number DA-001 is dated 20/5/20 and drawings numbered DA-100, DA-101, DA-300, DA-301, DA-400 and DA-500 to DA-502 are dated 25/6/2020.

2. Site Description

2.1 The site was inspected on the 3rd June 2020 and the on 26th of May, 2020.

2.2 This residential property is on the low side of the road and has an E aspect. It is located on the moderately graded middle reaches of a hillslope. The natural slope falls across the property at an average angle of ~15°. The slope above the property continues at similar angles and the slope below the property increases in grade.

2.3 At the road frontage a bitumen and brick paved driveway runs to a suspended concrete carport at the NW corner of the house (Photos 1 & 2). The carport is supported by brick piers and brick walls (Photo 3). One of the brick piers is tilting. The tilt was noted during a geotechnical inspection carried out by another firm in 2004.

The pier does not appear to have moved since 2004 and is currently considered stable. Between the road and the house is a gently sloping lawn (Photo 4). Fill that levels the lawn is supported by a low sandstone block retaining wall. Medium Strength Sandstone bedrock is exposed at the surface below the retaining wall (Photo 5).

The part two storey brick and timber clad house is supported by brick walls and brick piers (Photos 2 & 6). The supporting walls and piers stand vertical and show no significant signs of movement (Photo 7). Sandstone bedrock is outcropping under the house (Photo 7). A timber deck supported by steel posts extends off the downhill side of the house (Photos 6 & 8). The deck is in good condition.

A stormwater pipe from the road above terminates on the S side of the house. Stormwater from the pipe flows into a concrete channel that runs beside the house (Photos 9 & 10). These works appear to have been carried out as remedial measures after the 2004 report noted the sandstone the house was supported on was slightly undercut by the flow. The stormwater from the concrete channel flows into a creek channel immediately below the house and the creek extends to the lower boundary (Photo 11). A moderately sloping lawn extends from below the downhill side of the timber deck (Photo 12). A timber and steel clad studio is located near the downhill boundary of the property (Photo 13). The studio is supported by three rows of timber posts (Photo 14). The upper two rows of posts were tilting from vertical. One of the supporting posts is founded on the edge of the creek (Photo 15). It is recommended that the structure be used for storage only. The studio will be demolished as part of the proposed works. The slope below that extends to the lower boundary falls steeply (Photo 16). No signs of slope instability 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

Four 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 the testing on 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:

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** (~RL108.2)	**DCP 2** (~RL108.2)	**DCP 3** (~RL104.9)	**DCP 4** (~RL102.7)
0.0 to 0.3	#	40	1	4
0.3 to 0.6		#	#	5
0.6 to 0.9				#
0.9 to 1.2				
	Rock exposed at surface	End of Test @ 0.2m	Refusal @ 0.1m	Refusal @ 0.5m

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

DCP Notes:

DCP1 – Rock exposed at surface

DCP2 – End of Test @ 0.2m DCP still very slowly going down, dark brown soil on damp tip.

DCP3 – Refusal @ 0.1m, DCP bouncing, dark brown soil on damp tip.
DCP4 – Refusal @ 0.5m, DCP bouncing, dark brown soil on muddy 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, soil and clay that fills the bench step formation. In the test locations, the depth to rock ranged from the surface to depths of between 0.1 to 0.5m below the current surface. The sandstone underlying the property is estimated to be Medium Strength or better. See Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

As a watercourse flows across the property (Photo 11), we expect groundwater seepage to be slightly higher across the block as slope seepage will move towards the watercourse.

7. Surface Water

A stormwater pipe from the road above terminates on the S side of the house. Flows from the pipe run into a concrete channel beside the house and then into an open creek channel below the house (Photos 9 & 10). The creek runs down the property to the lower boundary and beyond (Photo 11). It was flowing during the inspection when it was raining.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property. The moderate to steep slope that falls across the property and continues above and below is a potential hazard (**Hazard One**).

RISK ANALYSIS SUMMARY ON NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The moderate to steep slope that falls across the property and continues above and below failing and impacting on the property.
LIKELIHOOD	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (12%)
RISK TO PROPERTY	'Low' (2×10^{-5})
RISK TO LIFE	8.3×10^{-7}/annum
COMMENTS	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 possible minor levelling, no excavations are required.

12. Fill

Two fills will be placed on the downhill side of the property for landscaping. No fills are to be laid until retaining walls are in place. The fills will reach a maximum depth of ~1.1m. The surface is to be prepared before any fills are laid by removing any organic matter and topsoil. Fills are to be laid in a loose thickness not exceeding 0.3m before being moderately

compacted. Tracking the machine over the loose fill in 1 to 2 passes should be sufficient. No structures are to be supported on fill.

13. Retaining Walls

For cantilever or singly-propped retaining walls, it is suggested the design be based on a triangular pressure distribution of lateral pressures using the parameters shown in Table 1.

Table 1 – Likely Earth Pressures for Retaining Walls

Unit	Earth Pressure Coefficients		
	Unit weight (kN/m^3)	'Active' K_a	'At Rest' K_0
Fill and Soil	20	0.40	0.55

For rock classes refer to Pells et al "Design Loadings for Foundations on Shale and Sandstone in the Sydney Region". Australian Geomechanics Journal 1978.

It is to be noted that the earth pressures in Table 1 assume a level surface above the wall, do not account for any surcharge loads, and assume retaining walls are fully drained. Ground materials and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

All retaining walls are to have sufficient back-wall drainage and be backfilled immediately behind the wall with free-draining material (such as gravel). This material is to be wrapped in a non-woven Geotextile fabric (i.e. Bidim A34 or similar), to prevent the drainage from becoming clogged with silt and clay. If no back-wall drainage is installed in retaining walls, the likely hydrostatic pressures are to be accounted for in the structural design.

14. Foundations

Any additional footings that may be required for the house additions can be supported on spread footings and shallow piers supported on Medium Strength Sandstone. A maximum allowable bearing pressure of 1000kPa can be assumed for footings on Medium Strength Sandstone.

Naturally occurring vertical cracks (known as joints) commonly occur in sandstone. These are generally filled with soil and are the natural seepage paths through the rock. They can extend to depths of several metres and are usually relatively narrow but can range between 0.1 to 0.8m wide. If a footing falls over a joint in the rock, the construction process is simplified if with the approval of the structural engineer the joint can be spanned or alternatively the footing can be repositioned so it does not fall over the joint.

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.

15. 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

Photo 12

Photo 13

Photo 14

Photo 15

Photo 16

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.

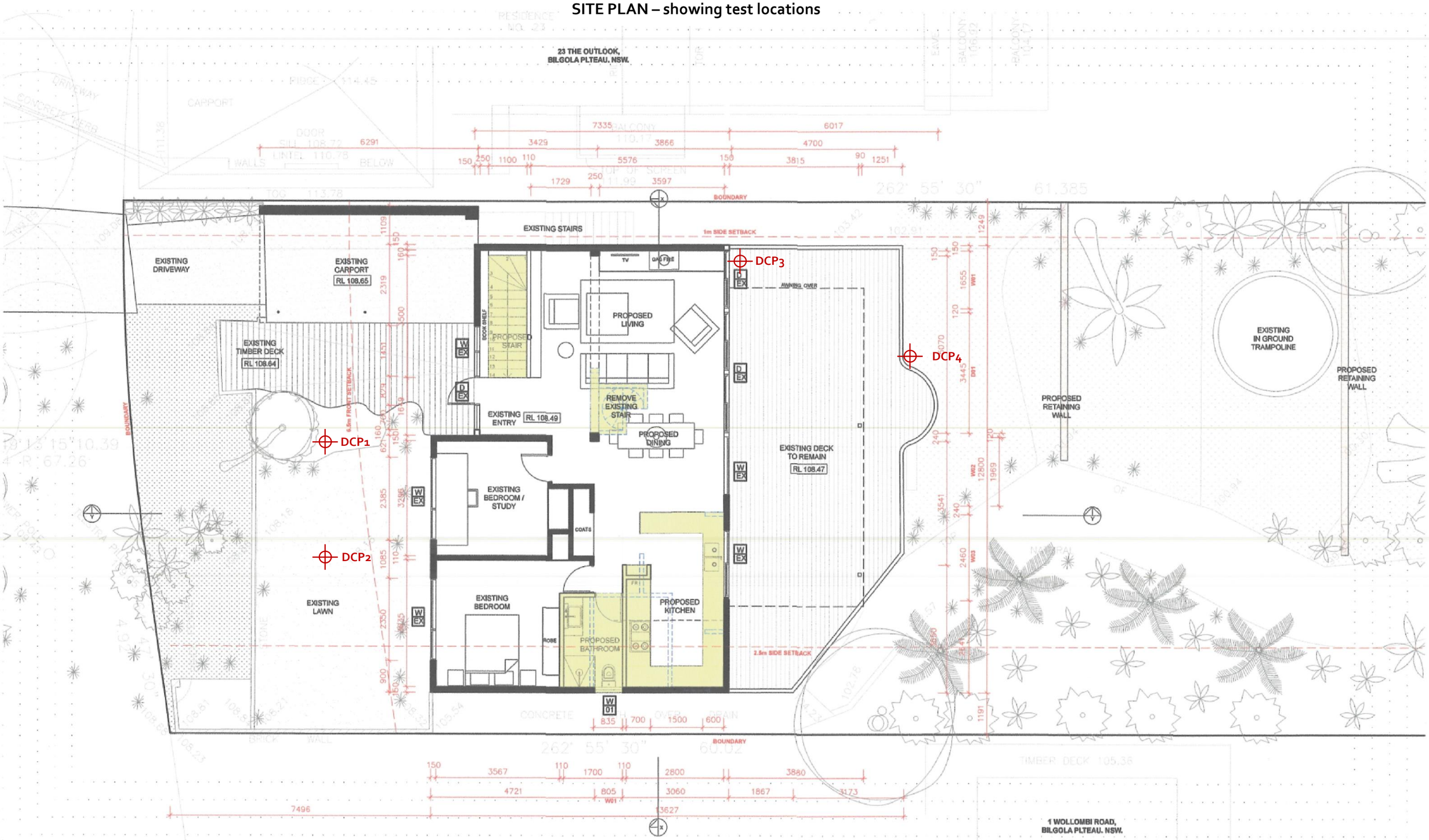
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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



GROUND FLOOR GENERAL ARRANGEMENT PLAN 1:50 @ A1 OR 1:100 @A 3

NORTH

LEGEND:

7.03 DENOTES EXISTING SPOT LEVEL

RL 7.10 DENOTES PROPOSED LEVEL

NOTE: THESE DRAWINGS ARE NOT FOR CONSTRUCTION. FOR DA APPROVAL ONLY.
NOTE: DO NOT SCALE OFF THIS DRAWING
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE B.C.
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS.
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE BASIX REQUIREMENTS

KEY:

- DENOTES AREA OF PROPOSED ADDITION
- DENOTES AREA OF PROPOSED CHANGES TO EXISTING BUILDING
- DENOTES PROPOSED WALLS
- DENOTES EXISTING WALLS TO REMAIN
- DENOTES OUTLINE OF EXISTING TO BE DEMOLISHED

PROJECT:
ALTERATIONS & ADDITIONS TO EXISTING DWELLING

CLIENT:
ALEXANDER ROZENBROEK

LOCATION:
25 THE OUTLOOK,
BILGOLA PLATEAU, NSW, 2107.

PROJECT STAGE:
DA

DRAWING TITLE:
GROUND FLOOR
GENERAL ARRANGEMENT PLAN

SCALE:
1:100 @ A3

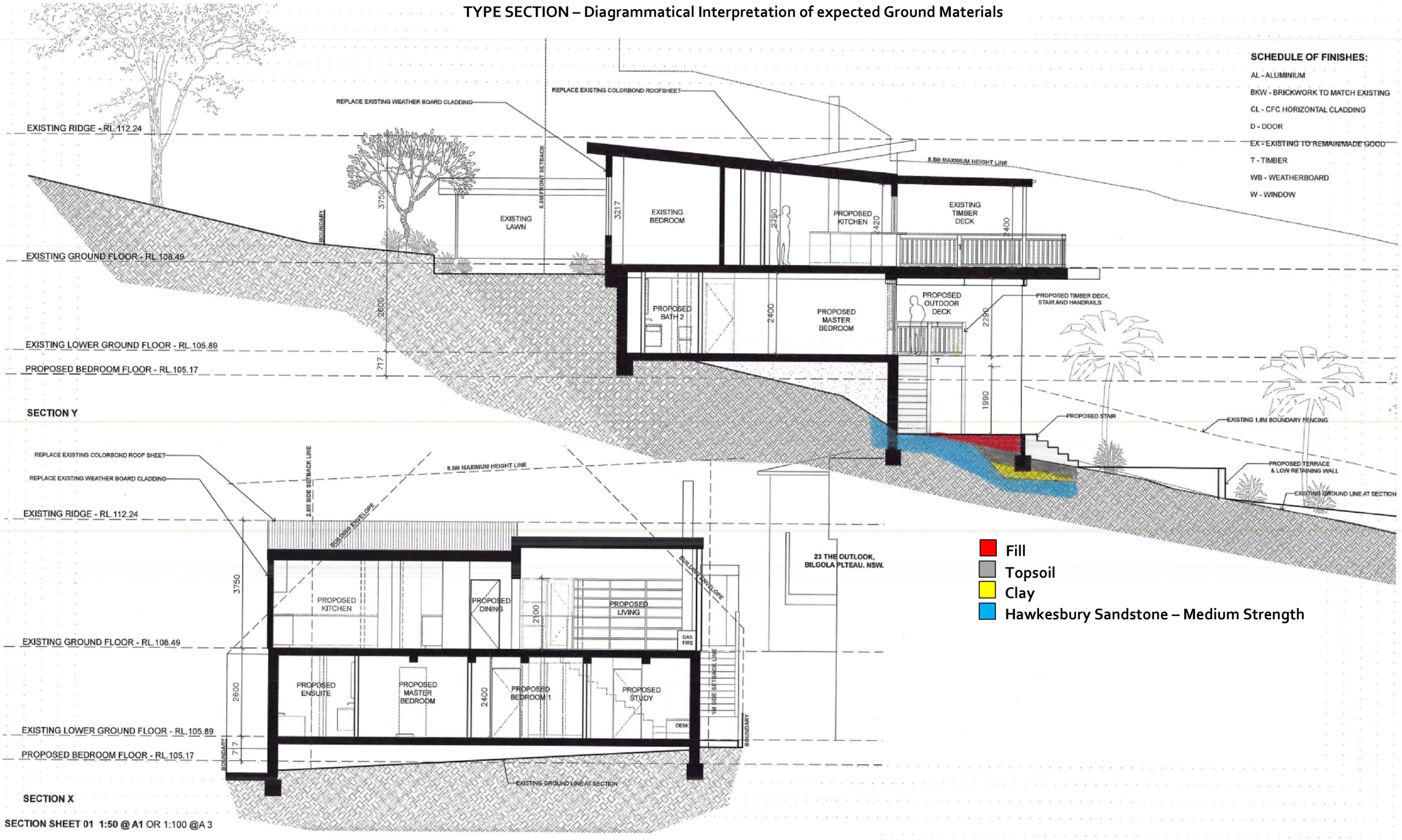
DATE OF ISSUE:
26.06.2020

DRAWING NO.
DA-101

REVISION:
-

rama
daniel raymond
architect
nsw reg. #8788
thomas martin
architect
nsw reg. #10393
1 / 5 WARAKH ST.
MONA VALE, NSW, 2103
e. info@ramaarchitects.com
ABN 612 753 426

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



LEGEND:

7.03 DENOTES EXISTING SPOT LEVEL

RL 7.10 DENOTES PROPOSED LEVEL

NOTE: THESE DRAWINGS ARE NOT FOR CONSTRUCTION, FOR DA APPROVAL ONLY.
NOTE: DO NOT SCALE OFF THIS DRAWING
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE B.C.
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS.
NOTE: ALL WORKS TO BE IN ACCORDANCE WITH THE BASIX REQUIREMENTS

KEY:

- DENOTES AREA OF PROPOSED ADDITION
- DENOTES AREA OF PROPOSED CHANGES TO EXISTING BUILDING
- DENOTES PROPOSED WALLS
- DENOTES EXISTING WALLS TO REMAIN
- — — DENOTES OUTLINE OF EXISTING TO BE DEMOLISHED

PROJECT:
ALTERATIONS & ADDITIONS TO EXISTING DWELLING

CLIENT:
ALEXANDER ROZENBROEK

LOCATION:
25 THE OUTLOOK, BILGOLA PLATEAU, NSW, 2107.

PROJECT STAGE:
DA

DRAWING TITLE:
SECTION
SHEET 01

SCALE:
1:100 @ A3

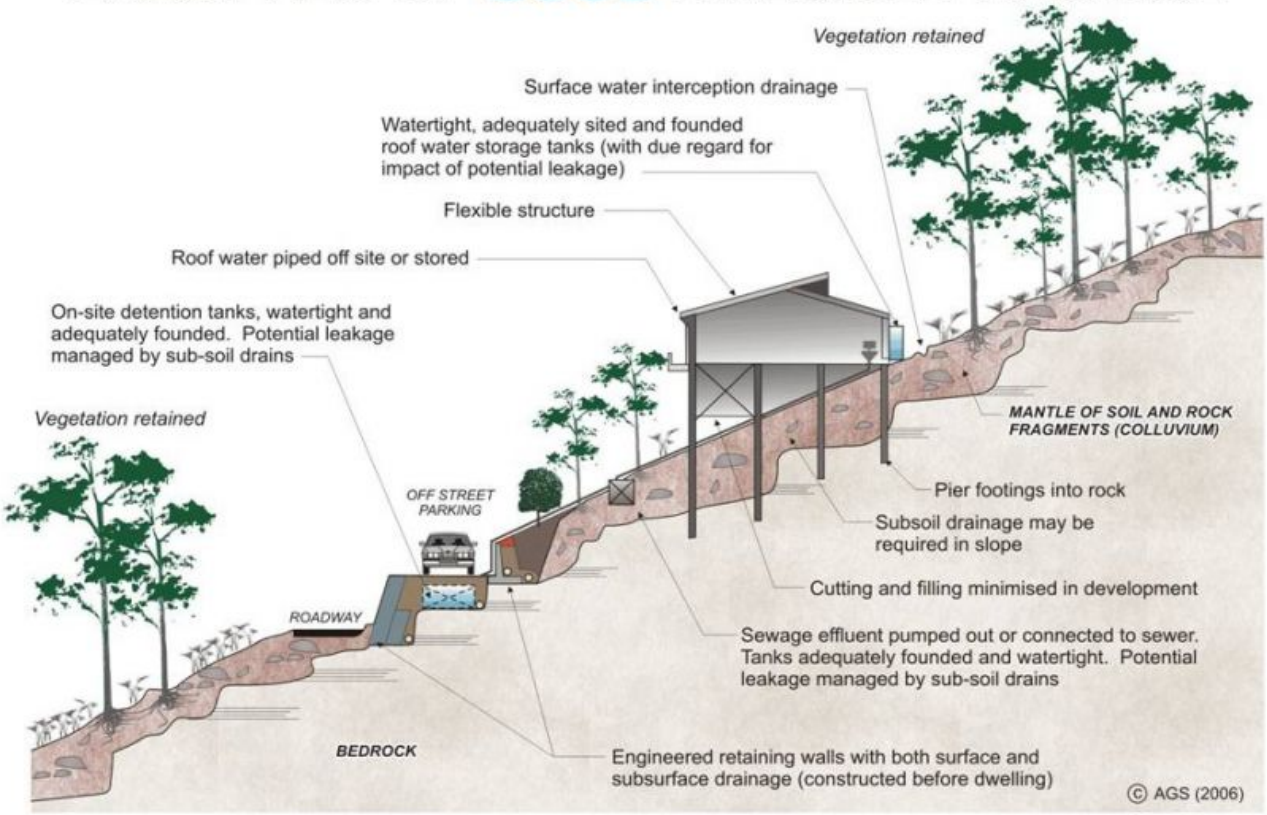
DATE OF ISSUE:
25.06.2020

DRAWING NO.
DA-400

REVISION:
-

rama
daniel raymond architect nsw reg. 9700
thomas martin architect nsw reg. 8103/83
1 / 8 WARRATAH ST, MONA VALE, NSW, 2103
www.ramaarchitects.com
e. info@ramaarchitects.com
ABN 612 713 425

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE