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

Development Application for _____
Name of Applicant

Address of site 40 Maxwell Street, Mona Vale

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 24/6/19 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 **40 Maxwell Street, Mona Vale**

Report Date: 24/6/19

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 40 Maxwell Street, Mona Vale

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 **40 Maxwell Street, Mona Vale**

Report Date: 24/6/19

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **20/3/19**
(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 **21/3/19**

☒ 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 & Additions and New Secondary Dwelling at **40 Maxwell Street, Mona Vale**

1. Proposed Development

1.1 Construct a new single storey secondary dwelling on the downhill side of the property.

1.2 Extend the uphill and downhill sides of the house.

1.3 Construct a new first floor addition.

1.4 Other various internal and external modifications.

1.5 Details of the proposed development are shown on 10 drawings prepared by Blue Sky Building Designs, Project number 2018080, sheets numbered A101 to 110, dated 11th March 2019.

2. Site Description

2.1 The site was inspected on the 20th March, 2019.

2.2 This residential property is on the low side of the road and, in the location of the house, has a SE aspect. The block is located within a gently graded gully between two hillslopes. At the road frontage, the slope falls at an average angle of ~8° to the base of the gully where a stormwater easement contains a stormwater pipe that is partially exposed at the surface (Photo 10). This was likely installed through the path of the original creek channel and has been backfilled during the development of the block. The slope begins to rise again on the other side of the easement. The slopes above the property continue at gentle angles.

2.3 At the road frontage, a concrete driveway runs down the slope to a gravel parking area on the NE side of the house (Photos 1 & 2). A cut and fill has been made

in the slope between the road frontage and the house (Photos 3 & 4). Both the cut and fill are supported by new stable timber retaining walls. The single-storey brick and timber framed and clad house is supported on brick walls and brick piers (Photo 5). No significant signs of movement or cracking were observed in the external supporting walls of the house. Two of the brick piers were observed to be tilting to a maximum angle of ~6° (Photos 6 & 7). We recommend these piers be replaced as part of the proposed works and note an assessment of the structural adequacy of the house will need to be undertaken by the structural engineer. A gently sloping lawn extends from the downhill side of the house to the SE common boundary (Photo 8). A stable ~1.5m high timber retaining wall along the SE common boundary supports a fill that levels the SE neighbouring property (Photo 9). No significant signs of movement were observed on the property. No geotechnical hazards that could impact on the subject property were observed on the neighbouring properties as seen from the subject property and the road.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. This is described as interbedded laminite, shale and quartz to lithic quartz sandstone.

4. Subsurface Investigation

Six DCP (Dynamic Cone Penetrometer) 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. It is likely DCP1 refused on a boulder/rock in the profile, this is not expected to be an issue for the remaining tests on this site and 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** (~RL13.0)	**DCP 2** (~RL13.5)	**DCP 3** (~RL11.0)	**DCP 4** (~RL10.4)	**DCP 5** (~RL10.4)	**DCP 6** (~RL11)
0.0 to 0.3	2	1F (DCP fell to 0.5m)	2	2	7	3
0.3 to 0.6	10	4	2	5	4	7
0.6 to 0.9	16	15	9	8	15	43
0.9 to 1.2	#	14	17	5	28	25
1.2 to 1.5		21	21	6	47	#
1.5 to 1.8		21	45	14	45	
1.8 to 2.1		24	#	28	#	
2.1 to 2.4		15		38		
2.4 to 2.7		#		#		
	Refusal on Rock @ 0.8m	Refusal on Rock @ 2.2m	Refusal on Rock @ 1.8m	Refusal on Rock @ 2.3m	End of Test @ 1.7m	Refusal on Rock @ 1.0m

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

DCP Notes:

DCP1 – Refusal on rock @ 0.8m, DCP bouncing off rock surface, white rock fragments on dry tip, clay above tip, yellow and white clay in sleeve above tip.
DCP2 – Refusal on rock @ 2.2m, DCP bouncing off rock surface, white impact dust on dry tip.
DCP3 – Refusal on rock @ 1.8m, DCP bouncing off rock surface, muddy wet tip.
DCP4 – Refusal on rock @ 2.3m, DCP bouncing off rock surface, muddy wet tip.
DCP5 – End of test @ 1.7m, DCP still very slowly going down, sand on wet tip, red clay above tip.
DCP6 – Refusal on rock @ 1.0m, DCP thudding, muddy wet tip.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the test locations, the ground materials consist of a sandy topsoil over firm to very stiff clays. The clays merge into the underlying weathered shale at variable depths of between ~1.0 to ~2.0m

below the current ground surface, being variable due to the weathered nature of the rock. Extremely Low to Very Low Strength Shale is expected to underlie the entire site. It is to be noted that this material can appear as a mottled stiff clay when it is cut up by excavation equipment. The original creek channel has likely been infilled during the initial development of the property. No other fills were observed during the testing on the site. See Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

Due to the position of the property on the slope, ground water seepage on the site is expected to be slightly higher than usual. Ground water seepage is expected to move over the buried surface of the rock, and through the cracks.

Due to the slope and elevation of the block, the water table is expected to be many metres below the base of the proposed excavation.

7. Surface Water

Loose organic matter and debris were observed washed into the gully from the property to the SW. This likely occurred during downpours that occurred on the days previous to the inspection. Normal sheet wash from the slope above will be intercepted by the street drainage system.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below, or beside the property. Groundwater seepage impacting on the proposed secondary dwelling footings is a potential hazard (**Hazard One**).

RISK ANALYSIS SUMMARY ON THE NEXT PAGE

Risk Analysis Summary

HAZARDS	Hazard One
TYPE	Groundwater seepage eroding the base of the footings for the secondary dwelling and supporting ground material causing failure of the footing.
LIKELIHOOD	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (20%)
RISK TO PROPERTY	'Moderate' (2×10^{-5})
RISK TO LIFE	5.7×10^{-7}/annum
COMMENTS	This level of risk to property is **'UNACCEPTABLE'**. To move the risk levels to acceptable levels the recommendations in **Section 12** are to be followed.

(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

A stormwater easement was observed running across the property near the SW boundary (Photo 5). We recommend all stormwater runoff from the proposed development be piped to this easement through any tanks that may be required by the regulating authorities.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

If the proposed additions to the house are flexible structures and some movement in accordance with a 'Class M' site can be tolerated (i.e. timber framed and clad), piers supported on the underlying firm to stiff clays are suitable footings for the proposed additions. Pad or pier depth to encounter this material is expected to be between 0.4 to 0.6m below the current ground surface. From the downhill side of the footings. A maximum allowable bearing pressure of 200kPa can be assumed for footings supported on firm to stiff clays.

For better quality footings or where little movement can be tolerated (i.e. the additions are of masonry construction), piers can be taken to Extremely Low to Very Low Strength Shale. The required pier depth is expected to be between 1.0 to 2.0m below the current ground surface with the majority of the foundations expected towards the deeper end of the range. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low to Very Low Strength Shale.

Ideally, footings should be founded on the same footing material across the existing house and new additions. Where the footing material changes across the structure, construction joints or similar are to be installed to prevent differential settlement where the structure cannot tolerate such movement.

As the proposed new secondary dwelling will be constructed over the infilled creek and a natural flow path, we suggest piers be taken to the underlying Extremely Low to Very Low Strength Shale. This will prevent the surrounding softer clay and weathered shale losing cohesion and washing away over time. This bearing material is expected at a maximum depth of ~1.7m below the current ground surface. A maximum allowable pressure of 600kPa can be assumed for footings supported on Extremely Low to Very Low Strength Shale.

It is recommended the footings be dug, inspected, and poured in quick succession (ideally the same day if possible). If the footings get wet, they will have to be drained, and the soft wet layer of shale on the footing surface will have to be removed before concrete is poured.

If a rapid turnaround from footing excavation to the concrete pour is not possible, a sealing layer of concrete may be added to the footing surface after it has been cleaned.

NOTE: If the contractor is unsure of the footing material required, it is more cost effective to get the geotechnical consultant 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

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.

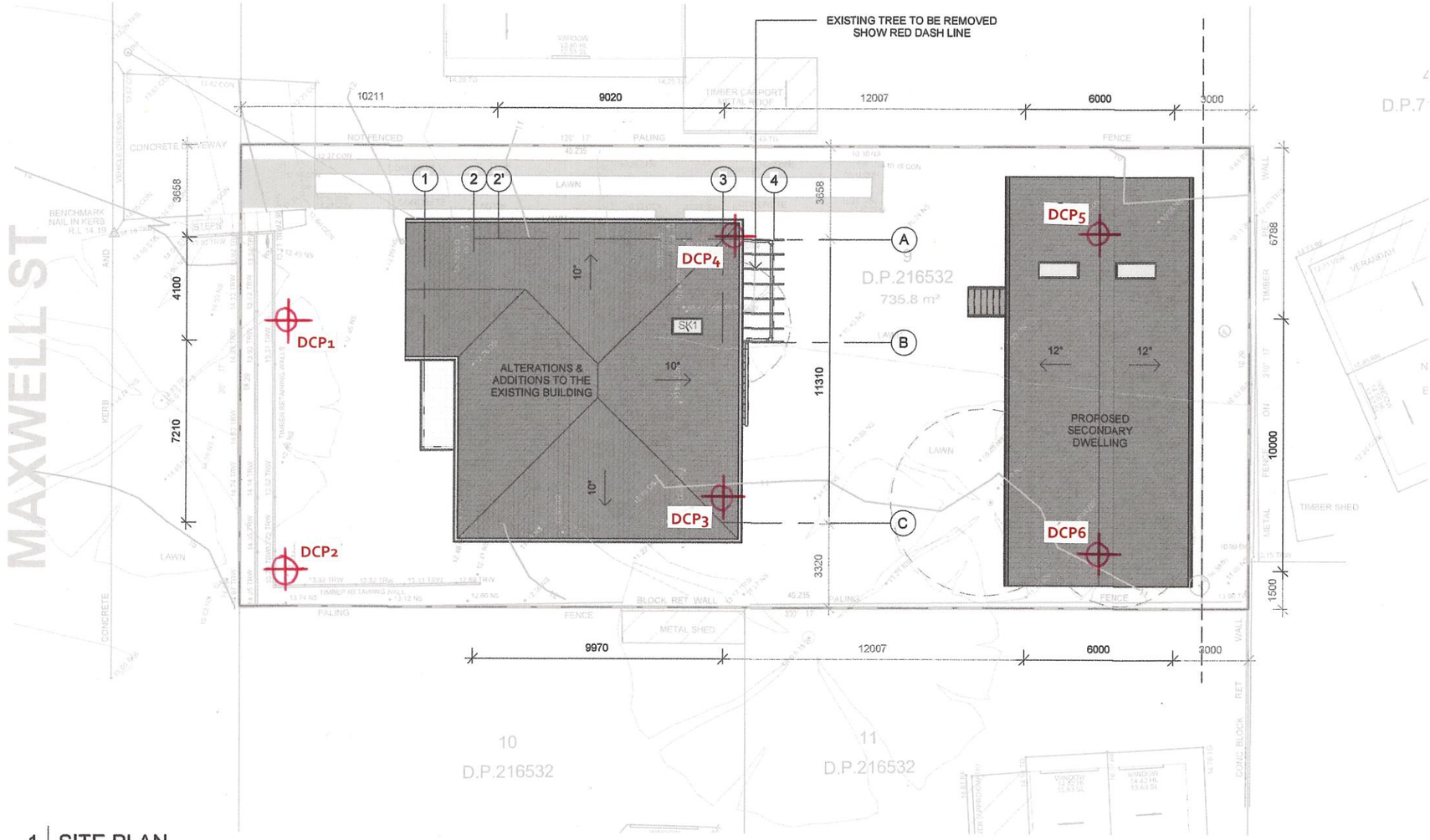
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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.

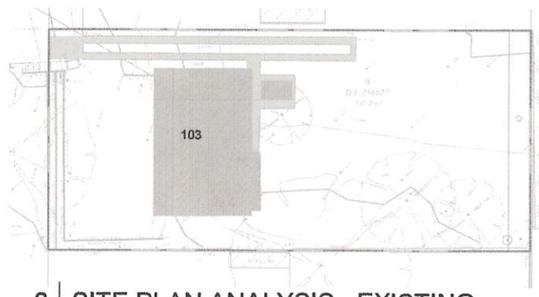
SITE PLAN – showing test locations



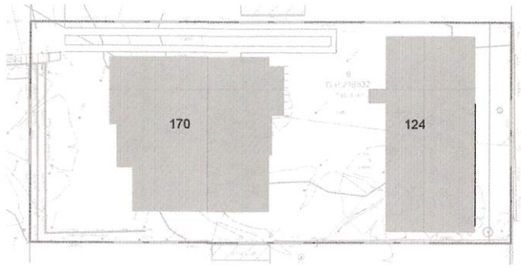
CALCULATION TABLE

ZONE	R2 - LOW DENSITY RESIDENTIAL		
HAZARDS	Geotechnical Hazard/ Flood Risk - Low to Med		
SITE AREA	735.8 m² (By Survey)		
MAX. BUILDING HEIGHT	Hmax = 8.5 m		
BUILDING ENVELOPE	3.5m - SIDE BOUNDARY ENVELOPES		
	EXISTING	DEMOLISHED	PROPOSED
GFA - MAIN DWELLING	76.2 m²	m²	203m²
SECONDARY DWELLING	-	-	58m²
SITE COVERAGE	107 m² / 14.5 %	m²	294 m² / 40 %
HARD SURFACE	67 m²	m²	43 m²
SOFT LANDSCAPING	561.8 m² / 76.3 %	-	399 m² / 54 %

1 | SITE PLAN
A101 | 1 : 200



3 | SITE PLAN ANALYSIS - EXISTING
A101 | 1 : 500



4 | SITE PLAN ANALYSIS - NEW PROPOSAL
A101 | 1 : 500

ALL BUILDING WORKS MUST BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING CODE OF AUSTRALIA (BCA) AND AUSTRALIAN STANDARDS

NOTES:

1. Demolition works to be carried out in accordance with the requirements of A2601-2001 The Demolition of Structures. Also in compliance with work cover authority of NSW requirements, including but not limited to:
   - Protection of site workers and the general public
   - Asbestos handling and disposal where applicable
2. Termite protection to be in accordance with AS 3600.1
3. All construction to comply with current BCA codes and Australian Standards.
4. Stormwater system to be connected to existing.
5. All timber framing shall comply with AS1684
6. These documents must be read in conjunction with all the sub-consultants reports and recommendations. The architectural documents form part of the total construction set and are not to be taken as exclusively being the building construction documents
7. Eaves within 900mm of allotment boundries are to be constructed of non-combustible materials. eaves must not be within 450mm of allotment boundaries as required by part 3.7.1 of BCA
8. Sediment & Erosion control are to be installed and maintained during the life of the project

Do not scale from plans. All dimensions and levels shown on plan are subject to confirmation on site.

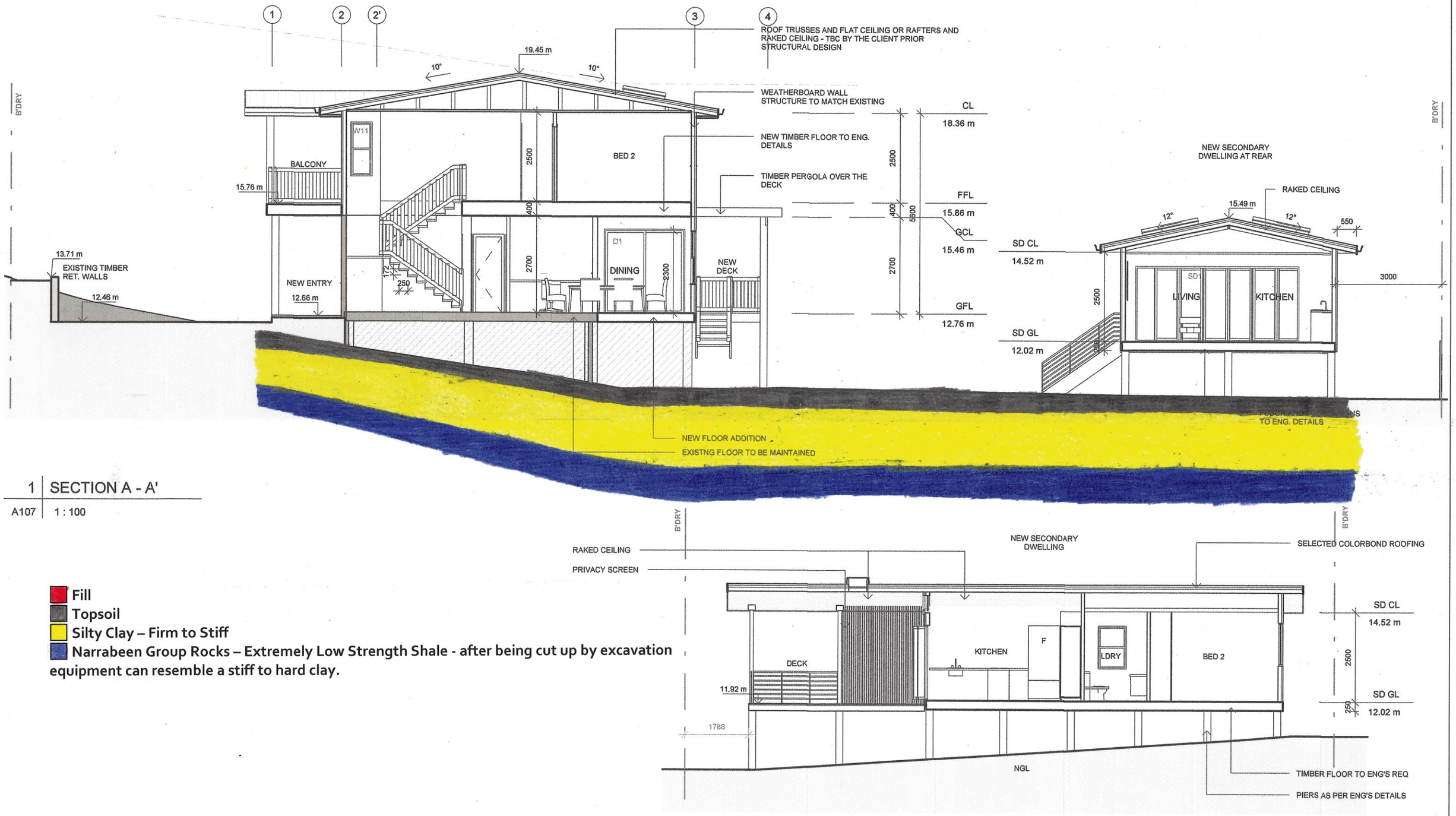
ISSUE	DATE	DESCRIPTION	DRWN	CHKD
-	10.12.2018	EXISTING	MW	
	20.12.2018	PRELIMINARY 1	KM	
2	11.03.2019	DA ISSUE	KC	KM

BLUE SKY BUILDING DESIGNS
PO BOX 167 Newport 2106
Mobile: 0 414 310 171
E: info@bsbd.com.au
www.blueskybuildingdesigns.com.au

PROJECT TITLE: ALTERATION & ADDITION
PROJECT NO.: 2018080
AT: 40 Maxwell St, Mona Vale
FOR: Jake & Rebecca Wicks

SHEET TITLE: SITE PLAN
SHEET NO: A101
SCALE A3: As indicated

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



1 | SECTION A - A'
A107 | 1 : 100

2 | SECTION B - B'
A107 | 1 : 100

- Fill
- Topsoil
- Silty Clay – Firm to Stiff
- Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

Do not scale from plans. All dimensions and levels shown on plan are subject to confirmation on site.

ISSUE	DATE	DESCRIPTION	DRWN	CHKD
-	10.12.2018	EXISTING	MW	
	20.12.2018	PRELIMINARY 1	KM	
2	11.03.2019	DA ISSUE	KC	KM

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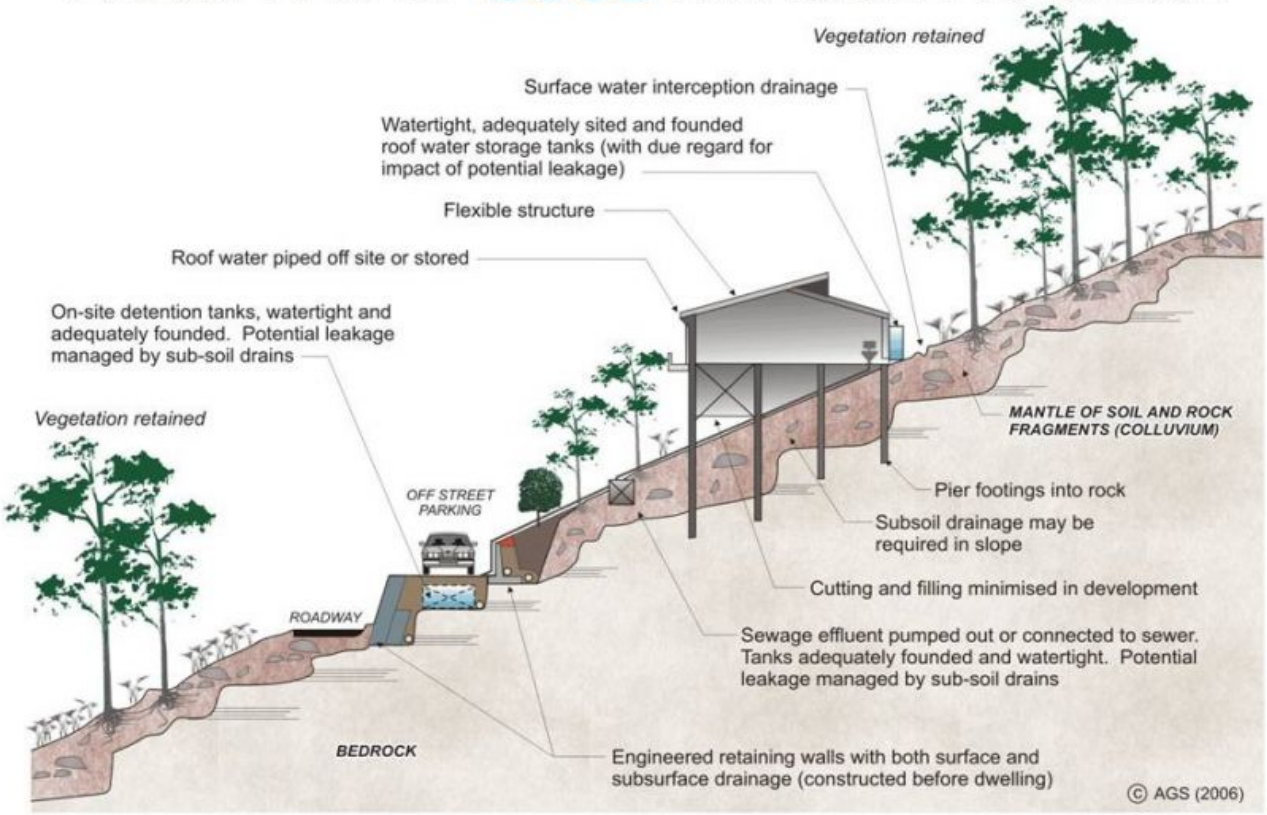
PROJECT TITLE:	ALTERATION & ADDITION
PROJECT NO.:	2018080
AT:	40 Maxwell St, Mona Vale
FOR:	Jake & Rebecca Wicks
SHEET TITLE:	SECTIONS
SHEET NO:	A107
SCALE A3:	1 : 100

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE