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

Development Application for _____
Name of Applicant

Address of site 11 Cook Terrace, 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 25/11/20 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 **11 Cook Terrace, Mona Vale**

Report Date: 25/11/20

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 11 Cook Terrace, 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 **11 Cook Terrace, Mona Vale**

Report Date: 25/11/20

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **17/11/20**
(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 **17/11/20**

☒ 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 Pool at **11 Cook Terrace, Mona Vale**

1. Proposed Development

1.1 Install a new pool with deck by excavating to a maximum depth of ~2.0m.

1.2 Details of the proposed development are shown on 8 drawings prepared by Blue Sky Building Designs, project number 2020041, drawings numbered A101 to A107 and NP, dated 4/11/20.

2. Site Description

2.1 The site was inspected on the 17th of November, 2020.

2.2 This residential property is on the high side of the road and has a NW aspect. It is located on the moderately graded upper reaches of a hillslope. The natural slope rises across the property at an average angle of ~9°. The slope below the property gradually eases and the slope above the property continues at similar angles before reaching the crest of the hillslope.

2.3 At the road frontage a concrete driveway runs up the slope to a garage attached to the existing house (Photo 1). The part two storey rendered and timber clad house is supported by brick walls and a concrete slab (Photos 1 to 3). The supporting walls display no significant signs of movement. A low brick retaining wall along the NE common boundary supports fill on the NW neighbouring property. A concrete deck with roof extends off the uphill side of the house (Photo 4). A gently sloping lawn terraced by a low timber retaining wall extends from the deck to the uphill property boundary (Photo 5). A stable timber shed is located near the uphill property boundary (Photo 6). 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 the Newport Formation of the Narrabeen Group. This is described as interbedded laminite, shale, and quartz to lithic quartz sandstone.

4. Subsurface Investigation

One Auger hole was put down to identify the soil materials. 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:

AUGER HOLE 1 (~RL35.3) **–** AH1 (photo 7)

Depth (m)	**Material Encountered**
0.0 to 0.3	**TOPSOIL**, brown, moist, fine to medium grained with fine trace organic matter.
0.3 to 0.5	**CLAY**, light brown orange, firm to stiff, moist.

End of Hole @ 0.5m in firm to stiff clay. 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** (~RL34.8)	**DCP 2** (~RL35.3)	**DCP 3** (~RL35.4)	**DCP 4** (~RL35.7)
0.0 to 0.3	6	6	4	3
0.3 to 0.6	8	8	8	18
0.6 to 0.9	13	12	21	20
0.9 to 1.2	40	30	30	30
1.2 to 1.5	#	#	#	#
	End of Test @ 1.2m	End of Test @ 1.1m	End of Test @ 1.1m	End of Test @ 1.1m

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

DCP Notes:

DCP1 – End of Test @ 1.2m, DCP still slowly going down, white impact dust on dry tip and orange clay on collar.

DCP2 – End of Test @ 1.1m, DCP still slowly going down, orange shale fragments on dry tip.

DCP3 – End of Test @ 1.1m, DCP still slowly going down, orange shale fragments on dry tip.

DCP4 – End of Test @ 1.1m, DCP still slowly going down, orange shale fragments on dry tip and orange clay on collar.

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 thin topsoil over firm to stiff clays. The clays merge into the weathered zone of the under lying rocks at an average depth of ~1.1m below the current surface. The weathered zone of the underlying rock is interpreted as Extremely Low Strength Shale. It is to be noted that this material is a soft rock and can appear as a mottled stiff clay when it is cut up by excavation equipment. 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 base of 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.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property. The moderately graded slope that falls across the property and continues above and below is a potential hazard (**Hazard One**). The proposed excavation for the pool collapsing onto the worksite is a potential hazard (**Hazard Two**).

RISK ANALYSIS SUMMARY IS ON THE NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The moderate slope that falls across the property and continues above and below failing and impacting on the property.	The proposed excavation for the pool collapsing onto the worksite during the excavation process.
LIKELIHOOD	'Unlikely' (10^{-4})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum	8.3×10^{-6}/annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** 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

The fall is to Cook Terrace. All stormwater from the proposed development is to be piped to the street drainage system through any tanks that may be required by the regulating authorities.

11. Excavations

An excavation to a maximum depth of ~2.0m is required to install the proposed pool. The excavation is interpreted to be through topsoil to a depth of ~0.3m over firm to stiff clay, with Extremely Low Strength Shale expected at an average depth ~1.1m below the current surface.

It is envisaged that excavations through soil, clay and Extremely Low Strength Shale can be carried out with an excavator and bucket.

12. Vibrations

It is expected the proposed excavation will be carried out with an excavator and bucket and the vibrations produced will be below the threshold limit for building or infrastructure damage.

13. Excavation Support Requirements

An excavation to a maximum depth of ~2.0m is required to install the proposed pool. The depth of the excavation adjacent to the S common boundary is ~1.7m. The excavation is set back ~1.5m from a timber boundary fence along the S common boundary but weathered rock in this location was encountered at a depth of 1.1m effectively reducing the zone of influence of the excavation. As such we consider the excavation setback sufficient in regards to the stability of the adjoining property.

The excavation will stand at near-vertical angles for short periods of time until the pool structure is installed, provided the cut batters are kept from becoming saturated.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. The materials and labour to construct the pool structure are to be organised so on completion of the excavation they can be constructed as soon as possible. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast. If the cut batters remain unsupported

for more than a few days before the commencement of pool construction they are to be temporarily supported with typical pool shoring such as braced form ply or similar until the pool structure is in place.

All excavation spoil is to be removed from site or be supported by engineered retaining walls.

14. Retaining Structures

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

Table 1 – Likely Earth Pressures for Retaining Structures

Unit	Earth Pressure Coefficients		
	Unit weight (kN/m^3)	'Active' K_a	'At Rest' K_0
Topsoil	20	0.40	0.55
Residual Clays	20	0.35	0.45
Extremely Low Strength Shale	22	0.25	0.35

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 structure, do not account for any surcharge loads and assume retaining structures are fully drained.

Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

All retaining structures are to have sufficient back-wall drainage and be backfilled immediately behind the structure 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 structures the full hydrostatic pressures are to be accounted for in the retaining structure design.

15. Foundations

The proposed pool is expected to be seated in Extremely Low Strength Shale. This is a suitable bearing material. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Shale.

As the bearing capacity of shale reduces when it is wet we recommend 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 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 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.

16. 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

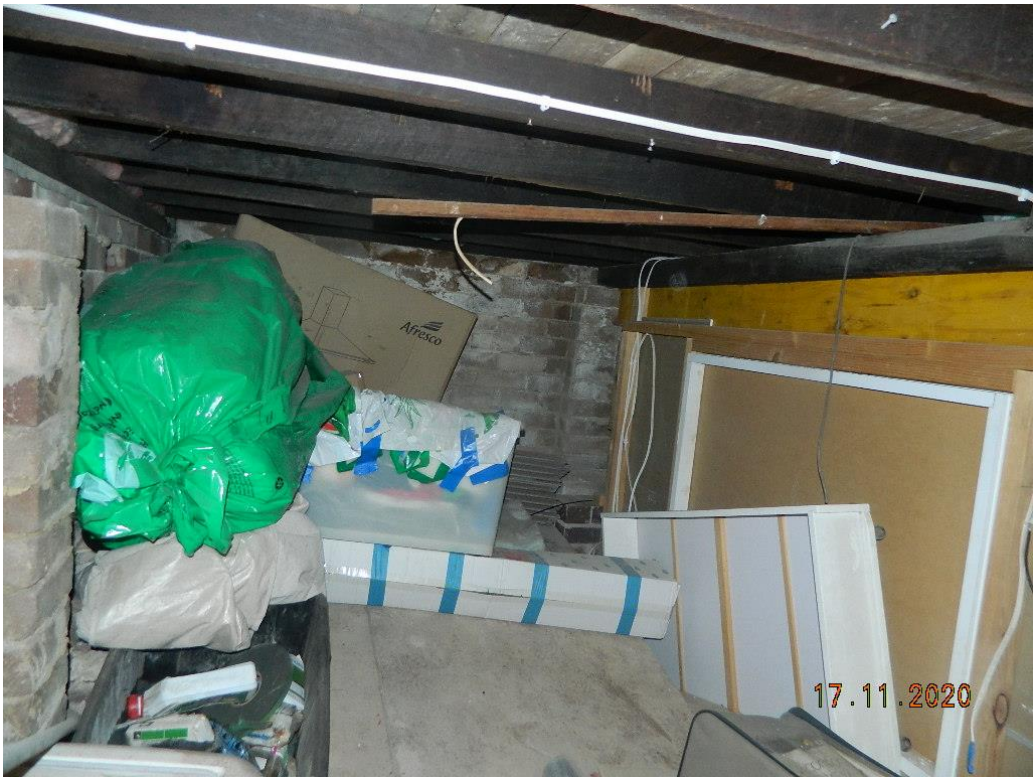


Photo 3

Photo 4

Photo 5

Photo 6

Photo 7: 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.

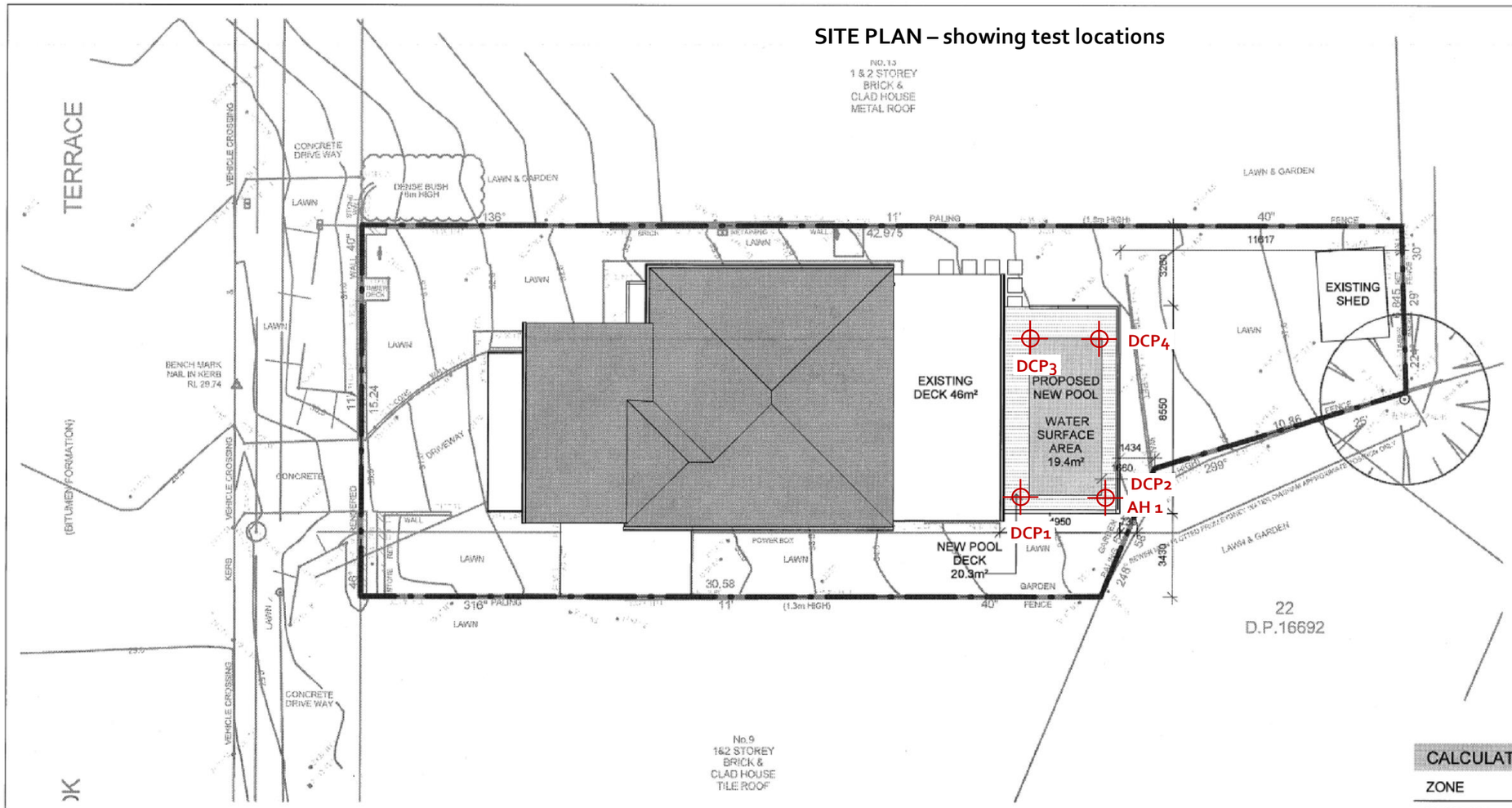
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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



1 | SITE PLAN

A101 | 1 : 200

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 part 3.1.3
3. Waterproofing shall be carried out in accordance with NCC Vol.2
4. All timber framing shall comply with AS1684
5. 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
6. 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
7. Smoke alarms to be installed in accordance with NCC 3.7.5 vol.2 2019
8. Sediment & Erosion control are to be installed and maintained during the life of the project
9. All construction to comply with current NCC codes and Australian Standards.

POOL NOTES:

1. Pool overflow to be connected to existing Sewer System
2. Pool fencing to be designed, located and maintained in accordance with the swimming pools act 1992, Regulation Pools Act 1992, Regulation and Australian Standard 1926.1 & comply with BCA Vol.2, Housing Provisions, Part 3.9.3 and AS1926.1. The min H of pool fence balustrade is 1200mm and openings not grater than 105mm

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

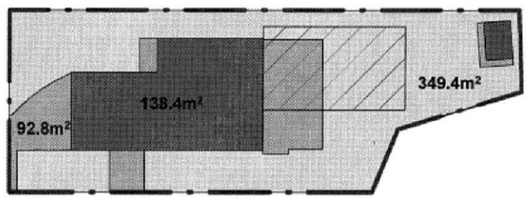
LANDSCAPED AREA

HARD SURFACE

SITE COVERAGE

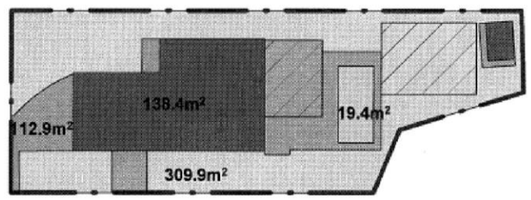
POOL

PRIVATE OPEN SPACE



4 | Site Plan Calc._EXISTING

A101 | 1 : 500



5 | Site Plan Calc._PROPOSED

A101 | 1 : 500

CALCULATION TABLE			
ZONE	E4 - ENVIRONMENTAL LIVING		
HAZARDS	-		
SITE AREA	580.6 m²		
MAX. BUILDING HEIGHT	Hmax = 8.5 m		
BUILDING ENVELOPE	3.5 m - SIDE BOUNDARY ENVELOPES		
	EXISTING	DEMOLISHED	PROPOSED
GROSS FLOOR AREA	112.6 m²	-	112.6 m²
GARAGE	37.7 m²	-	37.7 m²
SITE COVERAGE	138.4m² / 24%	-	138.4m² / 24%
HARD SURFACE	92.8m² / 16%	-	112.9m² / 19%
SOFT LANDSCAPING	349.4m² / 60%	39.5m² / 6%	309.9m² / 54% 54% + 6% = **60%**
POOL WATER SURFACE	-		19.4m²
PRIVATE OPEN SPACE	min 80m²		min 80m²

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

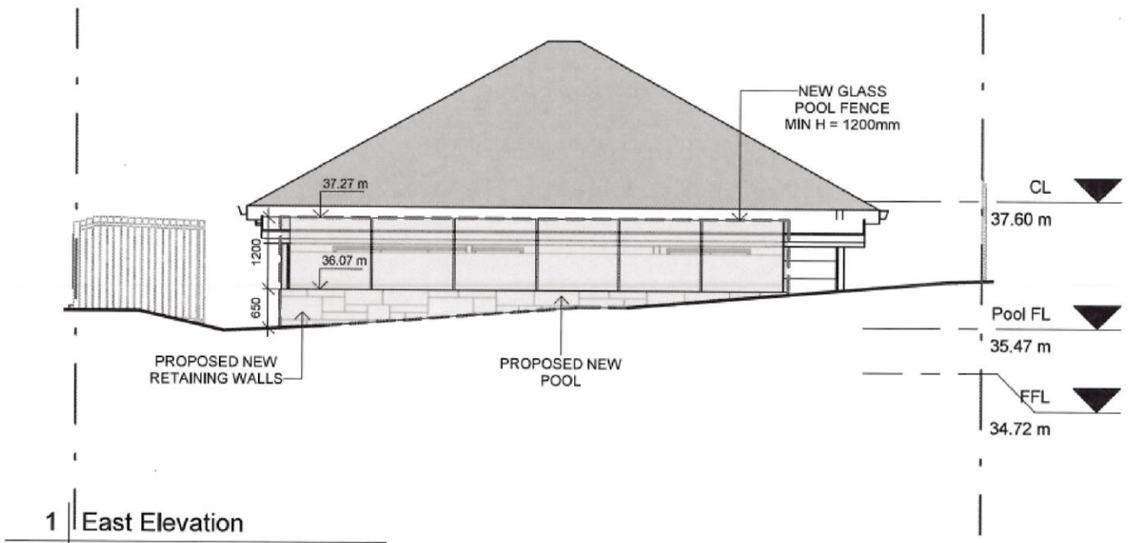
ISSUE	DATE	DESCRIPTION	DRWN	CHKD
-	14.10.2020	PRELIMINARY 1	MN	-
	04.11.2020	DA ISSUE	MN	

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

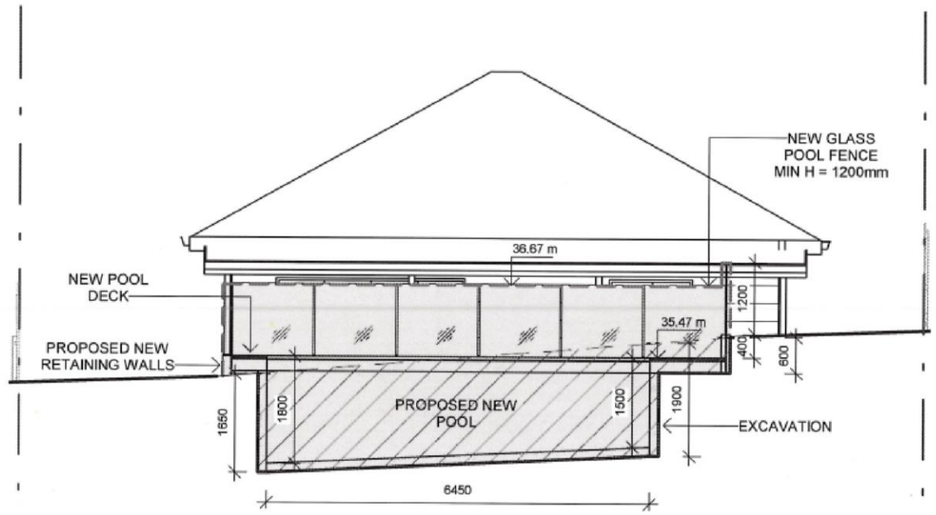
PROJECT TITLE:	POOL ADDITION
PROJECT NO.:	2020041
AT:	11 Cook Terrace, Mona Vale
FOR:	Sonja & Jeremy Millar Thomson
SHEET TITLE:	SITE PLAN
SHEET NO:	A101
SCALE A3:	As indicated

N

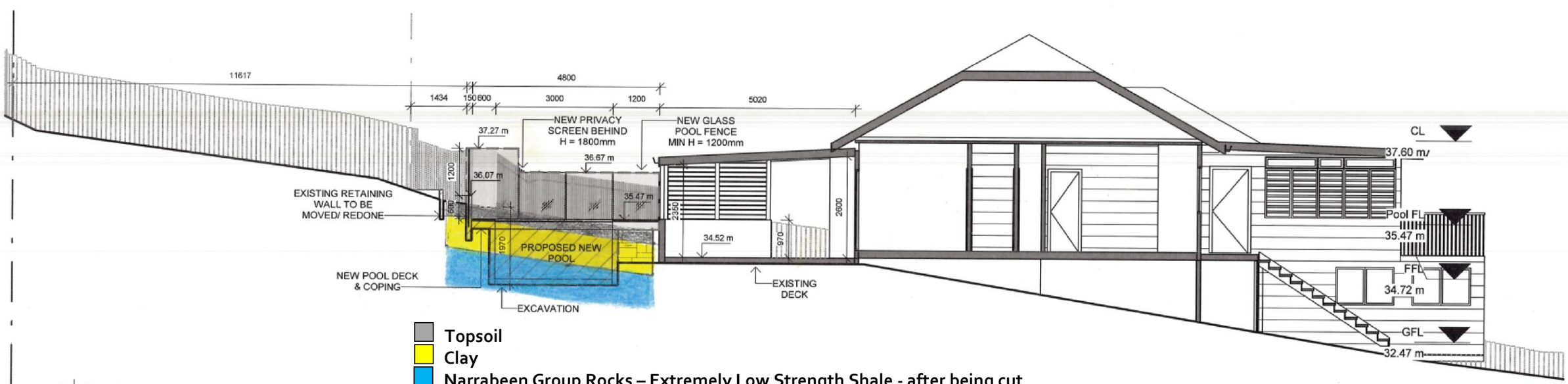
TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



1 | East Elevation
A105 | 1 : 100



3 | Section 2-2
A105 | 1 : 100



2 | Section 1-1
A105 | 1 : 100

- Topsoil
- Clay
- 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
-	14.10.2020	PRELIMINARY 1	MN	-
	04.11.2020	DA ISSUE	MN	

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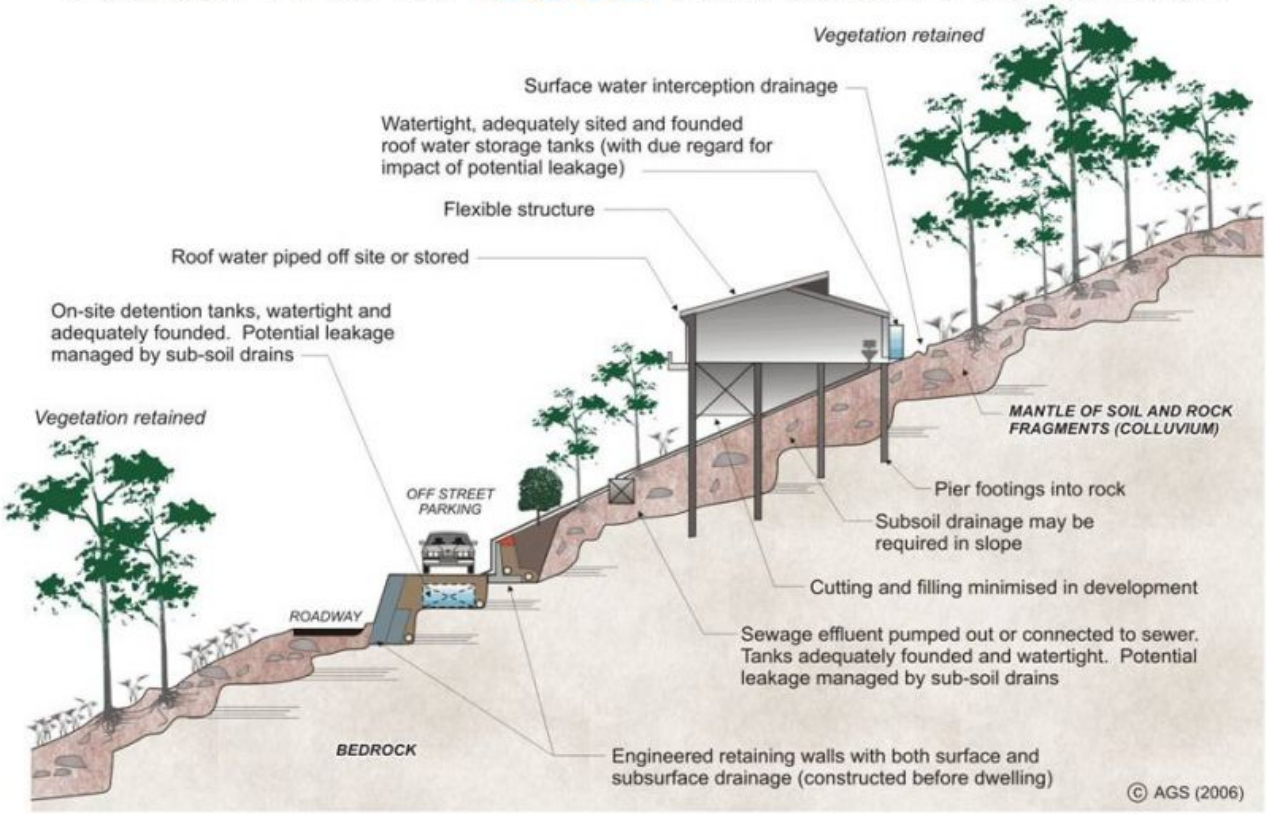
www.blueskybuildingdesigns.com.au

PROJECT TITLE:	POOL ADDITION
PROJECT NO.:	2020041
AT:	11 Cook Terrace, Mona Vale
FOR:	Sonja & Jeremy Millar Thomson
SHEET TITLE:	ELEVATION & SECTIONS
SHEET NO:	A105
SCALE A3:	1 : 100

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE