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

Devel	opment Application	Name of Applicant
Addre	ss of site	9 Wakooka Avenue, Elanora Heights
		rs the minimum requirements to be addressed in a Geotechnical Risk Declaration made by
geotecl	nnical engineer or e	engineering geologist or coastal engineer (where applicable) as part of a geotechnical report
I,	Ben White (Insert Name)	on behalf of White Geotechnical Group Pty Ltd (Trading or Company Name)
coastal organisa	engineer as defined	6/6/19 certify that I am a geotechnical engineer or engineering geologist or by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above ue this document and to certify that the organisation/company has a current professional indemnity
l: Please	mark appropriate b	ox
	have prepared the	e detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics le Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for
	accordance with th	hnically verify that the detailed Geotechnical Report referenced below has been prepared in ne Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Management Policy for Pittwater - 2009
	have examined the with Section 6.0 of assessment for the	e site and the proposed development in detail and have carried out a risk assessment in accordance the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk be proposed development are in compliance with the Geotechnical Risk Management Policy for a further detailed geotechnical reporting is not required for the subject site.
	have examined the Application only i	e site and the proposed development/alteration in detail and I am of the opinion that the Development involves Minor Development/Alteration that does not require a Geotechnical Report or Risk ence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
	have examined the Hazard and does the Geotechnical F	e site and the proposed development/alteration is separate from and is not affected by a Geotechnical not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with Risk Management Policy for Pittwater - 2009 requirements.
	·	coastal process and coastal forces analysis for inclusion in the Geotechnical Report
Geotec	hnical Report Detail Report Title: Geote	ls: echnical Report 9 Wakooka Avenue, Elanora Heights
	Report Date: 25/6/	19
	Author: BEN WHI	TE
	Author's Company	Organisation: WHITE GEOTECHNICAL GROUP PTY LTD
Documo	entation which rela	te to or are relied upon in report preparation:
	Australian Ge	omechanics Society Landslide Risk Management March 2007.
	White Geotec	hnical Group company archives.
Develop Risk Ma Manage	ment Application for anagement aspects ment" level for the life	Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical of the proposed development have been adequately addressed to achieve an "Acceptable Risk e of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and I measures have been identified to remove foreseeable risk.

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

Develo	pment Application		e of Applicant
Addres	s of site	9 Wakooka Avenue, Ela	nora Heights
Report. T	This checklist is to a	accompany the Geotechnical Repo	
Report	Title: Geotechnical	Report 9 Wakooka Avenue, E	Ilanora Heights
		,	
	Date: 25/6/19	Name of Applicant 9 Wakooka Avenue, Elanora Heights Wist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Risk is to accompany the Geotechnical Report and its certification (Form No. 1). ort Details: echnical Report 9 Wakooka Avenue, Elanora Heights //19 TE my/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD priate box ensive site mapping conducted 206/19	
Author:	BEN WHITE		
Author'	's Company/Orgai	nisation: WHITE GEOTECHNICA	AL GROUP PTY LTD
Please m	nark appropriate b	ох	
\boxtimes	Comprehensive site		
	Mapping details pre	` ,	geomorphic mapping to a minimum scale of 1:200 (as appropriate)
	Subsurface investig	•	
\boxtimes			rrad subsurface type-section
			ned subsurface type-section
	⊠ Belov	w the site	
	☐ Besid	le the site	
\boxtimes	Geotechnical hazar	ds described and reported	
\boxtimes	Risk assessment co	onducted in accordance with the Ge	otechnical Risk Management Policy for Pittwater - 2009
		•	
_	•	uency analysis	
	Risk calculation		
			sk Management" criteria as defined in the Geotechnical Risk
\boxtimes		•	the "Acceptable Risk Management" criteria provided that the
_			The property of the control of the property of the control of the
\boxtimes	Design Life Adopte	d:	
	⊠ 100 y	ears	
	☐ Other		
	0		
			s as described in the Geotechnical Risk Management Policy for
		•	practical have been identified and included in the report
			•
_	THE RESERVE TO THE RE	240 250 10.00 20	•
that the g Managen	eotechnical risk ma nent" level for the li	anagement aspects of the proposa ife of the structure, taken as at le	il have been adequately addressed to achieve an "Acceptable Risk ast 100 years unless otherwise stated, and justified in the Report
		Signature	elut
		Name	Ben White
		Chartered Professional Status	MScGEOLAusIMM CP GEOL

Company White Geotechnical Group Pty Ltd

Membership No.

222757



J2249. 25th June, 2019. Page 1.

GEOTECHNICAL INVESTIGATION:

New Secondary Dwelling at 9 Wakooka Avenue, Elanora Heights

1. Proposed Development

- **1.1** Construct a new secondary dwelling on the W side of the property.
- 1.2 Details of the proposed development are shown on 5 drawings prepared by Envirotecture, Project number K33, drawings numbered 11.01, 21.01, 21.02, 30.01, and 40.01, Issue 1, dated 13/2/19.

2. Site Description

- **2.1** The site was inspected on the 20th June, 2019.
- 2.2 This residential property has a SE aspect in the location of the proposed works. It is located on the gently graded middle reaches of a hillslope. The slope falls from the road frontage to a creek that cuts the property from N to S. The slope to the E of the creek begins to rise gently again. The creek encounters a ~4.0m high waterfall that is located near the S boundary. The slopes above the property gradually increases in grade. The slope below the property continues at moderate to steep angles.
- 2.3 At the road frontage, a concrete driveway runs down the slope to a bridge over a creek channel that cuts through the property from N to S (Photos 1 & 2). On the W side of the creek, the driveway diverts to a stable masonry garage (Photo 3). Between the road frontage and the garage is a gentle, moderately vegetated slope (Photo 4). The bed of the creek consists of stable, competent Medium Strength Sandstone (Photo 7). The creek encounters a waterfall that flows over a ~4.0m high rock face that is close to the S boundary (Photo 5). The rock face is undercut ~5.0m at the base. However, the rock face is thickly bedded and the undercut is bridged at both ends by competent rock. Thus, we consider the undercut to currently be stable. Filling has been placed on both banks of the creek to level the property. The fills are supported



J2249. 25th June, 2019.

Page 2.

by stable sandstone block retaining walls (Photos 6 & 7). A pool has been constructed

on the E side of the creek (Photo 8). No signs of movement were observed in the

concrete shell of the pool. The single-storey brick house is supported on brick walls

(Photo 9). No significant signs of movement were observed in the supporting brick

walls. An excavation has been made in the slope to create a level platform for the

house. The cut is supported by a brick retaining wall reaching ~1.2m high (Photo 10).

This wall was observed to be directly supported off an outcrop of competent Medium

Strength Sandstone bedrock.

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 bedrock. 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 and the

results are as follows:

DCP RESULTS ON THE NEXT PAGE



J2249. 25th June, 2019. Page 3.

DCP TEST RESULTS – Dynamic Cone Penetrometer					
Equipment: 9	okg hammer, 510mm dro	op, conical tip.	Standard	d: AS1289.6.3.2 - 1997	
Depth(m)	DCP 1	DCP 2	DCP 3	DCP 4	
Blows/0.3m	(~RL56.5)	(~RL56.5)	(~RL55.4)	(~RL55.3)	
0.0 to 0.3	11	2	10	2	
0.3 to 0.6	20	7	12	30	
0.6 to 0.9	15	#	22	23	
0.9 to 1.2	32		23	15	
1.2 to 1.5	13		#	#	
1.5 to 1.8	#				
	Refusal on Rock @ 1.3m	Refusal on Rock @ 0.4m	Refusal on Rock @ 1.1m	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 @ 1.3m, DCP bouncing off rock surface, clean dry tip.

DCP2 – Refusal on rock @ 0.4m, DCP bouncing off rock surface, white impact dust on dry tip.

DCP3 – Refusal on rock @ 1.1m, DCP bouncing off rock surface, white impact dust on dry tip.

DCP4 – Refusal on rock @ 1.0m, DCP bouncing off rock surface, white impact dust on dry tip.

5. Geological Observations/Interpretation

The surface features of the block are controlled by the outcropping and 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 sandy soils and firm to stiff sandy clays that fill the bench-step formation. In the test locations, the depth to Medium Strength Sandstone ranged between 0.4 to 1.3m below the current surface, being deeper due to the stepped nature of the underlying rock. See Type Section attached for a diagrammatical representation of the expected ground materials.



J2249. 25th June, 2019. Page 4.

6. Groundwater

Ground water seepage is expected to move over the buried surface of the rock and through the cracks. As a creek flows down the centre of the block (Photo 7), we expect groundwater seepage to be slightly higher across the block as slope seepage will move toward the creek. 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

Apart from the flowing creek down the centre of the site (Photo 7), 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 gently graded slope that falls across the property and continues above and below is a potential hazard (Hazard One). The undercut rock face below the property is a potential hazard (Hazard Two).

Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The gentle slope that falls across the site and continues above and below failing and impacting on the proposed works.	The undercut rock face failing and impacting on the subject property (Photo 5).
LIKELIHOOD	'Unlikely' (10 ⁻⁴)	'Rare' (10 ⁻⁵)
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Major' (60%)
RISK TO PROPERTY	'Low' (2 x 10 ⁻⁵)	'Low' (6 x 10 ⁻⁵)
RISK TO LIFE	5.5 x 10 ⁻⁷ /annum	8.3 x 10 ⁻⁷ /annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk is 'ACCEPTABLE'.

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



J2249. 25th June, 2019.

Page 5.

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

There is fall to the creek that cuts through the property (Photo 7). Roof water from the

development is to be piped to the creek through any tanks that may be required by the

regulating authorities.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

The proposed secondary dwelling is to be supported on piers taken to the underlying Medium

Strength Sandstone. This material is expected at depths of between 0.4 to 1.3m below the

current ground level. A maximum allowable bearing pressure of 800kPa 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 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.



J2249. 25th June, 2019. Page 6.

13. Inspections

The client and builder are to familiarise themselves with the following required inspections as well as council geotechnical policy. We cannot provide geotechnical certification for the owner or the regulating authorities if the following inspections have 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.

Bulut

Ben White M.Sc. Geol., AuslMM., CP GEOL.

No. 222757

Engineering Geologist



J2249. 25th June, 2019. Page 7.



Photo 1



Photo 2



J2249. 25th June, 2019. Page 8.



Photo 3



Photo 4



J2249. 25th June, 2019. Page 9.



Photo 5



Photo 6



J2249. 25th June, 2019. Page 10.



Photo 7



Photo 8



J2249. 25th June, 2019. Page 11.



Photo 9



Photo 10



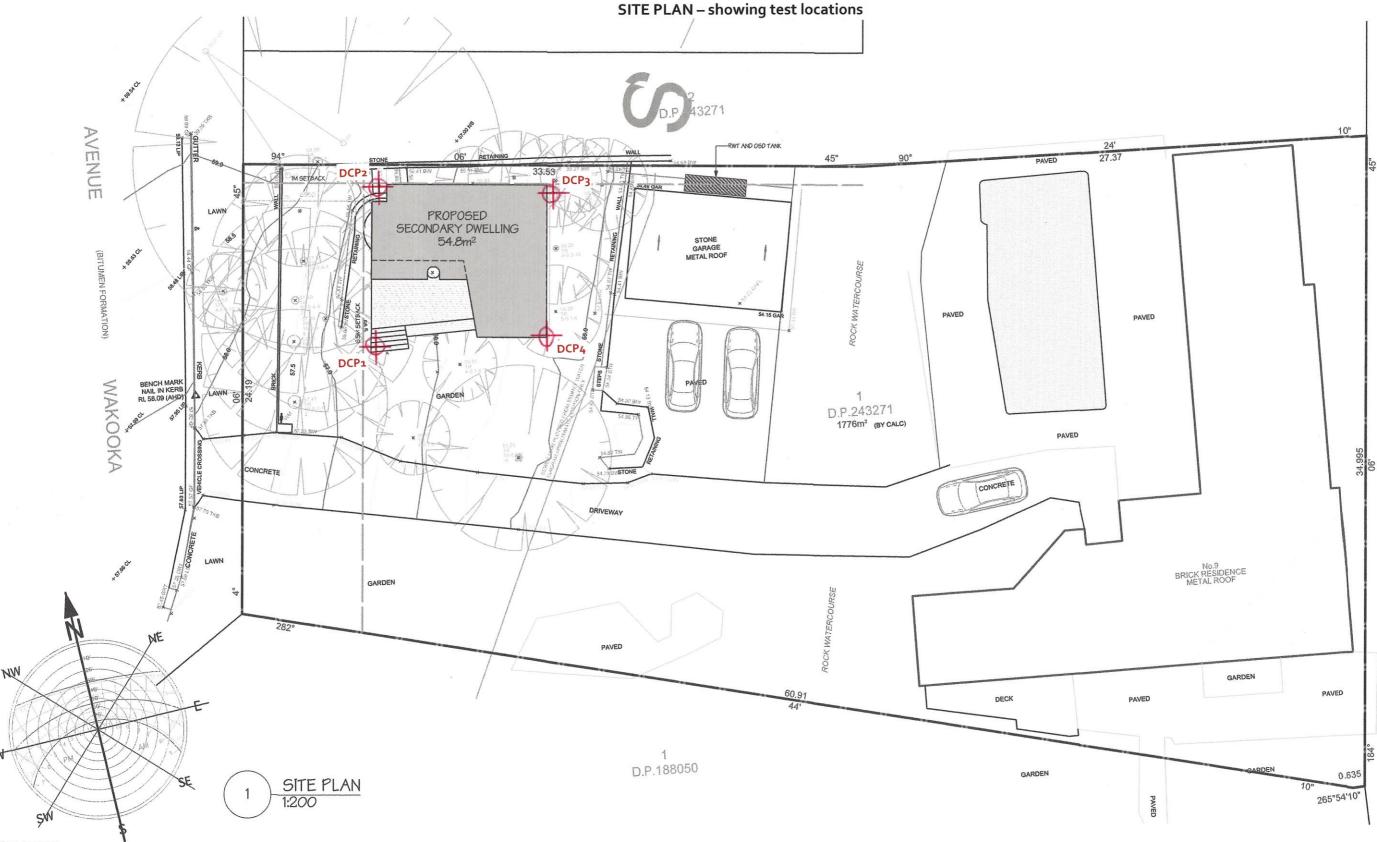
J2249. 25th June, 2019. Page 12.

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.



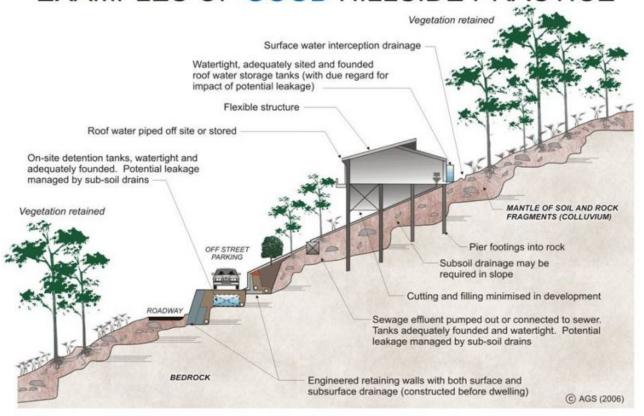
GENERAL NOTES

USED.

- BUILDING TO INCORPORATE BASIX COMMITMENTS TO COMPLY WITH THE ATTACHED BASIX CERTIFICATE NO. 9828295 DATED 13 FEBRUARY 2019
 SMOKE ALARMS TO BE INSTALLED IN ACCORDANCE WITH AS 3786-1993 'SMOKE ALARMS' AND PART 3.7.2 'SMOKE ALARMS' OF THE BCA (NB. SMOKE ALARMS TO BE INTERCONNECTED WHERE THERE IS MORE THAN ONE ALARM
- TERMITE MANAGEMENT TO COMPLY WITH AS3660-2000 TERMITE MANAGEMENT NEW BUILDING WORK'
- GLAZING TO COMPLY WITH AS1288-2006 'GLASS IN BUILDINGS SELECTION AND INSTALLATION' AND AS 2047-1999 'WINDOWS IN BUILDINGS SELECTION AND INSTALLATION' WATERPROOFING OF WET AREAS TO COMPLY WITH AS3740 'WATERPROOFING OF WET AREAS IN RESIDENTIAL BUILDINGS'. NO AIR DRIED LIQUID APPLIED TO MEMBRANES SHALL BE
- ALL HOT WATER PIPES SHOULD BE INSULATED AS PER AS3500.4
- ALL REQUIRED FACILITIES FOR A CLASS 1 BUILDING TO BE INSTALLED AS REQUIRED BY PART 3.8.2.2 'REQUIRED FACILITIES' OF THE BCA
- DOORS TO FULLY ENCLOSED SANITARY COMPARTMENTS TO COMPLY WITH PART 3.8.3 'FACILITIES' OF THE BCA
 STAIR CONSTRUCTION TO COMPLY WITH PART 3.9.1 'STAIR CONSTRUCTION OF THE BCA (NB. ALL STAIR TREADS TO HAVE A SURFACE THAT IS SLIP RESISTANT IN ACCORDANCE WITH PART 3.9.1.3 OF THE BCA
- BALUSTRADES CONSTRUCTION TO COMPLY WITH PART 3.9.2.3 'BALUSTRADES' OF THE BCA
- ALL NEW OPENABLE WINDOWS WITHIN A BEDROOM WITH A FLOOR LEVEL 2M OR MORE ABOVE A SURFACE BENEATH TO BE PROTECTED IN ACCORDANCE WITH PART 3.9.2.5 OF THE BCA
- DAMP PROOF MEMBRANE MUST BE 'HIGH IMPACT', O.2mm THICK POLYETHYLENE FILM
- ALL BUILDING WORK TO BE LOCATED WHOLLY WITHIN THE ALLOTMENT BOUNDARIES

	PROJECT NEW SECONDAR'		***************************************	***************************************	K 3
		ELANORA HEIGHTS			
	ANTJE KUEHNAS	T & MARGUS BISPIN	(C)	2018-11-06 D	ws# A 3 11.0
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EXAMPLES OF GOOD HILLSIDE PRACTICE



EXAMPLES OF POOR HILLSIDE PRACTICE

