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

Development Application for _____
Name of Applicant

Address of site 21 Elvina Avenue, Newport

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 26/3/25 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 **21 Elvina Avenue, Newport**
Report Date: 26/3/25

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 MScGEOL AIG., RPGeo

Membership No. 10306

Company **White Geotechnical Group Pty Ltd**

REGISTERED PROFESSIONAL GEOSCIENTIST
AUSTRALIAN INSTITUTE OF GEOSCIENTISTS
BENJAMIN WHITE
RPGeo No: 10306

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 21 Elvina Avenue, Newport

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 **21 Elvina Avenue, Newport**

Report Date: 26/3/25

Author: BEN WHITE

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

Please mark appropriate box

- ☒ Comprehensive site mapping conducted 26/3/25 (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 26/3/25
- ☒ 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 MScGEOL AIG., RPGeo

Membership No. 222757

Company **White Geotechnical Group Pty Ltd**

GEOTECHNICAL INVESTIGATION:

New House at **21 Elvina Avenue, Newport**

1. Proposed Development

1.1 Demolish the existing house and construct a new house by excavating to a maximum depth of ~2.7m.

1.2 Details of the proposed development are shown on 10 drawings prepared by 2D House Design, drawings numbered A112, and A100 to A108, dated 23rd January, 2007.

2. Site Description

2.1 The site was inspected on the 26th March, 2025.

2.2 This residential property is on the high side of the road and has a NE aspect. It is located on the moderately graded middle reaches of a hillslope. The natural slope rises across the property at an average angle of ~12°. The slope above and below the property continues at similar angles.

2.3 At the road frontage, a concrete driveway runs up the slope to a garage on the ground-floor of the house (Photo 1). In between the road frontage and the house is a moderately sloping lawn area (Photo 2). The fill for the lawn is supported by low sandstone flagging. The part two-storey house is supported on rendered masonry walls. The external walls show no significant signs of movement (Photo 3). The house is to be demolished as part of the proposed works. The cut for the upper level of the house and patio and fill for the terraced garden above is supported by a stable ~1.5m high rendered masonry retaining wall (Photo 4). Several stable retaining walls of various construction reaching up to ~1.2m high terrace the slope (Photo 5). A moderately sloping garden area extends to the upper common boundary (Photo 6).

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 hand Auger Hole (AH) was put down to identify 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 attached. 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. However, excavation and foundation budgets should always allow for the possibility that the interpreted ground conditions in this report vary from those encountered during excavations. See the appended "Important information about your report" for a more comprehensive explanation. The results are as follows:

AUGER HOLE 1 (~RL23.5) **–** AH1 (Photo 7)

Depth (m)	Material Encountered
0.0 to 0.2	**TOPSOIL**, dark brown clayey soil, fine grained, dense, dry.
0.4 to 0.7	**CLAY**, brown, fine grained, stiff, dry.

End of test @ 0.7m. No water table encountered.

DCP RESULTS ON THE NEXT PAGE

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** (~RL18.0)	**DCP 2** (~RL18.0)	**DCP 3** (~RL23.5)	**DCP 4** (~RL23.5)
0.0 to 0.3	4	4	16	18
0.3 to 0.6	5	7	17	18
0.6 to 0.9	8	7	41	28
0.9 to 1.2	1	3	#	36
1.2 to 1.5	2	8		#
1.5 to 1.8	10	16		
1.8 to 2.1	17	30		
2.1 to 2.4	31	#		
2.4 to 2.7	#			
	End of Test @ 2.4m	End of Test @ 2.1m	End of Test @ 0.9m	End of Test @ 1.2m

#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 @ 2.4m, DCP still going down slowly, red shale on damp tip.
DCP2 – End of test @ 2.1m, DCP still going down slowly, red shale on damp tip.
DCP3 – End of test @ 0.9m, DCP still going down slowly, red shale on dry tip.
DCP4 – End of test @ 1.2m, DCP still going down slowly, red shale on dry 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 fill and soils over clays. The clay merges into the underlying weathered rock at depths of between ~0.6m to 2.1m below the current surface. The weathered zone is interpreted to be Extremely Low Strength Shale. 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 denser and less permeable clay and weathered shale layers in the sub-surface profile. Due to the slope and elevation of the block, the water table 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 above or beside the property. The moderately graded slope that rises across the property and continues above and below is a potential hazard (**Hazard One**). The proposed excavation is a potential hazard until retaining walls are in place (**Hazard Two**).

RISK ANALYSIS SUMMARY ON THE NEXT PAGE

Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The moderate slope that rises across the property and continues above and below failing and impacting on the proposed works.	The excavation for the new house (to a maximum depth of ~2.7m) collapsing onto the work site before retaining structures are in place.
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 'UNNACEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in **Section 13 and 14** 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

There is fall to the street. Roof water from the 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 ~2.7m is required to construct the proposed house.

The excavation is expected to be through shallow soil over clay with Extremely Low Strength Shale expected at depths of between ~0.6m and ~2.1m. It is envisaged that excavations

through soil, clay, and Extremely Low Strength Shale can be carried out with an excavator and toothed bucket.

12. Vibrations

No excessive vibrations will be generated by excavation through soil, clay, and Extremely Low Strength Shale. Any vibrations generated by a domestic machine and bucket up to 20 tonne carrying out excavation works will be below the threshold limit for infrastructure or building damage.

13. Excavation Support Requirements

The excavations for the proposed house will reach a maximum depth of ~2.7m. Allowing 0.5m for back wall drainage, the setbacks from the proposed excavation to the existing structures/boundaries are as follows:

- ~0.5m from the E common boundary.
- ~0.7m from the W common boundary.
- ~3.2m from the W neighbouring house.
- ~4.5m from the E neighbouring house.

As such, both the E and W common boundaries will lie within the zone of influence of the proposed house excavation. In this instance, the zone of influence is the area above a theoretical 45° line through clay and shale from the base of the excavation towards the surrounding structures and boundaries. This line reduces to 30° through the fill and soil.

Due to the depth of the excavation and its proximity to the common boundaries, we recommend ground support be installed along the perimeter of the excavation prior to the commencement of the excavation to ensure the safety of any workers below the cut and integrity of the neighbouring properties. See the site plan attached for the minimum required extent of the shoring shown in blue.

A spaced piled retaining wall is one suitable method of support. Pier spacing for the wall is typically ~2.0m but can vary between 1.6 to 2.4m depending on the design. To drill the pier holes for the wall, a mini piling rig or similar that can excavate through Medium to High Strength Rock is recommended as the ground testing did not extend to the likely required depth of the piles. If a machine of this type is not available, we recommend carrying out core drilling before the construction commences to confirm the strength of the rock and to ensure the excavation equipment is capable of reaching the required depths. As the excavation is lowered in 1.5m lifts, infill sprayed concrete panels or similar are added between the piers to form the spaced wall. Drainage is installed behind the panels. The piers can be temporarily supported by embedment below the base of the excavation, or by a combination of embedment and temporary propping. Upon completion of the excavation, the piled walls are to be tied into the concrete floor and ceiling slabs of the house to provide permanent bracing.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

All excavation spoil is to be removed from site following the current Environmental Protection Agency (EPA) waste classification guidelines.

14. 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 ON THE NEXT PAGE

Table 1 – Likely Earth Pressures for Retaining Walls

Unit	Earth Pressure Coefficients			
	Unit weight (kN/m^3)	'Active' K_a	'At Rest' K_0	Passive
Soil	20	0.40	0.55	N/A
Residual Clays	20	0.35	0.45	K_p = 2.0 'ultimate'
Extremely Low Strength Rock	22	0.25	0.38	K_p = 2.5 'ultimate'

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 walls are fully drained.

It should be noted that passive pressure is an ultimate value and should have an appropriate safety factor applied. No passive resistance should be assumed for the top 0.4m to account for any disturbance from the excavation.

Rock strength 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 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 walls, the likely hydrostatic pressures are to be accounted for in the structural design.

15. Site Classification

The site classification is Class M in accordance with AS2870-2011.

16. Foundations

The proposed house can be supported on a thickened edge/raft slab with piers taken to Extremely Low Strength Shale where necessary. This ground material is expected to be exposed across the uphill side of the excavations. Where it is not exposed, and where this material drops away with the slope, piers will be required to maintain a uniform foundation material across the structure. This ground material is expected at depths of between 0.6m to 2.1m below the current surface in the area of the proposed works.

A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Shale. It should be noted that this material is a soft rock and a rock auger will cut through it so the builders should not be looking for refusal to end the footings.

As the bearing capacity of clay and 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 wet clay or 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.

17. Geotechnical Review

The structural plans are to be checked and certified by the geotechnical engineer as being in accordance with the geotechnical recommendations. On completion, a Form 2B will be issued. This form is required for the Construction Certificate to proceed.

18. 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 owners and Occupation Certificate if the following inspections have not been carried out during the construction process.

- The geotechnical consultant is to inspect the ground materials while the first pier for the ground support is being dug to assess the ground strength and to ensure it is in line with our expectations.
- All finished pier holes for piled wall/excavations for ground support are to be inspected and measured before concrete is placed.
- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment and contractors are still onsite and before steel reinforcing is placed or concrete is poured.

White Geotechnical Group Pty Ltd.

Tyler Jay Johns
BEng (Civil)(Hons),
Geotechnical Engineer.

Reviewed By:

Nathan Gardner B.Sc. (Geol. & Geophys. & Env. Stud.)
AIG., RPGeo Geotechnical & Engineering.
No. 10307
Engineering Geologist & Environmental Scientist.

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7 (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.

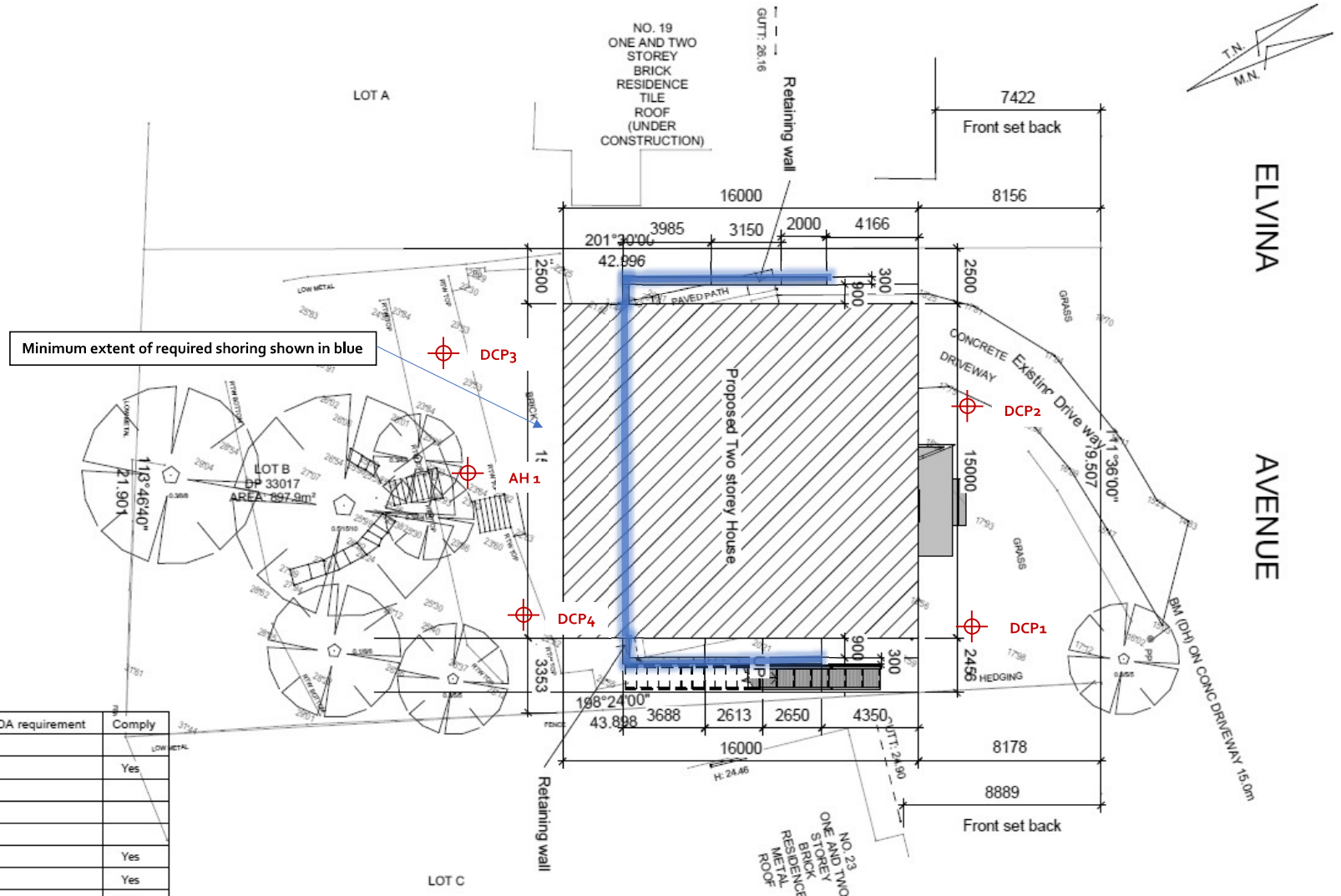
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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 & minimum extent of required shoring



1 Site plan
1 : 200

Site Data

	Existing	Proposed	DA requirement	Comply
Total site area	897.9sqm			
Total Floor area		462sqm		Yes
Existing GF	To be demolished			
Existing Garage	To be demolished			
Proposed GF		224.75sqm		Yes
Proposed FF		108.75sqm		Yes
Proposed lower F		128.5sqm		Yes
Proposed Garage		54.6sqm		Yes
Landscape area		670sqm74%	539sqm60%	Yes
Site cover		227sqm	359sqm	Yes
Site coverage		25%	50%	Yes

2D house Design
Tel: 9587 2090 or 0414 873 282 Email: henrykuang@hotmail.com

Project name:New two storey house

No.	Description	Date
	Issue date	01/23/07

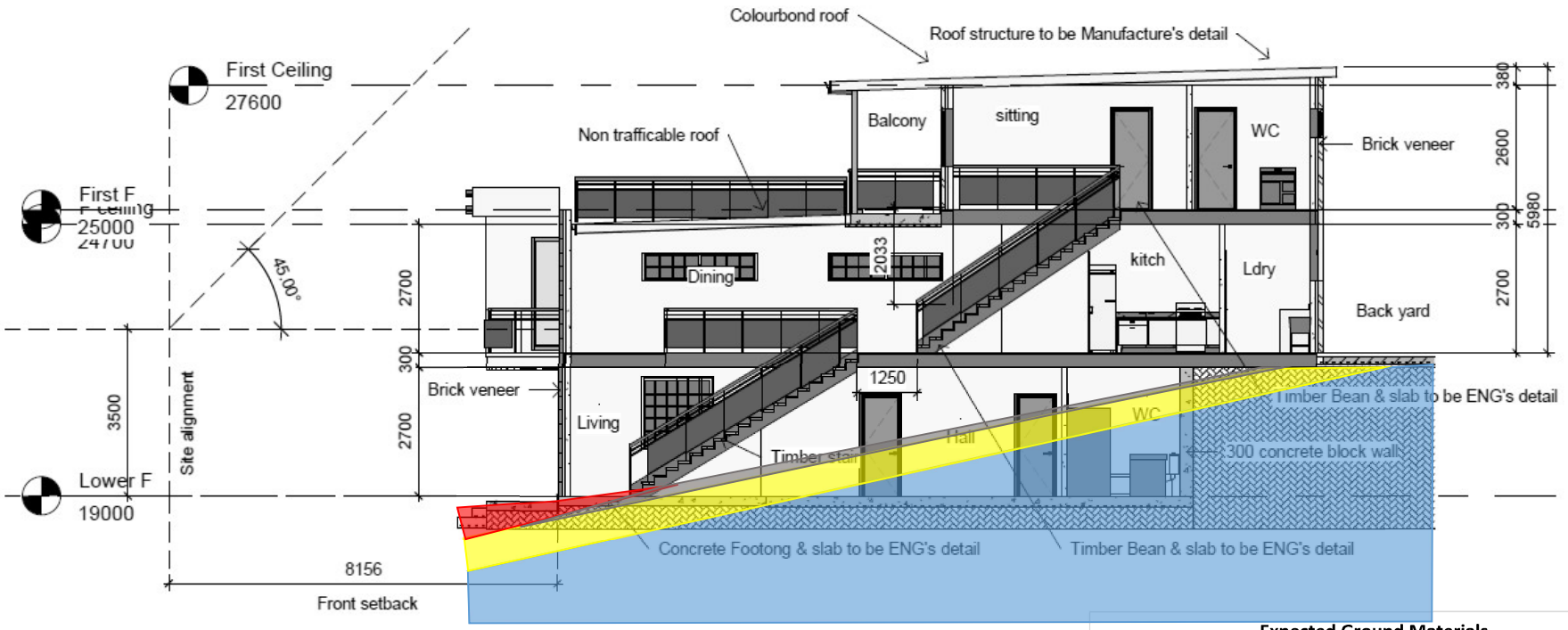
Mr Xu
21 Elvina Ave Newport

Site plan

Registered building designer No: 6585		A100
Date	11-10-2024	
Drawn by	henry kuang	
Checked by	henry kuang	Scale 1:200

3/3/2025 1:13:09 PM

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



1 Section 1
1 : 100

Expected Ground Materials

- Fill
- Topsoil
- 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.*

2D house Design
Tel: 9587 2090 or 0414 873 282 Email: henrykuang@hotmail.com

Project name:New two storey house

No.	Description	Date
	Issue date	03/03/25

Mr Xu
21 Elvina Ave Newport

Section

Registered building designer No: 6585	
Date	11-10-2024
Drawn by	henry kuang
Checked by	henry kuang

A106

Scale 1:100

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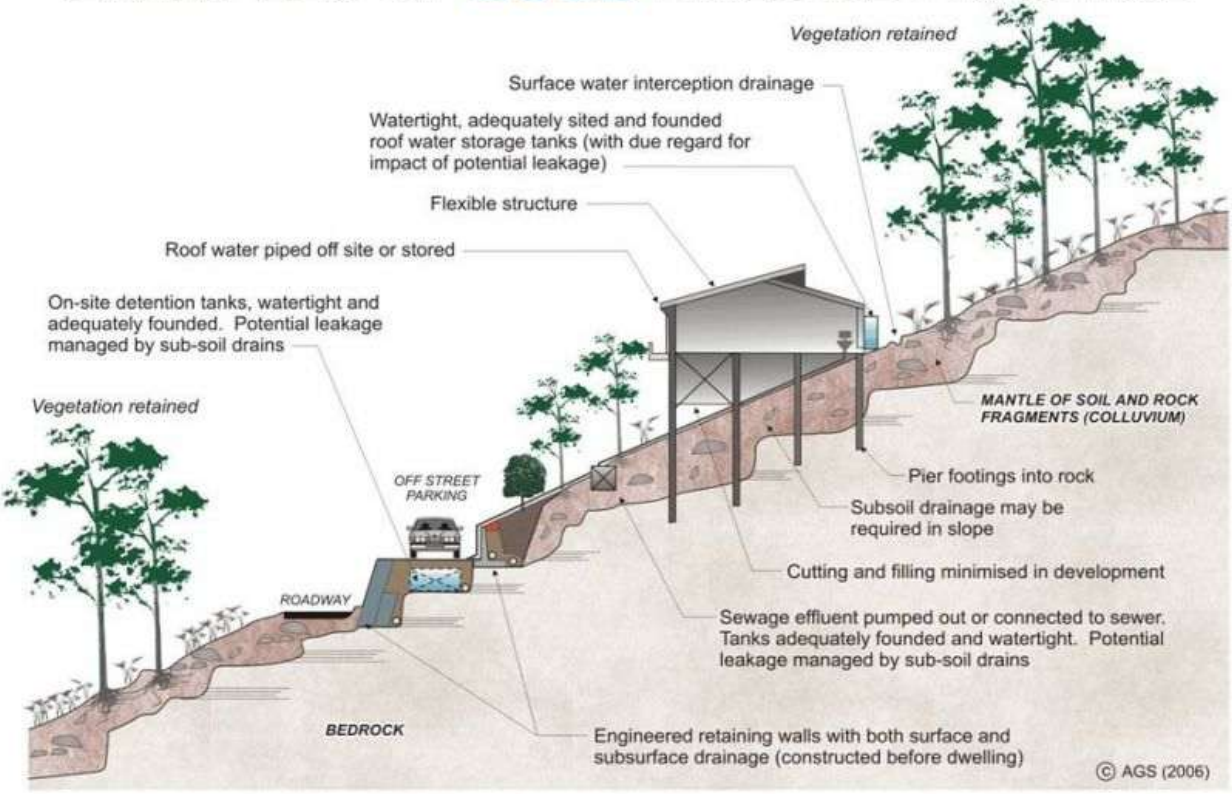
EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE