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

Development Application for _____
Name of Applicant

Address of site 16 Cabarita Road, Avalon

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 24/4/25 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 **16 Cabarita Road, Avalon**

Report Date: 23/4/25

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**

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 16 Cabarita Road, Avalon

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 **16 Cabarita Road, Avalon**

Report Date: 23/4/25

Author: BEN WHITE

Author's Company/Organisation: **White Geotechnical Group Pty Ltd**

Please mark appropriate box

- ☒ Comprehensive site mapping conducted **22/4/25** (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 **26/3/20**
- ☒ 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 MScGEOL AIG., RPGeo

Membership No. 222757

Company **White Geotechnical Group Pty Ltd**

GEOTECHNICAL INVESTIGATION:

New Lift at **16 Cabarita Road, Avalon**

1. Proposed Development

1.1 Construct an external lift and deck by excavating to a maximum depth of ~2.3m.

1.2 Details of the proposed development are shown on 5 drawings by Peter Downes Designs, drawings numbered A2 2430 00 to 04, dated 21/10/24.

2. Site Description

2.1 The site was inspected on the 22nd April, 2025, and previously on the 26th September, 2017, and 26th March, 2020.

2.2 This residential property is on the low side of the road and has a NE aspect. The block is located on the steeply graded lower reaches and toe of a slope that falls to the waterfront at Pittwater. At the road frontage, the natural slope falls at an average angle of ~20° that gradually increases down slope to a maximum of ~28° on the lower side of the house. Along the lower boundary, the slope quickly eases as the waterfront is approached. The grade above the property rises at decreasing angles.

2.3 At the road frontage, a concrete driveway runs to a stable garage along the upper boundary of the property (Photo 1). On the downhill side of the garage, an excavation has been made into the slope for a level lawn above the house (Photo 2). The excavation is supported by rendered masonry retaining walls that appear well constructed (Photo 3). The one and two storey clad house displays no significant signs of movement in the external supporting walls (Photo 4). The slope between the downhill side of the house and the waterfront is terraced with a series of stable stack rock retaining walls reaching ~0.8m high (Photo 5). A cut at the waterfront is supported by a stable ~1.8m high sandstone block retaining wall

(Photo 6). A boatshed and pool at the waterfront are cut into the slope and appear stable (Photos 7 & 8). The fill around the pool is supported by a stable ~1.8m high sandstone block seawall (Photo 9). Below the property, a jetty extends into Pittwater (Photo 10).

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

Two hand Auger Holes (AH) were put down to identify the soil materials. Eight 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. We note DCP6 likely encountered refusal on a footing for a retaining wall above. 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 (~RL3.0) **–** AH1 (Photo 11)

Depth (m)	**Material Encountered**
0.0 to 0.2	**TOPSOIL**, black/dark brown, loose, dry.
0.2 to 0.5	**CLAYEY SAND**, dark brown, medium dense, dry.

Refusal on rock @ 0.5m. Estimated to be a sandstone floater. No water table encountered.

AUGER HOLE 2 (~RL5.0) **–** AH2 (Photo 12)

Depth (m)	**Material Encountered**
0.0 to 0.1	**MULCH**, woodchips, dry.
0.1 to 0.4	**CLAYEY SAND**, dark brown, medium dense, dry.

Refusal on rock @ 0.4m. Estimated to be a sandstone floater. No water table 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** (~RL3.0)	**DCP 2** (~RL3.2)	**DCP 3** (~RL5.0)	**DCP 4** (~RL4.5)	**DCP 5** (~RL3.0)	**DCP 6** (~RL16.3)	**DCP 7** (~RL16.3)	**DCP 8** (~RL16.2)
0.0 to 0.3	4F	1F	6	3	7	7	11	6
0.3 to 0.6	6	16	19	15	14	#	13	21
0.6 to 0.9	24	#	45	42	36		12	8
0.9 to 1.2	40		#	#	25		16	20
1.2 to 1.5	#				#		15	28
1.5 to 1.8							14	22
1.8 to 2.1							22	14
2.1 to 2.4							22	25
2.4 to 2.7							#	35
2.7 to 3.0								#
	End of Test @ 1.2m	Refusal on Rock @ 0.6m	End of Test @ 0.9m	End of Test @ 0.9m	End of Test @ 1.0m	Refusal @ 0.2m	Refusal on Rock @ 2.4m	End of Test @ 2.7m

#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 very slowly going down, clean dry tip.

DCP2 – Refusal on rock @ 0.6m, DCP bouncing off rock surface, expected to be floater, clean dry tip.

DCP3 – End of test @ 0.9m, DCP still very slowly going down, clean dry tip.

DCP4 – End of test @ 0.9m, DCP still very slowly going down, small amount of yellow shale fragments on dry tip.

DCP5 – End of test @ 1.0m, DCP still very slowly going down, clean dry tip.
DCP6 – Refusal @ 0.2m on possible concrete retaining wall footing, DCP bouncing, wet muddy tip.
DCP7 – Refusal on rock @ 2.4m, DCP bouncing off rock surface, wet muddy tip, grey and maroon clay in collar above tip.
DCP8 – End of test @ 2.7m, DCP still very slowly going down, grey clay on wet tip, grey and maroon clay in collar above tip.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. They consist of a thin sandy topsoil over a medium dense clayey sand that is underlain by stiff to very stiff sandy clays with rock fragments throughout the profile. In the location of the proposed lift on the uphill side of the property, the clays merge into the weathered zone of the underlying shale at an average depth of ~2.4m below the current surface. Across the downhill side of the property, the clays merge into the weathered zone of the underlying shale at an average depth of ~1.0m below the current surface. It should be noted that sandstone floaters are expected throughout the profile. 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

Ground water seepage is expected to move over the denser and less permeable clay and weathered rock 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 significant surface flows were observed on the property during the inspection. Normal sheet wash from the slope above will be intercepted by the street drainage system for Cabarita Road above.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed below or beside the property. The steeply graded slope that falls across the property and continues above is a potential hazard (**Hazard One**). The proposed excavation collapsing onto the work site before permanent support is in place is a potential hazard (**Hazard Two**). The proposed excavation undercutting the footings of the garage structure above is a potential hazard (**Hazard Three**).

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two	Hazard Three
TYPE	The steeply graded slope that falls across the property and continues above failing and impacting on the existing house or the proposed works.	The unsupported cut batter of the excavation collapsing onto the work site before permanent support is in place.	The proposed excavation undercutting the footings of the garage structure above causing movement.
LIKELIHOOD	'Unlikely' (10^{-4})	'Possible' (10^{-3})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (25%)	'Medium' (15%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (2×10^{-4})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum	1.4×10^{-5}/annum	8.3×10^{-5}/annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk to life and property is '**UNACCEPTABLE.'** To move the risk levels to acceptable levels, the recommendations in **Section 13** are to be followed.	This level of risk to life and property is '**UNACCEPTABLE**.' To move the risk levels 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

There is fall to the waterfront below. All stormwater or drainage runoff from the proposed development is to be piped to the waterfront.

11. Excavations

An excavation to a maximum depth of ~2.3m is required to construct the lift. It is expected to be mostly through manmade fill. Silty soil, clays, and Extremely Low Strength Shale may be encountered near the base of the excavation. It is envisaged that excavations through fill, silty soil, clays, and Extremely Low Strength Shale can be carried out with a bucket only.

12. Vibrations

Any vibrations generated during the excavations through fill, soil, clay, and Extremely Low Strength Shale will be well below the threshold limit for infrastructure or building damage.

13. Excavation Support Requirements

The proposed excavation will reach a maximum depth of ~2.3m and is expected to be taken almost entirely through fill. The excavation will be taken through a masonry retaining wall and flush against the downhill supporting wall of the existing garage. As such, the existing garage will be within the zone of influence of the excavation. In this instance, the zone of influence is the area above a theoretical 45° line through clay and weathered shale from the base of the excavation towards the surrounding structures or boundaries. This line reduces to 30° through the fill and soil.

An opening will be cut through the masonry retaining wall immediately downslope of the garage (Photo 3). The boundaries of the wall to be removed are to be cut with saws before

the wall is dismantled from the top down. This work is to be conducted in an orderly manner so no damage occurs to the portions of the wall that are to remain. As the wall is lowered, any fill behind the wall is to be lowered simultaneously and battered at no steeper than 30° until the permanent retaining walls can be constructed.

The existing garage displays no significant cracking or any other significant signs of movement. As such, due to the steep slope, it is interpreted that the garage is supported on piers taken through the fill and into the natural weathered shale. Provided this interpretation is correct, the proposed excavation is not expected to undermine the foundations for the existing garage. However, as we are unable to confirm the depths of the footings, care must be taken by the builders during the excavation to ensure these footings are not undermined. If, during the excavation, the footings are found to not be supported on weathered shale or are within the zone of influence of the cut, they are to be underpinned to below the base of the proposed excavation, whichever is encountered first, as soon as possible.

During the excavation process, the geotechnical consultant is to inspect the cut in 1.5m intervals as it is lowered, while the machine/excavation equipment is on site, to ensure the ground materials are as expected and no additional temporary support is required.

Unsupported cut batters are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. The covers are to be tied down with metal pegs or other suitable fixtures so they cannot blow off in a storm. The materials and labour to construct the retaining structures are to be organised so on completion of the excavations they can be constructed as soon as possible. The excavations are 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 – Likely Earth Pressures for Retaining Walls

Unit	Earth Pressure Coefficients		
	Unit weight (kN/m^3)	'Active' K_a	'At Rest' K_0
Fill, Soil, and Residual Clays	20	0.40	0.55
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 wall, do not account for any surcharge loads, and assume retaining walls are fully drained. 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 wall with free-draining material (such as gravel). This material is to be wrapped in a non-woven Geotextile fabric (i.e. Bidim A34 or similar), to prevent the drainage from becoming clogged with silt and clay. If no back-wall drainage is installed in retaining walls, the likely hydrostatic pressures are to be accounted for in the structural design.

15. Site Classification

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

16. Foundations

The proposed lift can be supported on piers taken to and embedded no less than 1.0m into the underlying Extremely Low Strength Shale. This material is expected at an average depth of ~2.4m below the current lawn level on the uphill side of the property. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely 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.

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 inspection as well as council geotechnical policy. We cannot provide geotechnical certification for the owners and Occupation Certificate if the following inspection has not been carried out during the construction process.

- During the excavation process, the geotechnical consultant is to inspect the cut in 1.5m intervals as it is lowered, while the machine/excavation equipment is on site, to ensure the ground materials are as expected and no temporary support is required.
- 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.

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

Reviewed By:

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

Photo 1

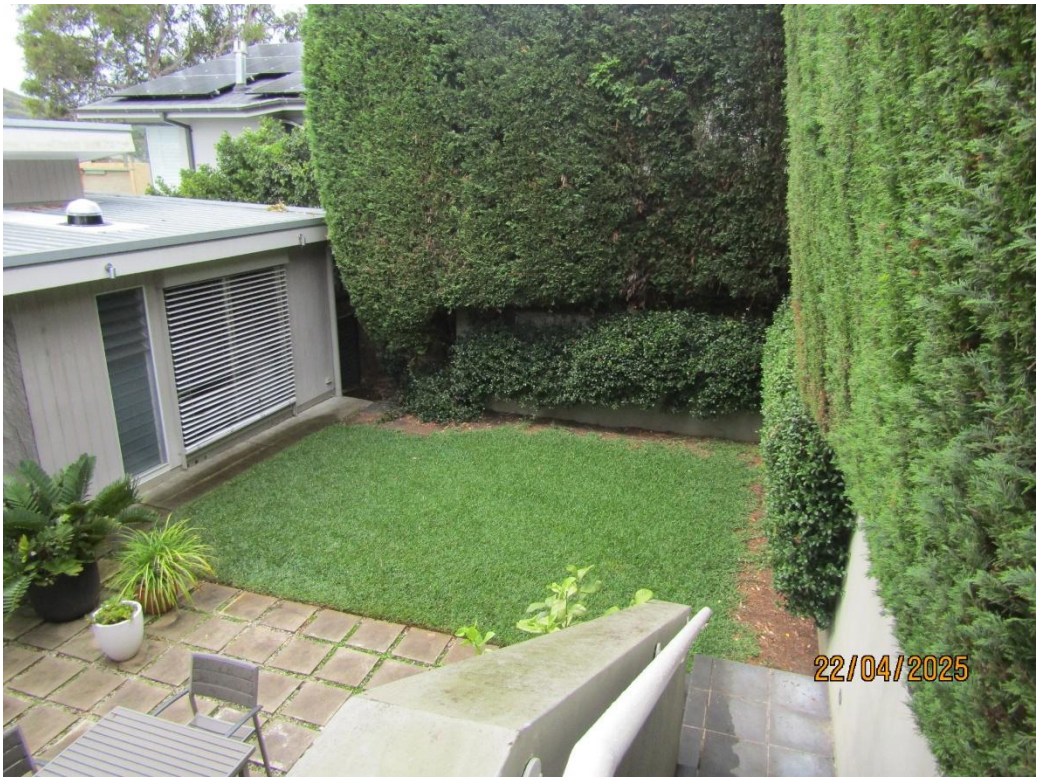

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11: AH1 – Downhole is from top to bottom

Photo 12: AH2 – 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

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DA ISSUE

NOT FOR CONSTRUCTION

T.N

existing garage

proposed vertical lift to manufacturer's details with associated works

existing 1 and 2 storey dwelling

existing lower lift

existing pool

existing hedges

existing

DCP1
DCP2
DCP3
DCP4
DCP5
DCP6
DCP7
DCP8
AH 1
AH 2

foreshore building line

Careel Bay

waste management area

cyan line = drainage easement Z68884

red line = 600mm stormwater pipe plotted from ALR 2019-0339 by MGP

existing boatshed

REVISION

peterdownes multi-award winner designs
77 Riviera Ave, Avalon Beach 2107 0488 662 445
www.peterdownes.com.au

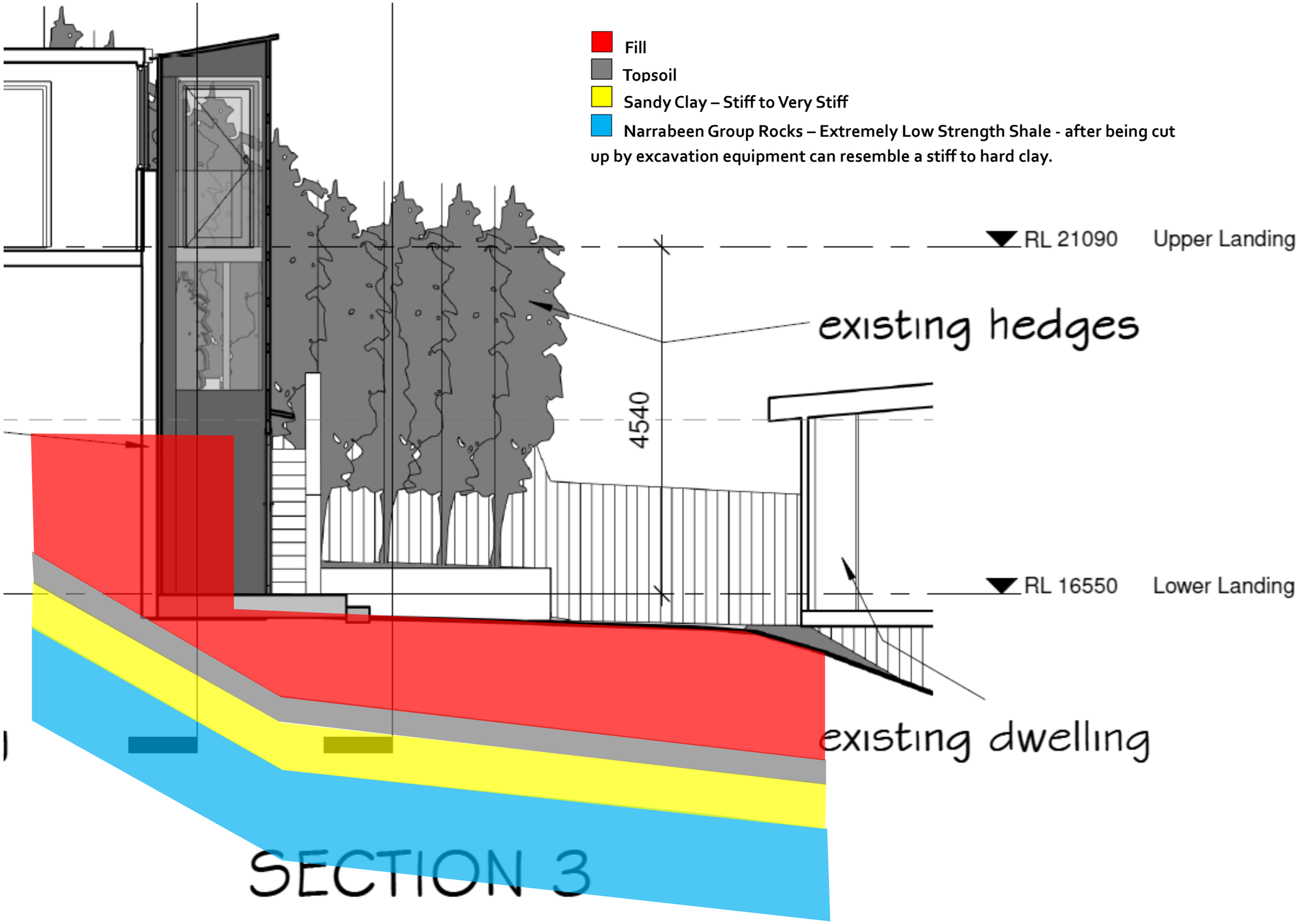
PROJECT: Proposed alterations and additions including a new lift at 16 Cabarita Road Avalon Beach

DRAWING: Site Plan

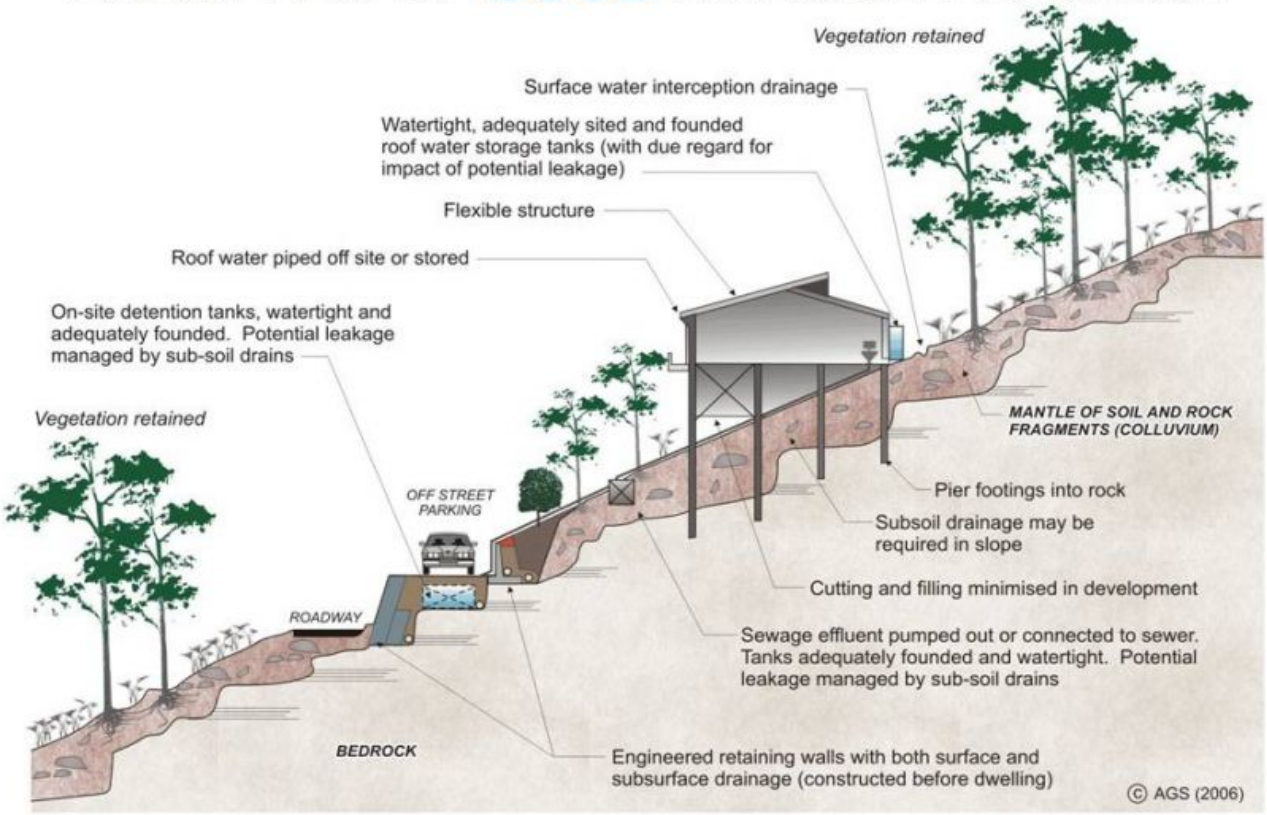
DRAWN	CHECKED
SD	SD
SCALE	DATE
1 : 100	21.10.24

DRG. A2 2430 01

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE