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

Development Application for _____
Name of Applicant

Address of site 7 Cooleena Road, Elanora Heights

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 10/12/24 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 **7 Cooleena Road, Elanora Heights**

Report Date: 10/12/24

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 7 Cooleena Road, Elanora Heights

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 **7 Cooleena Road, Elanora Heights**

Report Date: 10/12/24

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **29/11/24** (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 **29/11/24**

☒ 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:

Subdivision and Driveway at **7 Cooleena Road, Elanora Heights**

1. Proposed Development

1.1 Subdivide the property into two separate lots, "Lot 1" and "Lot 2".

1.2 Demolish the garage and construct a new shared driveway that runs down the W side of 'Lot 1' and terminates on the uphill side of 'Lot 2' by excavating to a maximum depth of ~1.4m.

1.3 Construct a carport off the proposed driveway on 'Lot 1'.

1.4 Details of the proposed development are shown on 10 drawings prepared by WY Design Studio, drawings numbered L01 to L10, dated 8.10.24.

2. Site Description

2.1 The site was inspected on the 29th November, 2024.

2.2 This residential property is on the low side of the street and has a S aspect. It is located on the moderately graded upper reaches of a hillslope. The slope falls across the property at an average angle of ~13°. The slope above the property eases to the crest of the slope. The slope below the property continues at similar angles.

2.3 At the road frontage, a concrete driveway runs down the slope to a garage attached to the W side of the house (Photo 1). The garage will be demolished as part of the proposed works. Between the road frontage and the house is a gentle to moderately sloping lawn area (Photo 2). The part two-storey house is supported on brick walls and sandstone block walls (Photo 3). The visible external walls show no significant signs of movement. Access to the foundation space was not available at the time of this inspection. A level lawn area that extends off the downhill side of the house is supported by a low retaining wall. This wall was covered in dense vegetation

and could not be assessed. However, it was observed to be directly supported on outcropping Medium Strength Sandstone (Photo 4). A second ~2.5m high Medium Strength Sandstone rockface outcrops and steps down the property below this wall (Photo 5). This outcropping rock is undercut to 1.0m and extends onto the neighbouring property. Given the thickness of the cantilever arm with no visible defects, it is considered stable. A moderately sloping overgrown lawn area extends to the lower common boundary (Photo 6). Several floaters are embedded in this slope in stable positions (Photo 7).

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

One hand Auger Hole (AH) 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 bedrock. 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:

GROUND TEST RESULTS ON THE NEXT PAGE

AUGER HOLE 1 (~RL43.5) **–** AH1 (Photo 8)

Depth (m)	**Material Encountered**
0.0 to 0.3	**TOPSOIL**, dark brown, medium grained, loose to medium dense, dry.

Refusal @ 0.3m on rock. Auger grinding. 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** (~RL43.5)	**DCP 2** (~RL40.5)	**DCP 3** (~RL39.0)	**DCP 4** (~RL51.5)	**DCP 5** (~RL51.5)
0.0 to 0.3	3	11	3	8	8
0.3 to 0.6	1	20	7	23	23
0.6 to 0.9	#	9	11	31	31
0.9 to 1.2		18	23	20	18
1.2 to 1.5		20	14	#	#
1.5 to 1.8		#	5		
1.8 to 2.1			#		
	Refusal on Rock @ 0.4m	Refusal on Rock @ 1.5m	Refusal on Rock @ 1.6m	Refusal on Rock @ 1.1m	Refusal on Rock @ 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 – Refusal on rock @ 0.4m, DCP bouncing off rock surface, white impact dust dry tip.

DCP2 – Refusal on rock @ 1.5m, DCP bouncing off rock surface, orange impact dust on dry tip.

DCP3 – Refusal on rock @ 1.6m, DCP bouncing off rock surface, orange impact dust on dry tip.

DCP4 – Refusal on rock @ 1.1m, DCP bouncing off rock surface, white impact dust on dry tip.

DCP5 – Refusal on rock @ 1.2m, 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. Where the rock is not exposed, it is overlain by fill and shallow soils over sand and clays that fill the bench step formation. Filling has been placed below the house for landscaping. In the test locations, where the rock is not exposed, it was encountered at depths of between 0.4m to 1.6m below the current surface, being slightly deeper due to the stepped nature of the underlying bedrock. The outcropping sandstone on the property is estimated to be Medium Strength or better and similar strength rock is expected to underlie the entire site as all the DCP tests bounced at refusal. 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. 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 Cooleena Road above.

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 undercut rock face (Photo 5) failing and toppling onto the slope below is a potential hazard (**Hazard Two**). The vibrations from the proposed excavation are a potential hazard (**Hazard Three**). The proposed excavation is a potential hazard until retaining walls are

in place (**Hazard Four**). The proposed excavation undercutting the footings for the house is a potential hazard (**Hazard Five**).

Risk Analysis Summary

HAZARDS	Hazard One	Hazard Three	Hazard Three
TYPE	The moderate slope that falls across the property and continues above and below failing and impacting on the proposed works.	The undercut rock face (Photos 5) failing and causing damage to the property below.	The vibrations produced during the proposed excavation impacting on the surrounding structures.
LIKELIHOOD	'Unlikely' (10^{-4})	'Rare' (10^{-5})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Major' (60%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Low' (6×10^{-5})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum	8.3×10^{-7}/annum	5.3×10^{-7}/annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk is 'ACCEPTABLE'.	This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in **Section 12** are to be followed.

RISK ANALYSIS SUMMARY ON THE NEXT PAGE

HAZARDS	Hazard Four	Hazard Five
TYPE	The excavation (up to a maximum depth of 1.4m) collapsing onto the work site before retaining structures are in place.	The proposed excavation undercutting the footings of the house causing failure.
LIKELIHOOD	'Possible' (10^{-3})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Medium' (35%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-6}/annum	5.3×10^{-5}/annum
COMMENTS	This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in **Section 13 and 14** are to be followed.	This level of risk to life and property is 'UNACCEPTABLE'. To move 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 plans indicate that the proposed stormwater for the development is to be piped to an existing easement near the downhill common boundary. The adequacy of the existing easement to handle the proposed flows is to be assessed by the stormwater engineer. If the easement is not suitable, the stormwater engineer is to refer to council stormwater policy for suitable options for stormwater disposal. This may include the use of a spreader pipe / OSD tank as required by the regulating authorities.

11. Excavations

An excavation up to a maximum depth of ~1.4m is required to construct the proposed driveway. Where the rock is not exposed, the excavation is expected to be through soil and sand with Medium Strength Rock expected at depths of between ~0.4m and ~1.6m below the current surface in the area of the proposed works.

It is envisaged that excavations through sandy soils and sand can be carried out with an excavator and bucket, and excavations through rock will require grinding or rock sawing and breaking.

12. Vibrations

Possible vibrations generated during excavations through soil, sand, and clay will be below the threshold limit for building damage. It is expected that the majority of the excavations will be through Medium Strength Sandstone or better.

Excavations through rock should be carried out to minimise the potential to cause vibration damage to the existing subject house and neighbouring structures to the W. Allowing ~0.5m for backwall drainage, the setbacks from the proposed excavation to the existing structures/boundaries are as follows:

- Flush with the existing subject house.
- ~0.2m from the W common boundary.
- ~0.7m from the W neighbouring house.

To reduce the likelihood of spurious claims, dilapidation reporting carried out on the W neighbouring properties is recommended prior to the excavation works commencing.

Close controls by the contractor over rock excavation are recommended so excessive vibrations are not generated.

Excavation methods are to be used that limit peak particle velocity to 5 mm/sec at the subject house walls. Vibration monitoring will be required to verify this is achieved. The vibration

monitoring equipment must include a light/alarm so the operator knows if vibration limits have been exceeded. It also must log and record vibrations throughout the excavation works.

In Medium Strength Rock or better techniques to minimise vibration transmission will be required. These include:

- Rock sawing the excavation perimeter to at least 1.0m deep prior to any rock breaking with hammers, keeping the saw cuts below the rock to be broken throughout the excavation process.
- Limiting rock hammer size.
- Rock hammering in short bursts so vibrations do not amplify.
- Rock breaking with the hammer angled away from the nearby sensitive structures.
- Creating additional saw breaks in the rock where vibration limits are exceeded, as well as reducing hammer size as necessary.
- Use of rock grinders (milling head).

Should excavation induced vibrations exceed vibration limits after the recommendations above have been implemented, excavation works are to cease immediately and our office is to be contacted.

It is worth noting that vibrations that are below thresholds for building damage may be felt by the occupants of the neighbouring houses.

13. Excavation Support Requirements

The excavation for the proposed driveway will reach a maximum depth of ~1.4m. Allowing ~0.5m for backwall drainage, the setbacks from the proposed excavation to the existing structures/boundaries are as follows:

- Flush with the existing subject house.
- ~0.2m from the W common boundary.
- ~0.7m from the W neighbouring house.

As such, the subject house and the W common boundary and neighbouring house will lie within the zone of influence of the proposed works. In this instance, the zone of influence is the area above a theoretical 30° line from the base of the excavation or top of Medium Strength Rock, whichever is encountered first, towards the surrounding structures and boundaries.

Support requirements for the subject house

Given the depth to rock, we think it is likely the supporting walls of the house are supported on rock. However, to be sure, where the walls of the house fall within the zone of influence of the excavation, exploration pits will need to be put down by the builder to determine the foundation depth and material. These are to be inspected by the geotechnical consultant.

If the foundations are confirmed to be supported on rock or extend below the zone of influence of the proposed excavation, the excavation may commence. If they are not, the walls will need to be underpinned to rock or to below the zone of influence of the cut prior to the excavation commencing. See the site plan attached for the minimum extent of the required exploration pits/underpinning.

Underpinning is to follow the underpinning sequence 'hit one miss two'. Under no circumstances is the bulk excavation to be taken to the edges of the walls and then underpinned. Underpins are to be constructed from drives that should be proportioned according to footing type and size. Allowances are to be made for drainage through the underpinning to prevent a build-up of hydrostatic pressure. Underpins that are not designed as retaining walls are to be supported by retaining walls. The void between the retaining walls and the underpinning is to be filled with free-draining material such as gravel.

During the excavation process, the geotechnical consultant is to inspect the excavations as they approach no less than 0.5m horizontally from the supporting walls of the house to confirm the stability of the cut to go flush with the footings.

Support requirements for the W common boundary and W neighbouring house

Due to the proximity of the excavation to the W common boundary and neighbouring house, the W side of the driveway excavation will need to be permanently supported prior to the commencement of the excavation through rock, or during the excavation process in a staged manner, so cut batters are not left unsupported. The support will need to be designed by the structural engineer. See the site plan attached for the minimum extent of the required shoring shown in blue.

Advice applying to the entire excavation

The materials and labour to construct the retaining walls are to be organised so on completion of the excavations they can be constructed as soon as possible.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters through fill, soil, sand, and clay 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 walls 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.

Upon completion of the excavation, it is recommended all cut faces be supported with retaining walls to prevent any potential future movement of joint blocks in the cut face that can occur over time, when unfavourable jointing is obscured behind the excavation face. Additionally, retaining walls will help control seepage and to prevent minor erosion and sediment movement. Excavation spoil may be used for landscaping on site.

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 and Sandy Soil	20	0.40	0.55
Clays and Sands	20	0.30	0.40
Medium Strength Sandstone	24	0.00	0.01

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. 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 S in accordance with AS2870-2011.

16. Foundations

A concrete slab and shallow piers supported directly off Medium Strength Sandstone are suitable footings for the proposed carport. It is expected to be exposed or in close proximity across the uphill side of the excavation. Where it is not exposed, and where the footprint of the proposed carport does not fall over the excavations, shallow piers taken to rock will be required to maintain a uniform foundation material across the structure. The piers for the downhill side of the carport are expected to encounter Medium Strength Sandstone at depths of between ~0.4m to ~1.6m below the current surface.

The proposed driveway can be supported off the natural surface after any organic matter has been stripped. A maximum allowable bearing pressure of 100kPa can be assumed for soil of the natural surface. Where the driveway is cut into the slope, it can be supported directly off the underlying Medium Strength Sandstone. A maximum allowable bearing pressure of 1000kPa can be assumed for footings on Medium Strength Sandstone.

Where the foundation material across the driveway and carport structure changes, construction joints are to be installed to separate the different foundation materials and to accommodate minor differential movement. Alternatively, the entire driveway can be supported on piers taken to Medium Strength Sandstone to maintain a uniform foundation material across the structure.

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.

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 owner or the regulating authorities if the following inspections have not been carried out during the construction process.

- The exploration pits to determine the foundation material along the supporting walls of the house are to be inspected by the geotechnical consultant to determine if underpinning is necessary. This is to occur before the bulk excavation for the lower floor commences.
- During the excavation process, the geotechnical consultant is to inspect the excavations as they approach no less than 0.5m horizontally from the supporting walls of the house to confirm the stability of the cut to go flush with the footings.
- 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.

REGISTERED PROFESSIONAL GEOSCIENTIST
AUSTRALIAN INSTITUTE OF GEOSCIENTISTS
NATHAN GARDNER
RPGeo No: 10307

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8 (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.

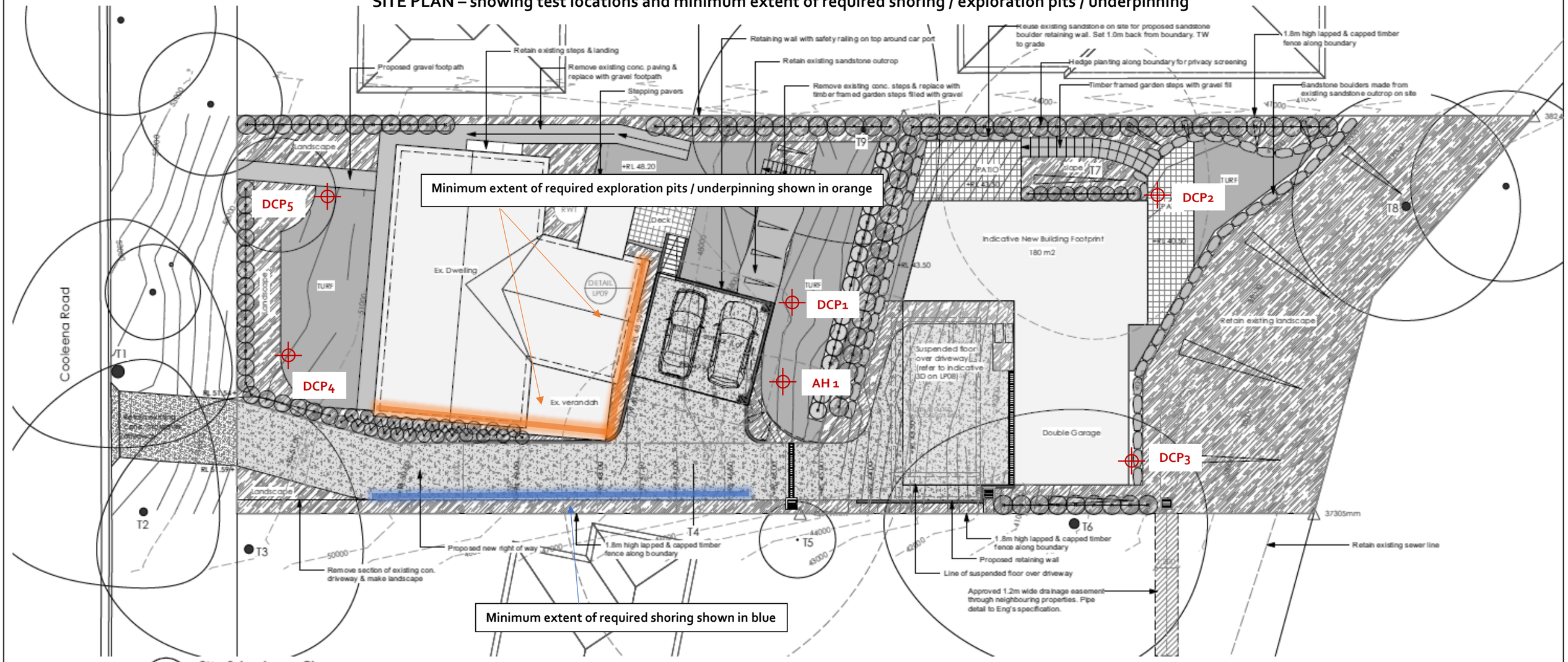
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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 and minimum extent of required shoring / exploration pits / underpinning



1 Site & Landscape Plan
Scale: 1:200

LEGEND

- Site Boundary
- Existing tree to be retained (refer to Arborist's Report)
- Existing tree to be removed (refer to Arborist's Report)
- New shrub planting
- Landscape planting area
- Turf area
- Existing concrete surface
- New concrete surface
- Compacted gravel surface
- Drainage pipeline to Hydraulic Eng's detail
- Grated drain to Hydraulic Eng's detail

North: north

Scale: as shown

Rev.	Notes	Issue Date
K	DA Submisson	08-10-2024
J	DA Submission	24-09-2024
I	DA Submission	25-08-2024
H	DA Submission	13-08-2024
G	DA Submission	30-07-2024
F	DA Submission	28-07-2024

Client: Joe Vescio

Project: Proposed Subdivision
7 Cooleana Road, Elanora Heights
NSW 2101

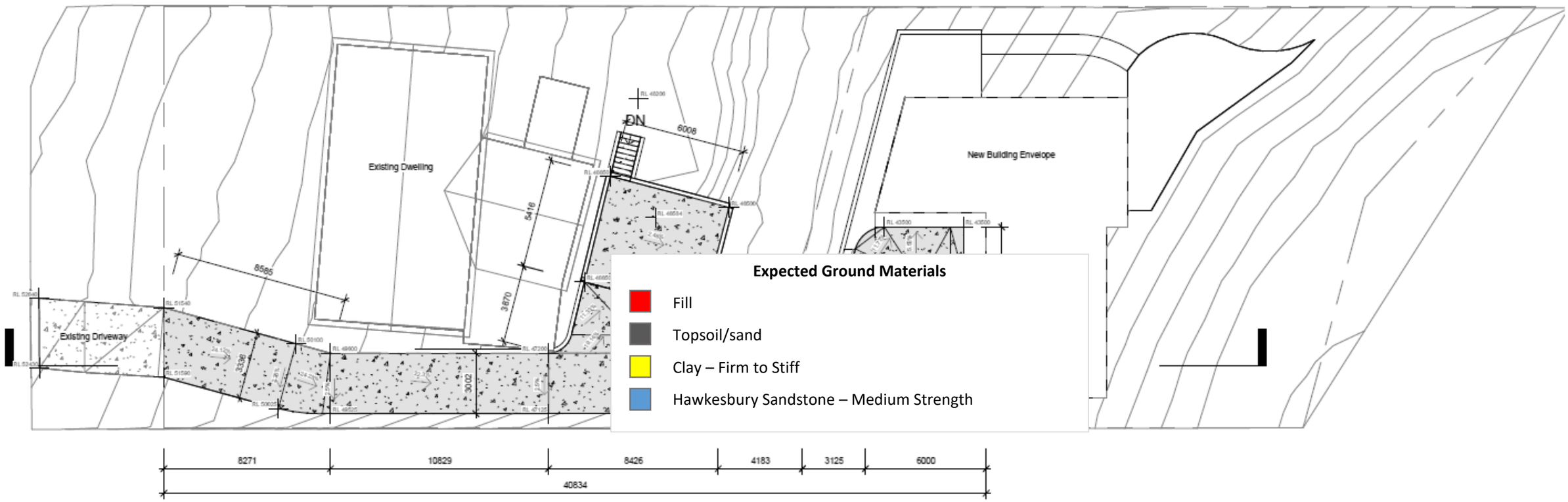
Sheet Title: Site & Landscape Plan

Drawn by: YW

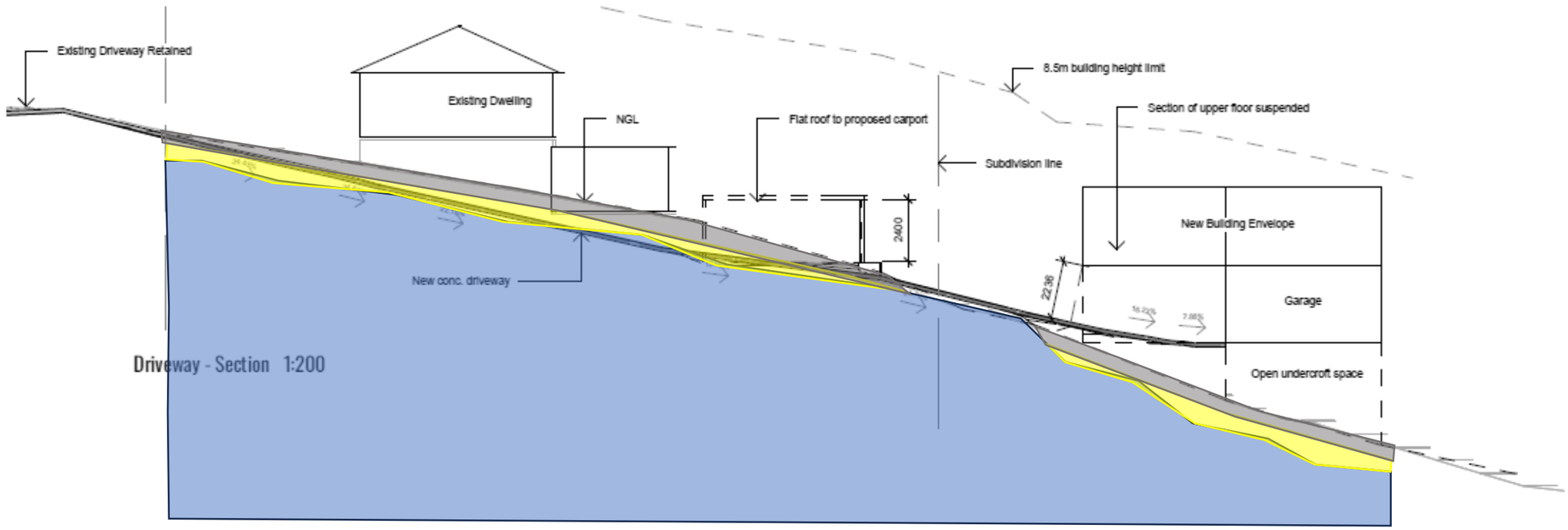
Checked by: YW

Sheet No. L02

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Driveway - Plan 1:200



Driveway - Section 1:200

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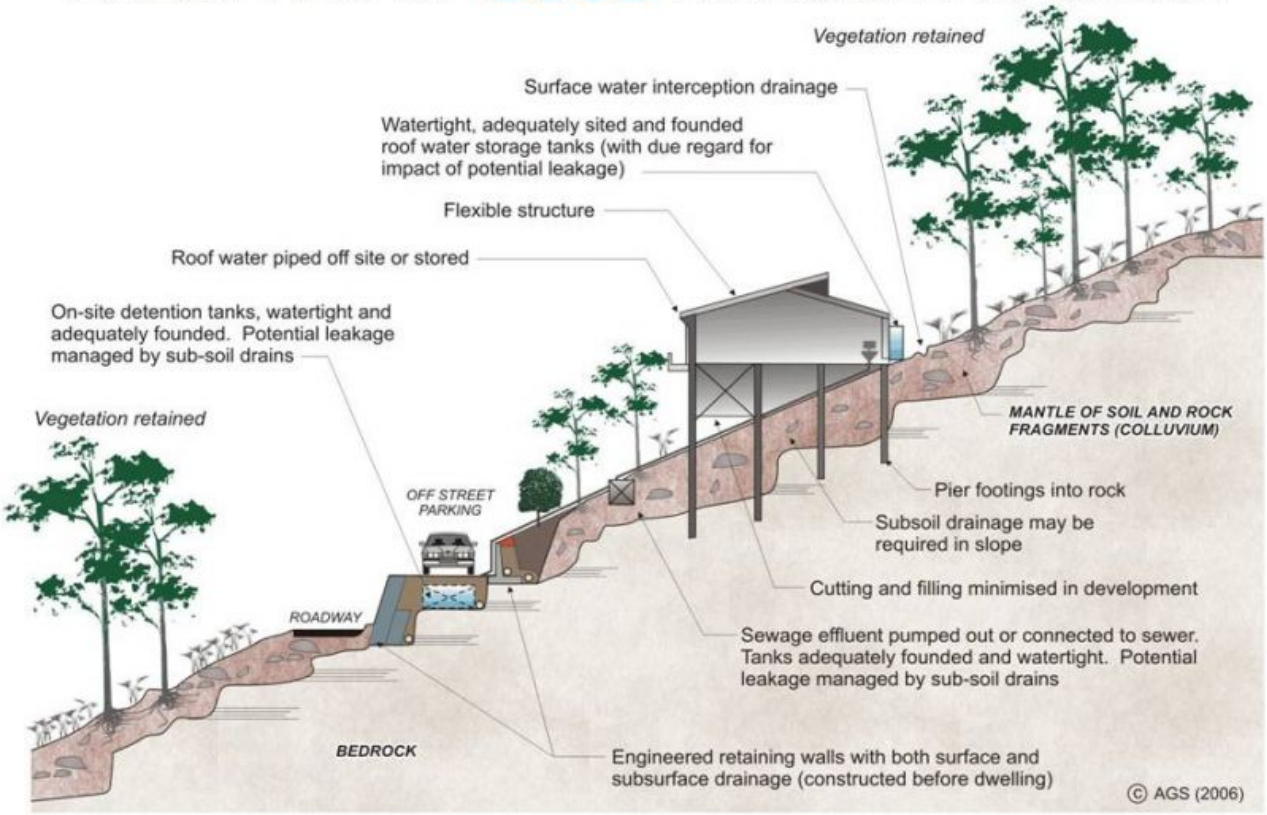
				K	DA Submisson	08-10-2024			
				J	DA Submission	24-09-2024			
				I	DA Submission	25-08-2024			
				H	DA Submission	13-08-2024			
				G	DA Submission	30-07-2024	Project: Proposed Subdivision 7 Cooleana Road, Elanora Heights NSW 2101	Drawn by: YW	
				F	DA Submission	28-07-2024		Checked by: YW	

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE