

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

Development Application for _____
Name of Applicant

Address of site 201 Whale Beach Road, Whale Beach

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 14/12/23 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 201 Whale Beach Road, Whale Beach
Report Date: 14/12/23

Author: BEN WHITE

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

Documentation which relate to or are relied upon in report preparation:

Australian Geomechanics Society Landslide Risk Management March 2007.
White Geotechnical Group company archives.

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature 
Name Ben White
Chartered Professional Status MScGEOLAusIMM CP GEOL
Membership No. 222757
Company White Geotechnical Group Pty Ltd

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements for Geotechnical Risk Management Report for Development Application

Development Application for	_____
	Name of Applicant
Address of site	<u>201 Whale Beach Road, Whale Beach</u>

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 <u>201 Whale Beach Road, Whale Beach</u>
Report Date: <u>14/12/23</u>
Author: <u>BEN WHITE</u>
Author's Company/Organisation: <u>WHITE GEOTECHNICAL GROUP PTY LTD</u>

Please mark appropriate box

- ☒ Comprehensive site mapping conducted 29/3/22
(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 29/3/22
- ☒ Geotechnical model developed and reported as an inferred subsurface type-section
- ☒ Geotechnical hazards identified
 - ☒ Above the site
 - ☒ On the site
 - ☒ Below the site
 - ☐ Beside the site
- ☒ Geotechnical hazards described and reported
- ☒ Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
 - ☒ Consequence analysis
 - ☒ Frequency analysis
- ☒ Risk calculation
- ☒ Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.
- ☒ Design Life Adopted:
 - ☒ 100 years
 - ☐ Other _____
specify
- ☒ Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified
- ☒ Additional action to remove risk where reasonable and practical have been identified and included in the report.
- ☐ Risk assessment within Bushfire Asset Protection Zone.

I am aware that Pittwater Council will rely on the Geotechnical Report, to which this checklist applies, as the basis for ensuring that the geotechnical risk management aspects of the proposal have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.



Signature

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL INVESTIGATION:

New Pool at **201 Whale Beach Road, Whale Beach**

1. Proposed Development

- 1.1** Install a pool on downhill side of the property by excavating to a maximum depth of ~1.5m.
- 1.2** Various other minor external alterations and additions.
- 1.2** Details of the proposed development are shown on 5 drawings prepared by Wyer & Co, project number 22.096, drawings numbered S4.55_00 to S4.55_04, dated 13.12.2023.

2. Site Description

- 2.1** The site was inspected on the 29th March, 2022.
- 2.2** This residential property is on the low side of the road and has a NE aspect. It is located on the steeply graded middle reaches of a hillslope. The natural slope falls across the property at an average angle of ~18°. The slope above and below the property continues at similar angles.
- 2.3** At the road frontage, a partially suspended concrete driveway runs across the slope to a garage attached to the uphill side of the house (Photo 1). The cut for the driveway is supported by a ~1.0m high stable concrete retaining wall (Photo 2). In between the road frontage and the house is a moderately sloping garden area. A stable, ~0.8m high timber log retaining wall supports a fill for a garden bed on the uphill side of the property (Photo 3). A second, stable ~1.2m high timber log retaining wall supports a cut to create the level platform for the uphill side of the house (Photo 4). The cut has been partially taken through an outcropping dislodged joint block that is embedded in the slope. The part four-storey timber clad and rendered

brick house is supported concrete block and brick walls, concrete piers, and steel posts. The concrete block and brick walls show no significant signs of movement and the concrete piers and steel posts stand vertical. A series of timber log retaining walls reaching up to ~1.0m high terrace the slope on the downhill side of the property. One of the timber log retaining walls support a fill to create a level platform for several large rainwater tanks (Photo 5). Another one of these low timber log retaining walls supporting a garden bed is tilting downslope to a maximum angle of ~15° and is in the slow process of failure (Photos 6 & 7). See **Section 14** for advice regarding this wall. A moderately sloping lawn and garden area extend to the lower common boundary (Photo 8).

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. Five 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. It is likely that DCP1 and DCP2 may have refused on large dislodged joint blocks in the profile. 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 (~RL32.8) – AH1 (Photo 9)

Depth (m)	Material Encountered
0.0 to 0.2	TOPSOIL , dark brown, medium grained, loose, fine trace of organic matter, damp.
0.2 to 0.5	CLAY , brown, fine grained, firm to stiff, damp.
0.5 to 0.9	CLAY , yellowy brown, fine grained, firm to stiff, damp.

End of test @ 0.9m. 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 (~RL33.0)	DCP 2 (~RL32.0)	DCP 3 (~RL33.5)	DCP 4 (~RL33.5)	DCP 5 (~RL32.0)
0.0 to 0.3	4	3	4	4	4
0.3 to 0.6	4	7	5	7	5
0.6 to 0.9	8	#	8	12	11
0.9 to 1.2	#		13	18	18
1.2 to 1.5			22	26	24
1.5 to 1.8			31	31	32
1.8 to 2.1			#	#	#
	Refusal @ 0.7m	Refusal @ 0.5m	End of Test @ 1.8m	End of Test @ 1.8m	End of Test @ 1.8m

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

DCP Notes:

DCP1 – Refusal @ 0.7m, DCP bouncing off rock surface, brown clay on wet tip.

DCP2 – Refusal @ 0.5m, DCP bouncing off rock surface, brown clay on wet tip.

DCP3 – End of test @ 1.8m, DCP still going down slowly, red and white clay on dry tip.

DCP4 – End of test @ 1.8m, DCP still going down slowly, red and white clay on dry tip.

DCP5 – End of test @ 1.8m, DCP still going down slowly, red and white clay 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 shallow soils over clays. The clay merges into the underlying weathered rock at depths of between ~1.2m to 1.5m below the current surface. The weathered zone is interpreted to be Extremely Low Strength Shale. Sandstone boulders were observed embedded in the slope above the house. It is interpreted that DCP1 and DCP2 refused on an underlying boulder similar to the ones at the surface. 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 Whale Beach Road above.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property. The steeply graded slope that falls across the property and continues above and below is a potential hazard (**Hazard One**). The tilted retaining wall on the downhill side of the property is a potential hazard (**Hazard Two**). The proposed excavation is a potential hazard until retaining structures are in place (**Hazard Three**).

RISK ANALYSIS ON THE NEXT PAGE

Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two	Hazard Three
TYPE	The steep slope that falls across the property and continues above and below failing and impacting on the proposed works.	Further movement of the low timber log retaining wall below the house that causes damage or failure (Photo 6 & 7).	The excavation (to a maximum depth of ~1.5m) collapsing onto the work site before retaining structures are in place.
LIKELIHOOD	'Unlikely' (10^{-4})	'Likely' (10^{-2})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Minor' (10%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (5×10^{-4})	'Moderate' (2×10^{-4})
RISK TO LIFE	9.1×10^{-7} /annum	1.3×10^{-5} /annum	8.3×10^{-6} /annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk to life and property is 'TOLERABLE'. To move the risk to 'ACCEPTABLE' levels, the recommendations in Section 13 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 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

No significant additional stormwater runoff will be created by the proposed development.

11. Excavation

An excavation to a maximum depth of ~1.5m is required for the proposed pool on the downhill side of the property.

The excavation is expected to be through shallow soil over clay with Extremely Low Strength Shale expected at depths of between ~1.2m to ~1.5m in the area of the proposed excavation. 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, sandy 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 excavation for the proposed pool will reach a maximum depth of ~1.5m. The setbacks from the proposed excavation to the existing structures/boundaries are as follows:

- ~1.0m from the W common boundary
- ~3.0m from the E common boundary

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

We recommend the soil and clay portions of the W side of the excavation be temporarily supported with typical pool shoring such as braced sacrificial form ply, until the pool structure is in place. The remaining sides of the cut are expected to stand at near-vertical angles for short periods of time until the pool structure is installed provided the cut batters are kept

from becoming saturated. If the cut batters through soil and clay remain unsupported for more than a few days before pool construction commences, they are also to be supported with typical pool shoring until the pool structure is in place. The support will need to be designed by the structural engineer. See site plan attached for extent of minimum required shoring shown in blue.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters through fill, soil, 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 pool structure are to be organised so on completion of the excavation they can be constructed as soon as possible. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

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

14. Retaining Structures

For cantilever or singly-propped retaining structures, 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 Structures

Unit	Earth Pressure Coefficients		
	Unit weight (kN/m ³)	'Active' K _a	'At Rest' K ₀
Fill, and soil	20	0.40	0.55
Residual Clays	20	0.35	0.45
Extremely Low Strength Shale	22	0.25	0.38

For rock classes refer to Pells et al "Design Loadings for Foundations on Shale and Sandstone in the Sydney Region".
Australian Geomechanics Journal 1978.

It is to be noted that the earth pressures in Table 1 assume a level surface above the structure, do not account for any surcharge loads, and assume retaining structures are fully drained. Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

All retaining structures are to have sufficient back-wall drainage and be backfilled immediately behind the structure with free-draining material (such as gravel). This material is to be wrapped in a non-woven Geotextile fabric (i.e. Bidim A34 or similar), to prevent the drainage from becoming clogged with silt and clay. If no back-wall drainage is installed in retaining structures, the likely hydrostatic pressures are to be accounted for in the structural design.

15. Foundations

The proposed pool is expected to be partially seated in Extremely Low Strength Shale. This is a suitable foundation material. It is expected to be exposed across the uphill side of the proposed excavation. Where it is not exposed, and where weathered rock drops away with the slope, shallow piers taken to Extremely Low Strength Shale will be required to maintain a uniform foundation material across the structure. The piers for the shallow portion of the

pool are expected to encounter Extremely Low Strength Shale at depths of between ~1.2m to ~1.5m below the current surface.

A maximum allowable bearing pressure of 600kPa can be assumed for footings embedded in 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.

16. Site Maintenance

The low timber log retaining wall on the downhill side of the property is tilting downslope at a maximum angle of ~15° (Photo 6 & 7). We recommend consideration be made to demolish the retaining wall during the proposed works and battering the soil at stable angles of not more than 30° from horizontal (1.0V to 1.7H). The existing wall will be obscured entirely by the proposed works.

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.

- 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:



Ben White M.Sc. Geol.,
AIG., RPGeo Geotechnical & Engineering.
No. 10306
Engineering Geologist.





Photo 1



Photo 2



Photo 3



Photo 4



Photo 5

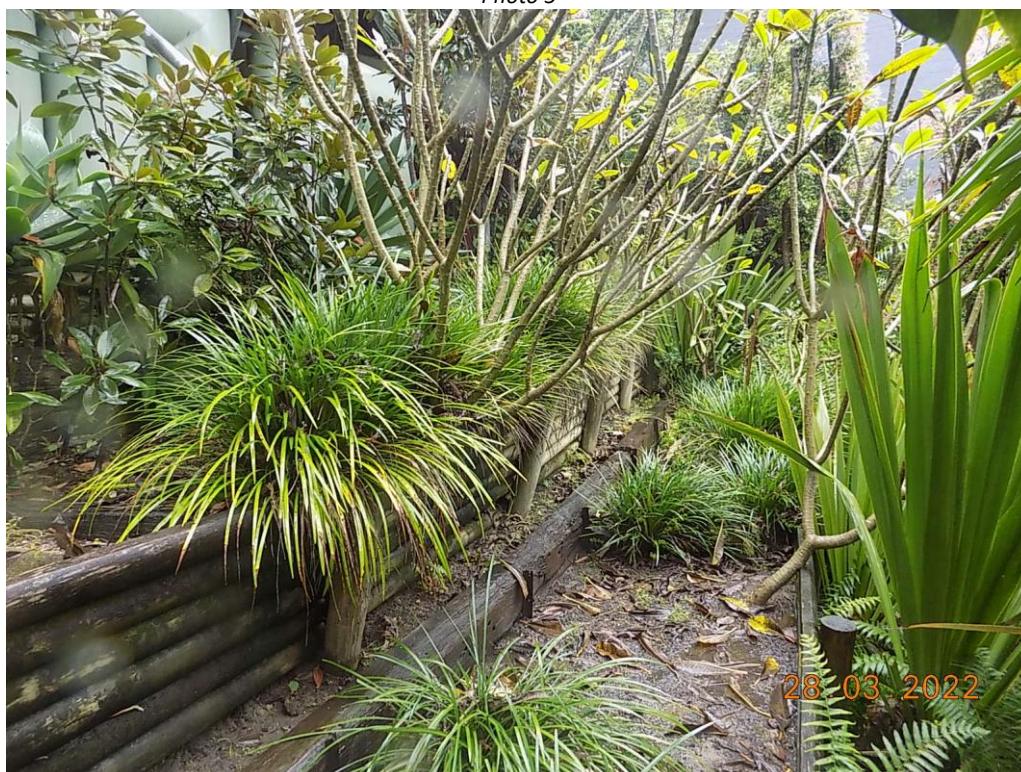


Photo 6



Photo 7



Photo 8



Photo 9 (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.

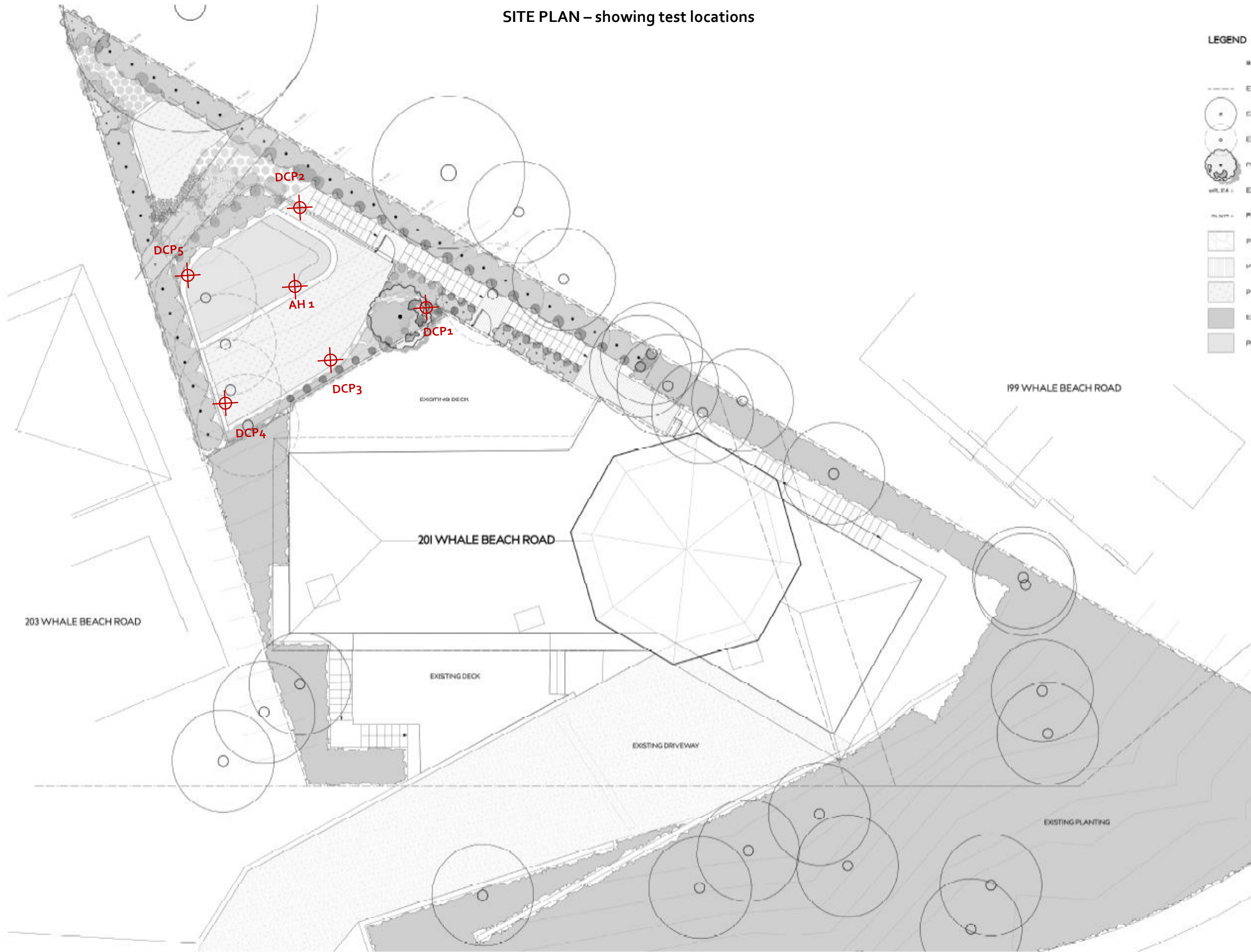
With this in mind, the following points are to be noted:

- 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

LEGEND

- BOUNDARY
- EXTENT OF WORKS
- EXISTING TREE RETAINED
- EXISTING TREE REMOVED
- PROPOSED TREE
- EXISTING LEVELS
- PROPOSED LEVELS
- PROPOSED STONE PAVING
- PROPOSED TIMBER DECKING
- PROPOSED LAWN
- EXISTING VEGETATION RETAINED
- PROPOSED POOL



PROJECT
BEALE RESIDENCE
201 WHALE BEACH ROAD, WHALE BEACH

DRAWING TITLE
SECTION 4.55
LANDSCAPE SITE PLAN

DRAWN BY
AS / AD
REVISION
01

DATE
13.12.2023
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JOB NUMBER
22.096

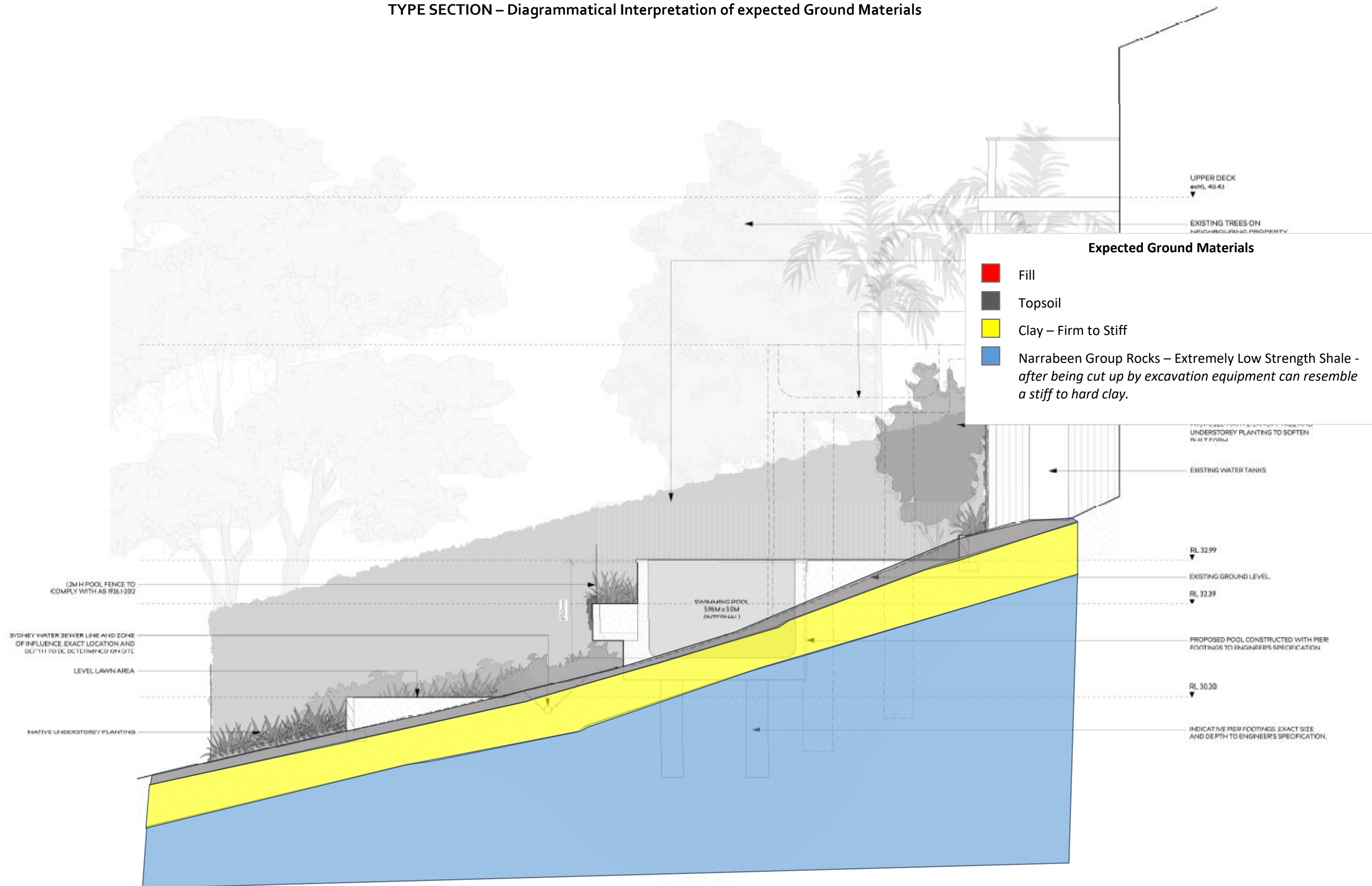
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WYER & CO

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



PROJECT
BEALE RESIDENCE
201 WHALE BEACH ROAD, WHALE BEACH

DRAWING TITLE
SECTION 4.55
ELEVATION AA

DRAWN BY
AS / AD

REVISION
01

DATE
13.12.2023

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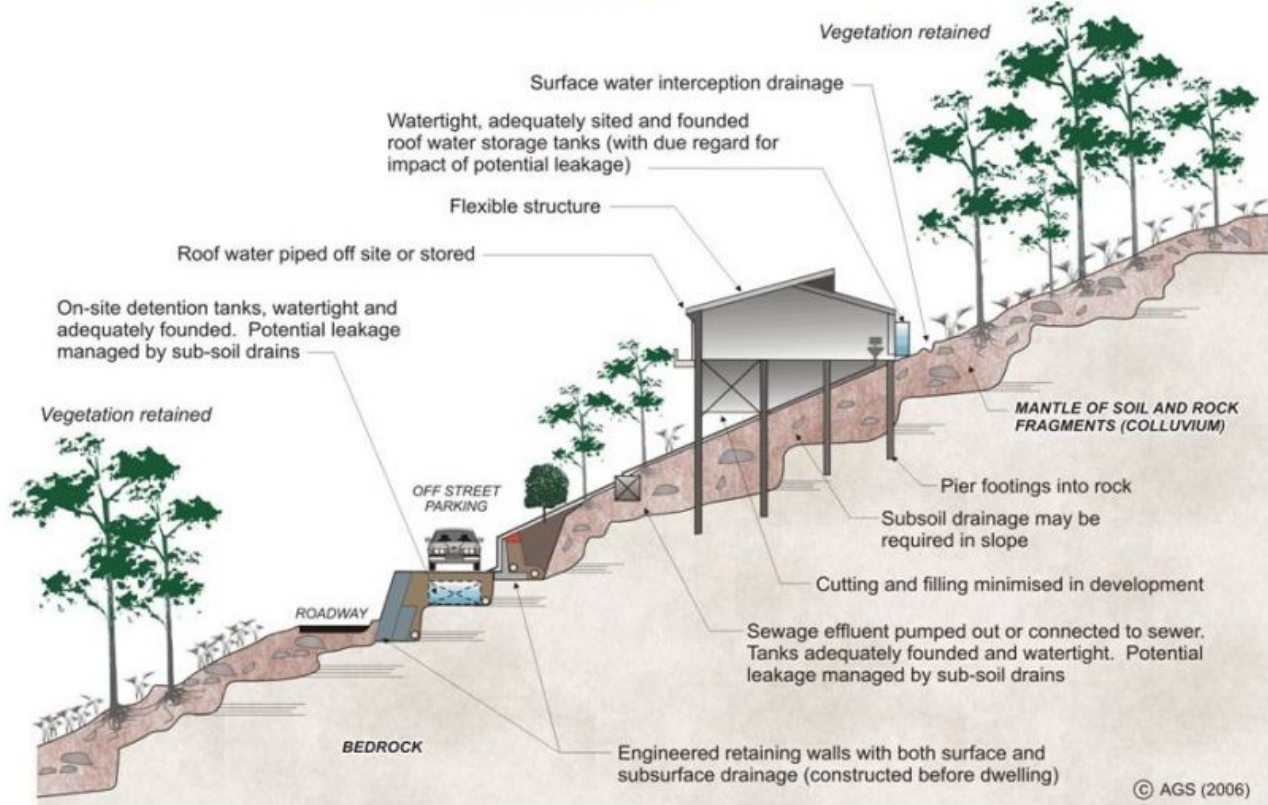
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EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

