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

Development Application for _____
Name of Applicant

Address of site 46A Irrubel Road, 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 11/2/19 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 **46A Irrubel Road, Newport**

Report Date: 11/2/19

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 46A Irrubel Road, 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 **46A Irrubel Road, Newport**

Report Date: 11/2/19

Author: BEN WHITE

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

Please mark appropriate box

- ☒ Comprehensive site mapping conducted **5/2/19** (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 **6/2/19**
- ☒ 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:

Proposed Pool at **46A Irrubel Road, Newport**

1. Proposed Development

1.1 Install a pool on the downhill side of the house by excavating to a maximum depth of ~1.3m in to the slope.

1.2 Demolish the existing retaining wall on the uphill side of the house and construct a new retaining wall by excavating to a maximum depth of ~1.5m into the slope.

1.3 Details of the proposed development are shown on 7 drawings prepared by Serenescapes, project number 18495, Revision B, drawing number L-01 to 07 dated 09/01/19.

2. Site Description

2.1 The site was inspected on the 5th February, 2019.

2.2 This battle-axe-shaped residential property is on the high side of the road and has a W aspect. It is positioned on the gentle to steeply graded lower reaches of a hillslope. From the uphill boundary to the downhill side of the house the slope falls at an average angle of ~9° and continues at near level angles from the downhill side of the house, before dropping away at maximum angles of ~20° towards the downhill boundary. The slope above the property continues at similar angles. The slope below the property drops to an intermittent watercourse.

2.3 At the road frontage, a concrete driveway runs to a carport attached to the S side of the house (Photos 1 & 2). An excavation has been made along the uphill boundary to level an area for the driveway and house (Photo 3). The cut is supported by a stable sandstone block retaining wall reaching a maximum height of ~1.0m a

which becomes a treated timber retaining wall reaching a maximum height of ~1.1m along the uphill side of the house (Photo 4). Both walls will be replaced as part of the proposed works. The part two-storey brick and timber clad house is supported on brick walls and brick piers (Photo 5). Settlement cracking was observed in the supporting walls of the downhill side of the house and one of the supporting brick piers was observed to be tilting (Photos 6, 7 & 8). Steel bracing has been placed for additional support to the cross beams. The brick walls will be remediated and the brick pier replaced as part of the proposed works. Ground tests indicate a fill up to a maximum depth of ~1.5m has been placed on the downhill side of the house for a level lawn area (Photo 9). The fill has been battered at safe angles. An old treated timber retaining wall on the downhill side of the property will be replaced as part of the proposed works (Photo 10). The slope below the wall falls at steep angles to intermittent watercourse along the lower boundary that flows from NE to SW. The watercourse was dry at the time of the inspection and the banks of the creek appear stable (Photo 11). No significant signs of movement were observed on the property. No geotechnical hazards that could impact on the subject property were observed on the neighbouring properties as seen from the subject property and the road.

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 the soil materials. Six 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. It should be noted that a level of caution should be applied when interpreting DCP test results. The test will not pass through hard buried objects so in some instances it can be difficult to

determine whether refusal has occurred on an obstruction in the profile or on the natural rock surface. This is not expected to be an issue for the testing on this site and the results are as follows:

AUGER HOLE 1 (~RL32.0) **–** AH1 (Photo 12)

Depth (m)	**Material Encountered**
0.0 to 0.3	**FILL,** disturbed sandy soil, brown, loose, rock fragments, fine to medium grained, organic matter, dry.
0.3 to 0.6	**FILL,** disturbed sandy soil, brown, loose, rock fragments, fine to medium grained, dry.
0.6 to 1.0	**SILTY CLAY**, brown to reddish brown, firm, fine to medium grained, rock fragments, dry.
1.0 to 1.3	**SANDY CLAY**, brown, firm, fine to medium grained, dry.
1.3 to 1.6	**CLAY**, yellowish brown, very stiff, mottled red, fine grained, dry.

End of hole @ 1.6m in stiff clay. No watertable encountered.

SEE DCP TEST RESULTS OVER THE 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** (~RL32.4)	**DCP 2** (~RL30.1)	**DCP 3** (~RL29.4)	**DCP 4** (~RL32.0)	**DCP 5** (~RL37.0)	**DCP 6** (~RL34.8)
0.0 to 0.3	15	5	5	7	4	25
0.3 to 0.6	8	10	15	6	8	10
0.6 to 0.9	8	12	6	8	19	13
0.9 to 1.2	21	5	5	11	28	18
1.2 to 1.5	6	5	17	9	45	28
1.5 to 1.8	9	9	24	12	#	#
1.8 to 2.1	12	14	36	10		
2.1 to 2.4	21	30	#	7		
2.4 to 2.7	30	#		19		
2.7 to 3.0	#			29		
3.0 to 3.3				#		
	End of Test @ 2.7m	End of Test @ 2.4m	End of Test @ 2.1m	End of Test @ 3.0m	End of Test @ 1.5m	End of Test @ 1.5m

#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 @ 2.7m, DCP still very slowly going down, red clay on damp tip.
DCP2 – End of test @ 2.4m, DCP still very slowly going down, muddy wet tip.
DCP3 – End of test @ 2.1m, DCP still very slowly going down, soil on dry tip.
DCP4 – End of test @ 3.0m, DCP still very slowly going down, red clay on dry tip.
DCP5 – End of test @ 1.5m, DCP still very slowly going down, orange clay on dry tip.
DCP6 – End of test @ 1.5m, DCP still very slowly going down, red/orange shale on dry tip.

5. Geological Interpretation

The slope materials are colluvial at the near surface and residual at depth. They consist of a fill and thin sandy topsoil over silty and sandy clays and clays with rock fragments throughout the profile. In the test locations the silty and sandy clays and clays merge into the weathered zone of the underlying shale at depths between ~0.6 to ~1.2m below the current surface,

being deeper over DCP1, 2 and 4 due to the fill placed to level lawn area on the downhill side of the house. It is interpreted from ground tests that the fill reaches a maximum depth of ~1.5m. The weathered zone is interpreted as Extremely Low Strength Shale. It is to be noted that this material 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 buried surface of the rock and through the cracks. As a creek cuts the slope below the block, we expect groundwater seepage to be higher across the block as slope seepage will move toward the creek.

Due to the slope and elevation of the block, the water table is expected to be many metres below the base of the proposed excavation.

7. Surface Water

Apart from the creek channel below the block, 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, below, or beside the property. The proposed pool excavation collapsing onto the worksite is a potential hazard (**Hazard One)**. The excavation for the proposed retaining wall along the uphill boundary is a potential hazard (**Hazard Two**).

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The proposed pool excavation collapsing onto the work site before the pool structure is in place.	The excavation for the proposed retaining wall along the uphill boundary failing and impacting the house before the new retaining wall is in place.
LIKELIHOOD	'Possible' (10^{-3})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (20%)	'Medium' (20%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})	'Moderate' (2×10^{-4})
RISK TO LIFE	7.4×10^{-6}/annum	1.3×10^{-4}/annum
COMMENTS	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.	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)

SEE OVER THE PAGE FOR CONTINUED RISK ANALYSIS SUMMARY

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 stormwater runoff will be created by the proposed developments.

11. Excavations

An excavation to a maximum depth of ~1.3m is required to install the pool. It is expected to be through a fill with rock fragments and building rubble throughout.

Another excavation to a maximum depth of ~1.5m is required to construct the proposed retaining wall along the uphill boundary. It is expected to be through sandy soil over silty and sandy clay and clay with Extremely Low Strength Shale expected towards the base of the excavation.

It is envisaged the excavations can be carried out with a bucket and rock hammers will not be required.

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

Pool Excavation

The excavation for the proposed pool will be as close as ~1.1m from the existing supporting posts of the upper ground floor deck on the downhill side of the house. The excavation is expected to be a maximum depth of ~1.3m in this location. Assuming the deck foundations are to a minimum depth of 0.4m the proposed pool excavation will be outside the zone of

influence of the pool foundation. In this instance the zone of influence is the area above a theoretical 45° line extending from the base of the excavation towards the surrounding structures and boundaries. No other structures or boundaries will lie within the zone of influence of the excavation.

The cut faces for the pool are expected to stand for a short period until the pool shell is in place provided they are prevented from becoming saturated. See "Excavation Advice Applying to All Excavations" to follow. If the cut faces for the pool will be left for more than a few days, without pool construction commencing, it is recommended that standard pool shoring such as sheet iron be used to support the cut batters.

Excavation Uphill Side of House – New Retaining Wall

Two posts for the existing carport fall within the footprint of the proposed excavation. The garage is to be adequately propped prior to the demolition of the existing retaining wall and subsequent excavation so the posts can be removed and replaced as part of the works.

Any retaining walls that are to be demolished as part of the proposed works are to be dismantled from the top down. Any fill and soil behind the wall is to be lowered simultaneously and battered at 1.0 Horizontal to 1.7 Vertical (30°) until the new retaining walls are installed. Excavations through undisturbed clay and Extremely Low Strength Shale or better will stand at vertical angles unsupported for the short period of time until retaining walls are installed provided the cut batters are prevented from becoming saturated. See "Excavation Advice Applying to All Excavations" to follow.

If cut batters will be left for more than a few days before the retaining wall construction begins temporary support is to be installed for the ~16.5m where the excavation is close to flush with the E common boundary. The support is to be approved/designed by the structural engineer. All temporary support is to remain in place until the retaining wall is built.

Excavation Advice Applying to All Excavations

All 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 can't blow off in a storm. Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. The materials and labour to construct the retaining structure is 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 either removed from site, battered permanently at 1.0 Vertical to 2.0 Horizontal (26°) or be supported by engineered retaining walls.

14. Fill

From the plans, it is apparent that filling to maximum heights of ~0.5m will be placed to landscape the downhill side of the house. No fills are to be laid until retaining walls are in place. The surface is to be prepared before any fills are laid by removing any organic matter and topsoil. Fills are to be laid in a loose thickness not exceeding 0.3m before being moderately compacted. Tracking the machine over the loose fill in 1 to 2 passes should be sufficient. Immediately behind the retaining structure (say to 1.5m), the fill is to be compacted with light weight equipment such as a hand-held plate compactor so as not to damage the retaining wall. Where light weight equipment is used, fills are to be laid in a loose thickness not exceeding 0.2m before being compacted. No structures are to be supported on fill.

15. Retaining Structures

For cantilever or singly propped retaining walls it is suggested the design be based on a triangular 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	20	0.45	0.55
Sandy Soil and Residual Clays	20	0.35	0.45
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. So in this instance slope surcharge loads will need to be accounted for in the design. 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 retaining wall design.

16. Foundations

The proposed pool is to be supported on piers taken to and embedded into the underlying Extremely Low Strength Shale below the base of the downhill retaining wall to prevent surcharge loads impacting on the wall. This ground material is expected at an average depth of ~2.4m below the current ground surface. 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 area will become saturated during pool use it is recommended any paving around the pool be supported on a piered concrete slab on the underlying firm to stiff clays expected at a depth of ~1.5m below the current ground surface. This will reduce the risk of settlement around the pool that can result from ongoing saturation of the fill. Similarly the plans show a drain on the uphill side of the pool. As two existing deck posts are immediately above the pool it is recommended the drain be a sufficient width and depth to prevent splashed water from flowing onto the surface around the deck posts. A maximum allowable bearing pressure of 200kPa can be assumed for footings on firm to stiff clays and 600kPa for footings embedded in Extremely Low Strength Shale.

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. 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 Occupation Certificate if the following inspection has not been carried out during the construction process.

- The excavation on the uphill side of the house is to be inspected towards the end of the excavation process but while the machine is still on site to ensure the ground materials are as expected and to confirm that temporary support is not required.

- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment is still onsite and before steel reinforcing is placed or concrete is poured.

White Geotechnical Group Pty Ltd.

Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist

Photo 1: Subject driveway is on the right

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12 - End of the auger is at the bottom of the picture

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 tests 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 professional. 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.

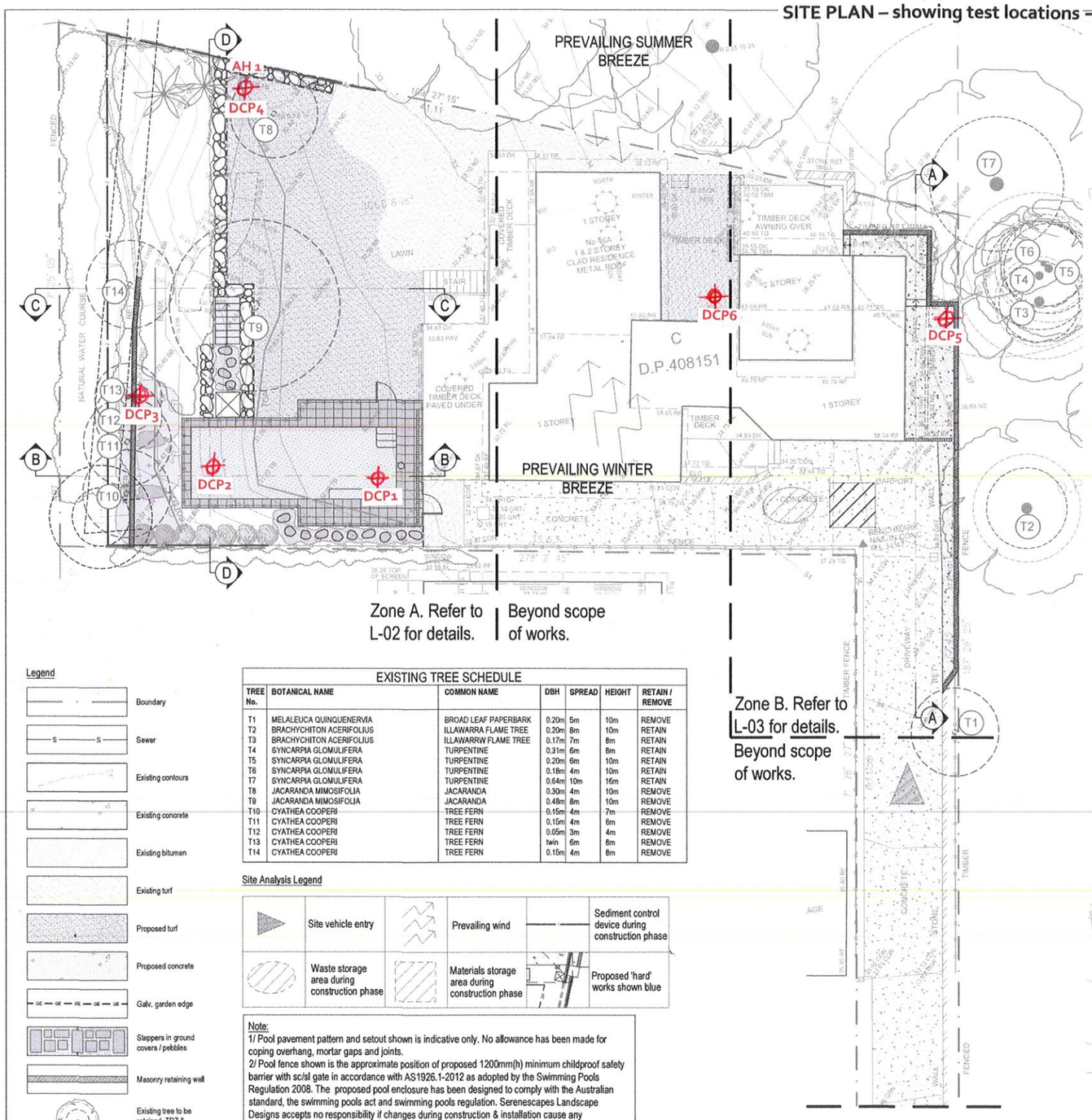
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

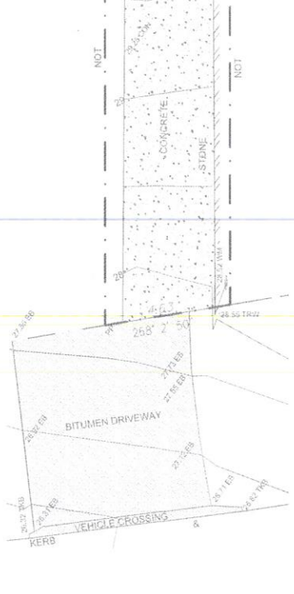
- This report should not be applied to any other project other than that outlined in section 1.0.

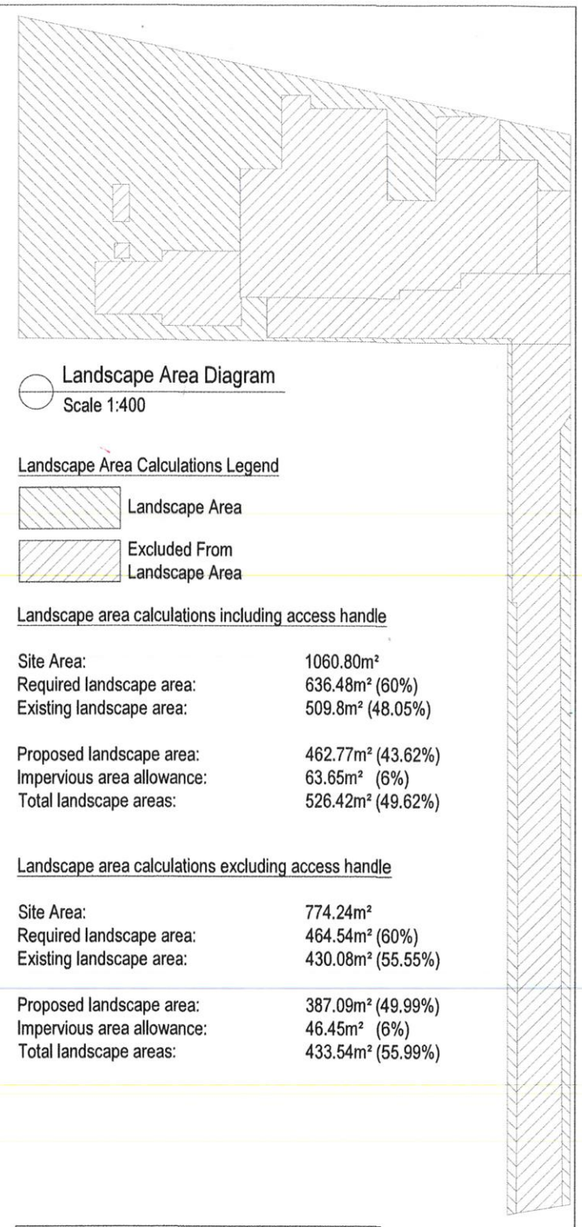
- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.

- 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







Landscape Area Diagram
Scale 1:400

Landscape Area Calculations Legend

- Landscape Area
- Excluded From Landscape Area

Landscape area calculations including access handle

Site Area:	1060.80m²
Required landscape area:	636.48m² (60%)
Existing landscape area:	509.8m² (48.05%)
Proposed landscape area:	462.77m² (43.62%)
Impervious area allowance:	63.65m² (6%)
Total landscape areas:	526.42m² (49.62%)

Landscape area calculations excluding access handle

Site Area:	774.24m²
Required landscape area:	464.54m² (60%)
Existing landscape area:	430.08m² (55.55%)
Proposed landscape area:	387.09m² (49.99%)
Impervious area allowance:	46.45m² (6%)
Total landscape areas:	433.54m² (55.99%)

Note:
1. Ensure minimum clearance from outer edge of access chamber lid is 1 metre. No structures above existing ground level within. Refer to Diagram 7 of Sydney Water 'Technical Guidelines for building over and adjacent to pipe assets' for details.
2. Ensure minimum clearance from outer edge of access chamber structure and vertical face of swimming pool is 2 metres. Refer to Diagram 13 of Sydney Water 'Technical Guidelines for building over and adjacent to pipe assets' for details.

Legend

- Boundary
- Sewer
- Existing contours
- Existing concrete
- Existing bitumen
- Existing turf
- Proposed turf
- Proposed concrete
- Galv. garden edge
- Steppers in ground covers / pebbles
- Masonry retaining wall
- Existing tree to be retained. TPZ & SRZ shown dashed
- Existing tree to be removed

EXISTING TREE SCHEDULE

TREE No.	BOTANICAL NAME	COMMON NAME	DBH	SPREAD	HEIGHT	RETAIN / REMOVE
T1	MELALEUCA QUINQUENERVIA	BROAD LEAF PAPERBARK	0.20m	5m	10m	REMOVE
T2	BRACHYCHITON ACERIFOLIUS	ILLAWARRA FLAME TREE	0.20m	8m	10m	RETAIN
T3	BRACHYCHITON ACERIFOLIUS	ILLAWARRW FLAME TREE	0.17m	7m	8m	RETAIN
T4	SYNCARPIA GLOMULIFERA	TURPENTINE	0.31m	6m	8m	RETAIN
T5	SYNCARPIA GLOMULIFERA	TURPENTINE	0.20m	6m	10m	RETAIN
T6	SYNCARPIA GLOMULIFERA	TURPENTINE	0.18m	4m	10m	RETAIN
T7	SYNCARPIA GLOMULIFERA	TURPENTINE	0.64m	10m	16m	RETAIN
T8	JACARANDA MIMOSIFOLIA	JACARANDA	0.30m	4m	10m	REMOVE
T9	JACARANDA MIMOSIFOLIA	JACARANDA	0.48m	8m	10m	REMOVE
T10	CYATHEA COOPERI	TREE FERN	0.15m	4m	7m	REMOVE
T11	CYATHEA COOPERI	TREE FERN	0.15m	4m	6m	REMOVE
T12	CYATHEA COOPERI	TREE FERN	0.05m	3m	4m	REMOVE
T13	CYATHEA COOPERI	TREE FERN	twin	6m	8m	REMOVE
T14	CYATHEA COOPERI	TREE FERN	0.15m	4m	8m	REMOVE

Site Analysis Legend

- Site vehicle entry
- Prevailing wind
- Sediment control device during construction phase
- Waste storage area during construction phase
- Materials storage area during construction phase
- Proposed 'hard' works shown blue

Note:
1/ Pool pavement pattern and setout shown is indicative only. No allowance has been made for coping overhang, mortar gaps and joints.
2/ Pool fence shown is the approximate position of proposed 1200mm(h) minimum childproof safety barrier with sc/sl gate in accordance with AS1926.1-2012 as adopted by the Swimming Pools Regulation 2008. The proposed pool enclosure has been designed to comply with the Australian standard, the swimming pools act and swimming pools regulation. Serenescapes Landscape Designs accepts no responsibility if changes during construction & installation cause any non-compliance.
3/ The boundary fence inside the pool zone must be a minimum height of 1800mm with a non climbable zone of 900mm on the inside of the fencing in accordance with the Australian Standard prescribed by the Swimming Pools Regulation 2008.
4) Any shrubs or plants located adjacent to the pool enclosure must be maintained for the lifetime of the development at a height that does not interfere with the required non climbable zones.

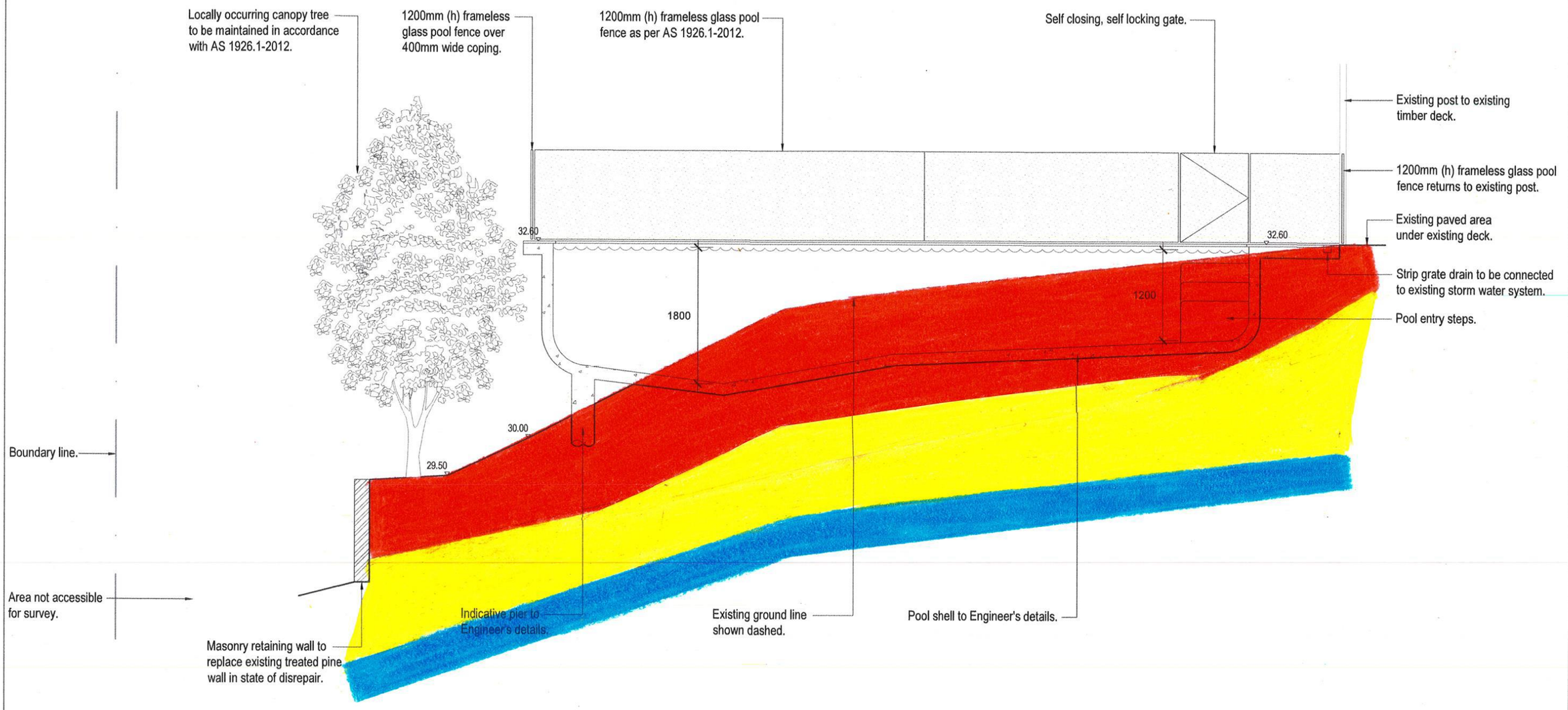
Note:
- Contractors to check and verify all dimensions and all levels on site prior to any works.
- Any discrepancies should be immediately referred to Serenescapes Landscape Designs.
- All work to comply with B.C.A. Statutory Authorities and relevant Australian Standards.
- Dimensions recognised over scaling. All measurements are in millimetres.
- Copyright Serenescapes Landscape Designs 2018.

serenescapes
Serenscapes Landscape Designs
ABN 71 611 726 222
Suite 54, 14 Narabang Way
Belrose NSW 2085
Tel: 02 9986 2157
info@serenescapes.com.au
www.serenescapes.com.au

Client:	Jon & Alison Cutler	Drawing Title:	Site Plan / Site Analysis / Sedimentation Control Plan		
Site Address:	46A Irrubel Road Newport	Drawn by: Ben Farrar AILDM # 1179	Project Number: 18495	Scale: 1:200 @ A3	Sheet Number: L-01 of 7

Rev:	Date:	Issue:	Checked:
A	23/11/18	Preliminary Issue	TB
B	09/01/19	DA Issue	TB

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Sectional Elevation BB
Scale 1:50

Fill
Sandy Soil
Sandy 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.

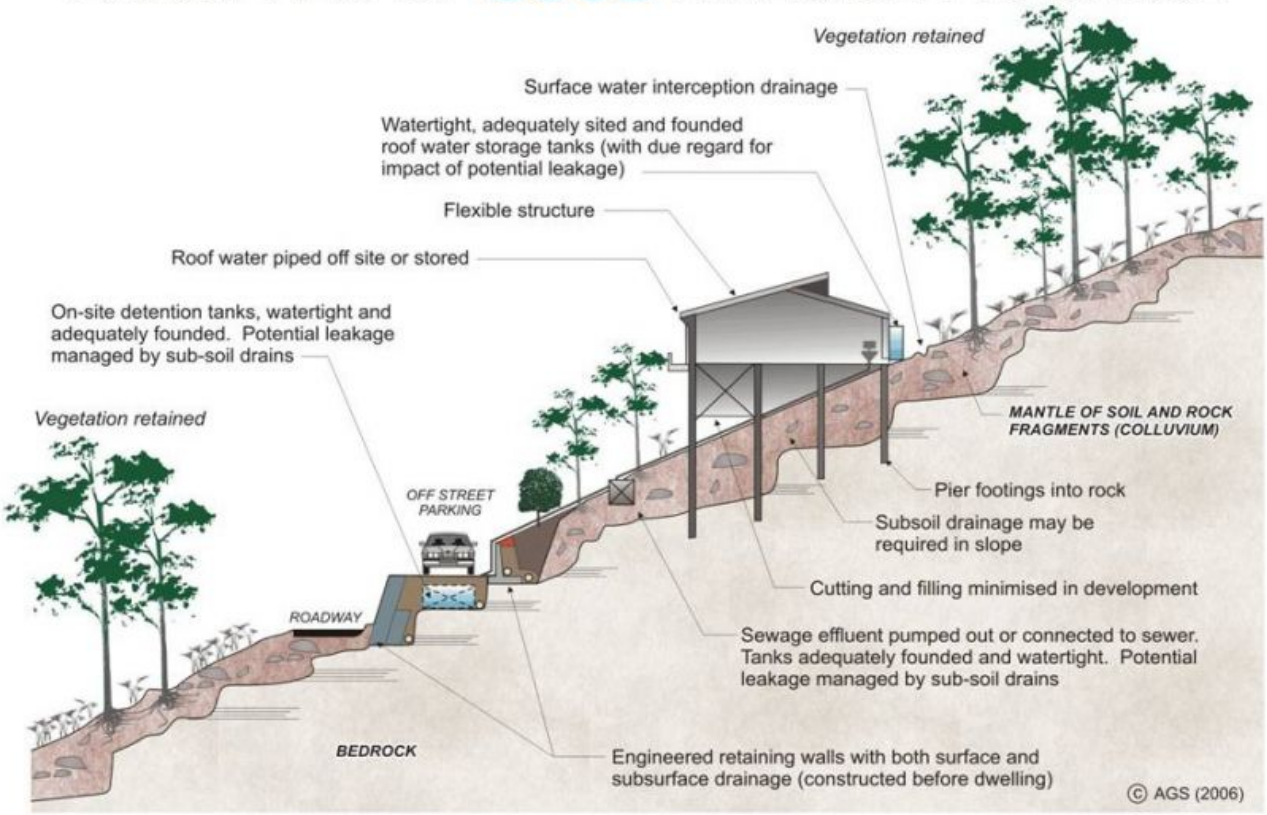
Note:
- Contractors to check and verify all dimensions and all levels on site prior to any works.
- Any discrepancies should be immediately referred to Serenescapes Landscape Designs.
- All work to comply with B.C.A. Statutory Authorities and relevant Australian Standards.
- Dimensions recognised over scaling. All measurements are in millimetres.
- Copyright Serenescapes Landscape Designs 2018.

serenescapes
Serenscapes Landscape Designs
ABN 71 611 726 222
Suite 54, 14 Narabang Way
Belrose NSW 2085
Tel: 02 9986 2157
info@serenescapes.com.au
www.serenescapes.com.au

Client:	Jon & Alison Cutler	Drawing Title:	Sectional Elevation		
Site Address:	46A Irrubel Road Newport	Drawn by: Ben Farrar AILDM # 1179	Project Number: 18495	Scale: 1:50 @ A3	Sheet Number: L-05 of 6

Rev:	Date:	Issue:	Checked:
A	23/11/18	Preliminary Issue	TB
B	09/01/19	DA Issue	TB

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE