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

Development Application for _____
Name of Applicant

Address of site 316 Hudson Parade, Clareville

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 27/11/20 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 **316 Hudson Parade, Clareville**

Report Date: 27/11/20

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 316 Hudson Parade, Clareville

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 **316 Hudson Parade, Clareville**

Report Date: 27/11/20

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **2/10/20**
(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 **2/10/20**

☒ Geotechnical model developed and reported as an inferred subsurface type-section

☒ Geotechnical hazards identified
- ☒ Above the site
- ☒ On the site
- ☒ Below the site
- ☐ Beside the site

☒ Geotechnical hazards described and reported

☒ Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Consequence analysis
- ☒ Frequency analysis

☒ Risk calculation

☒ Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009

☒ Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.

☒ Design Life Adopted:
- ☒ 100 years
- ☐ Other _____
specify

☒ Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified

☒ Additional action to remove risk where reasonable and practical have been identified and included in the report.

☐ Risk assessment within Bushfire Asset Protection Zone.

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

Signature _____

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL INVESTIGATION:

Alterations and Additions at **316 Hudson Parade, Clareville**

1. Proposed Development

1.1 Demolish the existing sandstone block and brick retaining walls on the uphill side of the house.

1.2 Extend the existing driveway and garage attached to the house on the uphill side and construct a new entertainment area with roof above and new pond by excavating to a maximum depth of ~3.1m.

1.3 Demolish part of the detached garage with studio above, leaving the S wall intact. Rebuild the garage/studio and extend on the E and W sides requiring an excavation to a maximum depth of ~1.6m.

1.4 Demolish part of the existing house, leaving most of the existing floors and walls intact.

1.5 Add a new first floor addition to the existing house.

1.6 Construct a lift connecting the first floor with the upper and lower ground floors of the house.

1.7 Various other internal and external alterations to the existing house.

1.8 Details of the proposed development are shown on 20 drawings prepared by Baxter and Jacobson Architects, job number 346-02, drawings numbered DA 2.02 to DA 2.02, DA 10.00, DA 10.01, DA 10.03 to DA 10.06, DA 10.08, DA 20.00 to DA 20.03, DA 30.03, DA 30.11, DA 30.20 and DA 50.00 to DA 50.02, dated 25/11/20.

2. Site Description

2.1 The site was inspected on the 2nd October, 2020.

2.2 This residential property is on the low side of the road and has a W aspect. From the upper boundary the natural slope falls at an average angle of ~35° to the uphill side of the house. The natural slope above, beside and below the house has been altered with cut and fills to create level platforms. The cut depths reach a maximum of ~1.8m and the fill height reaches a maximum height ~5.0m. The natural slope below the property falls at an average angle of ~30° that increases to ~45° where the slope falls to the waterfront.

2.3 At the road frontage a steeply graded slope falls to the uphill side of the subject house (Photos 1 & 2). No significant signs of movement were observed in this area. Vehicular access to the property is provided by a shared driveway from the S that cuts across the slope and runs to the existing house and a detached brick garage/studio beside the house (Photos 2 & 3). On the downhill, external supporting wall of the detached garage a vertical crack runs through the supporting concrete footing and brick wall (Photo 4). No deflection was measured in the wall. The structure is currently considered stable and will be demolished as part of the proposed works. Below the detached garage/studio is a sandstone flagging retaining wall that is estimated to be battered back at an angle of ~40° from vertical (Photo 5).

The two storey brick house displays no significant movement in the external supporting walls that could be associated with slope instability (Photo 6). A concrete pool is located below the N side of the house. The pool shell displays no visible signs of movement. The area below the house and beside the pool has been filled for a level lawn area. From visual observations on site the fill reaches a maximum height of ~5.0m on the S side and reduces to ~1.4m on the N end. The S side of the fill is supported by a gabion basket retaining wall (Photos 7 & 8). Where the wall lines the S common

boundary the baskets are slightly bulging. To ensure the ongoing stability of the wall into the future the recommendation in **Section 16** are to be followed. The remaining areas of the wall show no obvious bulging. The N side of the fill is supported by a concrete crib retaining wall that is obscured by thick vegetation (Photo 9). From what could be seen of the wall it appears stable.

2.4 The area below the property has been partly terraced with treated pine retaining walls that appear well constructed. Below the walls the slope falls steeply to the waterfront. Bands of medium strength sandstone outcrop in this area (Photo 10). The exposed sandstone is fractured and is relatively thinly bedded. The exposed rock does not display any significant undercutting or geological defects that could lead to a significant failure that could impact the retaining walls or house above.

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

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 location 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. But due to the possibility that the actual ground conditions vary from our interpretation there should be allowances in the excavation and foundation budget to account for this. We refer to the appended “Important Information about Your Report” to further clarify. The results are as follows:

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** (~RL21.2)	**DCP 2** (~RL21.2)	**DCP 3** (~RL21.2)	**DCP 4** (~RL21.3)	**DCP 5** (~RL21.8)	**DCP 6** (~RL18.0)
0.0 to 0.3	12	23	20	20	18	4
0.3 to 0.6	23	36	21	34	10	5
0.6 to 0.9	38	40	25	46	#	5
0.9 to 1.2	#	#	#	#		#
	Refusal @ 0.8m	Refusal @ 0.9m	Refusal @ 0.8m	Refusal @ 0.8m	Refusal @ 0.4m	Refusal @ 0.7m

#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 @ 0.8m, DCP bouncing off rock surface, orange clay on dry tip.
DCP2 – Refusal on rock @ 0.9m, DCP bouncing off rock surface, orange clay on dry tip.
DCP3 – Refusal on rock @ 0.8m, DCP bouncing off rock surface, clean dry tip.
DCP4 – Refusal on rock @ 0.8m, DCP bouncing off rock surface, orange shale fragments on dry tip.
DCP5 – Refusal on rock @ 0.4m, DCP bouncing off rock surface, light brown clay or rock fragments on dry tip.
DCP6 – Refusal on rock @ 0.7m, DCP bouncing off rock surface, orange clay on wet 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 a thin sandy topsoil over sandy clays. The clays merge into the weathered zone of the under lying rocks at depths of between 0.8m to 0.9m below the current surface. The weathered zone of the underlying rock is interpreted as Extremely Low to Low Strength Rock. It is to be noted that this material is a soft rock and can appear as a mottled stiff clay when it is cut up by excavation equipment. See Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

Normal ground water seepage is expected to move over the buried surface of the clay and rock and through the cracks in the rock.

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

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.

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 proposed excavations are a potential hazard until retaining structures are in place (**Hazard Two**). The additional surcharge loads from the proposed detached garage/studio extension is a potential hazard to the existing sandstone flagging retaining wall below (Photo 5) (**Hazard Three**). The portion of the gabion basket retaining wall that lines the S boundary is a potential hazard (**Hazard Four**).

RISK ANALYSIS SUMMARY ON NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The steeply graded slope falls across the property and continues above and below failing and impacting on the existing property.	The proposed excavations for the driveway extension, attached garage extension, new entertainment area and detached garage/studio collapsing onto the worksite before retaining walls are in place.
LIKELIHOOD	'Unlikely' (10^{-4})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (35%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum	8.3×10^{-6}/annum
COMMENTS	This level of risk to life and property is 'ACCEPTABLE'.	This level of risk to life and property is 'UNACCEPTABLE'. To move the 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)

RISK ANALYSIS SUMMARY CONTINUES ON NEXT PAGE

HAZARDS	Hazard Three	Hazard Four
TYPE	The additional surcharge loads from the proposed detached garage/studio transferring onto the existing sandstone flagging retaining wall that leads to failure (Photo 5).	Further movement of the gabion basket retaining wall that lines the S common boundary and leads to failure (Photo 8).
LIKELIHOOD	'Possible' (10^{-3})	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (35%)	'Medium' (30%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})	'Low' (2×10^{-5})
RISK TO LIFE	5.6×10^{-6}/annum	5.6×10^{-6}/annum
COMMENTS	This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels the recommendations in **Section 15** are to be followed.	This level of risk to life and property is 'ACCEPTABLE' provided the recommendations in **Section 16** are followed.

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.

All stormwater from the proposed development is to be piped to Pittwater through any tanks that may be required by the regulating authorities.

11. Excavations

An excavation to a maximum depth of ~3.1m is required to construct the proposed driveway extension, garage extension and new entertainment area and another excavation to a

maximum depth of ~1.6m is required to extend the existing detached garage/studio. The excavations are interpreted to be through topsoil and clay with Extremely Low to Low Strength Rock expected from depths of between ~0.4m to ~0.9m below the current surface.

Excavations through soil, clay and Rock up to Low Strength can be carried out with an excavator and bucket. If Medium Strength Rock is encountered it will require grinding or rock sawing and breaking.

12. Vibrations

It is expected the proposed excavations will be carried out with an excavator and bucket and the vibrations produced will be below the threshold limit for building or infrastructure damage.

If Medium Strength Rock or better is encountered, excavations through this material should be carried out to minimise the potential to cause vibration damage to the subject house, subject detached garage wall and neighbouring structures to the N and S. 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 10mm/sec at the subject garage walls, subject detached garage wall, N property boundary and S property boundary. Vibration monitoring will be required to verify this is achieved.

If a milling head is used to grind the rock, vibration monitoring will not be required. Alternatively, if rock sawing is carried out around the perimeter of the excavation boundaries in not less than 1.0m lifts, a rock hammer up to 300kg could be used to break the rock without vibration monitoring. Peak particle velocity will be less than 10mm/sec at the subject house, subject detached garage wall and property boundaries using this method provided the saw cuts are kept well below the rock to broken.

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

13. Excavation Support Requirements

On steep sites such as this one, to help maintain excavation stability before retaining walls are in place, it is critical upslope runoff be diverted from the proposed excavations with temporary or permanent drainage measures. Temporary measures may be trenches and sandbag mounds and permanent measures could be a wide diameter dish drain or similar. These are to be installed before any excavation work commences.

Excavation for Garage Extension, driveway & New Entertainment Area

An excavation to a maximum depth of ~3.1m is required to construct the proposed attached garage extension, driveway extension and new entertainment area. The excavation is set back sufficiently from the property boundaries. The excavation comes flush with a low brick retaining wall and is set back ~1.0m from a low rough stack rock retaining on the uphill side of the excavation. The walls are to be demolished from the top down prior to the excavation commencing. The backfill behind the walls is to be lowered simultaneously with the batter not exceeding 1.0 Vertical to 1.7 Horizontal (30°) as the walls are lowered.

The trees immediately above the proposed cut are to be assessed by an arborist and removed if their stability will be detrimentally impacted by the excavation.

The top 1.0m of this excavation through soil and clay is to be battered at 1.0 Vertical to 1.0 Horizontal (45°).

Excavation for detached garage/studio

Another excavation to a maximum depth of ~1.6m is required to extend the detached garage/studio. The excavation is set back sufficiently from the surrounding structures and boundaries. The soil portion of the excavation is to be battered temporarily at 1.0 Vertical to 2.0 Horizontal (26°) until the retaining walls are in place.

Advice applying to both Excavations

Provided to the recommendations above are followed the cut batters through clay and Extremely Low Strength Rock or better are expected to stand at near vertical angles for a short period of time until the retaining walls are in place, provided the cut batters are kept from becoming saturated.

As pointed out above upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. 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. The excavations are to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast. If the retaining walls are not constructed within a few days of the excavation being completed temporary shoring will be required.

Excavations are to be inspected by the Geotechnical Consultant as they are lowered in 1.5m intervals as they are lowered, to ensure the ground materials are as expected and to ensure temporary support is not required.

All excavation spoil is to be removed from site or be supported by engineered retaining walls.

14. Retaining Structures

For cantilever or singly propped retaining structures it is suggested the design be based on a triangular distribution of lateral pressures using the parameters shown in Table 1.

TABLE 1 ON 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
Soil	20	0.40	0.55
Residual Clays	20	0.35	0.45
Extremely Low Strength Rock	22	0.25	0.35
Rock up to Low Strength	24	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 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 full hydrostatic pressures are to be accounted for in the retaining structure design.

15. Foundations

The proposed garage (attached to the existing house) extension and pond are expected to be seated in Extremely Low Strength Rock or better. This is a suitable foundation material. The proposed roof for the entertainment area can be supported on piers taken to Extremely Low

Strength Rock or better. A maximum allowable bearing pressure of 600kPa can be assumed for footings supported on Extremely Low Strength Rock or better.

The foundations of the existing garage are currently unknown. Ideally, footings should be founded on the same footing material across the structure. Where the footing material does change across the structure construction joints or similar are to be installed to prevent differential settlement, where the structure cannot tolerate such movement.

The proposed driveway extension is expected to be seated in Extremely Low Strength Rock or better. The existing driveway is expected to be supported on clay on the downhill side. Construction joints are to be installed between the new and old portions of the driveway to separate the different foundation materials and to accommodate minor differential movement.

The proposed detached garage/studio is expected to be seated in Extremely Low Strength Rock or better on the uphill side. On the downhill side the garage/studio is to be supported on piers embedded into Extremely Low Strength Rock or better to maintain a uniform bearing material across the structure. Provided the footings are taken to and embedded into this ground material no surcharge loads from the proposed structure will be transferred onto the existing retaining wall below (Photo 5).

As the bearing capacity of weathered rock reduces when they are 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 weathered rock 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 professional 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. Ongoing Site Maintenance

The S side of the gabion basket retaining wall is slightly bulging (Photo 8). This structure is currently considered stable but to ensure the ongoing stability into the future we recommend they be inspected by the owners on a biennial basis or after heavy prolonged rainfall, whichever occurs first. A photographic record of the inspections is to be kept. We can carry out these inspections upon request. Should further movement be observed the Geotechnical Consultant is to be engaged to assess the structure and provide remedial advice should it be required.

17. 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 if the following inspections have not been carried out during the construction process.

- During the excavation process, the geotechnical consultant is to inspect the cut face in 1.5m intervals as it is lowered to ensure ground materials are as expected and that additional support is not required.

- All footings are to be inspected and approved by the geotechnical professional 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

Photo 2

Photo 3

Photo 4

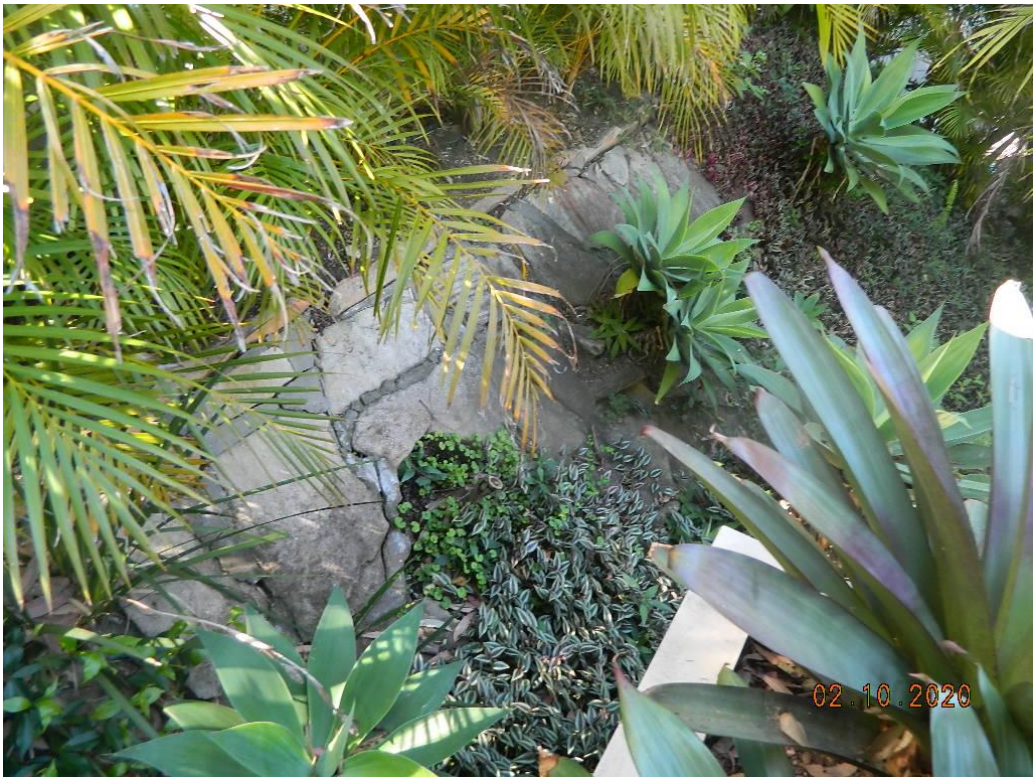


Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

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

LEGEND

BENCH MARK	▲
POWER POLE	● PP
GAS METER	⋈ GM
WATER TAP	⌘ TAP
ELECTRICITY (OVERHEAD)	—— P ——
GAS CONDUIT	——G(D)——
ELECTRICITY CONDUIT	——E(D)——
WATER CONDUIT	——W(D)——
UNKNOWN SERVICE CONDUIT	——(XD)——

NOTES

1. THE BOUNDARIES HAVE NOT BEEN MARKED
2. ALL AREAS AND DIMENSIONS HAVE BEEN COMPILED FROM PLANS MADE AVAILABLE BY THE OFFICE of LAND & PROPERTY INFORMATION (NSW) AND ARE SUBJECT TO FINAL SURVEY
3. ORIGIN OF LEVELS ON A.H.D. IS TAKEN FROM SSM 38157 R.L. 31.270 (A.H.D.) IN HUDSON PARADE
4. CONTOUR INTERVAL 0.5 m
5. CONTOURS ARE INDICATIVE ONLY. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION
6. FLOOR LEVELS SHOWN ARE THRESHOLD LEVELS. NO INVESTIGATION OF INTERNAL FLOOR LEVELS HAS BEEN UNDERTAKEN
7. NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE
8. 8/.4/7 DENOTES TREE SPREAD OF 8m, TRUNK DIAMETER OF 0.4m & APPROX HEIGHT OF 7m
9. BEARINGS SHOWN ARE MGA (MAP GRID OF AUSTRALIA) ADD APPROX. 1°00' FOR TRUE NORTH

DIAL BEFORE YOU DIG www.1100.com.au

REFER TO NOTES AND LEGEND

SCALE 1:100 @ A1

Revision	Date	Description	Reference
D	00/00/00	-	00
C	00/00/00	-	00
B	00/00/00	-	00
A	24/09/18	EXTRA DETAIL & LEVELS ADDED. ELEVATION ADDED.	42235.003

THIS IS THE PLAN REFERRED TO IN MY LETTER DATED:

Registered Surveyor NSW

LTS LOCKLEY
Registered Surveyors NSW
www.ltsl.com.au
Suite 1, Level 1
810 Pacific Highway
Gordon NSW 2072
Locked Bag 5
Gordon NSW 2072
P 1300 587 000
F 02 9499 7760

Client TONY WALLS

Drawing title
PLAN OF DETAIL AND LEVELS OVER PART LOT 1 IN DP 827733 AND PART LOT 32 IN DP 233469 KNOWN AS 316 & 314 HUDSON PARADE, CLAREVILLE

datum	AHD
site Area	1902m²
LGA	NORTHERN BEACHES
reference number	43725DT
scale	1:100 @A1
date of survey	09/09/16
SHEET	1 OF 2

SITE PLAN – showing test locations

DCP5
DCP4
DCP1
DCP2
DCP3
DCP6
NEW RETAINING WALL
POND 28m2
SIDE PASSAGE
EXTENT OF EXISTING DRIVEWAY
EXISTING
EXISTING - C.O.S
Roof Above
GARAGE EXTENSION
ENLARGED ROLLER DOOR
PROPOSED EXTENSION
EXISTING PAVED DRIVEWAY
GARAGE
+ RL 20.65
SLIDE ENTRY ENCLOSURE
SLIDE ENTRY XRL 22.01 +
EXISTING WATER SLIDE
LOUNGE AREA
Approx 80m2 Covered
Approx 30m2 Uncovered
ROOFLINE ABOVE
PIZZA OVEN
BBQ AREA
GARAGE
WC 3 m²
LIFT
PANTRY / FRIDGE 3 m²
LAUNDRY 8 m²
POND
MAIN ENTRY 15 m²
ENSUITE 9 m²
BEDROOM 2 16 m²
ENSUITE 7 m²
BEDROOM 1 19 m²
STAIRS 32 m²
KITCHEN 30 m²
Waste Bin
Recycling
DINING / LIVING 77 m²
TV
SL 19490
EX_SL 19350
ffl 19495
MAIN BALCONY 42 m²
NEW SLIDING DOORS
NEW SLIDING DOORS
EXISTING GARDEN
EXISTING SWIMMING POOL - NO WORKS
EXISTING COPPER ROOF
EXISTING COPPER ROOF
DOOR
WINDOW
6685 door
5400 WINDOW
3840 DOOR 4265

General Notes:

*Any discrepancies to be brought to Architects attention
*Use figure dimensions in preference to scaling
*Only scale under direction from architect
*Builder to examine site and verify conditions and dimensions
*This drawing remains the property of the Architect
*Client is granted conditional license to use the drawings
*Transfer of the Licence is prohibited
*Architect reserves the right to terminate the license
*Electronic data transfer should be scanned for viruses before use
*Any loss or damage (including consequential damage) caused to the recipient of electronic data, by its direct or indirect use, is not the liability of the Architect
*Refer to hard copies for accuracy of electronic data
*Copyright reserved by the Architect

Issue	Date	Amendment
1	25/11/20	DEVELOPMENT APPLICATION

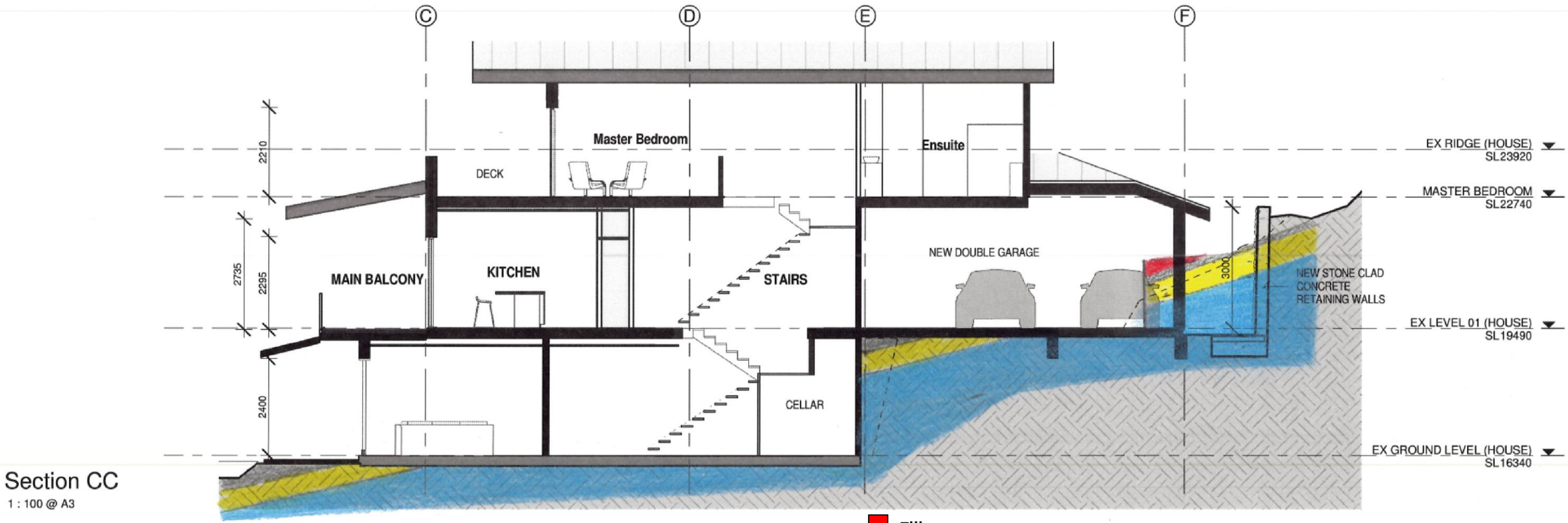
North Point

BAXTER & JACOBSON
ARCHITECTS
SYDNEY MANLY, NSW AUSTRALIA
BYRON BAY NSW AUSTRALIA
Nominated Architects
D Jacobson #4259 & M Baxter #4831
PHONE +612 9977 7648
EMAIL mark@bja.net.au
WEB www.bja.net.au

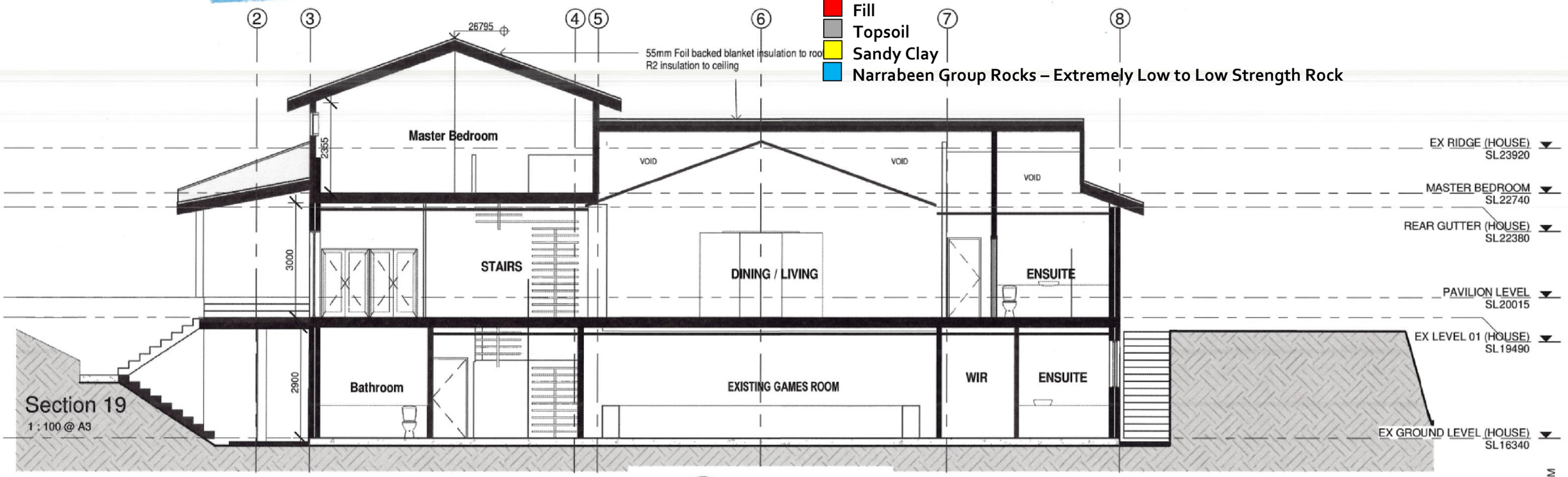
Project	316 Hudson Parade
Client	TONY WALLS
Address	316 Hudson Parade Lot 1 DP827733
Design Stage	DEVELOPMENT APPLICATION
Title	PROPOSED FLOOR PLAN - LEVEL 1
Job No	346-02
Drawn	GV
Checked	MFB
Scale	1 : 100
Drawing no.	DA 10.03
Issue	1

25/11/2020 5:36:21 PM

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Section CC
1 : 100 @ A3



Section 19
1 : 100 @ A3

- Fill
- Topsoil
- Sandy Clay
- Narrabeen Group Rocks – Extremely Low to Low Strength Rock

General Notes:

*Any discrepancies to be brought to Architects attention
*Use figure dimensions in preference to scaling
*Only scale under direction from architect
*Builder to examine site and verify conditions and dimensions
*This drawing remains the property of the Architect
*Client is granted conditional license to use the drawings
*Transfer of the Licence is prohibited
*Architect reserves the right to terminate the licence
*Electronic data transfer should be scanned for viruses before use
*Any loss or damage (including consequential damage) caused by the reliance of electronic data, for its direct or indirect use, is not the liability of the Architect
*Refer to hard copies for accuracy of electronic data
*Copyright reserved by the Architect

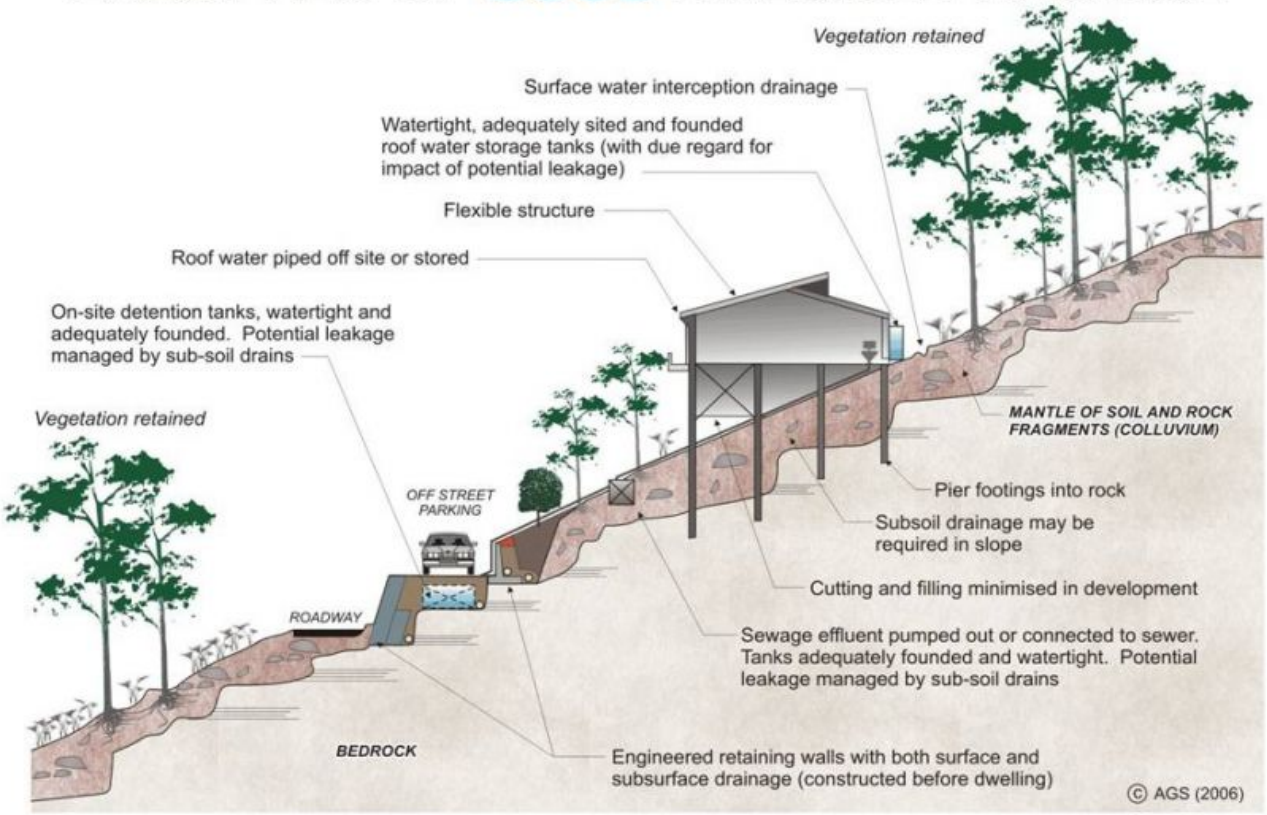
Issue	Date	Amendment
1	25/11/20	DEVELOPMENT APPLICATION

BAXTER & JACOBSON ARCHITECTS
SYDNEY MANLY, NSW AUSTRALIA
BYRON BAY NSW AUSTRALIA
Nominated Architects
D Jacobson #4259 & M Baxter #4831
PHONE +612 9977 7648
EMAIL mark@bja.net.au
WEB www.bja.net.au

Project	316 Hudson Parade
Client	TONY WALLS
Address	316 Hudson Parade Lot 1 DP827733
Design Stage	DEVELOPMENT APPLICATION
Title	HOUSE - SECTION
Job No	346-02
Drawn	GV
Checked	MFB
Scale	1 : 100
Drawing no.	DA 30.03
Issue	1

25/11/2020 5:37:48 PM

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE