

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

Development Application for PAUL NORMAN

Name of Applicant

Address of site 60 Palm Beach Road, Palm 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 2/9/19 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 60 Palm Beach Road, Palm Beach

Report Date: 2/9/19

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**

<b>Development Application for</b> _____	Name of Applicant
<b>Address of site</b> _____	<b>60 Palm Beach Road, Palm Beach</b>

*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 <b>60 Palm Beach Road, Palm Beach</b>
Report Date: <b>2/9/19</b>
Author: <b>BEN WHITE</b>
<b>Author's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD</b>

**Please mark appropriate box**

- Comprehensive site mapping conducted 30/8/19  
(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 30/8/19
- 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:**

New pool at **60 Palm Beach Road, Palm Beach**

### **1. Proposed Development**

- 1.1** Construct a new pool on the downhill side of the existing house.
- 1.2** Details of the proposed development are also shown on 4 drawings. The drawings are prepared by Right Angle Design and Drafting, job number RADD19035, drawings numbered P1-P4 and dated 19/6/2019.

### **2. Site Description**

- 2.1** The site was inspected on the 30<sup>th</sup> August, 2019.
- 2.2** This residential property has a SW aspect. It is located on the gently graded upper middle reaches of a hillslope. The slope rises across the site at an average angle of ~23°. The slope above the property continues at steep angles before easing as it approaches the crest of the hill. The grade below the property continues at steep angles.
- 2.3** A shared concrete right of way carriageway (ROW) extends from Palm Beach Rd to the high side of the existing house. This ROW has been cut into the slope with the cut supported by stable concrete wall that show no signs of distress and appear stable (Photo 1). A partially suspended driveway and garage extend downhill of the ROW to the house (Photo 2). Outcropping sandstone is visible to the N of the driveway and above the house (Photo 3). The two storey part rendered brick part timber clad house is supported on concrete piers and brick walls that appear stable (Photo 4). A stair case to the N of the house grants access to a terraced lawn below. Stable 1.0m high timber retaining walls have been used to level the slope (Photo 5). A pool is proposed on the downhill side of the existing house. Immediately below the footprint of the proposed pool is a sandstone rock face (Photo 6). The rock making up the face

is at least Medium Strength and contains no geological defects that could impact on its stability.

### 3. Geology

The Sydney 1:100 000 Geological sheet indicates the contact of the Hawkesbury Sandstone and the Newport Formation of the Narrabeen Group underlies the property. The map can be considered approximate and the test results and outcropping rock suggest the site is underlain by Hawkesbury Sandstone. It is described as a medium to coarse grained quartz sandstone with very minor shale and laminite lenses.

### 4. Subsurface Investigation

One auger hole was put down to identify the soil materials. Two DCP (Dynamic Cone Penetrometer) tests were carried out to determine the relative density of the overlying soil and the depth to bedrock. The locations of the tests are shown on the site plan. 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 (~RL30.0) – AH1 (Photo 7)

Depth (m)	Material Encountered
0.0 to 0.2	<b>TOPSOIL</b> , Sandy soil, dark brown, medium grained with fine trace organic matter.
0.3 to 0.5	<b>SAND</b> , maroon, medium grained with weathered rock fragments.

End of hole @ 0.5m grinding on rock. No watertable encountered.

### DCP TEST RESULTS ON THE NEXT 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 (RL30.0)	DCP 2 (RL30.5)
0.0 to 0.3	19	10
0.3 to 0.6	15	8
0.6 to 0.9	14	#
0.9 to 1.2	#	
	Refusal on Rock @ 0.8m	Refusal on Rock @ 0.4m

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

#### **DCP Notes:**

DCP3 – Refusal on rock @ 0.8m, DCP bouncing off rock surface, white dust on dry tip.

DCP4 – Refusal on rock @ 0.4m, DCP bouncing off rock surface, white to maroon dust on dry tip.

## **5. Geological Observations/Interpretation**

The surface features of the block are controlled by the outcropping and underlying sandstone bedrock that steps up the property forming sub-horizontal benches between the steps. Where the grade is steeper, the steps are larger, and the benches narrower. Where the slope eases, the opposite is true. The rock is overlain by manmade fill over natural sandy soils and firm to stiff sandy clays that fill the bench-step formation. In the test locations, the depth to Medium Strength Sandstone ranged between 0.4 to 0.8m below the current surface, being deeper where filling is present and due to the stepped nature of the underlying rock. 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 excavations.

## 7. Surface Water

No evidence of significant surface flows were observed on the property during the inspection.

## 8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above or beside the property. The steeply graded slope that falls across the property and continues below is a potential hazard (**Hazard One**).

### Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The steep slope that falls across the site and continues below failing and impacting on the proposed works.
LIKELIHOOD	'Unlikely' ( $10^{-4}$ )
CONSEQUENCES TO PROPERTY	'Medium' (12%)
RISK TO PROPERTY	'Low' ( $2 \times 10^{-6}$ )
RISK TO LIFE	$5.5 \times 10^{-8}$ /annum
COMMENTS	This level of risk is 'ACCEPTABLE'.

(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 stormwater will be produced by the proposed works.

## 11. Excavations

Apart from those for footings, no excavations are required.

## 12. Foundations

Piers supported off Medium Strength Sandstone are suitable footings for the proposed pool. Where footings are over a sloping rock surface, they are to be supported off level pads cut into the rock. This material is expected at shallow depths reaching a maximum of ~0.8m below the current ground level. A maximum allowable bearing pressure of 1000kPa can be assumed for footings on Medium Strength Sandstone.

Naturally occurring vertical cracks (known as joints) commonly occur in sandstone. These are generally filled with soil and are the natural seepage paths through the rock. They can extend to depths of several metres and are usually relatively narrow but can range between 0.1 to 0.8m wide. If a footing falls over a joint in the rock, the construction process is simplified if with the approval of the structural engineer the joint can be spanned or alternatively the footing can be repositioned so it does not fall over the joint.

**NOTE:** If the contractor is unsure of the footing material required, it is more cost-effective to get the geotechnical consultant on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over excavation in clay like shaly rock but can be valuable in all types of geology.

## 13. Inspections

The client and builder are to familiarise themselves with the following required inspections as well as council geotechnical policy. We cannot provide geotechnical certification for the owner or the regulating authorities if the following inspections have not been carried out during the construction process.

- 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



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7 – AH1

## 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**

**WARNING**  
 THE DIGITAL PDF VERSION CONSTITUTES THE ORIGINAL DOCUMENT.  
 THIS PLAN IS NOT AN IDENTIFICATION SURVEY AND SHOULD NOT BE USED AS SUCH.  
 THE BOUNDARIES HAVE NOT BEEN INVESTIGATED OR MARKED.  
 SCALING (DIGITALLY OR OTHERWISE) IS UNACCEPTABLE.



**NOTES:**

- The cadastral overlay shown on this plan should be regarded as approximate position only. If any structure is to be erected upon the land then the boundaries MUST be marked.
- Underground services have not been investigated and, if shown, are in approximate positions only. It is recommended to end users to establish line and depth of buried assets prior to any excavation. A "Dial before you dig" search MUST be made before any construction works can commence.
- Windows, doors, roof profiles and elevated structures are surveyed by remote measurement and position shown is indicative only. All detail including level shown on this plan MUST NOT be used for accurate design purposes unless verified on-site before hand.
- Levels shown are based on Australian Height Datum (origin SSM8189) RL5.6 & PMS2391 RL2.0.
- Survey control is based on the Map Grid of Australia (datum SSM8189) to PMS2391.
- Contours show indicative relief patterns only and are not to be used for level interpolation.
- Contour interval = 0.5m.

**BARENJOEY**

**LOT 100 DP116580**  
 (1457m<sup>2</sup> BY DEED)

**ROAD**

(R) RESTRICTION ON THE USE OF LAND (VIDE DP1115251)

BOSSI ID 3841  
 Surveyor Registered under the Surveying and Spatial Information Act, 2002



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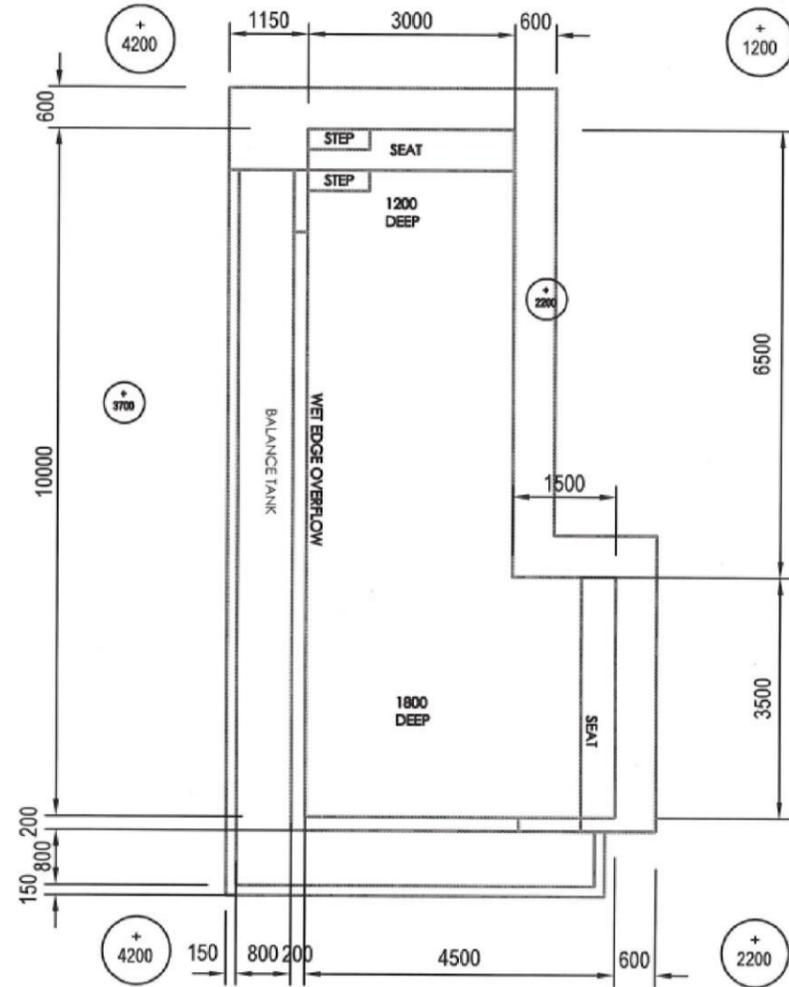
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R.F.	R.F.	ISSUED FOR INFORMATION PURPOSES ONLY	JUNE 2019	A
SURVEY	DRAWN	AMENDMENTS	DATE	No.

CLIENT: **MITA KOVACEVICH**  
 TITLE: **DETAIL & LEVELS SURVEY OF LAND AT 60 PALM BEACH ROAD PALM BEACH NSW 2108**

SCALE	1 : 100
DRAWING No.	1940-1-A
SHEET	1 of 1
<b>A1</b>	

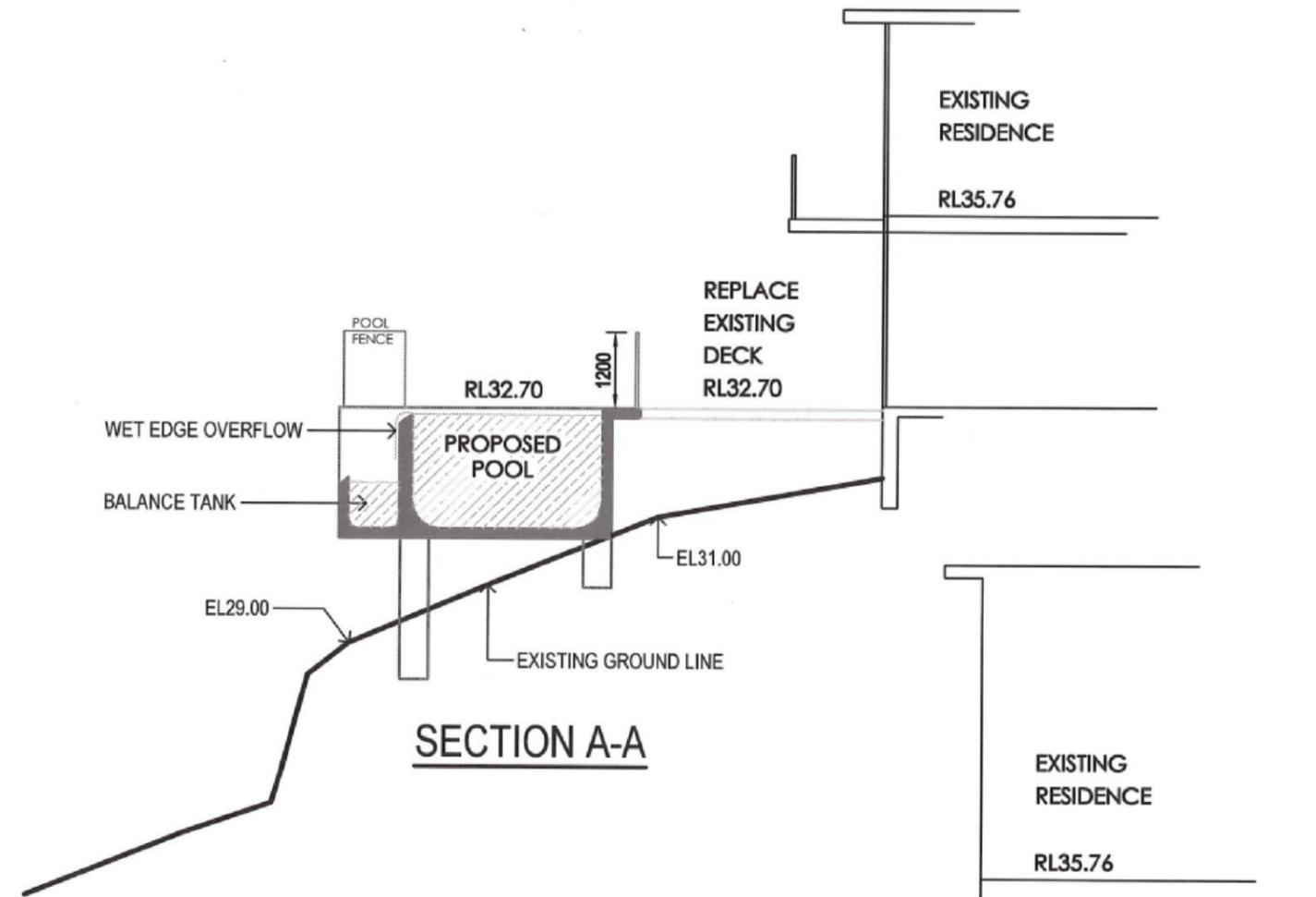
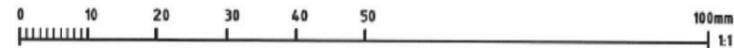
TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



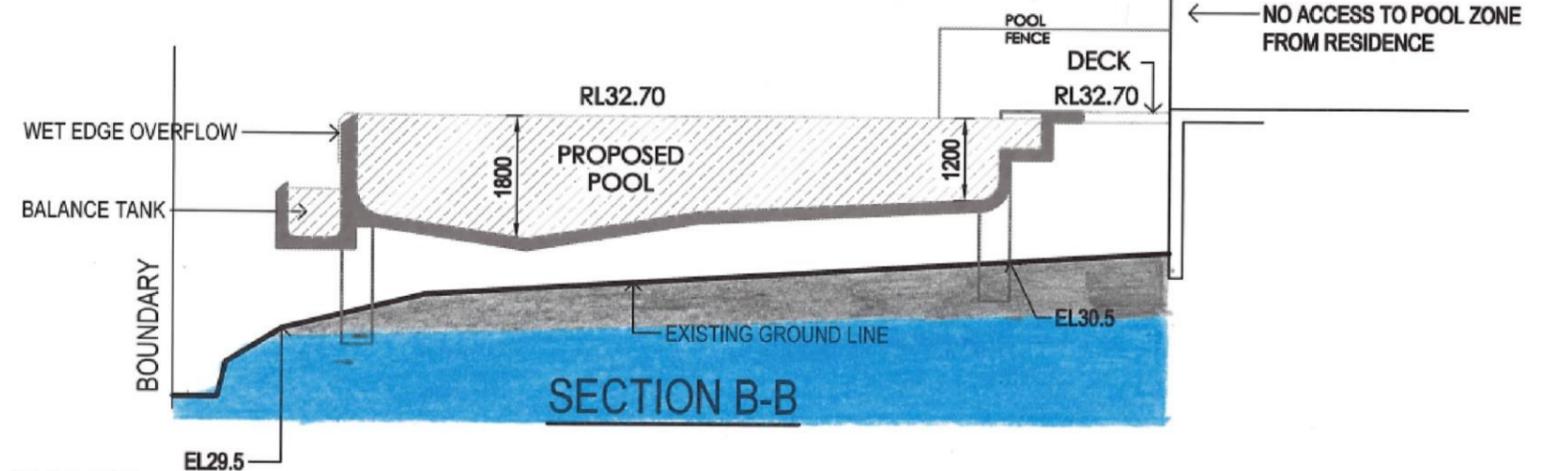
POOL PLAN

+500 DENOTES TOP OF POOL RELATIVE TO NATURAL GROUND LEVEL

- Fill
- Sandy Soil
- Sandy Clay
- Hawkesbury Sandstone – Medium Strength



SECTION A-A



SECTION B-B

PRELIMINARY

REVISIONS:

WE APPROVE THE PLANS IN THEIR CURRENT FORM, TO BE LODGED AT COUNCIL AS A DEVELOPMENT APPLICATION OR CERTIFIER FOR BUILDING APPROVAL.

ANY CHANGES AFTER THIS POINT WILL INCUR A COST.

DATE SIGNATURE

PROPOSED POOL & ASSOCIATED WORKS  
 LESLIE AND LYN MATHESON  
 LOT 100 DP1116580  
 No. 60 PALM BEACH ROAD  
 PALM BEACH 2108

DWG NAME  
 POOL PLAN AND SECTIONS

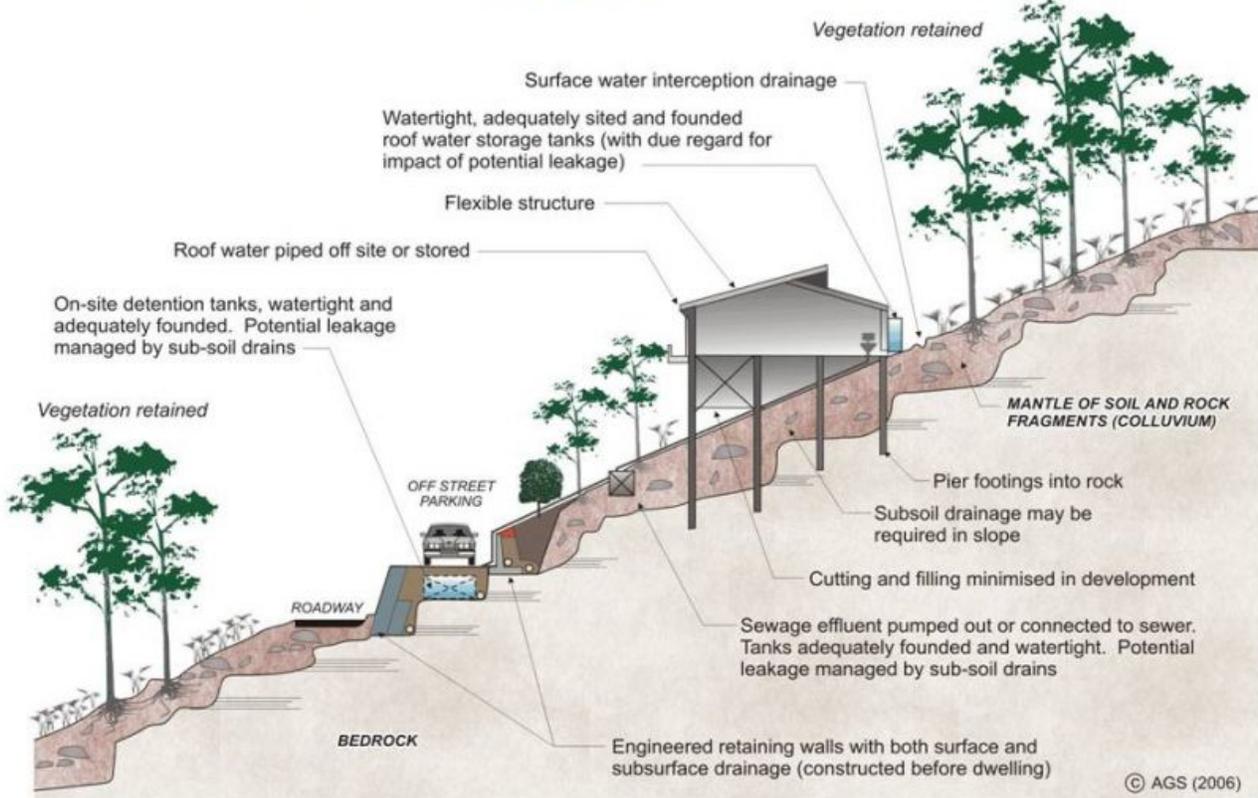
DATE	SCALE AT A3	JOB NUMBER	DWG NUMBER
JUN 19	1:100	RADD19035	P3



RIGHT ANGLE DESIGN & DRAFTING PTY LTD

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# EXAMPLES OF **GOOD** HILLSIDE PRACTICE



# EXAMPLES OF **POOR** HILLSIDE PRACTICE

