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

**Development Application for** _____
Name of Applicant

**Address of site** 14 Cheryl Crescent, 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 30/06/20 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 **14 Cheryl Crescent, Newport**

Report Date: 30/06/20

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** 14 Cheryl Crescent, 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 **14 Cheryl Crescent, Newport**

Report Date: 30/06/20

Author: BEN WHITE

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

**Please mark appropriate box**

☒ Comprehensive site mapping conducted **23/06/20**
(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 **23/06/20**

☒ 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:

Additions and Alterations at **14 Cheryl Crescent, Newport.**

## 1. Proposed Development

**1.1** Extend the existing driveway to form a turning area and replace the timber staircase adjacent to the proposed turning area.

**1.2** Details of the proposed works are shown on 1 drawing prepared by High Design, drawing numbered 3-3 841 19, Issue CC, dated March 2020.

## 2. Site Description

**2.1** The site was inspected on the 23rd of June, 2020.

**2.2** This residential property is located on the low side of Cheryl Crescent. It has an E aspect. It is located on the steeply graded middle reaches of a hillslope. The slope falls across the property at an average angle of ~26°. The slope above and below the property continues at similar steep angles.

**2.3** At the road frontage a concrete driveway runs to the existing carport (Photos 1 & 2). The natural slope on the uphill side of the house has been altered with filling to provide a more level platform for the existing driveway/carport area. The fill beside the driveway is supported by a stable but old ~3.2m high formed concrete retaining wall (Photos 3 & 4). The upper portion of the wall has been recently constructed on the old concrete retaining wall. The fill under the carport is supported by brick and concrete retaining walls (Photo 5). A portion of the lower concrete retaining wall displays horizontal cracking but is considered currently stable (Photo 6). The two storey rendered masonry and timber clad house is supported by masonry walls (Photos 7 & 8). The external walls show no significant signs of movement. Fill has been placed below the deck on the downhill side of the house. The fill is supported by

a ~2.4m high concrete block retaining wall. The wall displays minor stepped cracking through the mortar but is considered stable (Photo 9). Medium Strength Sandstone is outcropping on the downhill side of the house (Photos 7 & 10). No signs of slope instability were observed on the property. The adjoining neighbouring properties were observed to be in good order as seen from the street and subject property.

## 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

Three Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. The DCP test results have been obtained from a previous geotechnical report completed in 2018. 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 may have occurred for DCP1 & DCP2. 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 ON 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** | **DCP 2** | **DCP 3** |
| 0.0 to 0.3 | 3 | 2F | 7F fill |
| 0.3 to 0.6 | 7F | 5 | 3F fill |
| 0.6 to 0.9 | 8F | 5F | 4F fill |
| 0.9 to 1.2 | 13 | 3F | 5 fill |
| 1.2 to 1.5 | 13 | 10 | 11 clay |
| 1.5 to 1.8 | # | 4 | 9 clay |
| 1.8 to 2.1 | | # | 15 clay to W. shale |
| 2.1 to 2.4 | | | 23 W. shale |
| 2.4 to 2.7 | | | 29 W. shale |
| 2.7 to 3.0 | | | # |
| | Refusal @ 1.8m | Refusal @ 1.9m | Refusal @ 2.7m |

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

***DCP Notes:***

DCP1 – Refusal @ 1.8m, DCP bouncing at refusal, orange sandy clay on moist tip.
DCP2 – Refusal @ 1.9m, DCP bouncing at refusal, clean dry tip.
DCP3 – Refusal @ 2.7m, DCP bouncing at refusal, orange impact dust on dry tip.

DCP 3 in the table shows the interpreted material beside the blow count. W. Shale = Extremely Low Strength Shale.

## 5. Geological Observations/Interpretation

Observation of the concrete retaining wall (Photos 3 & 4) from the neighbouring property to the south indicates the natural surface approximates the slope along the base of the wall. We have inspected piering work two houses to the south along the road fill batter. Although it is lower in elevation the natural surface was not far below the surface. The DCP testing correlates with the wall height as viewed from the south and also suggests the natural surface approximates the base of the wall. DCP 1 & 2 indicate the fill is ~1.2m deep. Both these tests hit a hard obstruction at ~1.8m. It is unclear what the hard surface was but given DCP 3 was

higher up slope and hit refusal on rock at 2.7m we do not think it was rock. It may have been tie backs for the formed concrete retaining wall below. DCP 3 shows a typical profile for the area from about 1.5m where the clay merges into the weathered shale and then refuses on a hard band at 2.7m.

## 6. Groundwater

Normal ground water seepage is expected to move over the buried surface of the 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 proposed works.

## 7. Surface Water

No evidence of surface flows were observed on the property during the inspection. Normal sheet wash from the slope above will be intercepted by the street drainage system for Cheryl Crescent above.

## 8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed beside the property. The steep slope that falls across the property and continues above and below is a potential hazard (**Hazard One**). The lateral loads from the proposed turning area acting on the existing retaining wall is a potential hazard (**Hazard Two)**.

**RISK ANALYSIS SUMMARY ON NEXT PAGE**

## Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

| HAZARDS | Hazard One | Hazard Two |
|---|---|---|
| **TYPE** | The steep slope that falls across the property and continues above and below failing and impacting on the property. | Lateral loads from the proposed turning area slab acting on the existing retaining wall causing it to collapse (Photos 3 & 4). |
| **LIKELIHOOD** | 'Unlikely' ($10^{-4}$) | 'Possible' ($10^{-3}$) |
| **CONSEQUENCES TO PROPERTY** | 'Medium' (12%) | 'Medium' (12%) |
| **RISK TO PROPERTY** | 'Low' ($2 \times 10^{-5}$) | 'Moderate' ($2 \times 10^{-4}$) |
| **RISK TO LIFE** | $8.3 \times 10^{-7}$/annum | $5.0 \times 10^{-5}$/annum |
| **COMMENTS** | This level of risk 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)

## 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 development.

## 11. Excavations

Apart from those for footings and possible minor levelling, no excavations are required.

## 13. Foundations

If the proposed turning area is designed as a suspended slab supported off the existing retaining walls no foundations will be required. If the slab is supported by foundations they are to be taken beyond the zone of influence of the existing retaining walls and below the

backfill behind the walls into the Extremely Low Strength Shale. At DCP3 this is expected at a depth of ~2.1m. A maximum allowable bearing pressure of 600kPa can be assumed for piered footings on Extremely Low Strength Shale.

As the bearing capacity of 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 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 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.

## 13. 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.

- 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*


*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 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.

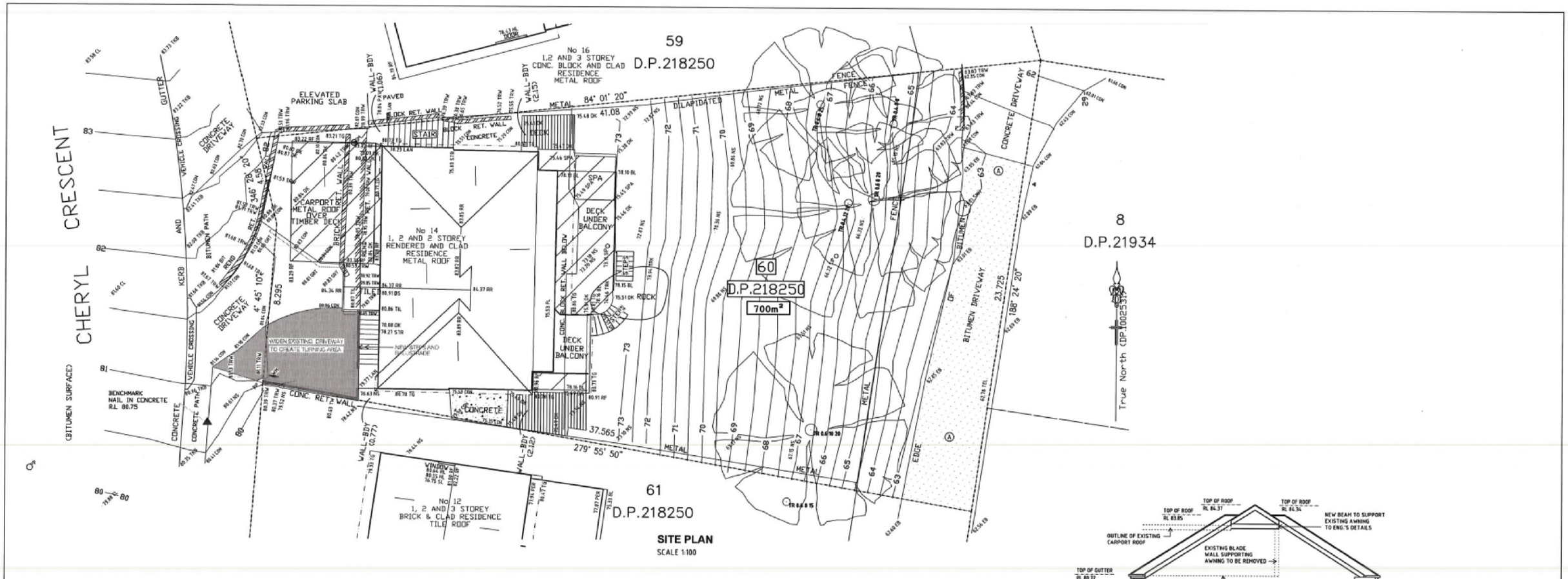
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

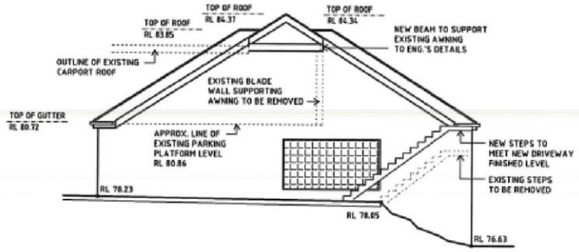
- This report should not be applied to any other project other than that outlined in section 1.0.

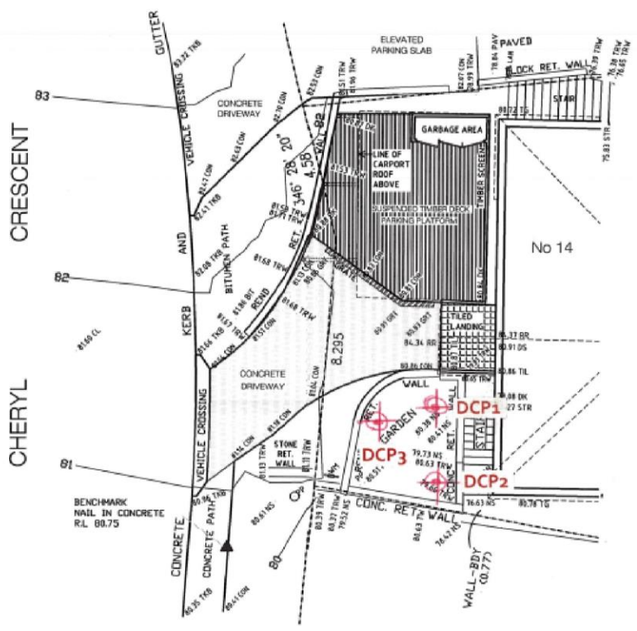
- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.

- 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.

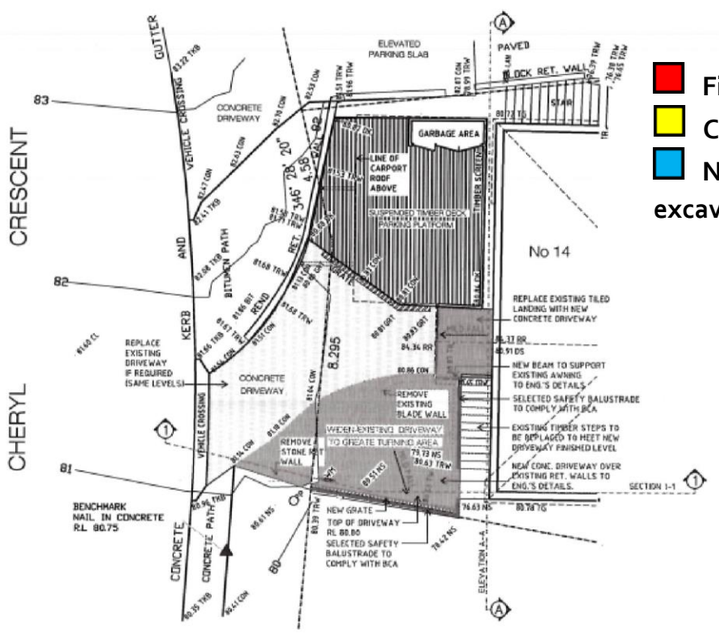
# SITE PLAN – showing test locations



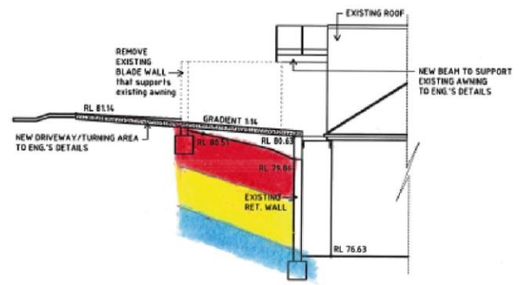




**EXISTING CARPORT / DRIVEWAY LAYOUT**
SCALE 1:100




**PROPOSED DRIVEWAY LAYOUT**
SCALE 1:100

- **Fill**
- **Clay**
- **Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut by excavation equipment can resemble a stiff to hard clay.**




**SECTION 1-1**
SCALE 1:100

1. BUILDER TO CHECK AND CONFIRM ALL NECESSARY DIMENSIONS ON SITE PRIOR TO CONSTRUCTION. DO NOT SCALE THE DRAWING.
2. ALL DIMENSIONS THAT RELATE TO SITE BOUNDARIES, SETBACKS AND EASEMENTS ARE SUBJECT TO VERIFICATION BY A SITE SURVEY.
3. ALL WORK TO BE IN ACCORDANCE WITH BUILDING CODE of AUSTRALIA & TO THE SATISFACTION OF LOCAL COUNCIL REQUIREMENTS.
4. ALL TIMBER CONSTRUCTION TO BE IN ACCORDANCE TO TIMBER FRAMING CODE.
5. ROOF WATER & SUB SOIL DRAINAGE TO BE DISPOSED OF IN THE APPROVED MANNER OR AS A DIRECTED BY LOCAL COUNCIL.
6. ALL ELECTRICAL POWER & LIGHT OUTLETS TO BE DETERMINED BY OWNER.
7. MAKE GOOD AND REPAIR ALL EXISTING FINISHES DAMAGED BY NEW WORK. REUSE EXISTING MATERIAL WHERE POSSIBLE.
8. ALL NEW DOWN PIPES ARE TO BE CONNECTED TO THE EXISTING STORM WATER SYSTEM.
9. COPYRIGHT OF ALL PLANS BELONGS TO 'HIGH DESIGN' - Architectural Design

PROJECT ADDRESS:
14 Cheryl Crescent
Newport

CLIENT:

March, 2020
DRAWN BY: B. V.
CHECKED
DRAWING No. 3-3 841 19
ISSUE cc


HIGH DESIGN
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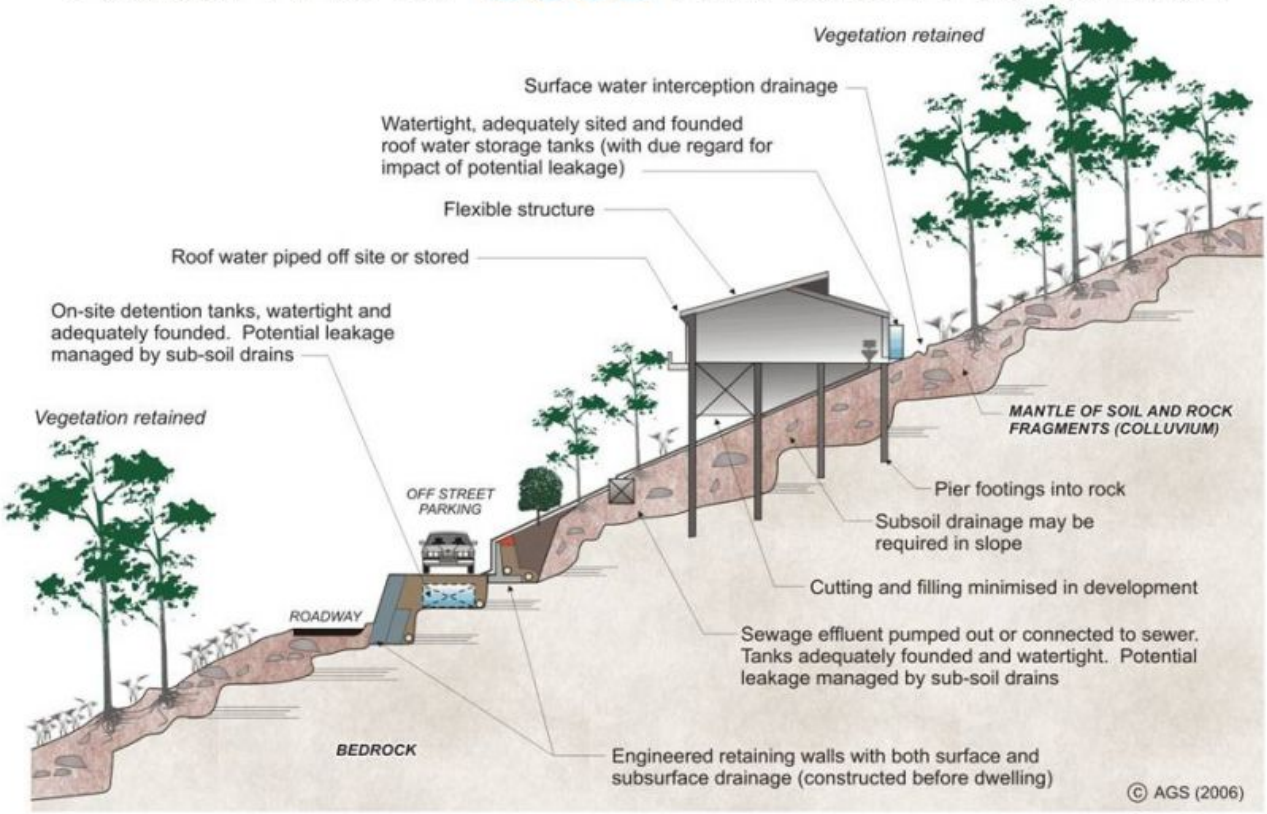
# EXAMPLES OF **GOOD** HILLSIDE PRACTICE




# EXAMPLES OF **POOR** HILLSIDE PRACTICE