## 13 Pacific Road, Palm Beach

Comments on Updates to Plans

We have reviewed the existing geotechnical report, the plans used to carry out the report, and the updated plans for DA shown on 6 drawings prepared by Jamisa Architects, drawings numbered DA01 to DA06, Issue E, dated 11/2021.

The changes include:

- Lowering the entire house ~0.5m. This increases the excavation depth from ~1.3m to ~1.8m.
- Various other minor modifications.

Provided the vibration and excavation support advice in the original report are followed, the proposed changes will not add any additional risk. The changes are considered minor from a geotechnical perspective and do not alter the recommendations or the risk assessment in the original report carried out by this firm numbered J2578 and dated the 10th September, 2020.

White Geotechnical Group Pty Ltd.

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

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

**Development Application for** _____
Name of Applicant

**Address of site** 13 Pacific 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 10/9/20 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 **13 Pacific Road, Palm Beach**

Report Date: 10/9/20

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** 13 Pacific Road, Palm Beach

*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 **13 Pacific Road, Palm Beach**

Report Date: 10/9/20

Author: BEN WHITE

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

**Please mark appropriate box**

☒ Comprehensive site mapping conducted **17/02/20**
(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 **17/02/20**

☒ 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:

New House and driveway at **13 Pacific Road, Palm Beach**

## 1. Proposed Development

**1.1** Demolish the existing house.

**1.2** Construct a new house by excavating to a maximum depth of ~1.3m.

**1.3** Construct a new suspended driveway.

**1.4** Details of the proposed development are shown on 6 drawings prepared by Jamisa Architects Pty Ltd, Job Number 03/2018/07, drawings numbered DA01 to DA06, Issue A, dated September 2020.

## 2. Site Description

**2.1** The site was inspected on the 17th of February, 2020.

**2.2** This residential property is on the low side of the road and has an E aspect. It is located on the steeply graded upper reaches of a hillslope. The natural slope descends across the property at an average angle of ~22°. The slope above the property decreases in grade and the slope below the property increases in grade.

**2.3** Sandstone bedrock outcrops uphill of Pacific Road (Photo 1). At the road frontage a concrete driveway runs to a carport at the SW corner of the house (Photos 2 & 3). A stable ~0.7m high concrete block retaining wall supports the driveway fill. Sandstone bedrock outcrops downhill of the retaining wall (Photo 4). The single storey brick house is supported on brick walls, brick piers and a concrete slab (Photos 5 & 6). The concrete slab is in good condition and the supporting walls and piers stand vertical and show no significant signs of movement (Photos 7 & 8). Sandstone bedrock outcrops underneath and downhill of the house (Photos 9 & 10). A timber balcony at the downhill side of the house is supported by timber posts and

is in good condition (Photo 6). The steep slope below the property is thickly vegetated (Photos 11 & 12). No signs of slope instability were observed on the property.

## 3. Geology

The Sydney 1:100 000 Geological sheet indicates 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

Seven 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:

| **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** (~RL85.4) | **DCP 2** (~RL84.5) | **DCP 3** (~RL84.6) | **DCP 4** (~RL82.9) | **DCP 5** (~RL80.2) | **DCP 6** (~RL78.5) | **DCP 7** (~RL76.1) |
| 0.0 to 0.3 | 3 | # | 2 | # | 2 | # | 5 |
| 0.3 to 0.6 | 5 | | 5 | | 4 | | 4 |
| 0.6 to 0.9 | 16 | | 22 | | 5 | | 3 |
| 0.9 to 1.2 | # | | # | | # | | # |
| | Refusal @ 0.7m | Rock exposed at surface | Refusal @ 0.8m | Rock exposed at surface | Refusal @ 0.7m | Rock exposed at surface | 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 @ 0.7m, DCP bouncing, nothing on clean dry tip.

DCP2 – Rock exposed at surface

DCP3 – Refusal @ 0.8m, DCP bouncing, light brown impact dust on dry tip.
DCP4 – Rock exposed at surface
DCP5 – Refusal @ 0.7m, DCP bouncing, white impact dust on dry tip.
DCP6 – Rock exposed at surface
DCP7 – Refusal @ 0.7m, DCP bouncing, white and brown impact dust on dry tip.

## 5. Geological Observations/Interpretation

The surface features of the block are controlled by the underlying sandstone bedrock that steps down 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 soil and clay that fills the bench step formation. In the test locations, the depth to rock ranged from the surface to a depth of ~0.8m below the current surface. The sandstone underlying the property is estimated to be Medium Strength or better. 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 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. 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 beside the property. The steep slope that falls across the property and continues above and below is a potential hazard (**Hazard One**). The vibrations from the proposed excavation are a potential hazard (**Hazard Two**).

### 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. | The vibrations produced during the proposed excavation impacting on the neighbouring properties. |
| **LIKELIHOOD** | 'Unlikely' ($10^{-4}$) | 'Possible' ($10^{-3}$) |
| **CONSEQUENCES TO PROPERTY** | 'Medium' (12%) | 'Medium' (15%) |
| **RISK TO PROPERTY** | 'Low' ($2 \times 10^{-5}$) | 'Moderate' ($2 \times 10^{-4}$) |
| **RISK TO LIFE** | $8.3 \times 10^{-7}$/annum | $5.3 \times 10^{-7}$/annum |
| **COMMENTS** | This level of risk is 'ACCEPTABLE'. | This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels the recommendations in **Sections 11 & 12** 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

Ideally, it is recommended a drainage easement be obtained from the downhill neighbouring property and all stormwater or drainage runoff from the proposed development be piped to the street below. If this option is not feasible, a spreader/dispersion trench is suitable as a

last resort, provided flows are kept close to natural runoff for the site. All stormwater is to be piped through any tanks that may be required by the regulating authorities.

## 11. Excavations

An excavation to a maximum depth of ~1.3m is required to construct the proposed new house. The excavation is expected to be through shallow soil with the majority of the excavation through Medium Strength Sandstone. It is envisaged that excavations through soil can be carried out with an excavator and bucket and excavations through rock will require grinding or rock sawing and breaking.

## 12. Vibrations

Excavations through Medium Strength Rock or better should be carried out to minimise the potential to cause vibration damage to the neighbouring house to the N. 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 5mm/sec at the N 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 5mm/sec at the N property boundary 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 neighbouring properties.

## 13. Excavation Support Requirements

An excavation to a maximum depth of ~1.3m is required to construct the proposed new house.

The shallow 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. Medium Strength Sandstone or better will stand at vertical angles unsupported subject to approval by the geotechnical consultant.

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. 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 walls are to be organised so on completion of the excavation they can be constructed as soon as possible. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

All excavation spoil is to be removed from site 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 – 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 |
| Medium Strength Sandstone | 24 | 0.00 | 0.01 |

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

Spread footings and piers supported off level Medium Strength Sandstone are suitable footings for the proposed new house and suspended driveway. Medium Strength Sandstone is expected at the surface and up to a depth of ~0.8m below the current ground surface. 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 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. 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*

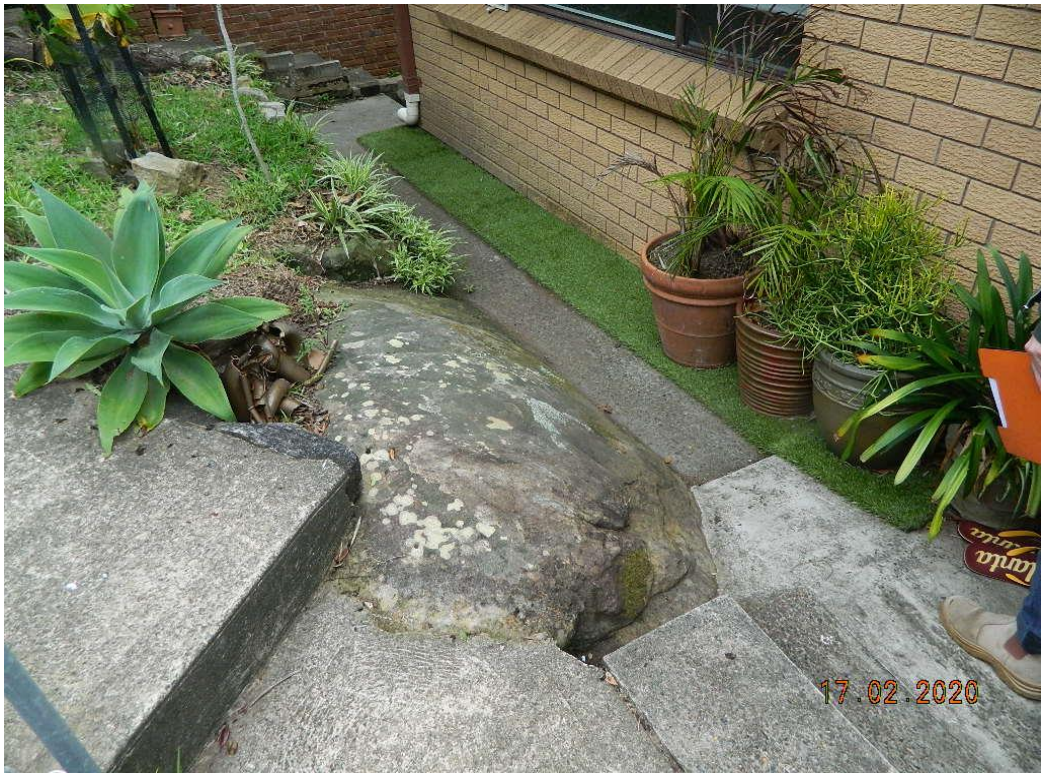



*Photo 5*


*Photo 6*


*Photo 7*


*Photo 8*


*Photo 9*


*Photo 10*


*Photo 11*


*Photo 12*

## 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.

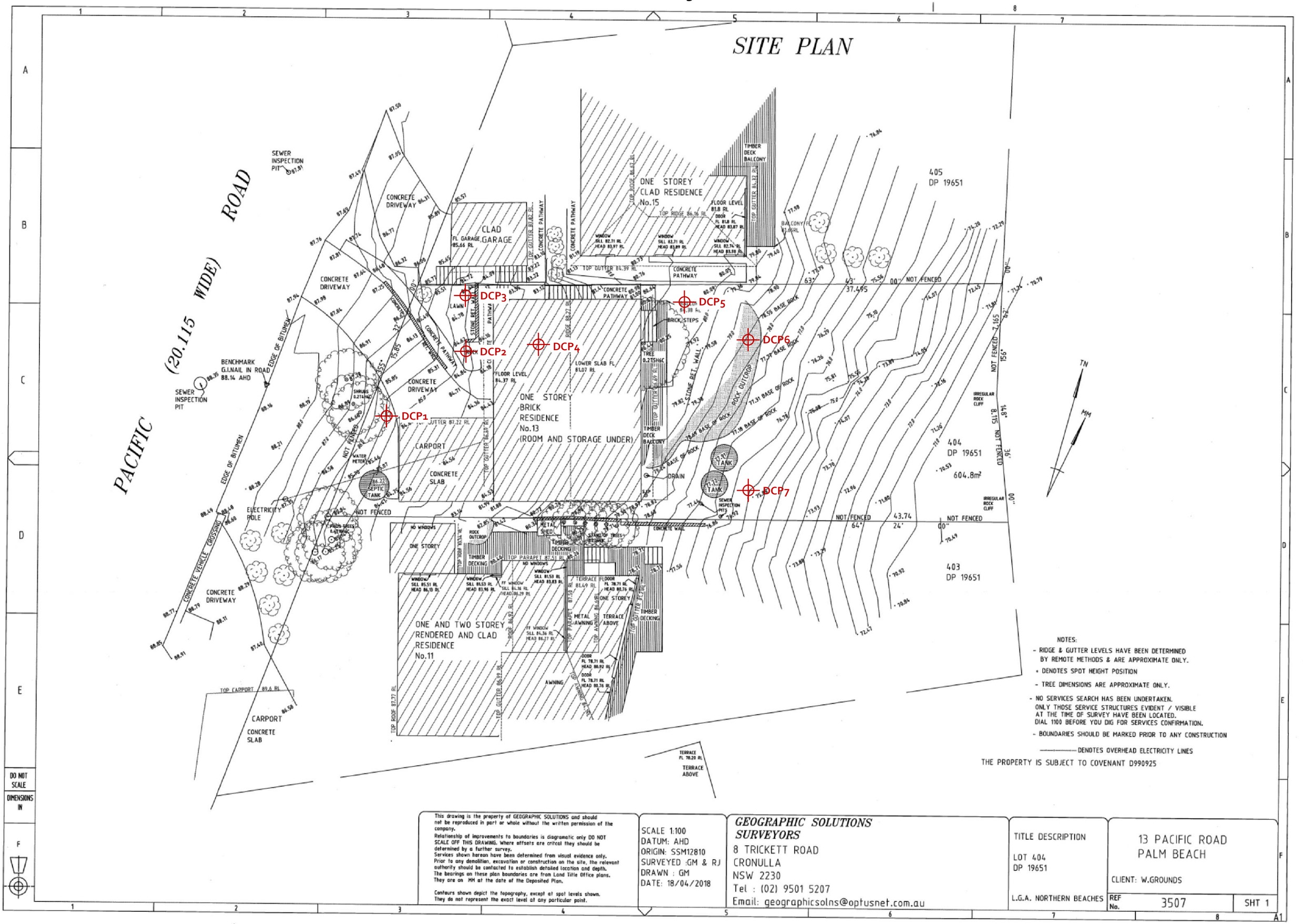
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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**




NOTES:

- RIDGE & GUTTER LEVELS HAVE BEEN DETERMINED BY REMOTE METHODS & ARE APPROXIMATE ONLY.
- + DENOTES SPOT HEIGHT POSITION
- TREE DIMENSIONS ARE APPROXIMATE ONLY.
- NO SERVICES SEARCH HAS BEEN UNDERTAKEN. ONLY THOSE SERVICE STRUCTURES EVIDENT / VISIBLE AT THE TIME OF SURVEY HAVE BEEN LOCATED. DIAL 1100 BEFORE YOU DIG FOR SERVICES CONFIRMATION.
- BOUNDARIES SHOULD BE MARKED PRIOR TO ANY CONSTRUCTION

———— DENOTES OVERHEAD ELECTRICITY LINES

THE PROPERTY IS SUBJECT TO COVENANT D990925



Relationship of improvements to boundaries is diagramatic only DO NOT SCALE OFF THIS DRAWING. Where offsets are critcal they should be determined by a further survey.
Services shown hereon have been determined from visual evidence only. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted to establish detailed location and depth.
The bearings on these plan boundaries are from Land Title Office plans. They are on MM at the date of the Deposited Plan.

Contours shown depict the topography, except at spot levels shown. They do not represent the exact level at any particular point.

SCALE 1:100
DATUM: AHD
ORIGIN: SSM12810
SURVEYED :GM & RJ
DRAWN : GM
DATE: 18/04/2018

*GEOGRAPHIC SOLUTIONS SURVEYORS*
8 TRICKETT ROAD
CRONULLA
NSW 2230
Tel : (02) 9501 5207
Email: geographicsolns@optusnet.com.au

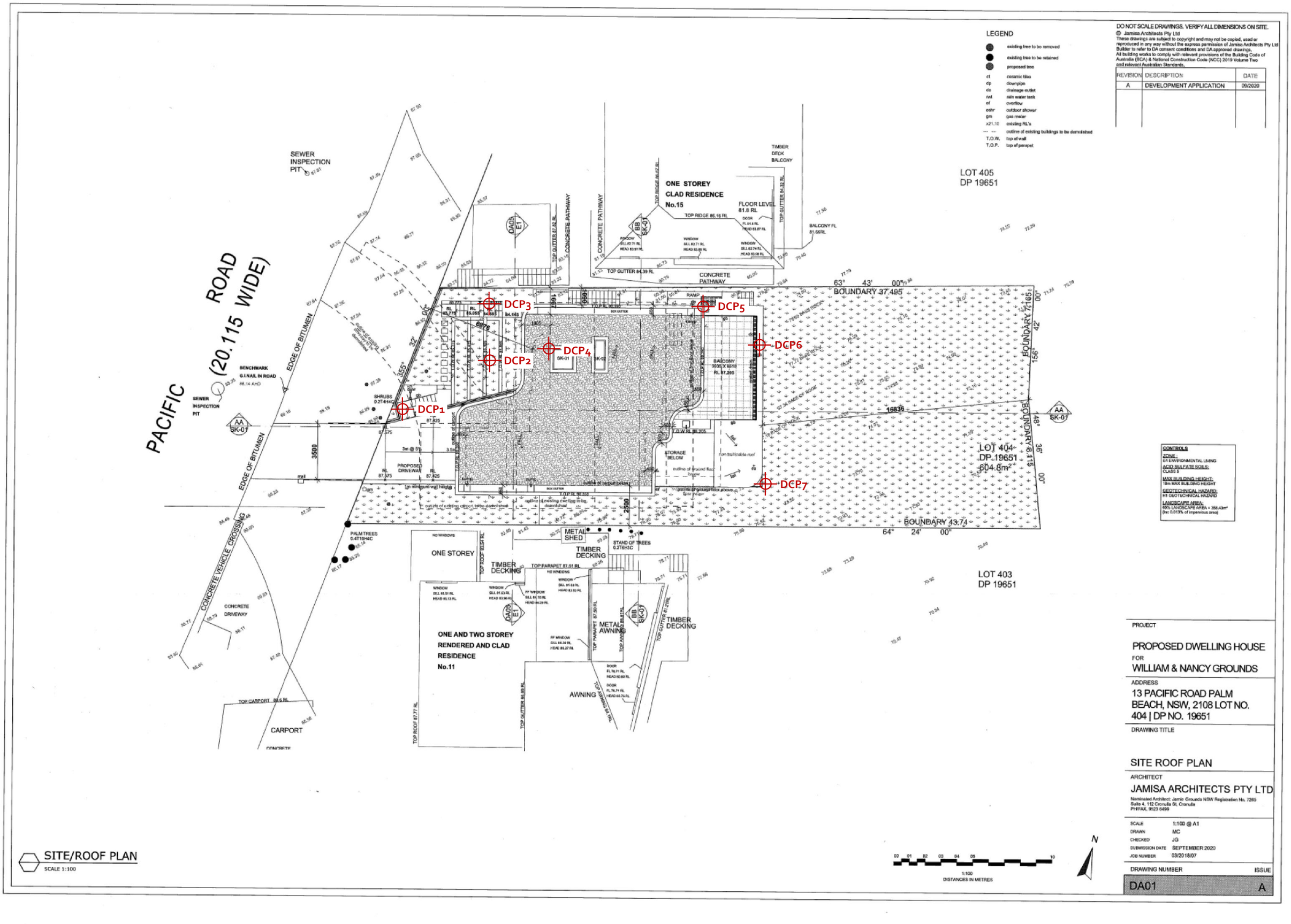
TITLE DESCRIPTION
LOT 404
DP 19651
L.G.A. NORTHERN BEACHES

13 PACIFIC ROAD
PALM BEACH
CLIENT: W.GROUNDS

REF No. 3507
SHT 1

DO NOT SCALE
DIMENSIONS IN

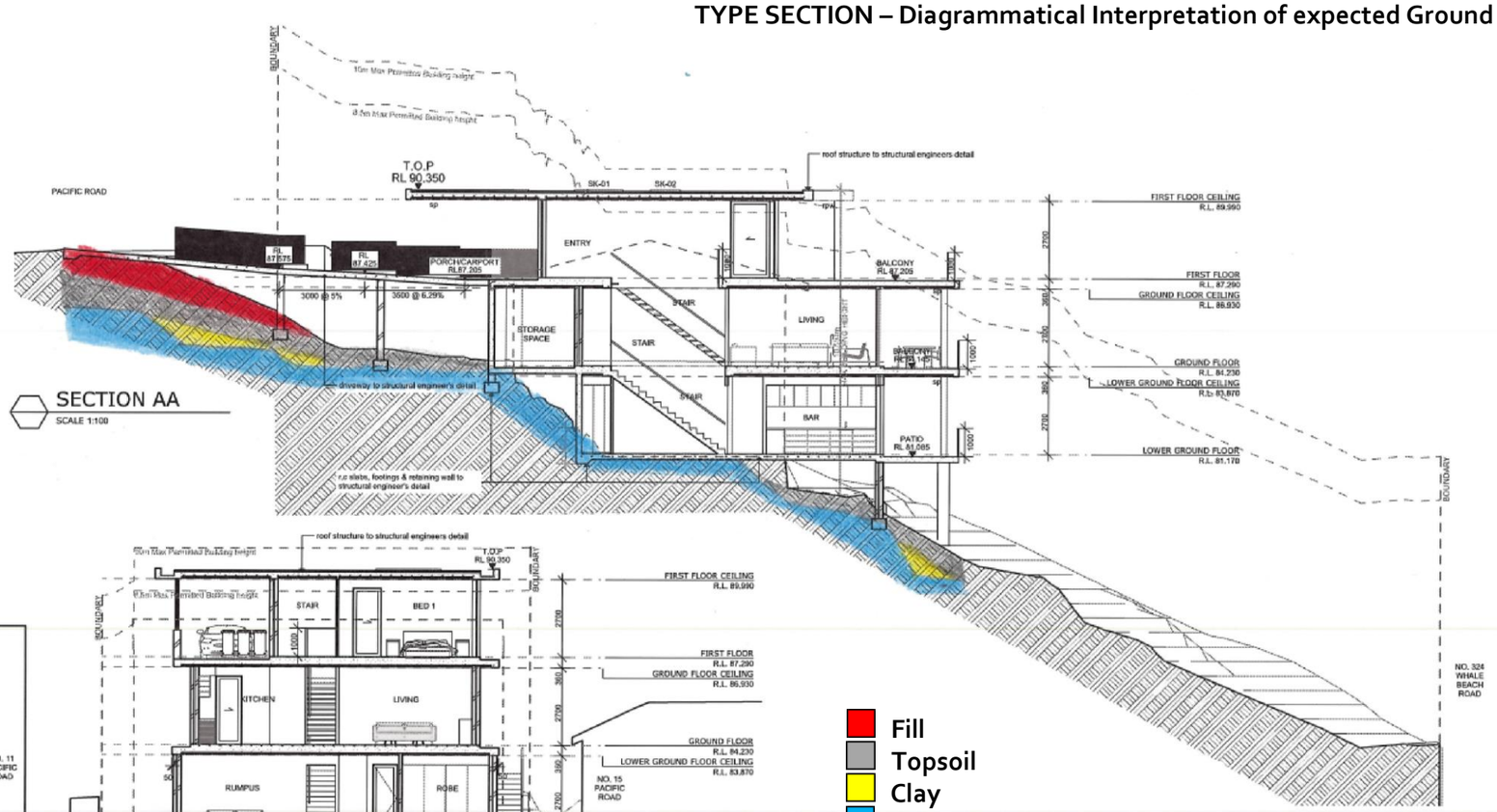
# SITE PLAN – showing test locations



# TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



| REVISION | DESCRIPTION | DATE |
|---|---|---|
| A | DEVELOPMENT APPLICATION | 09/2020 |

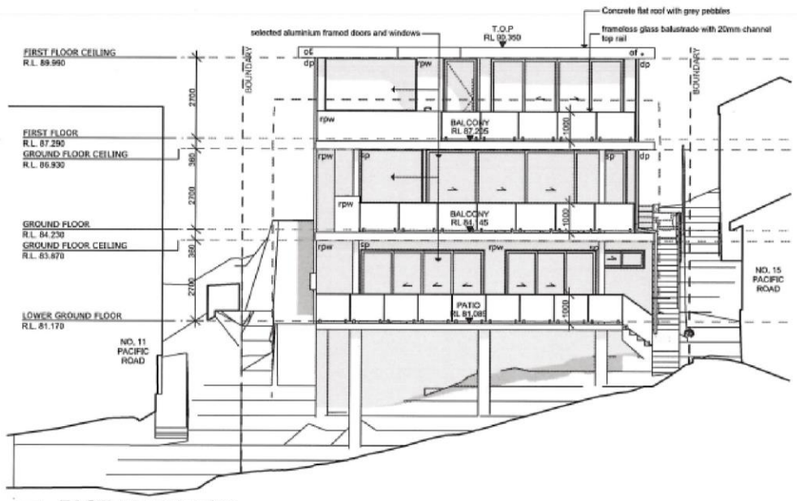



SECTION AA
SCALE 1:100

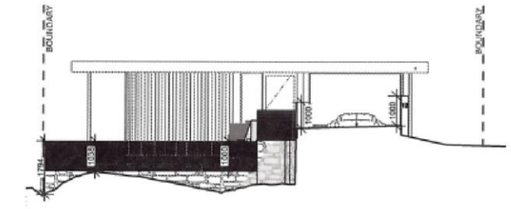



SECTION BB
SCALE 1:100

**Fill**
**Topsoil**
**Clay**
**Hawkesbury Sandstone – Medium Strength**




EAST ELEVATION
SCALE 1:100




FRONT FENCE ELEVATION
SCALE 1:100

LEGEND
of overflow
sp structural post
dp downpipe
rpw rendered & painted masonry wall
outline of existing buildings to be demolished

00 01 02 03 04 05 10
1:100
DISTANCES IN METRES

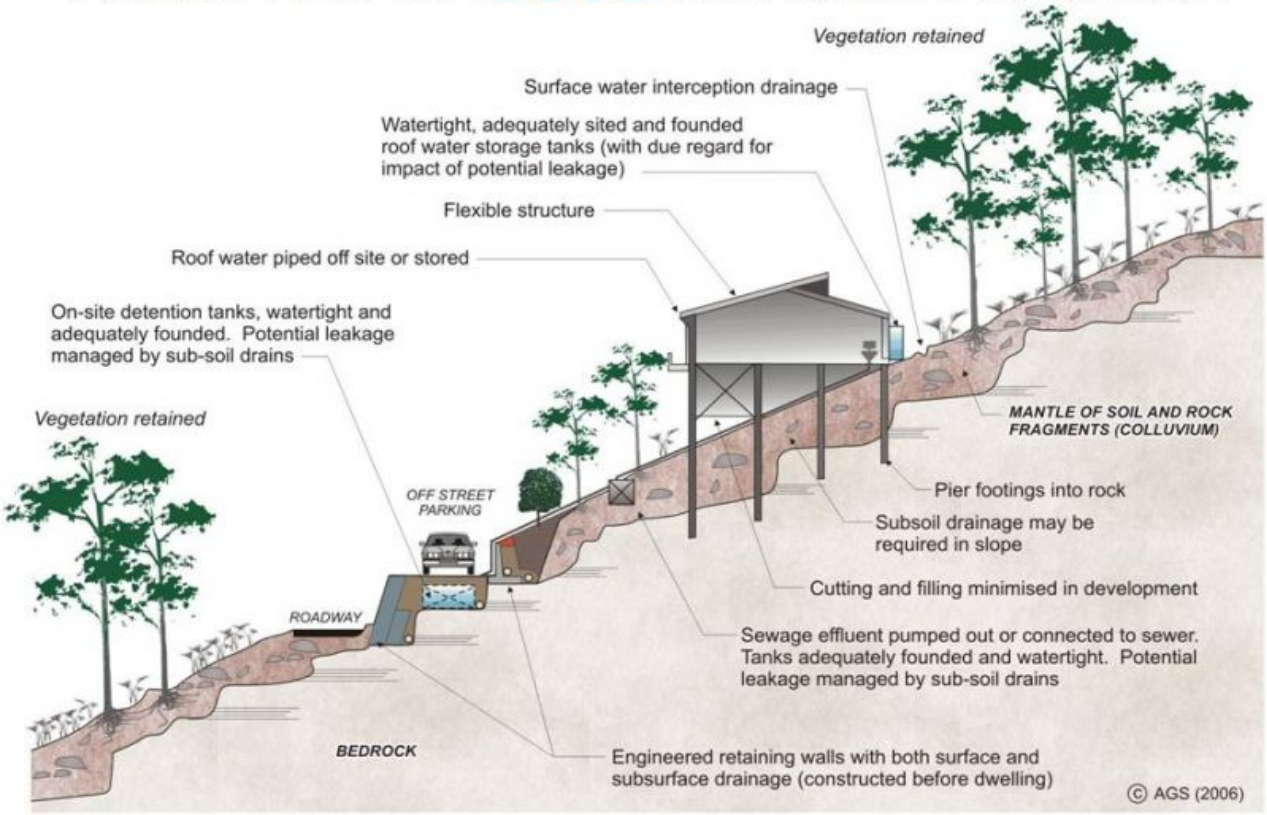
PROJECT
PROPOSED DWELLING HOUSE
FOR
WILLIAM & NANCY GROUNDS
ADDRESS
13 PACIFIC ROAD PALM BEACH, NSW, 2108 LOT NO. 404 | DP NO. 19651
DRAWING TITLE
SECTIONS

ARCHITECT
JAMISA ARCHITECTS PTY LTD
Nominated Architect: Jamie Grounds NSW Registration No. 7265
Suite 4, 112 Cronulla St, Cronulla
PH/FAX. 9523 6499

| | |
|---|---|
| SCALE | 1:100 @ A1 |
| DRAWN | MC |
| CHECKED | JG |
| SUBMISSION DATE | SEPTEMBER 2020 |
| JOB NUMBER | 03/2018/07 |

DRAWING NUMBER: DA06
ISSUE: A

# EXAMPLES OF **GOOD** HILLSIDE PRACTICE




# EXAMPLES OF **POOR** HILLSIDE PRACTICE