## 20 Sunrise 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 shown on 9 architectural drawings prepared by Northern Beaches Drafting, project number 2408, drawings numbered DA4 to DA12, Issue A, dated 25/2/25.

The changes include:

- Lowered the S portion of the proposed secondary dwelling by 1.0m, requiring an excavation to a maximum depth of ~1.4m.
- Removed the proposed inclined lift.
- Various other minor internal and external alterations and additions.

The additional excavation slightly increases the overall risk of the project. As such, we would add the following advice to the existing report, where the advice contradicts that in the existing report, it supersedes it:

### Excavation Support Requirements

The excavation at the S side of the proposed secondary dwelling is to be carried out following the excavation support recommendations in the attached geotechnical report by this firm for the excavation at the N side of the secondary dwelling.

### Conclusion

Provided these recommendations are followed as well as the recommendations in the original attached report carried out by this firm (job number J5281, dated 23/9/24), the proposed works have an 'acceptable' risk level in accordance with the 2009 Geotechnical Risk Management Policy for Pittwater.

White Geotechnical Group Pty Ltd.

Dion Sheldon
BEng(Civil)(Hons) MIEAust NER,
Geotechnical Engineer.

Reviewed By:

Nathan Gardner B.Sc. (Geol. & Geophys. & Env. Stud.)
AIG., RPGeo Geotechnical & Engineering.
No. 10307
Engineering Geologist & Environmental Scientist.

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

**Development Application for** _____
Name of Applicant

**Address of site** 20 Sunrise 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 23/9/24 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 **20 Sunrise Road, Palm Beach**
Report Date: 23/9/24

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** 20 Sunrise 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 **20 Sunrise Road, Palm Beach**

Report Date: 23/9/24

Author: BEN WHITE

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

**Please mark appropriate box**

- ☒ Comprehensive site mapping conducted **15/12/23** (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 **15/12/23**
- ☒ 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 Secondary Dwelling and Inclined Lift at **20 Sunrise Road, Palm Beach**

## 1. Proposed Development

**1.1** Construct a new single storey secondary dwelling downhill of the existing house and pool by excavating to a maximum depth of ~2.2m.

**1.2** Construct a new inclined lift that runs from the secondary dwelling to Ocean Road.

**1.3** Details of the proposed development are shown on 15 drawings prepared by Northern Beaches Drafting, project number 2408, drawings numbered DA4 to DA18, dated 19/9/24.

## 2. Site Description

**2.1** The site was inspected on the 15th December, 2023, and previously on the 5th March, 2021.

**2.2** This residential property has dual access. It is on the low side of Sunrise Road and the high side of Ocean Road. The property has an E aspect. The block is located on the steeply graded middle to lower reaches of a hillslope. The natural slope falls from Sunrise Road at an average angle of ~20° to the approximate mid-point of the property before falling at very steep angles of ~48° to the road frontage with Ocean Road. The slope above the property gradually decreases in grade. The slope below the property quickly eases to gentles angles at the beach.

**2.3** At the road frontage to Sunrise Road, a stone-paved driveway runs to a garage attached to the uphill side of the house (Photo 1). The part three-storey house is supported on brick and concrete block walls and concrete columns (Photo 2). The supporting walls display no significant signs of movement and the supporting columns

stand vertical. Some of the supporting walls were observed to be supported directly off competent Medium Strength Sandstone bedrock (Photo 3). A mostly suspended pool has been constructed off the downhill side of the house (Photo 4). The concrete shell of the pool displays no signs of movement related to slope instability and is considered stable. A steep slope falls from the base of the pool to the top of a ~6.0m high sandstone cliff (Photo 5). The cliff consists of massive Medium Strength Sandstone and displays no significant geological defects. Thus, it is considered stable. A very steep and very densely-vegetated slope falls from the base of the cliff to the road frontage with Ocean Road (Photo 6). Some stable bands of sandstone were observed to be outcropping through this slope (Photo 7).

## 3. Geology

The Sydney 1:100 000 Geological sheet indicates the contact of the Hawkesbury Sandstone and the Newport Formation of the Narrabeen Group cuts the property. The contact is most likely located at the base of the sandstone cliff that falls below the pool. The Narrabeen Group rocks extend from this point down to the lower boundary and beyond (with some sandstone bands). The Narrabeen Group Rocks are described as interbedded laminite, shale, and quartz to lithic quartz sandstone.

## 4. Subsurface Investigation

One hand Auger Hole (AH) was put down to identify the soil materials. Four 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 attached. 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 have been an issue for 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:

**AUGER HOLE 1 –** AH2 (Photo 8)

| Depth (m) | Material Encountered |
|---|---|
| 0.0 to 0.7 | **FILL**, sandy soil, with some rock fragments, dark brown, dry to moist, fine to coarse grained. |
| 0.7 to 0.9 | **COLLUVIUM**, sand, brown orange, damp, fine to medium grained. |
| 0.9 to 1.1 | **CLAY**, grey, firm to stiff, moist. |

End of hole @ 1.1m in firm to stiff clay. No water table encountered.

**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 | DCP 4 |
|---|---|---|---|---|
| 0.0 to 0.3 | 8 | 9 | 32 | 17 |
| 0.3 to 0.6 | 9 | 14 | 17 | 13 |
| 0.6 to 0.9 | 4 | 5 | 7 | 11 |
| 0.9 to 1.2 | 7 | 14 | 16 | 21 |
| 1.2 to 1.5 | 8 | 45 | 16 | 18 |
| 1.5 to 1.8 | 16 | # | 13 | 15 |
| 1.8 to 2.1 | 15 | | 26 | 25 |
| 2.1 to 2.4 | # | | 19 | # |
| 2.4 to 2.7 | | | 20 | |
| 2.7 to 3.0 | | | # | |
| | Refusal on Rock @ 1.9m | Refusal on Rock @ 1.4m | Refusal on Rock @ 2.6m | Refusal on Rock @ 2.0m |

#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 @ 1.9m, DCP bouncing off rock surface, grey and yellow clay and dark brown soil on moist tip.
DCP2 – Refusal on Rock @ 1.4m, DCP bouncing off rock surface, dark brown soil on dry tip.
DCP3 – Refusal on Rock @ 2.6m, DCP bouncing off rock surface, orange clay and dark brown soil on damp tip.
DCP4 – Refusal on Rock @ 2.0m, DCP bouncing off rock surface, brown soil on dry 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 fill and colluvium over firm to stiff clays. Fill to a maximum depth of ~1.0m has been placed across the slope in the location of the proposed works for landscaping and for a pathway. In the test locations, the clays merge into the weathered zone of the underlying rock at depths of between ~1.4m to ~2.6m below the current surface, being deeper in the filled areas (DCP1 & 4) and deeper where the colluvium is deeper (DCP3). 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

Ground water seepage is expected to move over the denser and less permeable clay and weathered rock layers in the sub-surface profile. Due to the slope and elevation of the block, the water table is expected to be many metres below the base of 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 Sunrise Road above. Runoff generated on the long slope on site will move down the slope at a relatively high velocity due to the steep grade.

Due to the steep grade of the slope, it is recommended as part of the development a cut off drain be installed on the uphill side of the proposed secondary dwelling (and below the cliff face) to catch surface flows from the slope and rock face above. The captured flows from this drain should be piped to the street. As current modelling indicates weather conditions on the East Coast will become more extreme into the future all drains, pits and associated plumbing are to be oversized and designed to cope with extreme prolonged rainfall events. The drain is to be the first thing constructed on the site as part of the development and is to be designed by a stormwater or civil engineer in consultation with the geotechnical consultant. It is a condition of the slope stability assessment in Section 8 (**Hazard One**) that this be done.

## 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 ~6.0m high sandstone rock face (Photo 5) is a potential hazard (**Hazard Two**). The proposed excavation is a potential hazard until retaining structures are in place (**Hazard Three**).

**RISK ANALYSIS SUMMARY ON NEXT PAGE**

**Geotechnical Hazards and Risk Analysis - Risk Analysis Summary**

| HAZARDS | Hazard One | Hazard Two | Hazard Three |
|---|---|---|---|
| **TYPE** | The steep slope that falls across the property and continues above and below failing and impacting on the property. | The ~6.0m high sandstone rock face (Photo 5) mass failing and impacting on the property and the proposed secondary dwelling. | The proposed excavation for the secondary dwelling collapsing onto the worksite and impacting the neighbouring properties during the excavation process. |
| **LIKELIHOOD** | 'Unlikely' ($10^{-4}$) | 'Rare' ($10^{-5}$) | 'Possible' ($10^{-3}$) |
| **CONSEQUENCES TO PROPERTY** | 'Medium' (12%) | 'Medium' (30%) | 'Medium' (15%) |
| **RISK TO PROPERTY** | 'Low' ($2 \times 10^{-5}$) | 'Low' ($2 \times 10^{-6}$) | 'Moderate' ($2 \times 10^{-4}$) |
| **RISK TO LIFE** | $8.3 \times 10^{-7}$/annum | $6.2 \times 10^{-7}$/annum | $7.4 \times 10^{-5}$/annum |
| **COMMENTS** | This level of risk is 'ACCEPTABLE', provided the recommendations in **Section 7 and 16** are carried out. | 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

The fall is to Ocean Road. All stormwater from the proposed development is to be piped to the street drainage system through any tanks that may be required by the regulating authorities.

## 11. Excavations

An excavation to a maximum depth of ~2.2m is required to construct the proposed secondary dwelling. The excavation is expected to be through fill, colluvium and clay. Extremely Low to Low Strength Rock may be encountered near the base of the excavation at the uphill side.

It is envisaged that excavations through fill, colluvium, clay and rock up to Low Strength can be carried out with an excavator and toothed bucket or hand tools.

## 12. Vibrations

It is expected the proposed excavation will be carried out with an excavator and toothed bucket or hand tools and the vibrations produced will be below the threshold limit for building or infrastructure damage using a domestic sized excavator up to 16 tonne or hand tools.

## 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 excavation with the permanent drainage measures outlined in **Section 7**.

An excavation to a maximum depth of ~2.2m is required to construct the proposed secondary dwelling. Allowing for backwall drainage, the excavation is set ~1.5m from the N common boundary. The N common boundary will be within the zone of influence of the excavation. In this instance, the zone of influence is the area above a theoretical 30° line (from horizontal) through fill/colluvium and a 45° line through clay / weathered rock from the base of the excavation towards the surrounding structures and boundaries.

Due to the steep grade of the slope and the proximity to the N common boundary, all sides of the excavation will need to be temporarily or permanently supported prior to the commencement of the excavation, or during the excavation process in a staged manner, so cut batters are not left unsupported. The support will need to be designed by the structural engineer. See the Ground Floor Plan attached for the minimum extent of the required shoring shown in blue.

As discussed above upslope runoff is to be diverted from the cut faces by drainage diversion works. The materials and labour to construct the retaining walls are to be organised so shoring walls can be installed as required. 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 following the current Environmental Protection Agency (EPA) waste classification guidelines.

## 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' $K_0$ |
| Fill and Colluvium | 20 | 0.40 | 0.55 |
| Residual Clays | 20 | 0.35 | 0.45 |
| Extremely Low to Low Strength Rock | 22 | 0.25 | 0.38 |

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 and do not account for any surcharge loads, noting that surcharge loads from the slope above will be acting on the wall. It also assumes retaining structures are fully drained. Ground materials 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 secondary dwelling is to be supported on piers taken to and embedded no less than 1.0m from the downhill edge of the footing into Extremely Low Strength Rock or better. This ground material is expected at depths of between ~1.4m to ~2.6m below the current surface so the total required foundation depth is expected to be in the order of ~2.4m to ~3.6m deep. If hard rock (Medium Strength or better) is encountered at the pier bases suitable bar can be drilled and grouted 0.6m into the rock to provide lateral support instead of the proposed 1.0m socket. A maximum allowable bearing pressure of 600kPa can be assumed for footings embedded in Extremely Low Strength Rock or better.

The very steep slope at the location of the proposed inclined lift be inspected by the geotechnical consultant after the vegetation has been cleared and the lift foundation locations have been marked on the slope, but prior to the footing excavations commencing. This is to determine the most suitable foundation type and the required embedment depths as the rock quality is known to be variable down this slope.

As the bearing capacity of weathered rock 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 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 and inspected.

***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 Maintenance

Where slopes are steep and approach or exceed 30°, such as on this site, it is prudent for the owners to occasionally inspect the slope (say annually or after heavy and prolonged rainfall events, whichever occurs first). Should any of the following be observed: movement or cracking in retaining walls, cracking in any structures, cracking or movement in the slope surface, tilting or movement in established trees, leaking pipes, or newly observed flowing water, or changes in the erosional process or drainage regime, then a geotechnical consultant should be engaged to assess the slope. We can carry out these inspections upon request. The risk assessment in **Section 8** is subject to this ongoing maintenance being carried out.

## 17. Geotechnical Review

The structural plans are to be checked and certified by the geotechnical engineer as being in accordance with the geotechnical recommendations. On completion, a Form 2B will be issued. This form is required for the Construction Certificate to proceed.

## 18. 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 Occupation Certificate if the following inspections have not been carried out during the construction process.

- The very steep slope at the location of the proposed inclined lift be inspected by the geotechnical consultant after the vegetation has been cleared and the lift foundation locations have been marked on the slope, but prior to the footing excavations commencing. This is to determine the most suitable foundation type and the required embedment depths as the rock quality is known to be variable down this slope.

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

White Geotechnical Group Pty Ltd.

Dion Sheldon
BEng(Civil)(Hons),
Geotechnical Engineer.

Reviewed By:

Ben White M.Sc. Geol.,
AIG., RPGeo Geotechnical & Engineering.
No. 10306
Engineering Geologist.


*Photo 1*


*Photo 2*


*Photo 3*


*Photo 4*


*Photo 5*


*Photo 6*


*Photo 7*


*Photo 8: AH1 – Downhole is from top to bottom.*

## 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

PROPOSED
PRIVATE OPEN SPACE (EXISTING)
EXISTING DWELLING
MATERIAL STOCKPILE
SEDIMENT CONTROL
SITE SAFETY FENCE
EXISTING LEVELS
BOUNDARY
WASTE MANAGEMENT

B
D.P.110414

140
D.P.11552

139
D.P.11552

OCEAN ROAD
BITUMEN FORMATION

DCP3
DCP2
DCP1
AH 1
DCP4

WASTE MANAGEMENT AREA

Indinator detail by contractor at CC Stage

TN
MID-WINTER SUNSET
MID-WINTER SUNRISE

Site, Site Analysis & Waste Management & Stormwater Concept Plan
1:200

| Date : | Issue : | Description : |
|---|---|---|
| | | |

The builder shall check and verify all dimensions and verify all errors and omissions to the Designer. Do not scale the drawings.
Drawings shall not be used for construction purposes until issued by the Designer for construction.

NORTHERN BEACHES DRAFTING

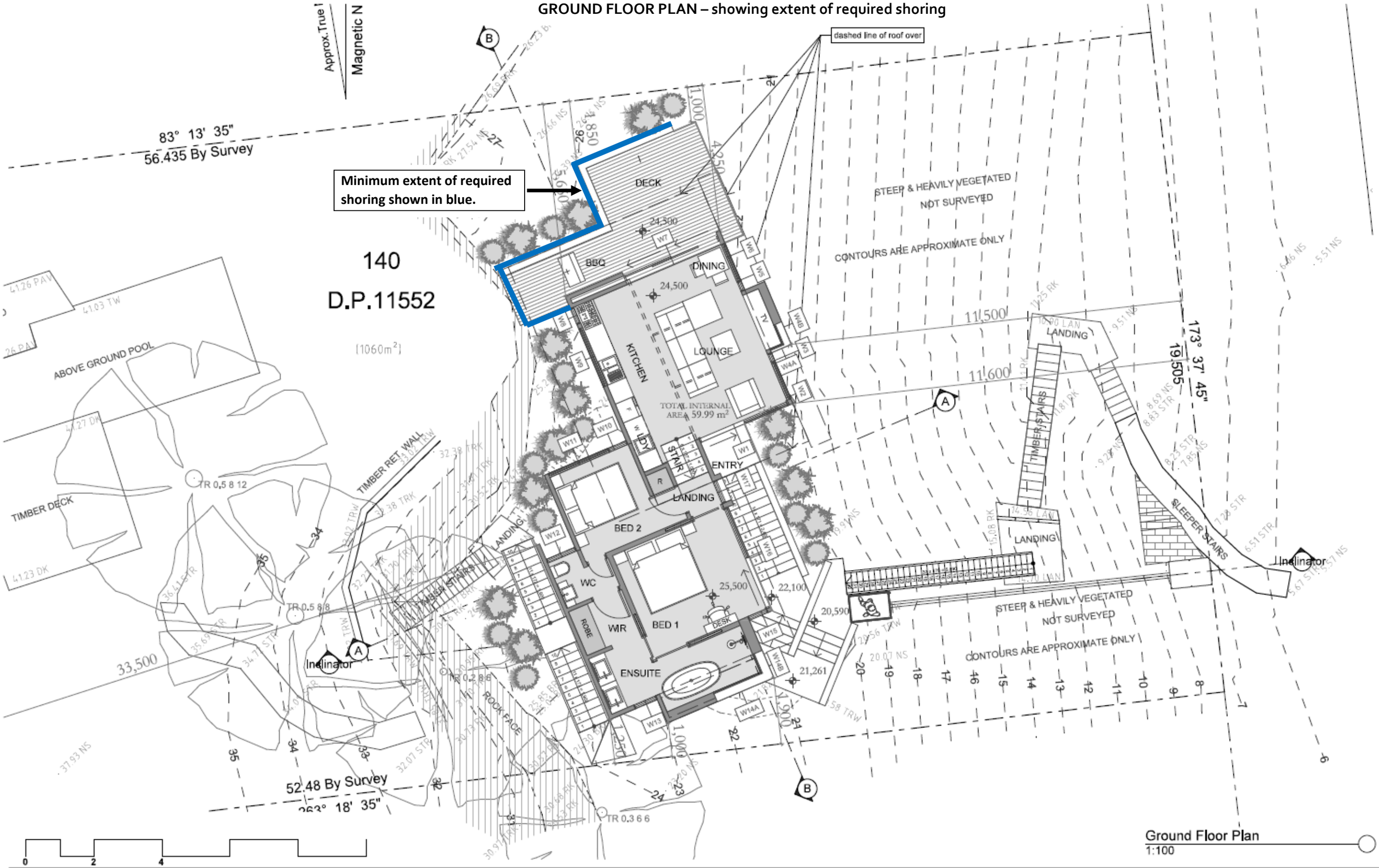
Project : Secondary Dwelling
Development Application
20 Sunrise Rd, Palm Beach
Lot 140 in DP 11552 - 1060m2
Client : Private Resident
Drawing : - Site, Site Analysis & Waste Management & Stormwater Concept Plan

- Proposed Work
- Demolition
- Existing

Drawn/Designed : PB
Project Number : 2408
Drawing No. : DA4

Date : 190924
Scale : 1:200 @ A3
Issue :

# GROUND FLOOR PLAN – showing extent of required shoring




Ground Floor Plan
1:100

| Date : | Issue : | Description : |
|---|---|---|
| | | |

TN

The builder shall check and verify all dimensions and verify all errors and omissions to the Designer. Do not scale the drawings.
Drawings shall not be used for construction purposes until issued by the Designer for construction.


NORTHERN BEACHES DRAFTING
P 0414 978 499
e phil@northernbeachesdrafting.com.au


Project : Secondary Dwelling
Development Application
20 Sunrise Rd, Palm Beach
Lot 140 In DP 11552 - 1060m2

Client : Private Resident

Drawing : - Ground Floor Plan

- Proposed Work
- Demolition
- Existing

Drawn/Designed : PB
Project Number : 2408
Drawing No. : DA6

Date : 190924
Scale : 1:100 @ A3
Issue :

## TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials


Fill, Colluvium and Residual Clays

Narrabeen Group Rocks – Extremely Low to Low Strength Rock - after being cut up by excavation equipment can resemble a stiff to hard clay.

Section Inclinator
1:100

0 2 4

| Date : | Issue : | Description : |
|---|---|---|
| | | |

The builder shall check and verify all dimensions and verify all errors and omissions to the Designer. Do not scale the drawings.
Drawings shall not be used for construction purposes until issued by the Designer for construction.

NORTHERN BEACHES DRAFTING
p 0414 970 499
e phil@northernbeachesdrafting.com.au

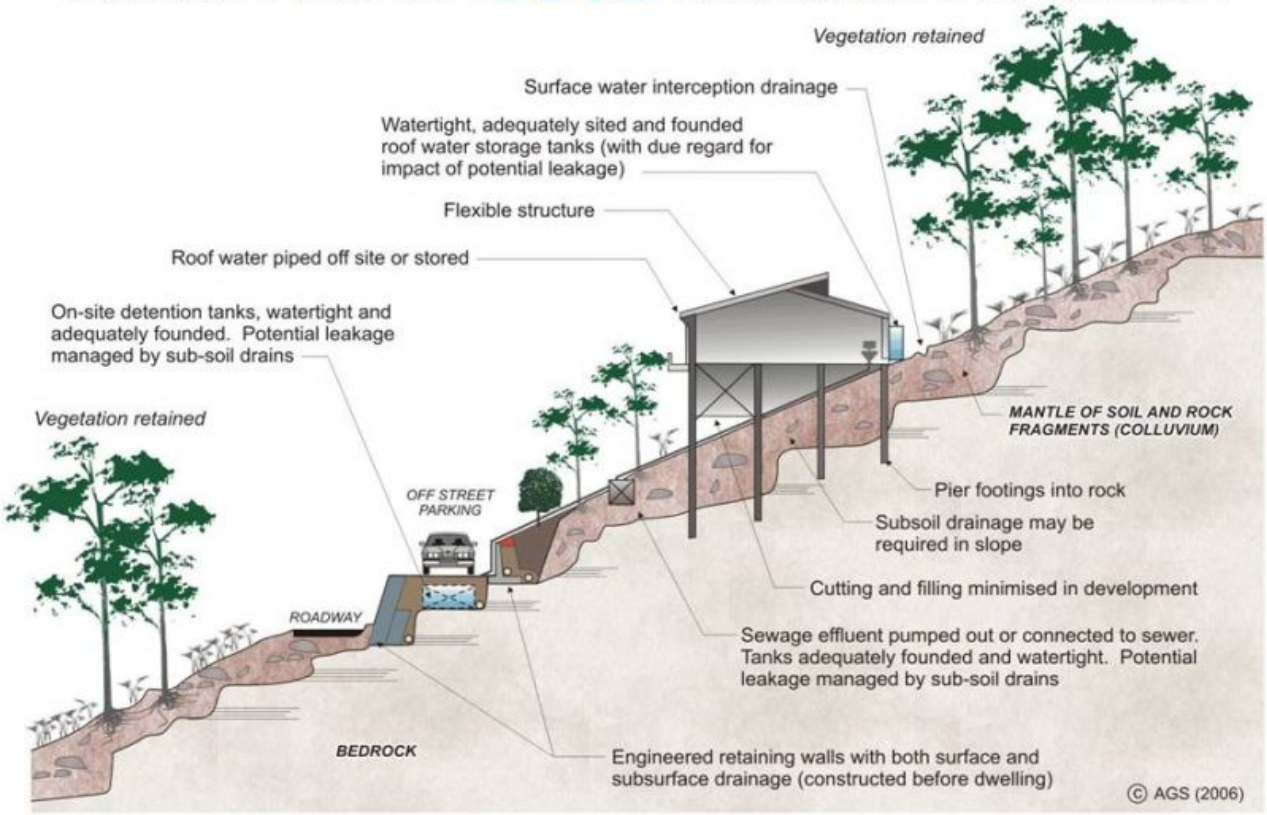
Project : Secondary Dwelling
Development Application
20 Sunrise Rd, Palm Beach
Lot 140 In DP 11552 - 1060m2
Client : Private Resident
Drawing : - Section Inclinator

- Proposed Work
- Demolition
- Existing

Drawn/Designed : PB
Project Number : 2408
Drawing No. : DA13

Date : 190924
Scale : 1:100 @ A3
Issue :

# EXAMPLES OF **GOOD** HILLSIDE PRACTICE




# EXAMPLES OF **POOR** HILLSIDE PRACTICE