Jack Hodgson Consultants Pty Limited
CONSULTING CIVIL, GEOTECHNICAL AND STRUCTURAL ENGINEERS
ABN: 94 053 405 011

The General Manager
Northern Beaches Council- Pittwater Area
P O Box 82
MANLY NSW 1655

Dear Sir,

51 PLATEAU ROAD, AVALON
ADDENDUM TO ACCOMPANY GEOTECHNICAL REPORT

This letter is written as an addendum to the geotechnical report prepared by Jack Hodgson Consultants Pty Ltd: "Risk Analysis & Management for Proposed Carport Relocation at 51 Plateau Road, Avalon" dated 20th April, 2018 based on architectural plans prepared by Michael Airey Dwg No: 1-5 & 5A Revision A dated March 2018.

We have reviewed the amended plans prepared by Michael Airey Dwg No 1 to 18 Revision A dated 19th March, 2019 which proposes a rumpus room be added under the proposed carport. This will take the excavations from the previously quoted RL90.00 to a lower RL88.30. However the excavation increase will be minimal as there an existing retaining wall and stepped rock shelf already creating the majority of the space required.

The proposed changes at the subject address will have an Acceptable Risk Level in accordance with 2009 Geotechnical Risk Management Policy for Pittwater and do not alter the recommendations made in our Risk management Report or Form 1 & 1A previously issued.

JACK HODGSON CONSULTANTS PTY. LIMITED.

Peter Thompson Dip Civil Eng
MIE Aust CPEng
Member No. 146800
Civil/Geotechnical Engineer

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

Development Application for _____
Name of Applicant

Address of site 51 PLATEAU ROAD, AVALON

Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, Peter Thompson *on behalf of* Jack Hodgson Consultants Pty Ltd
(insert name) (Trading or Company Name)

on this the 20TH APRIL, 2018 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 $2million.

Please mark appropriate box

☒ 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

☒ I 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 paragraph 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm 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 am of the opinion that the Development Application only involves Minor Development/Alterations that do not require a Detailed Geotechnical Risk Assessment and hence my report is in accordance with the Geotechnical Risk Management Policy for Pittwater – 2009 requirements for Minor Development/Alterations.

☐ Have examined the site and the proposed development/alteration is separate form and 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

☐ Provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

Report Title: RISK ANALYSIS & MANAGEMENT FOR PROPOSED CARPORT RELOCATION AT 51 PLATEAU ROAD, AVALON – MT 31454

Report Date: 20/4/2018

Author : PETER THOMPSON

Author's Company/Organisation : JACK HODGSON CONSULTANTS PTY LTD

Documentation which relate to or are relied upon in report preparation:

Architectural drawings prepared by Michael Airey Dwg No: 1-8 & 5A Revision A dated March 2018

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 Peter Thompson

Name Peter Thompson

Chartered Professional Status MIE Aust CPEng

Membership No. 146800

Company Jack Hodgson Consultants 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 **51 PLATEAU ROAD, AVALON**

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: RISK ANALYSIS & MANAGEMENT FOR PROPOSED CARPORT RELOCATION AT 51 PLATEAU ROAD, AVALON – MT 31454

Report Date: 20TH APRIL, 2018

Author: PETER THOMPSON

Author's Company/Organisation: JACK HODGSON CONSULTANTS PTY LTD

Please mark appropriate box

☐ Comprehensive site mapping conducted ..... (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 SEE REPORT
  ☐ Yes Date conducted .....
☒ 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 Peter Thompson
Name Peter Thompson
Chartered Professional Status MIE Aust CPEng
Membership No. 146800
Company Jack Hodgson Consultants Pty Ltd

Jack Hodgson Consultants Pty Limited
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ABN: 94 053 405 011

RISK ANALYSIS & MANAGEMENT FOR PROPOSED CARPORT RELOCATION AT 51 PLATEAU ROAD AVALON

1. INTRODUCTION.

1.1 This assessment has been prepared to accompany an application for a development approval. The requirements of the Geotechnical Risk Management Policy for Northern Beaches Council - Pittwater, 2009 have been met.

1.2 The definitions used in this Report are those used in the Geotechnical Risk Management Policy for Northern Beaches Council - Pittwater, 2009.

1.3 The methods used in this Assessment are based on those described in Landslide Risk Management March 2007, published by the Australian Geomechanics Society and as modified by the Geotechnical Risk Management Policy for Northern Beaches Council - Pittwater, 2009.

1.4 The experience of Jack Hodgson Consultants spans a time period over 40 years in the Northern Beaches Council area and Greater Sydney region.

2. PROPOSED DEVELOPMENT.

2.1 Relocate carport.

2.2 Construct new vehicle crossing.

2.3 Details of the proposed development are shown on a series of architectural drawings prepared by Michael Airey, Dwg No: 1-5 & 5A, Revision A, dated March 2018.

3. DESCRIPTION OF SITE & SURROUNDING AREA.

3.1 The site was inspected on the 18th April 2018. This site has been previously visited by this firm in August 2013 and December 2006.

3.2 This rectangular shaped block is located on the southern side of Plateau Road and slopes down away from the road. The property has a southerly aspect. The block is situated near the crest of the ridge that runs roughly east to west aligned with Plateau Road. The slope across the property drops toward the south at a moderate to steep rate.

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3. DESCRIPTION OF SITE & SURROUNDING AREA. (Continued)

3.3 Vehicular entry is via a steep concrete driveway that arcs around from the road frontage to a carport that runs along the northern side of the residence (Photo 1). Pedestrian access is also via the driveway. Rock steps (Photo 2), along the eastern side of the residence lead down to a lower deck area (Photo 3). From the deck area steps formed by wooden sides (Photo 4) lead from the south western corner of the residence through a heavily vegetated area to a level grassed area running along the southern boundary (Photos 5 & 6). Under the deck area there is an area of stacked rock and soils (Photo 7). This area was stable at the time of the inspection, but attention will need to be paid to ensure its long term stability in the future. There is a wooden retaining wall on the southern boundary of the adjacent property to the west. This wall is showing signs of failure and will need attention in the near term. The stability of this wall is not considered a risk to the stability of the subject property. Rock steps extend up past the wooden steps on the western side of the residence (Photo 4), and lead to a large sandstone outcrop (Photo 9). Sandstone outcropping is abundant in the garden area between the residence and the road frontage (Photos 10 & 11). Between the northern boundary and the road kerb is a low wooden wall in good condition (Photo 12). At the time of our inspection the house and grounds were found to be in good condition with no signs of significant movement related to slope instability.

3.4 The multi-level rendered brick house is in good condition. The brick and concrete block supporting walls show no signs of movement.

4. GEOLOGY OF THE SITE.

4.1 Referencing the Sydney 1:100,000 Geological Series Sheet 9130 indicates the site is close to the transition zone between the interbedded sandstones, siltstones and shales of the Narrabeen Group and the Hawkesbury Sandstones of the Wianamatta Group. Outcropping Sandstone onsite indicated that the site is underlain by Hawkesbury Sandstones of the Wianamatta Group. The Hawkesbury Sandstones of the Wianamatta Group are of Middle Triassic age and were probably laid down in braided streams. The sand grains are mainly quartz with some sand grade claystone fragments. There are lenticular deposits of mudstones and laminates which are thought to have been deposited in abandoned channels of the main streams. The sandstones generally have widely spaced sub vertical joints with some current bedding. The joint directions are approximately north/south and east/west. The beds vary in thickness from 0.5 to in excess of 5 metres. The Narrabeen Group Rocks are Late Permian to Middle Triassic in age with the early rocks not outcropping in the area under discussion. The materials from which the rocks were formed consist of gravels, coarse to fine sands, silts and clays. They were deposited in a riverine type environment with larger floods causing fans of finer materials. The direction of deposition changed during the period of formation. The lower beds are very variable with the variations decreasing as the junction with the Hawkesbury Sandstones is approached. This is marked by the

4. GEOLOGY OF THE SITE. (Continued)

highest of persistent shale beds over thicker sandstone beds which are similar in composition to the Hawkesbury Sandstones.

4.2 The slope materials are colluvial in origin at the surface and become residual with depth. They consist of topsoil over sandy clays and clays that merge into the weathered rock at depths from 1.0 to 1.5 metres below current surface levels.

5. SUBSURFACE INVESTIGATION.

Due to abundant outcropping Hawkesbury Sandstone across the block, and in the surrounding area, no subsurface testing was deemed necessary at this stage.

6. DRAINAGE OF THE SITE.

6.1 ON THE SITE.

The block is naturally well drained. Evidence of a water path was sighted under the dwelling. It was dry at the time of our inspection.

6.2 SURROUNDING AREA.

Overland stormwater flow entering the site from the adjoining properties was not evident. Normal overland runoff could enter the site from the road reserve above during heavy or extended rainfall.

7. GEOTECHNICAL HAZARDS.

7.1 ABOVE THE SITE.

No geotechnical hazards likely to adversely affect the subject property were observed above the site.

7.2 ON THE SITE.

7.2.1 By reference to Pittwater Councils Geotechnical Hazard mapping, the block is classified as a H1 Hazard zone. The western boundary touches the hazard zone on the councils Geotechnical hazard map. The majority of the site is however unclassified. The slope of the land surface that falls across the property is considered a potential hazard (**HAZARD ONE**).

7. GEOTECHNICAL HAZARDS. (Continued)

7.3 BELOW THE SITE.

No geotechnical hazards likely to adversely affect the subject property were observed below the site.

7.4 BESIDE THE SITE.

No geotechnical hazards likely to adversely affect the subject property were observed beside the site. As outlined in **Section 3**, the property to the west of the subject property has a wooden retaining wall on or towards the southern boundary of the property. The wall is showing signs of failure and will need attention in the near term. It is considered the wall and its stability will not affect the stability of the subject site.

8. RISK ASSESSMENT.

8.1 ABOVE THE SITE.

As no geotechnical hazards likely to adversely impact upon the subject site were observed above the site, no risk analysis is required.

8.2 ON THE SITE.

8.2.1 HAZARD ONE Qualitative Risk Assessment on Property

The slope of the land surface rises across the property at moderate to steep angles toward the south east. The likelihood of the slope failing and impacting on the house is assessed as 'Unlikely' (10^{-4}). The consequences to property of such a failure are assessed as 'Low' (5%).
The risk to property is 'Low' (5×10^{-6}).

8.2.2 HAZARD ONE Quantitative Risk Assessment on Life

For loss of life risk can be calculated as follows:
$\mathbf{R_{(Loll)} = P_{(H)} \times P_{(SH)} \times P_{(TS)} \times V_{(DT)}}$ (See Appendix for full explanation of terms)

8.2.2.1 Annual Probability
No evidence of significant slope instability was identified at the time of inspection.
$\mathbf{P_{(H)}} = 0.0001$/annum

8. RISK ASSESSMENT. (Continued)

8.2.2.2 Probability of Spatial Impact

The house is situated toward the toe of moderate to steep slope.

$\mathbf{P_{(SH)}} = 0.1$

8.2.2.3 Possibility of the Location Being Occupied During Failure

The average household is taken to be occupied by 4 people. It is estimated that 1 person is in the house for 20 hours a day, 7 days a week. It is estimated 3 people are in the house 12 hours a day, 5 days a week.

For the person most at risk:

$\frac{20}{24} x \frac{7}{7} = 0.83$

$\mathbf{P_{(TS)}} = 0.83$

8.2.2.4 Probability of Loss of Life on Impact of Failure

Based on the volume of land sliding and its likely velocity when it fails, it is estimated that the vulnerability of a person to being killed in the house when a landslide occurs is 0.01

$\mathbf{V_{(DT)}} = 0.01$

8.2.2.5 Risk Estimation

$\mathbf{R_{(LoI)}} = 0.0001 \times 0.1 \times 0.83 \times 0.01$

$= 0.000000083$

$\mathbf{R_{(LoI)}} = 8.3 \times 10^{-8}$/annum

NOTE: This level of risk is **'ACCEPTABLE'** provided the recommendations provided in **Section 10** are followed.

8.3 BELOW THE SITE.

As no geotechnical hazards likely to adversely impact upon the subject site were observed below the site, no risk analysis is required.

8.4 BESIDE THE SITE.

As no geotechnical hazards likely to adversely impact upon the subject site were observed beside the site, no risk analysis is required.

9. SUITABILITY OF DEVELOPMENT FOR SITE.

9.1 GENERAL COMMENTS.

The proposed development is considered suitable for the site.

9.2 GEOTECHNICAL COMMENTS.

No geotechnical hazards will be created by the completion of the proposed development in accordance with the requirements of this Report and good engineering and building practice.

9.3 CONCLUSIONS.

The site and the proposed development can achieve the Acceptable Risk Management criteria outlined in the Pittwater Geotechnical Risk Policy provided the recommendations given in **Section 10** are undertaken.

10. RISK MANAGEMENT.

10.1. TYPE OF STRUCTURE.

The proposed structures are considered suitable.

10.2. EXCAVATIONS.

10.2.1 All excavation recommendations as outlined below should be read in conjunction with Safe Work Australia's *'Excavation Work – Code of Practice'*, published March, 2015.

10.2.2 Excavations to an approximate level of RL90.0 will be undertaken for the footings of the proposed driveway. Where sandstone is not exposed at the surface, the cuts are expected to be through sandy topsoils and clays before competent sandstone is encountered. Provided the unconsolidated materials (soils/soft clays) are suitably battered back the underlying materials will stand unsupported for short periods until permanent support is in place.

10.2.3 Any new or replaced retaining walls are to be installed as soon as possible after the excavations are complete. The cut batters for the lower ground level cuts are to be covered to prevent loss of moisture in dry weather and to prevent access of moisture in wet weather. Upslope runoff must be diverted from the cut faces by sandbag mounds or similar diversion works. Temporary support may be necessary for the cut batters for the lower ground level, depending upon the material encountered in the cuts, the likelihood of

10. RISK MANAGEMENT. (Continued)

heavy rain and the length of period before permanent support is installed. The design Coefficient of Lateral Pressure is 0.6.

10.2.4 We recommend that any excavation through rock be carried out initially using a rock saw to minimise the vibration impact and disturbance on the adjoining properties. Any rock breaking must be carried out only after the rock has been sawed and in small bursts to prevent the vibration amplifying. The break in the rock from the saw must be between the rock to be broken and the closest adjoining structure. The energy input per blow of hydraulic picks should not exceed 600 Joules. A 300kg rock breaker produces ~600 Joules. It should be noted the input per blow varies between types of hammers so this is to be confirmed with the manufacturer.

Should the above advice be followed, the need for vibration monitoring over the course of the excavation process may not be required. However if it is elected to employ vibration monitoring throughout the excavation process the following parameters should be adhered to; The Australian Standard AS2670.2-1990 "Evaluation of human exposure to whole-body vibrations – continuous and shock induced vibrations in buildings (1-80 Hz)" suggests a day time limit of 8 mm/s component PPV for human comfort is acceptable.

We would suggest allowable vibration limits be set at 5mm/s PPV. It is expected that rock hammers with an approximate weight of 200-400kg will be adequate to operate within these tolerances.

10.2.5 All temporary and permanent shoring and its possible requirement is to be discussed with the Geotechnical Engineer prior to the commencement of excavations.

10.2.6 All excavated material left onsite will require to be held in place by engineer designed retaining walls.

10.2.7 All excavated material removed from the site is to be removed in accordance with current Office of Environment and Heritage (OEH) regulations

10.3. FILLS.

10.3.1 If filling is required, all fills are to be placed in layers not more than 250 mm thick and compacted to not less than 95% of Standard Optimum Dry Density at plus or minus 2% of Standard Optimum Moisture Content.

10. **RISK MANAGEMENT. (Continued)**

10.3.2 The fill batters are to be not steeper than 1 vertical to 1.7 horizontal or they are to be supported by properly designed and constructed retaining walls.

10.4. FOUNDATION MATERIALS AND FOOTINGS.

10.4.1 It is recommended that all footings be supported on the underlying sandstone bedrock, using piers as necessary. The design allowable bearing pressures are 1.0 MPa for spread footings or piers. All footings are to be founded on material of similar consistency to minimise potential for differential settlement.

10.4.2 We would recommend the site be classified as 'Class A' as outlined in AS 2870. Class A is defined as mostly sand and rock site with little or no ground movement.

10.5. STORM WATER DRAINAGE.

Should any additional storm water be generated from any new works, runoff is to be piped to the existing stormwater system for the house through any water tanks or onsite detention systems that may be required by the regulating authorities. All drainage work is to comply with the relevant Australian standards (AS/NZS 3500 Plumbing and Drainage).

10.6. SUBSURFACE DRAINAGE.

10.6.1 All retaining walls new and replaced are to have adequate back wall drainage.

10.6.2 Retaining walls are to be back filled with non-cohesive free draining material to provide a drainage layer immediately behind the wall. The free draining material is to be separated from the materials by geotextile fabric ground.

10.7. INSPECTIONS.

It is essential that the foundation materials of any new footing excavations be inspected and approved by the geotechnical engineer before concrete is placed. This includes any retaining wall footings.

11. GEOTECHNICAL CONDITIONS FOR ISSUE OF CONSTRUCTION CERTIFICATE.

It is recommended that the following geotechnical conditions be applied to Development Approval:-

The work to be completed is to be carried out in accordance with the Risk Management Report MT 31454 dated 20th April, 2018.

The Geotechnical Engineer is to inspect and approve the foundation materials of all footing excavations before concrete is placed.

12. GEOTECHNICAL CONDITIONS FOR ISSUE OF OCCUPATION CERTIFICATE.

The Geotechnical Engineer is to certify the following geotechnical aspects of the development:-

The work to be completed was carried out in accordance with the Geotechnical Assessment Report MT 31454 dated 20th April, 2018.

The Geotechnical Engineer has inspected and approved the foundation materials of all footing excavations before concrete was placed.

13. RISK ANALYSIS SUMMARY.

HAZARDS	HAZARD ONE
TYPE	By reference to Pittwater Councils Geotechnical Hazard mapping, the block is identified as an H1 Hazard Zone. The slope of the land surface that falls across the property is considered a potential hazard.
LIKELIHOOD	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Minor' (5%)
RISK TO PROPERTY	'Low'(5×10^{-6})
RISK TO LIFE	8.3×10^{-8}/annum
COMMENTS	This level of risk is **'ACCEPTABLE'** provided the conditions in **Section 10** are followed.

JACK HODGSON CONSULTANTS PTY. LIMITED.

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Civil/Geotechnical Engineer

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Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

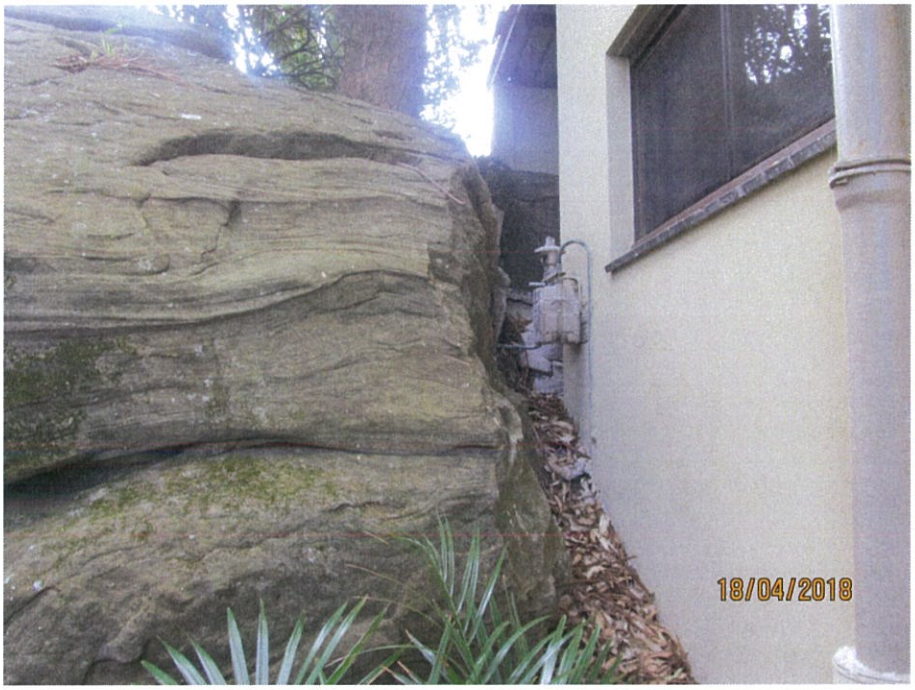


Photo 9

Photo 10

Photo 11

Photo 12

7 RISK ESTIMATION

7.1 QUANTITATIVE RISK ESTIMATION

Quantitative risk estimation involves integration of the frequency analysis and the consequences.
For property, the risk can be calculated from:
$R_{(Prop)} = P_{(H)} \times P_{(S:H)} \times P_{(T:S)} \times V_{(Prop:S)} \times E$ (1)

Where
$R_{(Prop)}$ is the risk (annual loss of property value).

$P_{(H)}$ is the annual probability of the landslide.

$P_{(S:H)}$ is the probability of spatial impact by the landslide on the property, taking into account the travel distance and travel direction.

$P_{(T:S)}$ is the temporal spatial probability. For houses and other buildings $P_{(T:S)}$= 1.0. For Vehicles and other moving elements at risk $1.0 < P_{(T:S)} > 0$.

$V_{(Prop:S)}$ is the vulnerability of the property to the spatial impact (proportion of property value lost).

E is the element at risk (e.g. the value or net present value of the property).
For loss of life, the individual risk can be calculated from:

$R_{(LoL)} = P_{(H)} \times P_{(S:H)} \times P_{(T:S)} \times V_{(D:T)}$ (2)
Where

$R_{(LoL)}$ is the risk (annual probability of loss of life (death) of an individual).

$P_{(H)}$ is the annual probability of the landslide.

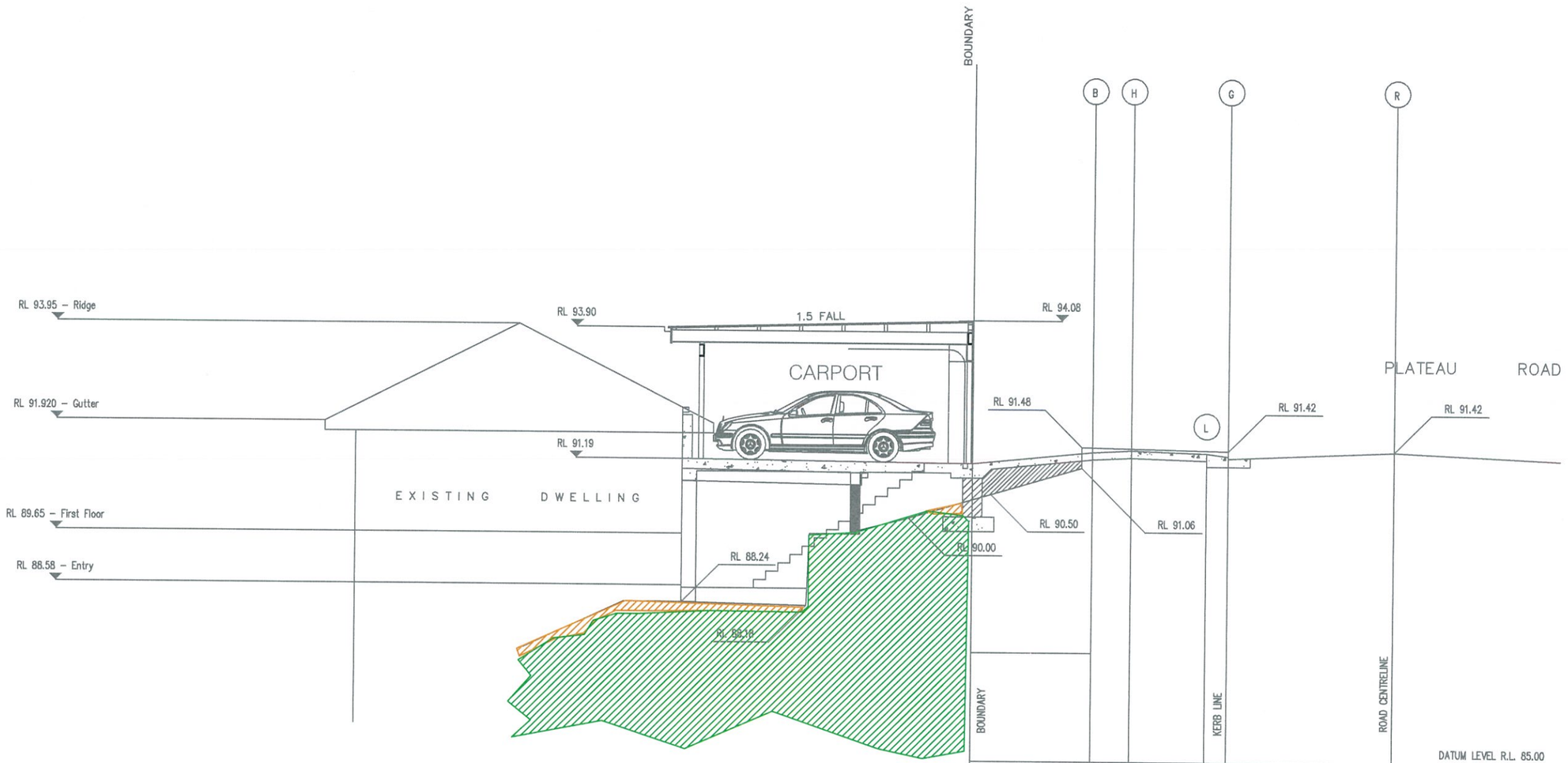
$P_{(S:H)}$ is the probability of spatial impact of the landslide impacting a building (location) taking into account the travel distance and travel direction given the event.

$P_{(T:S)}$ is the temporal spatial probability (e.g. of the building or location being occupied by the individual) given the spatial impact and allowing for the possibility of evacuation given there is warning of the landslide occurrence.

$V_{(D:T)}$ is the vulnerability of the individual (probability of loss of life of the individual given the impact).
A full risk analysis involves consideration of all landslide hazards for the site (e.g. large, deep seated landsliding, smaller slides, boulder falls, debris flows) and all the elements at risk.

For comparison with tolerable risk criteria, the individual risk from all the landslide hazards affecting the person most at risk, or the property, should be summed.

The assessment must clearly state whether it pertains to 'as existing' conditions or following implementation of recommended risk mitigation measures, thereby giving the 'residual risk'.



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NOTE
INTERPRETED SUB SURFACE SECTION ONLY.
ACTUAL GROUND CONDITIONS MAY VARY.

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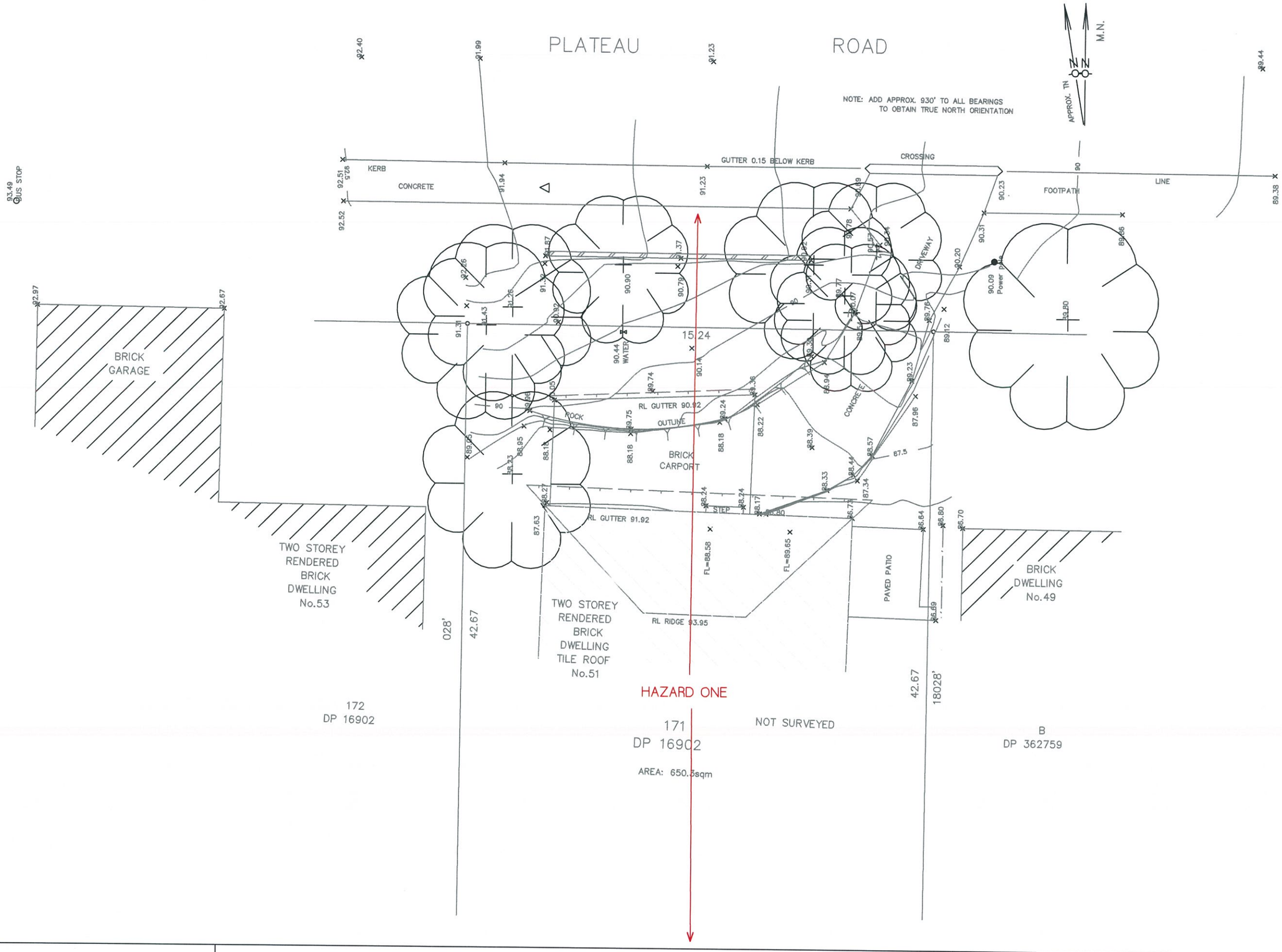
TYPE SECTION

Job No	Address
MT 31454	51 PLATEAU ROAD AVALON NSW
Scale NTS	

STRATA PROFILE LEGEND

- Fill
- Sandy Topsoil
- Sandy Clay
- Narrabeen Group Rocks
- Hawkesbury Sandstone



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SITE PLAN – HAZARD ONE

Job No	Address
MT 31454	51 PLATEAU ROAD
Scale	AVALON
NTS	NSW