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

Development Application for _____
Name of Applicant

Address of site 283 Hudson Parade, Clareville

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 12/5/21 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 **283 Hudson Parade, Clareville**
Report Date: 12/5/21

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 283 Hudson Parade, Clareville

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 **283 Hudson Parade, Clareville**

Report Date: 12/5/21

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **2/3/21**
(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 **2/3/21**

☒ 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:

Alterations and Additions at **283 Hudson Parade, Clareville**

1. Proposed Development

1.1 Add a new above ground basement with deck underneath the SW corner of the existing house.

1.2 Construct new roofs over the existing house and carport.

1.3 Various other minor internal and external alterations to the existing house.

1.4 Construct a workshop on the N side of the existing carport.

1.5 Install a rainwater tank on the W side of the house.

1.6 Details of the proposed development are shown on 15 drawings prepared by Inlet Design Studio, drawings numbered A01 to A15, dated 3/5/21.

2. Site Description

2.1 The site was inspected on the 2nd of March, 2021.

2.2 This residential property is on the high side of the road and has a NW aspect. It is located on the steeply graded middle reaches of a hillslope. The natural slope rises across the property at an average angle of ~34°. The slope below the property decreases in grade. The slope above the property continues at similar steep angles for some 40m before gradually easing.

2.3 The property is accessed by a bitumen right of carriageway (ROW) off Georgia Lee Place. Sandstone bedrock is outcropping on the uphill neighbouring property (Photo 1). A concrete carport with storage room is located on the W side of the house (Photo 2). The fill batter for the ROW is supported by stable timber and sandstone retaining walls ~1.5m high. The part two storey timber clad and brick house is

supported by steel posts and concrete piers (Photos 3 to 5). The supporting posts and piers show no significant signs of movement (Photos 5 & 6). Stable timber, brick and sprayed concrete retaining walls up to ~1.6m support cuts for the lower ground floor of the house.

Fill provides level platforms for garden areas on the downhill side of the house (Photo 7). Stable sprayed concrete retaining walls up to ~1.7m high support the fill. Slope Stabilisation works appear to have recently been carried out on the site. This includes stabilisation of the downhill row of house piers with anchors and the installation of a low sprayed concrete and anchored wall immediately below the piers (Photo 8). One of the rock exposed has been anchored (Photo 9) as well a recently constructed garden bed lower on the slope. Sandstone bedrock and detached joint blocks are exposed at the surface at various locations across the property (Photos 10 to 12). The rocks are in stable positions on the slope. A watercourse runs down the slope along the W property boundary (Photos 13 & 14). During the inspection, water was observed flowing in the watercourse which diverged midway down the slope into three separate flow paths before converging near the downhill property boundary and entering a stormwater drain at the Hudson Parade road reserve (Photos 15 & 16).

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 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 and 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 – Dynamic Cone Penetrometer			
Equipment: 9kg hammer, 510mm drop, conical tip.		Standard: AS1289.6.3.2 - 1997	
Depth(m) **Blows/0.3m**	**DCP 1** (~RL39.8)	**DCP 2** (~RL37.8)	**DCP 3** (~RL43.0)
0.0 to 0.3	14	14	8
0.3 to 0.6	12	#	5
0.6 to 0.9	5		21
0.9 to 1.2	18		28
1.2 to 1.5	#		10F
1.5 to 1.8			15
1.8 to 2.1			40
2.1 to 2.4			#
	Refusal on rock @ 1.1m	Refusal on rock @ 0.3m	End of Test @ 2.1m

#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 @ 1.1m, DCP bouncing, white sandstone fragments on moist tip.
DCP2 – Refusal on rock @ 0.3m, DCP bouncing, dark brown soil on damp tip.
DCP3 – End of Test @ 2.1m, DCP still very slowly going down.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. Sandstone bedrock is outcropping uphill of the property and on the downhill side of the house. These are

expected to be sandstone bands in an otherwise shale dominated profile. The rock is overlain by a topsoil and clay. In the test locations the depth to rock ranged from between ~0.3m to ~2.1m below the current surface. Many large floaters are located at the surface and are expected through the profile. The weathered rock in the location of the tests is interpreted to be Extremely Low Strength Rock 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

Apart from the watercourse that runs down the slope on the W side of the house, 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 the ROW above. Runoff generated on the site will move down the slope at a relatively high velocity due to the steep grade.

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**).

RISK ANALYSIS SUMMARY ON NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The steep slope that falls across the property and continues above and below failing and impacting on the property.
LIKELIHOOD	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (12%)
RISK TO PROPERTY	'Low' (2×10^{-5})
RISK TO LIFE	8.3×10^{-7}/annum
COMMENTS	This level of risk is 'ACCEPTABLE', provided the recommendations in **Section 13** are carried out.

(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 a watercourse that runs down the slope on the W side of the house. All stormwater is to be piped to the watercourse through any tanks that may be required by the regulating authorities.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

Any new foundations required for the house additions are to be supported on piers embedded at least 0.6m into Extremely Low Strength Rock or better. To account for the possibility that large floaters are encountered we have conservatively reduced the foundation

bearing pressure on rock, noting that a very large floater will act as a spread foundation provided it is seated in a stable position in the slope. A maximum allowable bearing pressure of 400kPa can be assumed for footings on Extremely Low Strength Rock or better.

Once the rainwater tank size has been finalised, the Geotechnical Consultant is to be on site to assess the location of the tank and required foundations. This can be carried out before or in conjunction with the foundation inspection of the house additions.

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.

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.

13. 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 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.

14. 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.

- Once the tank size has been finalised, the Geotechnical Consultant is to be on site to assess the location of the tank and required foundations. This can be carried out before or in conjunction with the foundation inspection of the house additions.

- 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

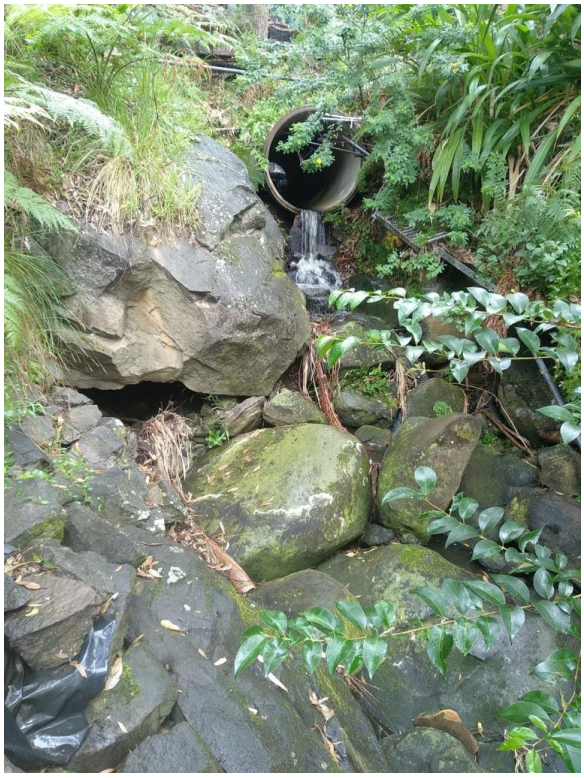


Photo 13

Photo 14

Photo 15

Photo 16

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.

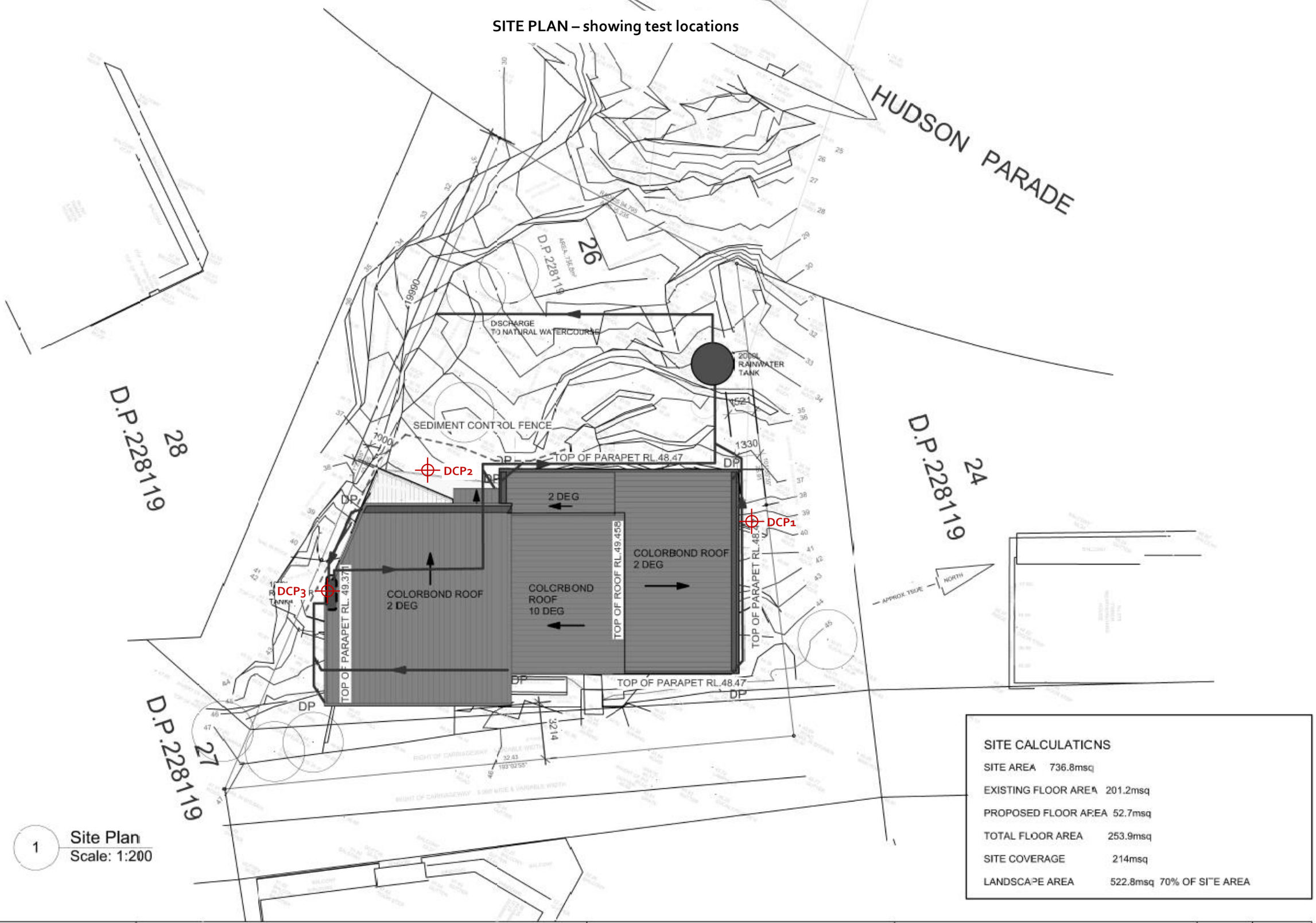
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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



1 Site Plan
Scale: 1:200

SITE CALCULATIONS

SITE AREA	736.8msq
EXISTING FLOOR AREA	201.2msq
PROPOSED FLOOR AREA	52.7msq
TOTAL FLOOR AREA	253.9msq
SITE COVERAGE	214msq
LANDSCAPE AREA	522.8msq 70% OF SITE AREA

Inlet Design Studio
Newport, NSW, 2106,
P 0415647351
E robyn@inletdesign.com.au

ABN: 26 075 061 335

REVISION:	DATE:	REVISION NOTE:

CLIENT: Mr and Mrs Kidner

ADDRESS: 283 Hudson Parade Clareville
LOT 26 DP 228119

DRAWING: Site Plan

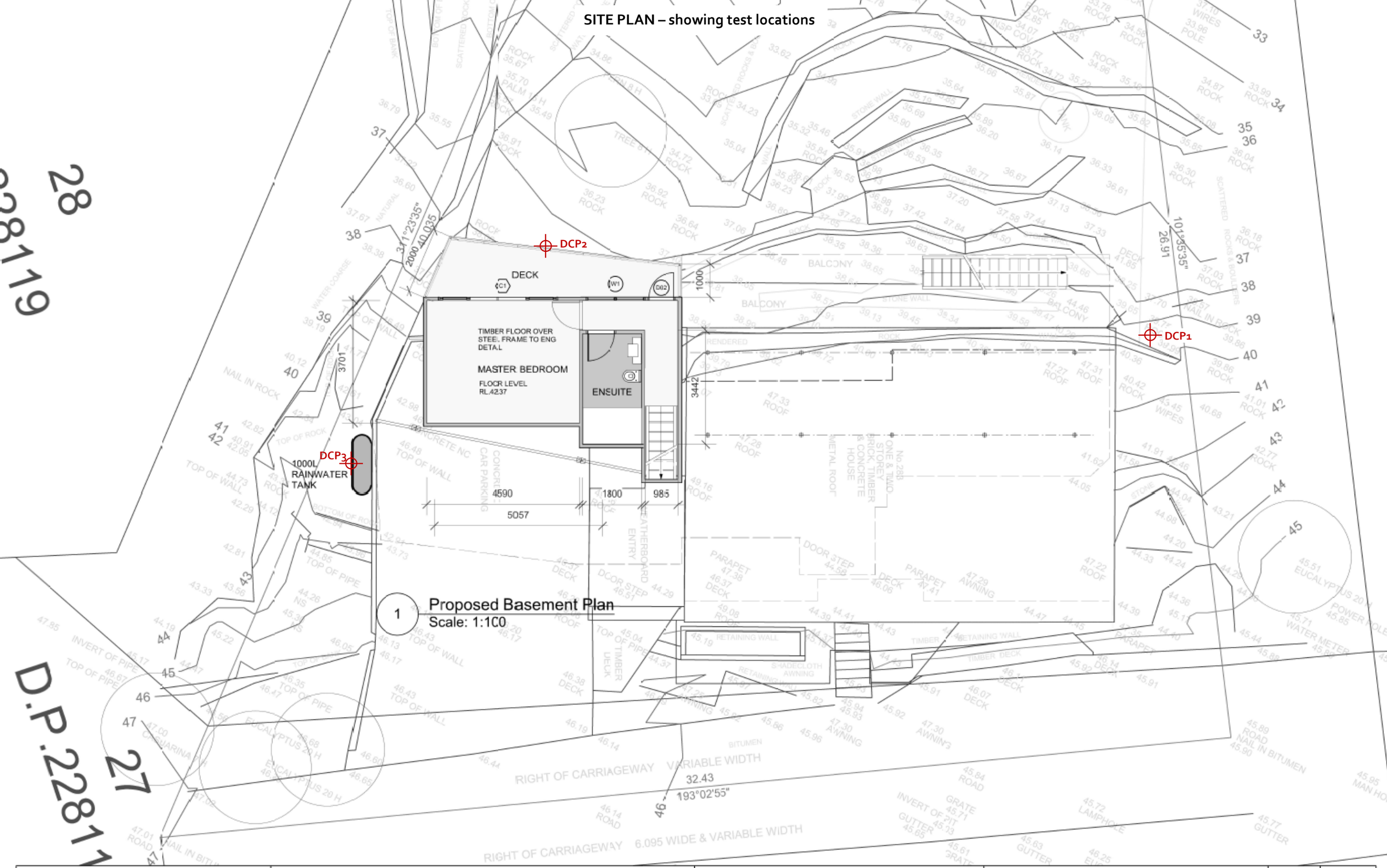
PROJECT: ALTERATIONS AND ADDITIONS

PROJECT NO: 283 Hudson

ISSUE TYPE: 2

DRAWN:	SHEET NO:
RJ	A01
CHKD:	SCALE @ A3:
RJ	1:200
ISSUE DATE:	REVISION:
03/05/21	

SITE PLAN – showing test locations



1 Proposed Basement Plan
Scale: 1:100

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Newport, NSW, 2106,
P 0415647351
E robyn@inletdesign.com.au

ABN: 26 075 061 335

REVISION:	DATE:	REVISION NOTE:

CLIENT: Mr and Mrs Kidner

ADDRESS: 283 Hudson Parade Clareville
LOT 26 DP 228119

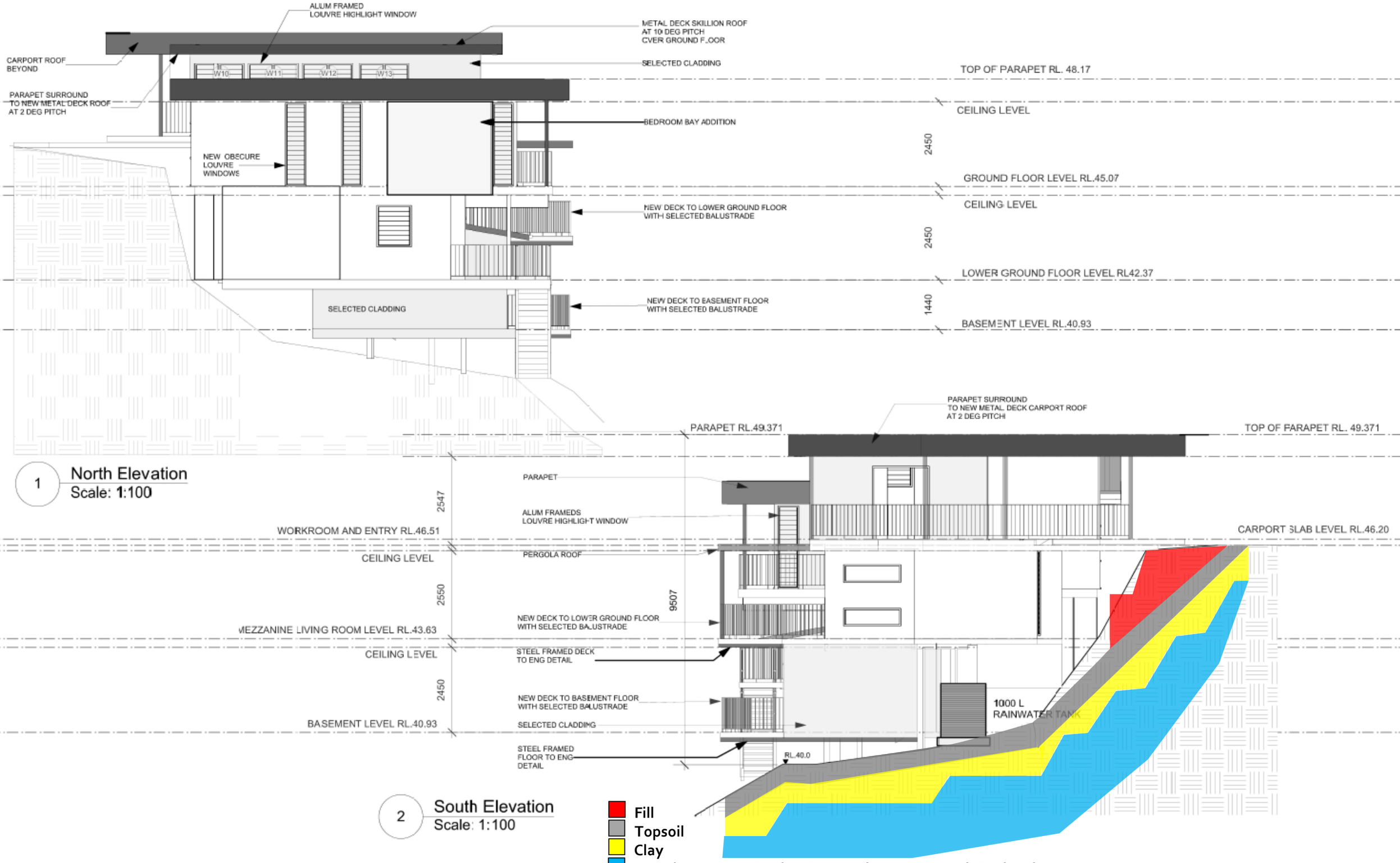
DRAWING: Proposed Basement Plan

PROJECT: ALTERATIONS AND ADDITIONS

PROJECT NO: 283 Hudson

ISSUE TYPE: 2

DRAWN:	SHEET NO:
RJ	A05
CHKD:	SCALE @ A3:
RJ	1:100
ISSUE DATE:	REVISION:
03/05/21	



1 North Elevation
Scale: 1:100

2 South Elevation
Scale: 1:100

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ABN: 26 075 061 335

REVISION:	DATE:	REVISION NOTE:

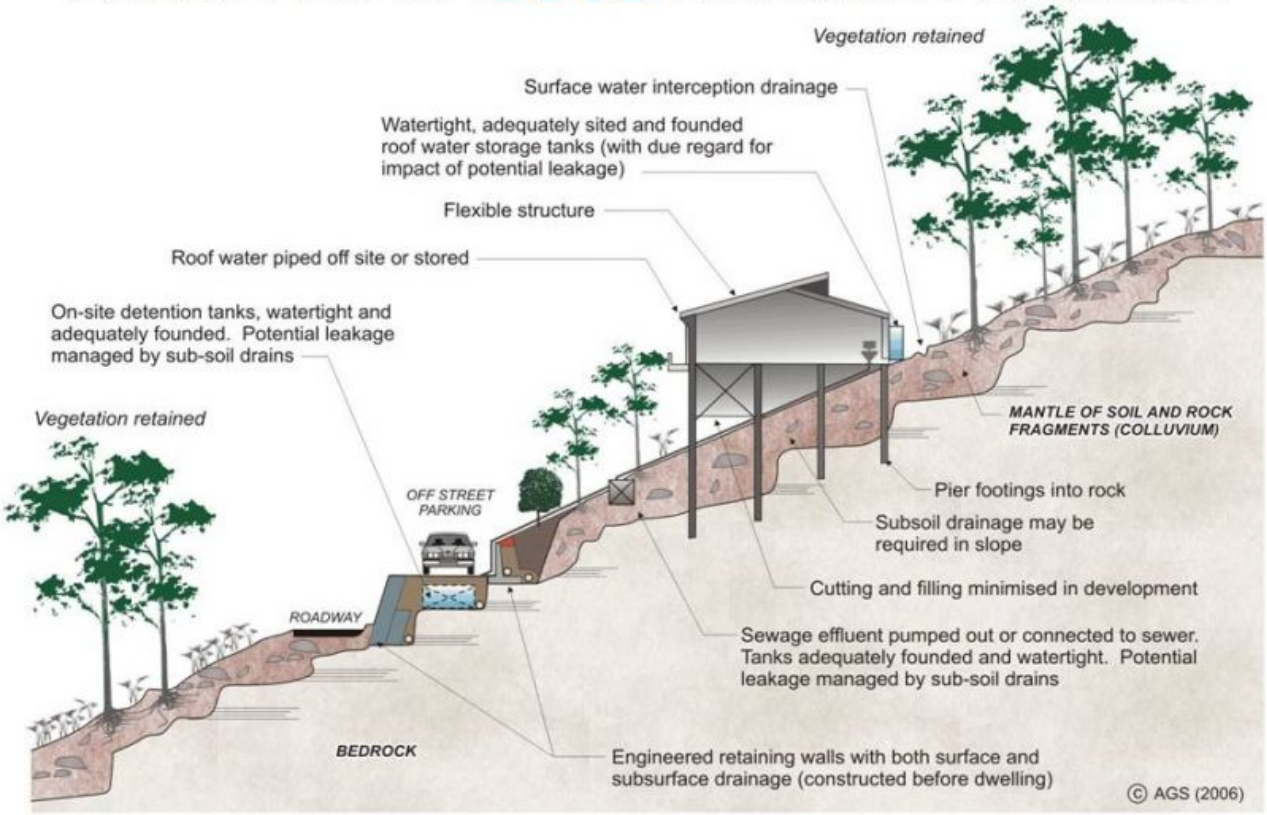
CLIENT: Mr and Mrs Kidner

ADDRESS: 283 Hudson Parade Clareville
LOT 26 DP 228119

DRAWING: NORTH AND SOUTH ELEVATIONS
PROJECT: ALTERATIONS AND ADDITIONS
PROJECT NO: 283 Hudson
ISSUE TYPE: 2

DRAWN: RJ
CHKD: RJ
ISSUE DATE: 03/05/21
SHEET NO: A10
SCALE @ A3: 1:100
REVISION:

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE