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

Development Application for _____
Name of Applicant

Address of site 77, 77A, & 81 Myola Road, Newport

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk ***Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report***

I, Ben White *on behalf of* White Geotechnical Group Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 8/2/21 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 **77, 77A, & 81 Myola Road, Newport**

Report Date: 5/2/21

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 77, 77A, & 81 Myola Road, Newport

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).

Geotechnical Report Details:

Report Title: Geotechnical Report **77, 77A, & 81 Myola Road, Newport**

Report Date: 5/2/21

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **4/2/21**
(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 **2/4/20**

☒ 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 Right of Carriageway at **77, 77A, & 81 Myola Road, Newport**

1. Proposed Development

1.1 Construct a new Right of Carriageway (ROW) to the properties.

1.2 Details of the proposed development are shown on 1 drawing prepared by Adam Clerke Surveyors, drawing reference 4012F_2, dated 7/8/20.

2. Site Description

2.1 The site was inspected on the 4th February, 2021, and previously on the 2nd April, 2020, and 10th March, 2017.

2.2 These irregular and battle-axe-shaped residential properties are on the high side of the road and encompass both flanks of a W-trending ridgeline. At the road frontage, the slope rises gently up the ridgeline but falls at angles that increase to moderate on both flanks. The slopes below continue to fall at increasing angles.

2.3 **77 Myola Road** – At the road frontage, a long concrete ROW runs past the S side of the property (Photo 1). Competent Medium Strength Sandstone outcrops through the N side of the slope that drops away from the ROW (Photo 2). A concrete driveway diverts off the ROW to a parking area near the road frontage (Photo 3). A stable steel and timber framed and clad granny flat has been constructed beside the parking area (Photo 4). The slope between the granny flat and the main house has been terraced with three stable sandstone block retaining walls and a series of stable garden slopes (Photos 5, 6, & 7). The old single-storey split level sandstone block house is supported on brick and sandstone block walls (Photo 8). Some stepped cracking was observed through the mortar of the sandstone blocks on the lower E side of the house (Photo 9). This type of cracking is typical in houses of this age and construction. No

other significant signs of movement were observed in the supporting walls. The house has been partially excavated directly into the outcropping sandstone (Photo 10). A gently sloping lawn extends above the house to the upper common boundary (Photo 11).

2.4 77A Myola Road – At the road frontage, a concrete ROW runs up the slope along the ridgeline to a concrete parking area on the W side of the property (Photo 12). Between the parking area and the house is a near-level lawn covered fill (Photo 13). The fill for this lawn and for the parking area is supported by an old timber crib retaining wall that will be demolished as part of a separate DA (Photo 14). The fill for the lawn is also supported by a stable mortared stack rock retaining wall ~1.0m high in the foundation space of the house (Photo 15). No significant signs of movement were observed in the supporting brick piers and sandstone block walls of the old, single-storey sandstone block and timber framed and clad house (Photo 16). A cut has been made in the slope to provide a level platform for the house. The cut is supported by a stable ~1.6m high concrete block retaining wall (Photo 17). The wall appears to have been tied back with steel rods and displays no significant signs of movement. Along the base of the wall is a low flagging wall that displays some movement.

2.5 81 Myola Road – At the road frontage, a concrete ROW runs up the slope along the ridgeline to a garage on the ground floor of the house and to a carport with studio above on the S side of the property (Photos 18 & 19). An excavation has been made in the slope to level the slope surface for the driveway and house. The cut is supported by a stable retaining wall reaching ~2.3m high that has been mostly dressed in stone (Photos 20 & 21). The two-storey clad house is in good condition (Photo 22). A gently sloping lawn and garden area extends off the N and W sides of the house (Photo 23). An above-ground pool has been constructed in the NE corner of the property (Photo 24). The water level of the pool indicates no ground movement has occurred in the shell of the pool since its construction.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. A band of sandstone was observed to be outcropping across most of the length of the ROW. The sandstone band extends through the otherwise shale-dominated profile.

4. Subsurface Investigation

Eleven Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to bedrock. 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** (~RL63.6)	**DCP 2** (~RL63.9)	**DCP 3** (~RL64.0)	**DCP 4** (~RL63.9)	**DCP 5** (~RL64.8)	**DCP 6** (~RL65.6)
0.0 to 0.3	25	23	32	13	28	33
0.3 to 0.6	9	23	#	#	#	34
0.6 to 0.9	21	18				#
0.9 to 1.2	#	12				
1.2 to 1.5		15				
1.5 to 1.8		15				
1.8 to 2.1		#				
	Refusal on Rock @ 0.9m	Refusal on Rock @ 1.6m	Refusal on Rock @ 0.3m	Refusal on Rock @ 0.2m	Refusal on Rock @ 0.3m	Refusal on Rock @ 0.6m

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

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 7** (~RL67.2)	**DCP 8** (~RL68.8)	**DCP 9** (~RL69.5)	**DCP 10** (~RL70.0)	**DCP 11** (~RL70.4)
0.0 to 0.3	14	13	20	27	16
0.3 to 0.6	3	#	#	#	10
0.6 to 0.9	#				7
0.9 to 1.2					#
	Refusal on Rock @ 0.4m	Refusal on Rock @ 0.2m	End of Test @ 0.3m	Refusal on Rock @ 0.2m	End of Test @ 0.8m

#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 @ 0.9m, DCP bouncing off rock surface, orange clay on damp tip, white and orange clay in collar above tip.
DCP2 – Refusal on rock @ 1.6m, DCP bouncing off rock surface, brown shale fragments on dry tip, brown and orange clay in collar above tip.
DCP3 – Refusal on rock @ 0.3m, DCP bouncing off rock surface, clean dry tip.
DCP4 – Refusal on rock @ 0.2m, DCP bouncing off rock surface, white impact dust on dry tip.
DCP5 – Refusal on rock @ 0.3m, DCP bouncing off rock surface, white impact dust on dry tip.
DCP6 – Refusal on rock @ 0.6m, DCP bouncing off rock surface, white and brown sandstone on dry tip.
DCP7 – Refusal on rock @ 0.4m, DCP bouncing off rock surface, white impact dust on dry tip.
DCP8 – Refusal on rock @ 0.2m, DCP bouncing off rock surface, white sandstone fragments on dry tip.
DCP9 – Refusal on rock @ 0.3m, DCP bouncing off rock surface, white sandstone on dry tip.
DCP10 – Refusal on rock @ 0.2m, DCP bouncing off rock surface, white and orange sandstone on dry tip.
DCP11 – Refusal on rock @ 0.8m, DCP bouncing off rock surface, orange clay on damp tip.

5. Geological Observations/Interpretation

Across the majority of the location of the proposed driveway, the surface features of the block are controlled by the underlying sandstone bedrock that steps up 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 sandy soils and sandy clays that fill the bench step formation. In the test locations across the majority of the uphill side of the proposed driveway, the depth to rock ranged between 0.2 to 0.8m below the current surface, being slightly deeper due to the stepped nature of the underlying bedrock. The sandstone underlying the property is estimated to be medium strength or better as the DCP bounced at the end of every test.

Across the downhill side of the proposed driveway (DCP 1 & 2), the materials encountered were more typical of what we expect to find within the generally shale-dominated Narrabeen Group of Rocks. The natural profile in this location consists of a thin sandy topsoil over silty clays and clays with rock fragments throughout the profile. In the test locations, the clays merge into the weathered zone of the underlying rocks at depths between 0.9 to 1.6m below the current surface, being deeper due to the presence of backfill for the boundary retaining wall below. The weathered zone of the underlying rock is interpreted as Extremely Low to Very Low Strength Shale. This ground 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

Normal ground water seepage is expected to move over the buried surface of the rock and through the cracks. Due to the slope and elevation of the block, the water table is expected to be many metres below the base of the proposed excavation.

7. Surface Water

No evidence of surface flows were observed on the property during the inspection. As the property encompasses the crest of the slope, any surface flows will be generated on the property and will flow away from the property.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below, or beside the properties. The gentle to moderately graded slope that rises over the crest of the ridge and encompasses the three properties is a potential hazard (**Hazard One**).

Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The gentle to moderate slope that rises across the crest of the ridge and encompasses the three properties failing and impacting on the proposed works.
LIKELIHOOD	'Unlikely' (10^{-4})
CONSEQUENCES TO PROPERTY	'Medium' (12%)
RISK TO PROPERTY	'Low' (2×10^{-5})
RISK TO LIFE	5.5×10^{-7}/annum
COMMENTS	This level of risk is 'ACCEPTABLE'.

(See Aust. Geomech. Jnl. Mar 2007 Vol. 42 No 1, for full explanation of terms)

9. Suitability of the Proposed Development for the Site

The proposed development is suitable for the site. No geotechnical hazards will be created by the completion of the proposed development provided it is carried out in accordance with the requirements of this report and good engineering and building practice.

10. Stormwater

No significant additional stormwater runoff will be created by the proposed development.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

The proposed ROW is to be supported directly off the shallow Medium Strength Sandstone that underlies the majority of the proposed driveway location. Across the downhill side, the proposed driveway may be supported on the surface clays. Where the foundation material across the structure changes, expansion joints are to be installed to separate the different foundation materials and to accommodate minor differential movement.

A maximum allowable bearing pressure of 800kPa can be assumed for footings on Medium Strength Sandstone and a maximum allowable bearing pressure of 200kPa can be assumed for footings on clay.

As the bearing capacity of clay and shale reduces when it is wet, we recommend the footings be dug, inspected and poured in quick succession (ideally the same day if possible). If the footings get wet, they will have to be drained and the soft layer of wet clay or shale on the footing surface will have to be removed before concrete is poured.

If a rapid turnaround from footing excavation to the concrete pour is not possible, a sealing layer of concrete may be added to the footing surface after it has been cleaned.

NOTE: If the contractor is unsure of the footing material required, it is more cost-effective to get the geotechnical consultant on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over-excavation in clay-like shaly-rock but can be valuable in all types of geology.

13. Inspections

The client and builder are to familiarise themselves with the following required inspections as well as council geotechnical policy. We cannot provide geotechnical certification for the owner or the regulating authorities if the following inspections have 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

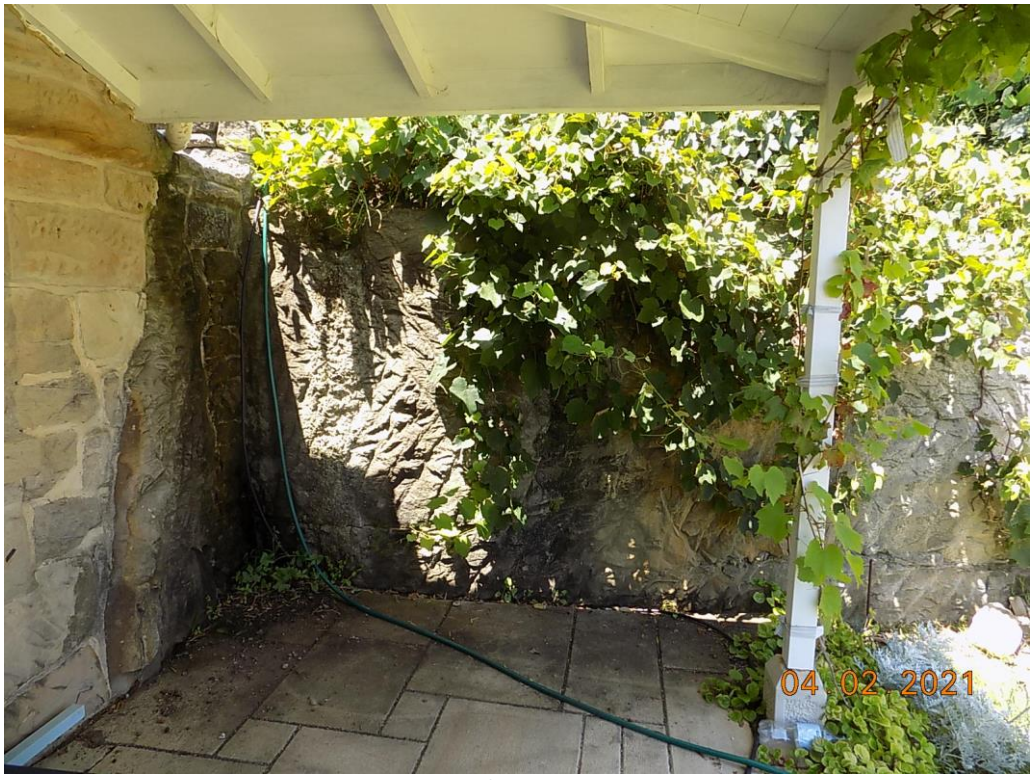


Photo 10

Photo 11

Photo 12

Photo 43

Photo 14

Photo 15

Photo 16

Photo 17

Photo 18

Photo 19

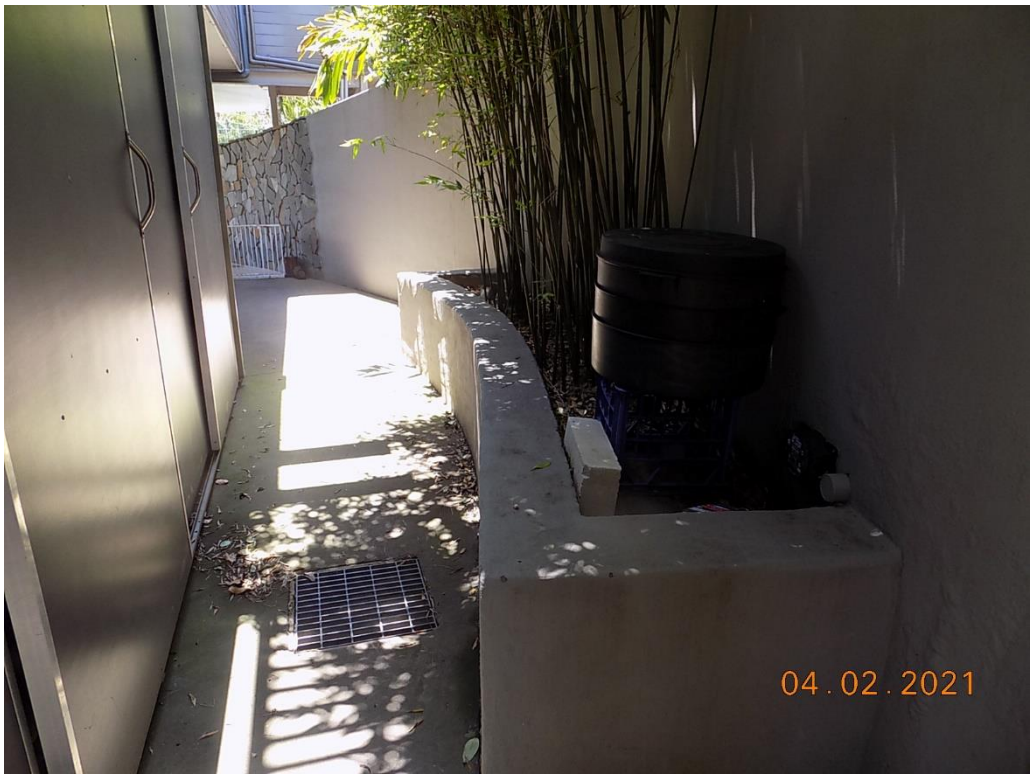


Photo 20

Photo 21

Photo 22

Photo 23

Photo 24

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.

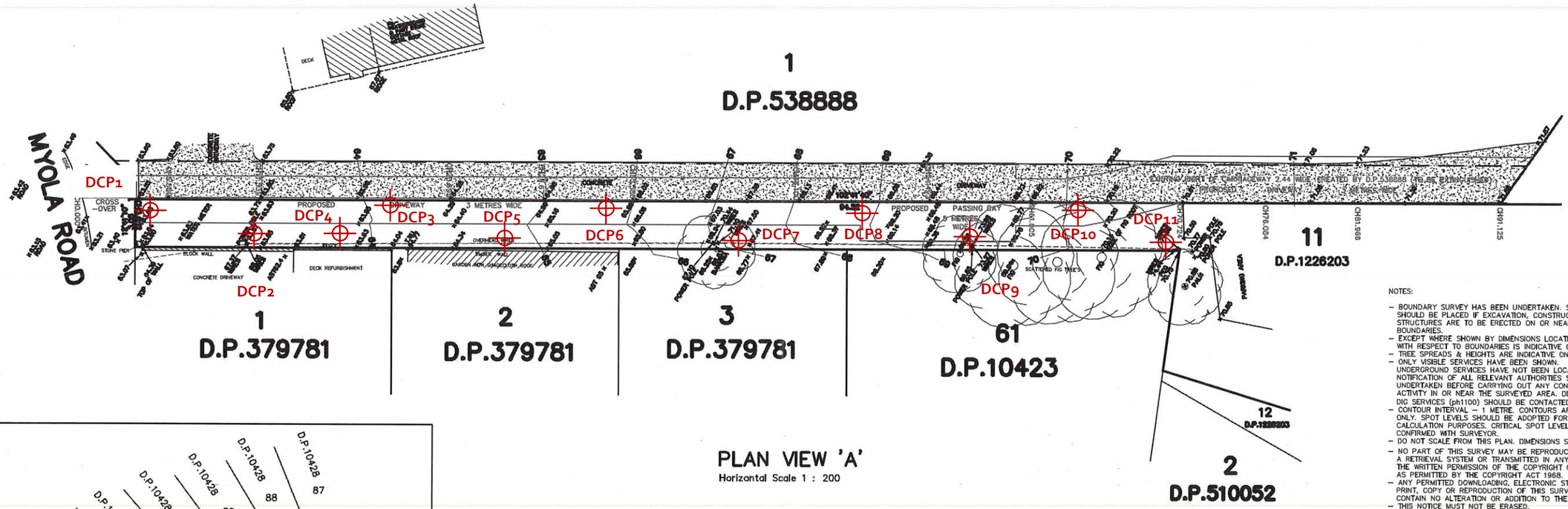
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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



PLAN VIEW 'A'
Horizontal Scale 1 : 200

NOTES:

- BOUNDARY SURVEY HAS BEEN UNDERTAKEN. SURVEY MARKS SHOULD BE PLACED IF EXCAVATION, CONSTRUCTION OR STRUCTURES ARE TO BE ERECTED ON OR NEAR THE BOUNDARIES.
- EXCEPT WHERE SHOWN BY DIMENSIONS LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
- TREE SPREADS & HEIGHTS ARE INDICATIVE ONLY.
- ONLY VISIBLE SERVICES HAVE BEEN SHOWN. UNDERGROUND SERVICES HAVE NOT BEEN LOCATED. NOTIFICATION OF ALL RELEVANT AUTHORITIES SHOULD BE UNDERTAKEN BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA. DIAL BEFORE YOU DIG SERVICES (ph1100) SHOULD BE CONTACTED.
- CONTOUR INTERVAL – 1 METRE. CONTOURS ARE INDICATIVE ONLY. SPOT LEVELS SHOULD BE ADOPTED FOR DESIGN AND CALCULATION PURPOSES. CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
- DO NOT SCALE FROM THIS PLAN. DIMENSIONS SHOULD BE USED.
- NO PART OF THIS SURVEY MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM, WITHOUT THE WRITTEN PERMISSION OF THE COPYRIGHT OWNER EXCEPT AS PERMITTED BY THE COPYRIGHT ACT 1968.
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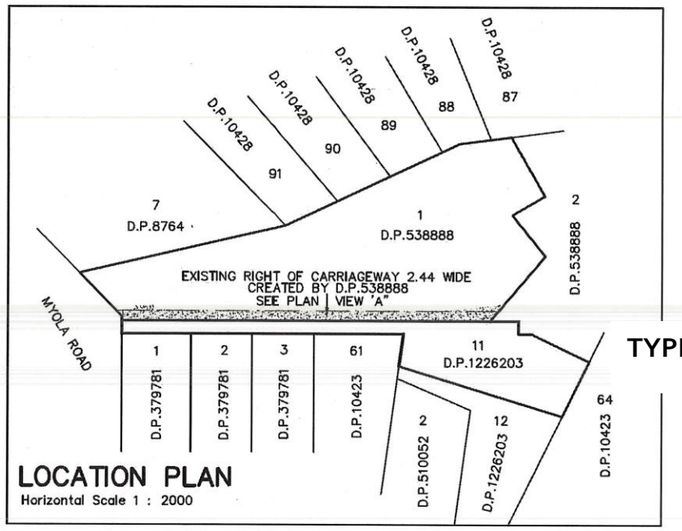
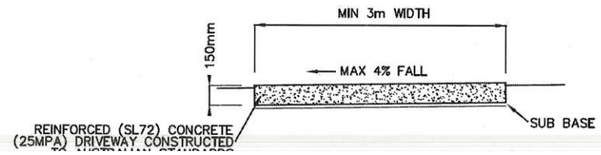
- TITLES AND ENCUMBERANCES HAVE NOT BEEN COMMENTED ON.
- ORIGIN OF LEVELS: P.M.46837 R.L70.95 A.H.D. (SCIMS)
- COPYRIGHT © ADAM CLERKE SURVEYORS PTY LTD 2020
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF JONATHAN MILLIGAN
- PLAN PREPARED BY REGISTERED SURVEYOR FOR DEVELOPMENT APPLICATION PURPOSES ONLY.

Adam Clerke
Registered surveyor No: 8490

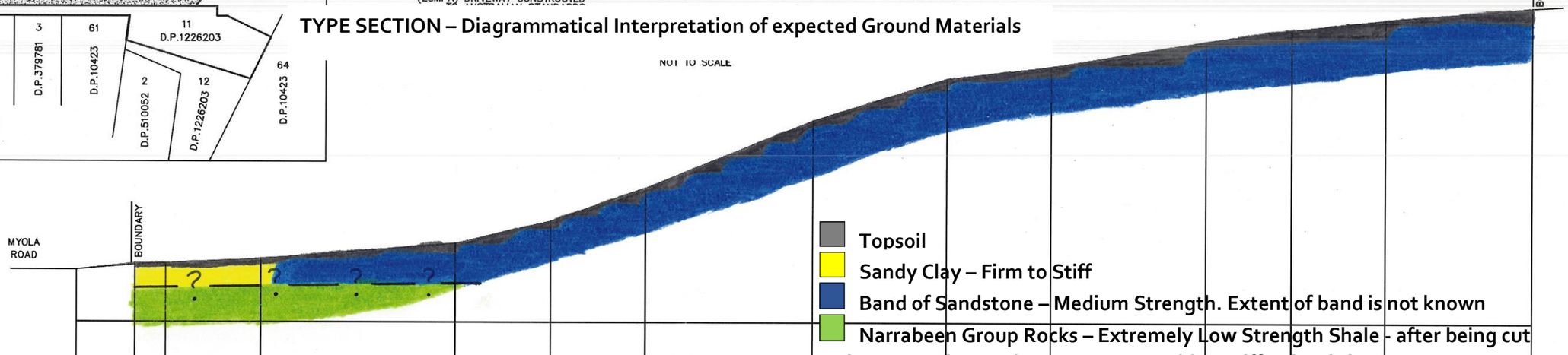


LOCATION PLAN
Horizontal Scale 1 : 2000



TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

NOT TO SCALE



- Topsoil
- Sandy Clay – Firm to Stiff
- Band of Sandstone – Medium Strength. Extent of band is not known
- Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

Datum: 60 Grade Line	ADOPT COUNCIL STANDARD XOVER	1.03%	2.15%	3.98%	11.69%	17.64%	20%	15.66%	5.84%	8.16%	6.87%	5.34%	4.19%	
Existing & Design Elevation	63.450 EXIST 63.550	63.650 DESIGN	63.670	63.798	64.282	64.981	66.024	68.126	69.441	69.821	70.614	70.982	71.296	71.680
Chainage	0.000	3.652	5.580	11.531	23.695	29.677	35.586	46.100	54.493	61.005	70.724	76.084	81.966	91.125

LONGSECTION
Horizontal Scale 1 : 200
Vertical Scale 1 : 100

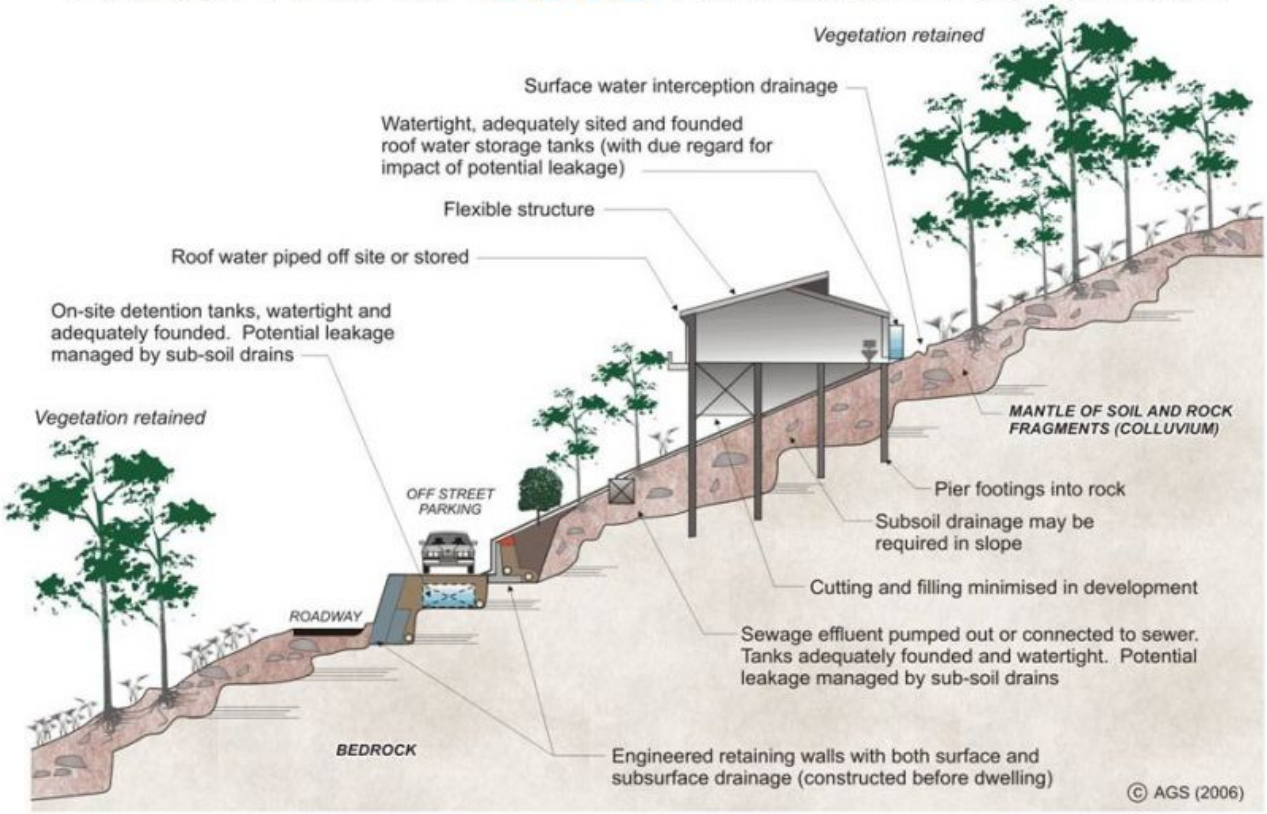
ADAM CLERKE SURVEYORS PTY LTD
Incorporating PAUL KERN & COMPANY
LAND & ENGINEERING SURVEYORS
P.O. BOX 175 NEWPORT NSW 2106
TEL..9918 4111 E..adam@adamclerkesurveyor.com.au

PROPOSED DRIVEWAY

77, 77A & 81 MYOLA ROAD, NEWPORT.

DATE... 7/08/20 REF... 4012F_2
DATUM...A.H.D

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE