54 Bardo Road, Newport

Geotechnical Comments for Section 4.55.

We have reviewed the existing geotechnical report, the original plans, and the 19 amended plans by Giles Tribe, job number 20055, drawings numbered DA001 to DA003, DA005 to DA019 and DA022, dated 13/10/21.

The changes include:

- Alterations to the basement setbacks.
- Other minor alterations.

The changes to the plans are minor from a geotechnical perspective and do not alter the recommendations or the risk assessment in the report carried out by this firm numbered J2746 and dated the 11th August, 2020.

White Geotechnical Group Pty Ltd.

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

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

Development Application for _____
Name of Applicant

Address of site 54 Bardo 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 11/8/20 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least $10million.

I:
Please mark appropriate box

☒ have prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009

☒ am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009

☐ have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with Section 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.

☐ have examined the site and the proposed development/alteration in detail and I am of the opinion that the Development Application only involves Minor Development/Alteration that does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.

☐ have examined the site and the proposed development/alteration is separate from and is not affected by a Geotechnical Hazard and does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.

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

Geotechnical Report Details:

Report Title: Geotechnical Report **54 Bardo Road, Newport**

Report Date: 11/8/20

Author: BEN WHITE

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

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

Australian Geomechanics Society Landslide Risk Management March 2007.

White Geotechnical Group company archives.

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature _____

Name Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements for Geotechnical Risk Management Report for Development Application

Development Application for _____
Name of Applicant

Address of site 54 Bardo 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 **54 Bardo Road, Newport**

Report Date: 11/8/20

Author: BEN WHITE

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

Please mark appropriate box

☒ Comprehensive site mapping conducted **4/8/20**
(date)

☒ Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)

☒ Subsurface investigation required
- ☐ No Justification _____
- ☒ Yes Date conducted **4/8/20**

☒ 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 Seniors Housing Complex at **54 Bardo Road, Newport**

1. Proposed Development

1.1 Demolish the existing house and construct a new single (rear) and two storey (front) seniors housing complex with basement parking by excavating to a maximum depth of ~6.0m into the slope.

1.2 Details of the proposed development are shown on 19 drawings prepared by Giles Tribe, job number 20055, dated 24/7/20. Drawings numbered DA002 to DA004, DA009 to DA018 and DA021 are Revision A. Drawings DA001 and DA005 are Revision B. Drawings DA006 to DA008 are Revision E.

2. Site Description

2.1 The site was inspected on the 4th August, 2020.

2.2 This residential property is on the high side of the road and has a S aspect. The block is located on the gently graded lower middle reaches of a hillslope. The slope rises across the property at an average angle of <5°. The slope gradually increases in grade above the property. The grade below the property continues at gentle angles.

2.3 At the road frontage, a concrete driveway runs to a carport on the downhill side of the house (Photos 1 & 2). A gently sloping lawn is located E of the driveway, carport and house (Photo 3). The one storey brick and timber clad house is supported by brick walls and brick piers (Photo 3). The supporting walls and piers stand vertical and show no significant signs of movement (Photo 4). A gently sloping lawn extends from the uphill side of the house to the uphill property boundary (Photo 5). A fibro shed is located near the NW corner of the property. The house and shed will be demolished and the site will be cleared as part of the proposed works. The adjoining

neighbouring properties were observed to be in good order as seen from the street and subject property.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. It is described as interbedded laminite, shale and quartz to lithic quartz sandstone.

4. Subsurface Investigation

Three auger holes were put down to identify the soil materials. Twelve Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. The locations of the tests are shown on the site plan. It should be noted that a level of caution should be applied when interpreting DCP test results. The test will not pass through hard buried objects so in some instances it can be difficult to determine whether refusal has occurred on an obstruction in the profile or on the natural rock surface. This is expected to have occurred for DCP1 to DCP3, DCP6 and DCP10. 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 (~RL14.8) **–** AH1 (Photo 6)

Depth (m)	**Material Encountered**
0.0 to 0.5	**SILTY SAND**, dark brown, damp, fine to medium grained with fine trace organic matter.
0.5 to 0.6	**HARDPAN (Laterite)**. light brown/orange, damp.

Refusal @ 0.6m in hardpan (laterite). No watertable encountered.

AUGER HOLE 2 (~RL17.7) **–** AH2 (Photo 7)

Depth (m)	Material Encountered
0.0 to 0.5	**SILTY SAND**, dark grey/brown, loose to medium dense, moist, fine to medium grained.
0.5 to 0.7	**HARDPAN (Laterite)**, light brown/orange, moist.

Refusal @ 0.7m in hardpan (laterite). No watertable encountered.

AUGER HOLE 3 (~RL16.5) **–** AH3 (Photo 8)

Depth (m)	Material Encountered
0.0 to 0.7	**SILTY SAND**, dark brown/grey, loose to medium dense, moist, fine to medium grained with fine trace organic matter.
0.7 to 0.8	**HARDPAN (Laterite)**, light brown/orange, moist.
0.8 to 1.1	**SILTY SAND**, dark brown, damp to wet, medium grained.
1.1 to 1.2	**SAND**, light grey/orange, wet, medium grained.
1.2 to 2.2	**SANDY CLAY**, orange, grey and dark brown, soft to very stiff, wet.

End of hole @ 2.2m in very stiff sandy clay. No watertable encountered.

DCP TEST RESULTS ON NEXT PAGE

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** (~RL14.5)	**DCP 2** (~RL14.4)	**DCP 3** (~RL14.8)	**DCP 4** (~RL15.0)	**DCP 5** (~RL16.1)	**DCP 6** (~RL17.0)
0.0 to 0.3	4	3	10	5	8	4
0.3 to 0.6	11	11	20	10	5	14
0.6 to 0.9	5	40	#	14	5	20
0.9 to 1.2	#	#		12	15	#
1.2 to 1.5				21	17	
1.5 to 1.8				32	28	
1.8 to 2.1				40	40	
2.1 to 2.4				#	#	
	Refusal @ 0.7m	Refusal @ 0.9m	Refusal @ 0.5m	End of Test @ 2.0m	End of Test @ 2.1m	Refusal @ 0.7m

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

DCP TEST RESULTS CONTINUE ON NEXT PAGE

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** (~RL17.3)	**DCP 8** (~RL17.8)	**DCP 9** (~RL17.7)	**DCP 10** (~RL17.3)	**DCP 11** (~RL16.8)	**DCP 12** (~RL16.5)
0.0 to 0.3	5	3	3	1F	3	3
0.3 to 0.6	13	3	3	4	6	4
0.6 to 0.9	13	14	20	30	53	11
0.9 to 1.2	28	32	11	#	11	5
1.2 to 1.5	22	22	17		20	5
1.5 to 1.8	30	35	18		24	9
1.8 to 2.1	#	#	23		33	25
2.1 to 2.4			34		37	40
2.4 to 2.7			#		#	#
	End of Test @ 1.8m	End of Test @ 1.8m	End of Test @ 2.4m	End of Test @ 0.8m	End of Test @ 2.4m	End of Test @ 2.4m

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

DCP Notes:

DCP1 – Refusal @ 0.7m, DCP bouncing, dark brown soil on damp tip.
DCP2 – Refusal @ 0.9m, DCP thudding, dark brown sandy soil on wet tip.
DCP3 – Refusal @ 0.5m, DCP thudding, dark brown sandy soil on wet tip.
DCP4 – End of test @ 2.0m, DCP still very slowly going down, brown sandy soil on damp tip.
DCP5 – End of test @ 2.1m, DCP still very slowly going down, brown sandy soil on wet tip.
DCP6 – Refusal @ 0.7m, DCP bouncing, dark brown sandy soil on damp tip.
DCP7 – End of test @ 1.8m, DCP still very slowly going down, dark brown sandy soil on damp tip.
DCP8 – End of test @ 1.8m, DCP still very slowly going down, dark brown sandy soil on damp tip.
DCP9 – End of test @ 2.4m, DCP still very slowly going down, light brown sandy soil on wet tip.
DCP10 – Refusal @ 0.8m, DCP bouncing, dark brown sandy soil on damp tip.
DCP11 – End of test @ 2.4m, DCP still very slowly going down, dark brown sandy soil on damp tip.
DCP12 – End of test @ 2.4m, DCP still very slowly going down, brown sandy soil on wet 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 silty sand, hardpan (laterite) and sand over clays. It is interpreted that DCP1 to DCP3, DCP6 and DCP10 hit refusal on the laterite band. The clays merge into the weathered zone of the under lying rocks at depths of between 1.8m to 2.4m below the current surface. The weathered zone of the underlying rock is interpreted as Extremely Low Strength Shale. 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 was observed in auger hole AH3 and each DCP tip was observed to be damp or wet upon retrieval. This ground water seepage moves over the buried surface of the clay and rock and through the cracks in the rock. A heavy rainfall event occurred a week prior to the testing. The slightly higher than average ground water seepage noted on site is attributed to this rain event and the fact the site is below broad slopes that drain in the direction of the property.

Due to the slope and elevation of the block, the water table in this location 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. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below, or beside the property. The proposed excavation is a potential hazard until the retaining walls are in place (**Hazard One**).

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One
TYPE	The excavation (up to a depth of ~6.0m) collapsing onto the work site and impacting the neighbouring properties before retaining walls are in place.
LIKELIHOOD	'Likely' (10^{-2})
CONSEQUENCES TO PROPERTY	'Medium' (30%)
RISK TO PROPERTY	'High' (2×10^{-3})
RISK TO LIFE	5.3×10^{-4}/annum
COMMENTS	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 the road. Roof water from the 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 ~6.0m will be required to construct the proposed complex. The excavation tapers away in height with the natural slope.

The excavation is expected to be through silty sand and sand to a depth of ~1.2m. Soft to very stiff sandy clays underlie the sand with Extremely Low Strength Shale expected at depths from between ~1.8m to ~2.4m below the current surface.

It is envisaged that excavations through sand, clay and rock up to Low Strength can be carried out with an excavator and bucket. If Medium Strength Rock is encountered it will require grinding or rock sawing and breaking.

12. Vibrations

It is expected the proposed excavation will be carried out with an excavator and bucket and the vibrations produced will be below the threshold limit for building or infrastructure damage.

If harder rock is encountered, excavations through Medium Strength Rock or better should be carried out to minimise the potential to cause vibration damage to the neighbouring houses to the E and W. Close controls by the contractor over rock excavation are recommended so excessive vibrations are not generated.

Excavation methods are to be used that limit peak particle velocity to 10mm/sec at the property boundaries. Vibration monitoring will be required to verify this is achieved.

If a milling head is used to grind the rock, vibration monitoring will not be required. Alternatively, if rock sawing is carried out around the perimeter of the excavation boundaries in not less than 1.0m lifts, a rock hammer up to 300kg could be used to break the rock without vibration monitoring. Peak particle velocity will be less than 10mm/sec at the property boundaries using this method provided the saw cuts are kept well below the rock to broken.

It is worth noting that vibrations that are below thresholds for building damage may be felt by the occupants of the neighbouring properties.

13. Excavation Support Requirements

It is recommended, before the structural design commences for the project, exploration core drilling is to be carried out on the site to confirm to the rock quality and strength. This is to be arranged and supervised by the geotechnical consultant and should consist of a minimum of two cored bore holes taken to a depth of not less than 8.0m each. The following ground support advice can be considered preliminary and will be reviewed on recovery of the drill core. It may change as a result of the assessment of the drill core.

As this job is considered technically complex and due to the depth of the excavation, we recommend it be carried out by builders and contractors who are well experienced in similar work and can provide a proven history of completed work. We recommend a pre-construction meeting between the structural engineer, the builder, and the geotechnical consultant to discuss and confirm the excavation plan and to ensure suitable excavation equipment will be on site.

The excavation will reach a maximum depth of ~6.0m. Allowing for back-wall drainage, the excavation will be set back ~0.9m from the E and W common boundaries, ~1.7m from the E neighbouring house, ~2.1m from the W neighbouring house and ~1.9m from the N common boundary. Due to the depth of the excavation and its proximity to the neighbouring properties and structures, all sides of the excavation will require ground support installed prior to the commencement of the excavation.

We recommend heavy ground support be installed prior to the commencement of the excavation to ensure the safety of any workers below the cut and integrity of the neighbouring properties and structures. As the sand layer of the profile is relatively thick across the property, a Secant or Contiguous Pile Wall is the suggested method of support around the perimeter of the excavation. Secant piles are the preferred option but if contiguous piles are used, the gaps between the piles are to be grouted closed as the excavation is lowered so no sand/sediment moves through the wall. The piers can be supported by embedment, propping, temporary, or permanent rock anchors (depending on

the location of the excavation) installed as the excavation is lowered. To drill the pier holes for the walls, a powerful excavator or small pilling rig that can excavate through Medium Strength Rock will be required. The wall is to be tied into the concrete floor and ceiling slabs after which any temporary support can be released.

It is recommended the builder contact the site Geotechnical Consultant prior to the excavation contractor being engaged to ensure suitable piling equipment is used.

The geotechnical consultant is to inspect the drilling process of the entire first pile and the ground materials at the base of all pier holes/excavations installed for ground support purposes.

All excavation spoil is to be removed from site following the current Environmental Protection Agency (EPA) waste classification guidelines.

14. Retaining Walls

For cantilever or singly-propped retaining walls, it is suggested the design be based on a triangular pressure distribution of lateral pressures using the parameters shown in Table 1.

Table 1 – Likely Earth Pressures for Retaining Walls

Unit	Earth Pressure Coefficients			
	Unit weight (kN/m^3)	'Active' K_a	'At Rest' K_0	Passive
Sand and Residual Clays	20	0.40	0.55	N/A
Extremely Low to Very Low Strength Rock	22	0.25	0.35	Kp 2.5 ultimate
Low Strength Rock	24	0.20	0.35	1000kPa ultimate

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 wall, do not account for any surcharge loads, and assume retaining walls are fully drained, so hydrostatic surcharge loads will need to be accounted for in the design. It should be noted that passive pressure is an ultimate value and should have an appropriate safety factor applied. No passive resistance should be assumed for the top 0.4m to account for any disturbance from the excavation. Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

It should be noted normal seepage will move into the bulk excavation for the proposed basement. We expect this seepage can be removed with a conventional sump and pump system. The bulk excavation is to be periodically inspected by the Geotechnical Consultant to monitor ground water movements into the bulk excavation.

As the downhill side of the basement is embedded a minimum of 2.7m below the current surface, it is suggested the basement be tanked to minimise the use of pumps over the life of the building. Tanking the basement will also result in less impact on soil moisture levels around the development.

15. Foundations

The basement is expected to be seated in Extremely Low Strength Shale. This is a suitable foundation material. Where the proposed building does not fall over the footprint of the excavation, piers taken to Extremely Low Strength will be required. This ground material is expected at depths from between ~1.8m to ~2.4m below the current surface. We note any foundations outside the basement footprint are to be below the zone of influence of the basement retaining walls, where the walls have not been designed for such surcharge loads. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Shale. It should be noted that this material is a soft rock and a rock auger will cut through it, so the builders should not be looking for refusal to end the footings.

As the bearing capacity of 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 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.

REQUIRED INSPECTIONS ON NEXT PAGE

16. 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 geotechnical consultant is to inspect the ground materials while the first pier for the ground support is being dug to assess the ground strength and to ensure it is in line with our expectations.

- All finished pier holes for piled wall/excavations for ground support are to be inspected and measured before concrete is placed.

- The excavation face is to be progressively monitored as it is lowered by the geotechnical engineer/geologist to ensure the ground materials are as expected and to monitor groundwater flows into the bulk excavation.

- 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

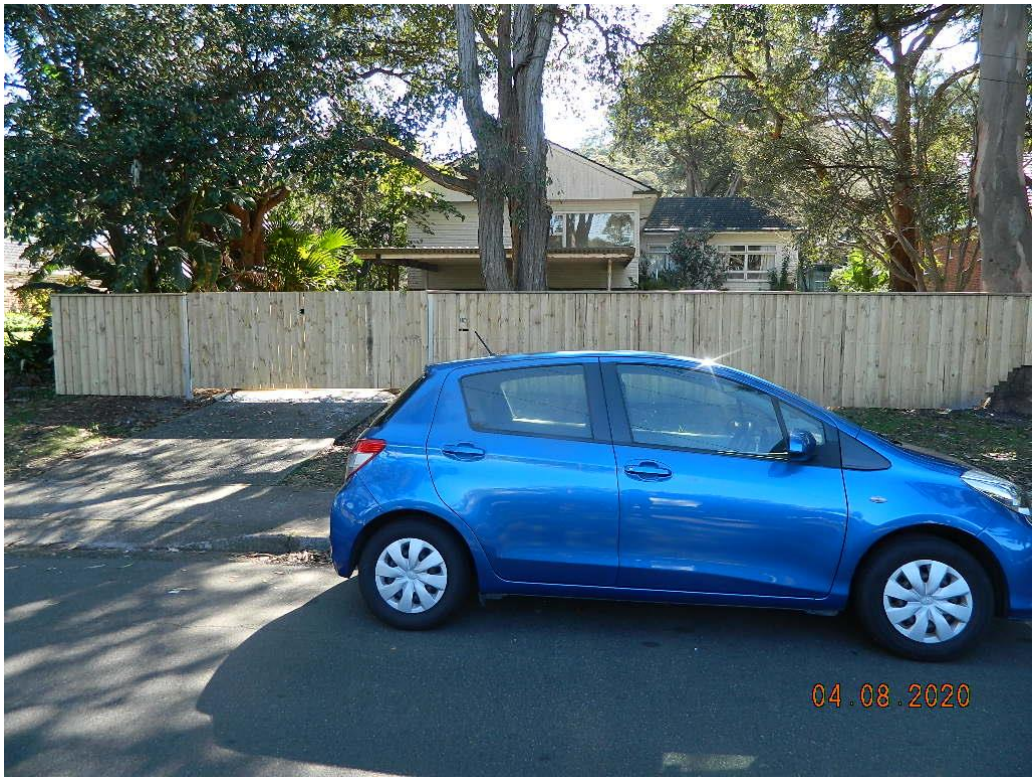


Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6: AH1 – Downhole is from left to right.

Photo 7: AH2 – Downhole is from left to right.

Photo 8: AH3 – 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.

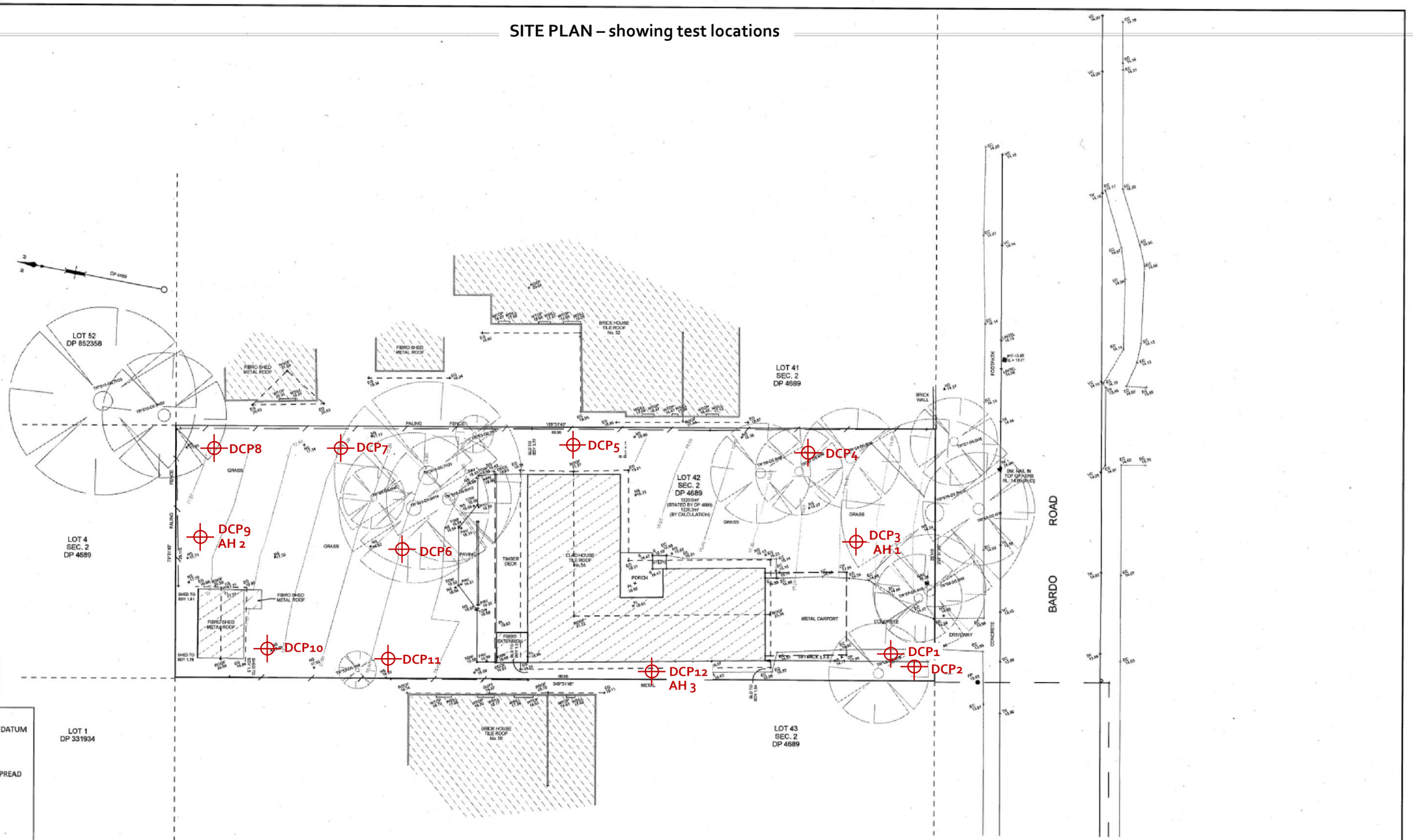
- This report should not be applied to any other project other than that outlined in section 1.0.

- 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.

A1

SITE PLAN – showing test locations



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LEGEND:

AHD	AUSTRALIAN HEIGHT DATUM
AWN	AWNING
BM	BENCH MARK
CONC	CONCRETE
CS	CONCRETE SURFACE
D/H/S	DIAMETER/HEIGHT/SPREAD
D	DOOR
EC	EDGE OF CONCRETE
EG	EAVE & GUTTER
FL	FLOOR LEVEL
GDN	GARDEN
HYD	HYDRANT
IL	INVERT LEVEL
LH	LAMP HOLE
NS	NATURAL SURFACE
PAV	PAVERS
PP	POWER POLE
PL	PORCH LEVEL
RL	REDUCED LEVEL
S	STEPS
SL	SURFACE LEVEL
SILL	WINDOW SILL
SV	STOP VALE
TEL	TELSTRA PIT
TK	TOP OF KERB
TOW	TOP OF WALL
VC	VEHICLE CROSSING
W	WINDOW
WM	WATER METER
WTOP	TOP OF WINDOW

NOTES:

A) SERVICES SHOWN HAVE BEEN DERIVED FROM VISUAL EVIDENCE APPARENT AT THE TIME OF SURVEY. SERVICES MAY EXIST WHICH ARE NOT SHOWN. THE RELEVANT SERVICE AUTHORITY SHOULD BE CONTACTED TO VERIFY THE EXISTENCE AND POSITION OF SERVICES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OR EXCAVATION.
B) DIAMETER, HEIGHT & SPREAD OF TREES ARE APPROXIMATE ONLY.
C) LEVELS SHOWN ARE OF AUSTRALIAN HEIGHT DATUM. ORIGIN OF LEVELS : SSM 24858, RL 12.888 (AHD), CLASS LC.
D) USE STATED DIMENSIONS. DO NOT SCALE.
E) THESE NOTES FORM PART OF THIS PLAN AND CANNOT BE REMOVED.
F) NO COVENANTS AND/OR RESTRICTIONS HAVE BEEN INVESTIGATED BY C & A SURVEYORS PTY LTD.
G) DISTANCES SHOWN ARE IN METERS.
H) BEARINGS ARE ON MAGNETIC NORTH AS PER DP 4689

C & A SURVEYORS NSW P/L
Ph:9630 9299 Fax:9638 1199
Suite 3, Level 4, 460 CHURCH STREET,
NORTH PARRAMATTA NSW 2151
info@candasurveyors.com.au
www.candasurveyors.com.au

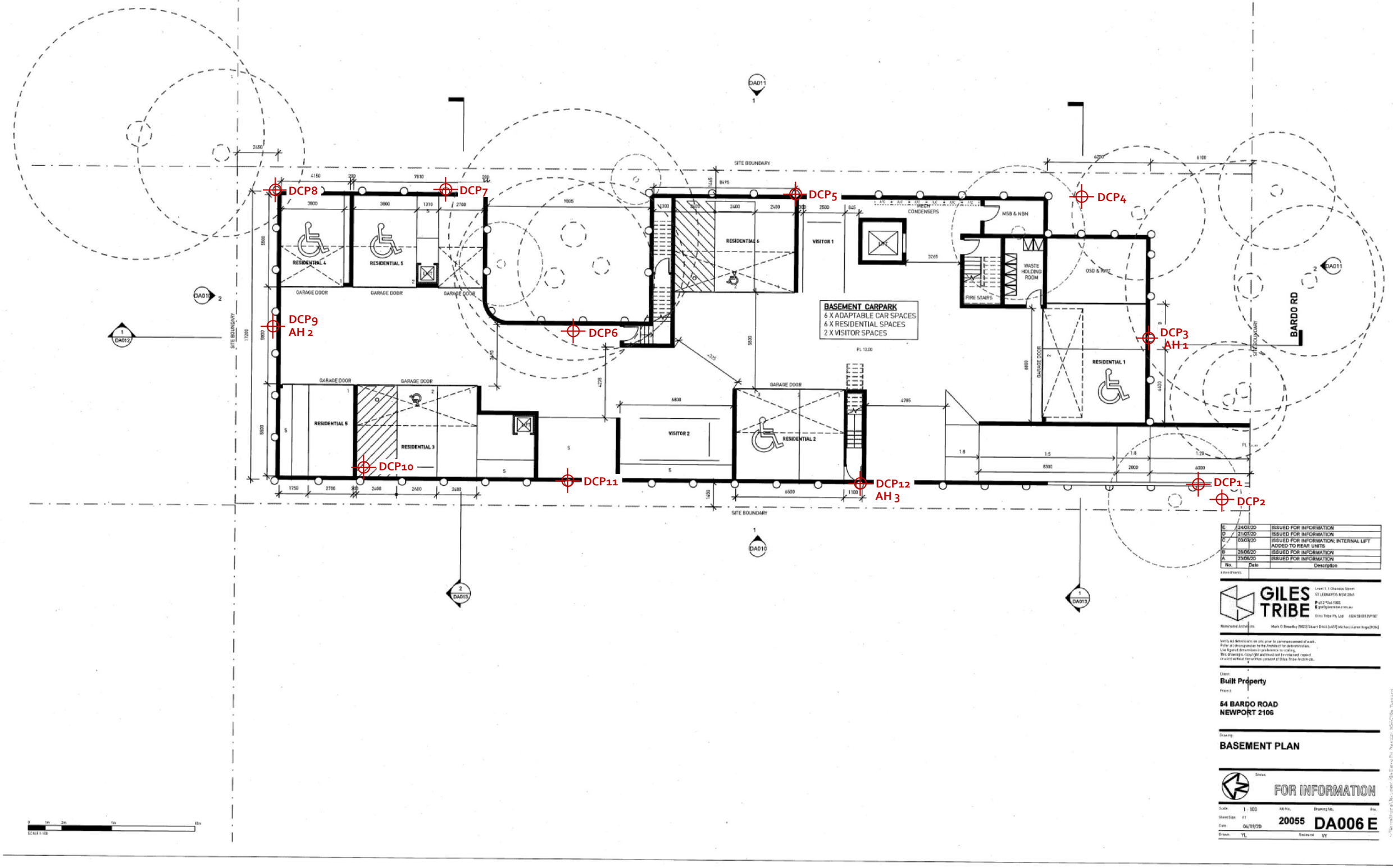
DETAIL & IDENTIFICATION SURVEY OF
LOT 42 SECTION 2 IN DP 4689, LOCATED AT
No. 54, BARDO ROAD, NEWPORT.

INSTRUCTING PARTY: CHEYNE JAMES

Revision No	Description	Date
01	DRAWN FOR ISSUE	24/04/2020
02	DRAWN FOR ISSUE	2/07/2020
03	ADD INFO	4/8/2020
04	ADD INFO	6/8/2020

DATUM:	AHD	SURVEYED BY:	HH
SURVEY DATE:	21/04/2020	DRAWN BY:	HA
DATE DRAWN:	24/04/2020	SCALE:	1:150@A1
REFERENCE:	13949-20 DET/ID	SHEET:	1 OF 1

SITE PLAN – showing test locations



No.	Date	Description
E	24/07/20	ISSUED FOR INFORMATION
D	21/07/20	ISSUED FOR INFORMATION
C	03/03/20	ISSUED FOR INFORMATION; INTERNAL LIFT ADDED TO REAR UNITS
B	26/06/20	ISSUED FOR INFORMATION
A	23/06/20	ISSUED FOR INFORMATION

GILES TRIBE

Client: **Built Property**

Project: **54 BARDO ROAD NEWPORT 2106**

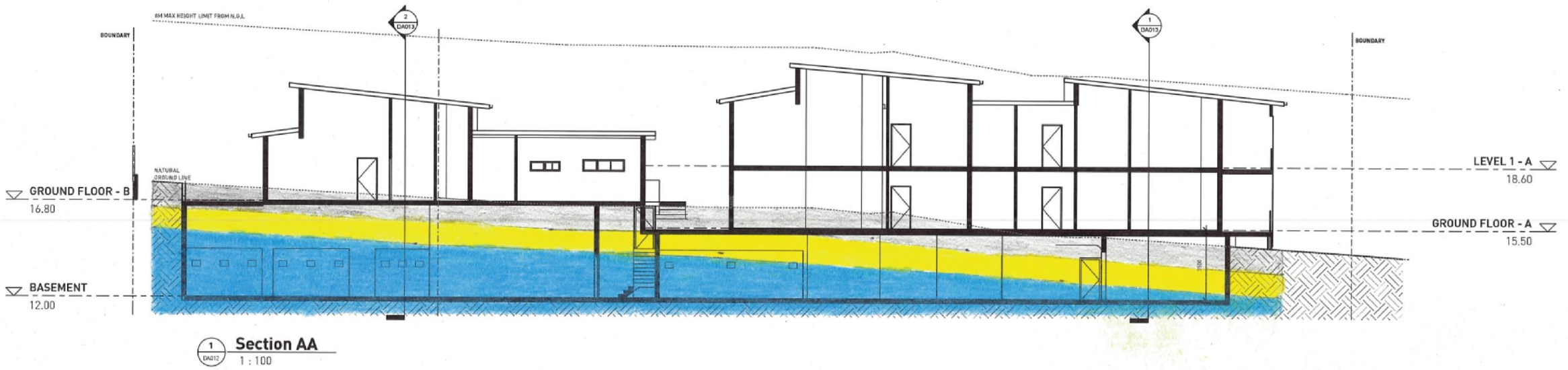
Drawing: **BASEMENT PLAN**

Status: **FOR INFORMATION**

Scale: 1 : 100 | Job No.: 20055 | Drawing No.: DA006 | Rev.: E

Sheet Size: A1 | Date: 04/19/20 | Drawn: YL | Reviewed: VY

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



1 DA012 **Section AA**
1 : 100

Silty Sand
Sandy Clay
Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

0 1m 2m 5m 10m
SCALE 1:100

No.	Date	Description
A	24/07/20	ISSUED FOR INFORMATION

Amendments

GILES TRIBE
Level 1, 1 Chandos Street
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E gt@gilestribe.com.au
Giles Tribe Pty Ltd ABN 58 609 059 582

Nominated Architects: Mark G Brearley [5423] Stuart D Hill [6405] Michael Aaron Nagy [8936]

Verify all dimensions on site prior to commencement of work.
Refer all discrepancies to the Architect for determination.
Use figured dimension in preference to scaling.
This drawing is copyright and must not be reproduced, copied or issued without the written consent of Giles Tribe Architects.

Client
Built Property

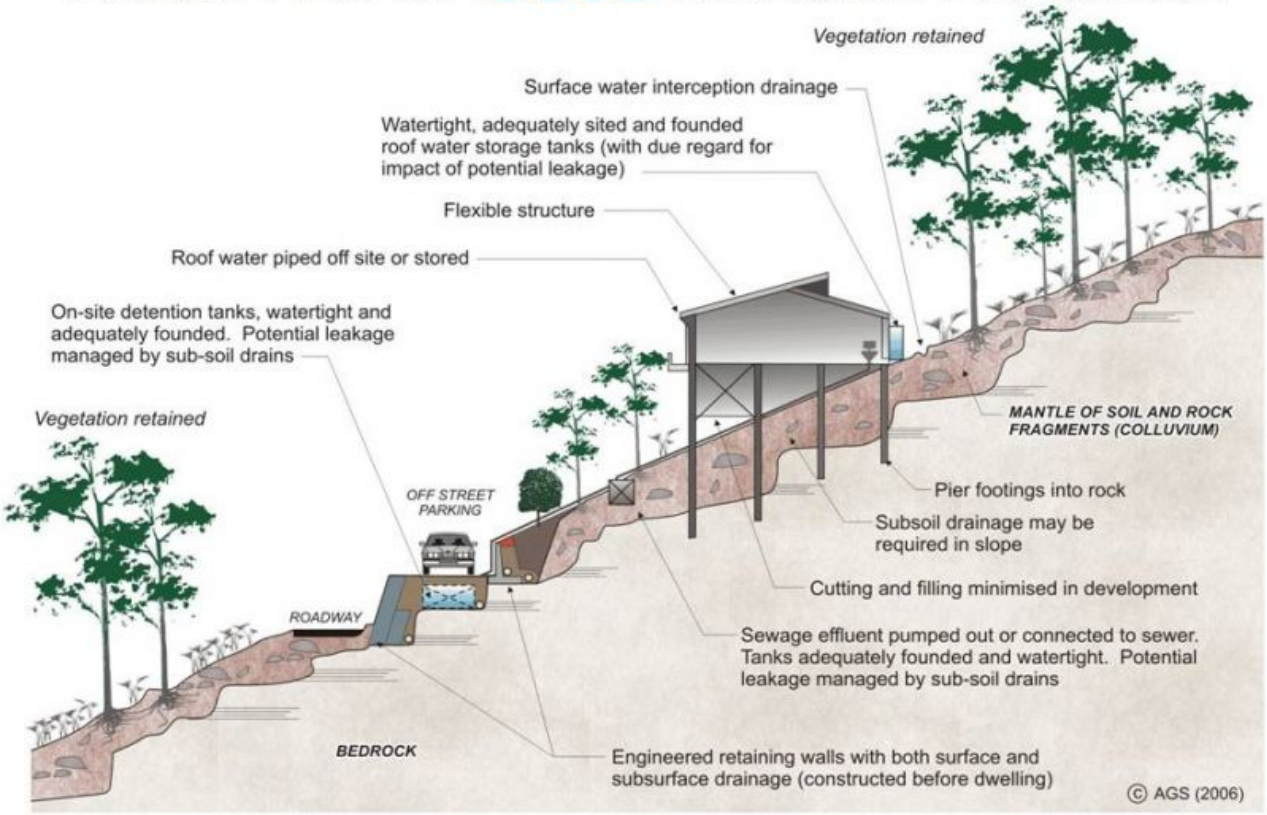
Project
64 BARDO ROAD
NEWPORT 2106

Drawing
SECTION AA & BB

Status
FOR INFORMATION

Scale	1 : 100	Job No.	Drawing No. / Rev.
Sheet Size	A1	20055	DA012 A
Date	06/19/20		
Drawn	YL	Reviewed	VV

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE