GEOTECHNICAL INVESTIGATION:

New house and Granny Flat at **28 Stuart Street, Collaroy**

1. Proposed Development

1.1 Demolish the existing house and garage. Construct a new driveway over the footprint of the old garage.

1.2 Construct a new part four storey house with basement parking below by excavating to a maximum depth of ~6.5m.

1.3 Construct a new granny flat attached to the top floor of the proposed house. The granny flat and entrance to the granny flat requires an excavation to a maximum depth of ~1.6m.

1.4 Details of the proposed development are shown on 20 drawings prepared by Vigor Master, drawings numbered A001 to A007, A101 to A106, A201 to A206 and A301, dated 28/9/21.

2. Site Description

2.1 The site was inspected on the 19th March, 2021.

2.2 This residential property is on the high side of the road and has a N aspect. The block is located on the steeply graded lower middle reaches of a hillslope. The slope falls across the property at an average angle of ~20°. The slope below the property decreases in grade. The slope above the property continues at similar angles for ~60m and then increases in grade for ~70m before reaching the crest of the slope.

2.3 At the road frontage, a bitumen driveway runs to a brick garage (Photo 1). The E brick wall of the garage displays stepped and vertical cracking up to ~28mm thick (Photo 2), but will be demolished as part of the proposed works. Sandstone block, brick and concrete retaining walls up to ~1.4m high support the fill for a terraced lawn area between the road frontage and the house (Photos 3 to 5). The upper and middle concrete retaining walls displays vertical cracks up to ~30mm. It is expected that the walls will be demolished as part of the proposed works. The single storey brick and timber clad house is supported by brick walls, brick piers and steel posts (Photos 6 & 7). The supporting walls, piers and posts stand vertical and show no significant signs of movement (Photos 8 & 9). Brick and rendered brick retaining walls support a low cut for a storage area in the foundation space of the house.

Formed concrete retaining walls up to ~2.2m high support a cut and fill on the uphill side of the house (Photos 7, 10 & 11). Weep holes have been installed in the walls to provide drainage. The southern walls display cracks up to ~30mm thick and a portion of one of the walls has separated ~35mm downslope, but the walls will be demolished as part of the proposed works (Photo 12). A gently sloping lawn and a single storey timber clad studio with storage room below is located on the uphill side of the retaining walls (Photos 13 & 14). The studio is supported by timber posts, concrete walls and brick piers. The supporting concrete walls display some minor cracking but are considered to be stable (Photo 15). Sandstone bedrock is outcropping in the foundation space (Photo 16). A lawn and garden area is located on the uphill side of the studio (Photo 17).

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by Hawkesbury Sandstone although the contact of the Narrabeen Group is shown close to the NE side of the property. We note at a residential scale the map is not always accurate.

4. Subsurface Investigation

One auger hole was put down to identify the soil materials. Ten 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 DCP6. 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 (~RL31.7) **–** AH1 (Photo 22)

Depth (m)	**Material Encountered**
0.0 to 0.4	**FILL**, sandy soil and clayey soil with rock fragments, dark brown and orange, damp, fine to course grained.
0.4 to 0.5	**SANDY SOIL**, dark brown, damp, fine to medium grained.
0.5 to 0.8	**SANDY CLAY**, orange, firm to stiff, damp.

End of hole @ 0.8m in firm to stiff 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** (~RL22.9)	**DCP 2** (~RL24.2)	**DCP 3** (~RL26.2)	**DCP 4** (~RL26.9)	**DCP 5** (~RL29.0)
0.0 to 0.3	4	4	2	2	2
0.3 to 0.6	6	5	5	7	5
0.6 to 0.9	7	5	7	11	24
0.9 to 1.2	8	9	7	18	24
1.2 to 1.5	15	17	10	#	12
1.5 to 1.8	16	18	#		15
1.8 to 2.1	40	35			32
2.1 to 2.4	#	#			#
	End of Test @ 2.1m	End of Test @ 2.0m	Refusal @ 1.3m	Refusal @ 1.2m	Refusal @ 2.1m

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 6** (~RL30.9)	**DCP 7** (~RL35.0)	**DCP 8** (~RL31.5)	**DCP 9** (~RL29.2)	**DCP 10** (~RL26.8)
0.0 to 0.3	3	3	24	2	3
0.3 to 0.6	6	5	17	5	5
0.6 to 0.9	#	5	17	9	6
0.9 to 1.2		7	26	13	25
1.2 to 1.5		14	18	14	#
1.5 to 1.8		15	40	40	
1.8 to 2.1		18	#	#	
2.1 to 2.4		#			
	Refusal @ 0.6m	Refusal @ 1.9m	End of Test @ 1.7m	End of Test @ 1.7m	Refusal @ 1.1m

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

DCP Notes:

DCP1 – End of test @ 2.1m, DCP still very slowly going down, brown sandy soil on wet tip.

DCP2 – End of test @ 2.0m, DCP still very slowly going down, dark brown soil on damp tip.

DCP3 – Refusal on rock @ 1.3m, DCP bouncing off rock surface, white impact dust on dry tip.

DCP4 – Refusal on rock @ 1.2m, DCP bouncing off rock surface, orange rock fragments and orange clay on damp tip.
DCP5 – Refusal on rock @ 2.1m, DCP bouncing off rock surface, orange rock fragments and brown soil on damp tip.
DCP6 – Refusal on rock @ 0.6m, DCP bouncing off rock surface, orange and white rock fragments on dry tip.
DCP7 – Refusal on rock @ 1.9m, DCP bouncing off rock surface, bright orange clayey rock on dry tip.
DCP8 – End of test @ 1.7m, DCP still very slowly going down, white rock fragments on dry tip.
DCP9 – End of test @ 1.7m, DCP still very slowly going down, orange red rock fragments on moist tip.
DCP10 – Refusal on rock @ 1.1m, DCP bouncing off rock surface, orange rock fragments on dry tip.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the test locations, the ground materials consist of fill and a sandy topsoil over sandy clays. Fill to a maximum depth of ~1.4m forms near level lawn areas across the property. The clays merge into the weathered zone of the under lying rocks at depths from between ~0.6m to ~2.1m below the current surface. The weathered zone of the underlying rock is interpreted as Extremely Low to Medium Strength Rock. 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 base of the proposed excavations.

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 beside the property. The moderate to steep slope that falls across the property and continues above and below is a potential hazard (**Hazard One**). The proposed excavation for the house is a potential hazard until the retaining walls are in place (**Hazard Two**). The proposed excavation for the granny flat is potential hazards until the retaining walls are in place (**Hazard Three**). The proposed excavation for the house undercutting the concrete retaining wall on the W side of the house (Photo 21), timber retaining wall that runs along part of the W common boundary (Photos 18 & 19) and concrete block retaining wall that runs along part of the E common boundary (Photo 20) is a potential hazard (**Hazard Four**). The vibrations from the proposed excavations are a potential hazard (**Hazard Five**).

RISK ANALYSIS SUMMARY ON NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two	Hazard Three
TYPE	The moderate to steep slope that falls across the property and continues above and below failing and impacting on the property.	The proposed excavation for the house (up to a depth of ~6.5m) collapsing onto the work site and impacting the neighbouring properties before retaining walls are in place.	The proposed excavation for the granny flat collapsing onto the work site and impacting the neighbouring properties before retaining walls are in place.
LIKELIHOOD	'Unlikely' (10^{-4})	'Likely' (10^{-2})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Medium' (30%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'High' (2×10^{-3})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7}/annum	8.3×10^{-4}/annum	8.3×10^{-6}/annum
COMMENTS	This level of risk is 'ACCEPTABLE'.	This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** are to be followed.	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)

RISK ANALYSIS SUMMARY CONTINUES ON NEXT PAGE

HAZARDS	Hazard Four	Hazard Five
TYPE	The proposed excavation for the house undercutting the concrete retaining wall on the W side of the house (Photo 21), timber retaining wall that runs along part of the W common boundary (Photos 18 & 19) and concrete block retaining wall that runs along part of the E common boundary (Photo 20).	The vibrations produced during the proposed excavations impacting on the surrounding structures.
LIKELIHOOD	'Possible' (10^{-3})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (35%)	'Medium' (15%)
RISK TO PROPERTY	'Moderate' (2×10^{-4})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-5}/annum	5.3×10^{-7}/annum
COMMENTS	This level of risk to life and property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** are to be followed.	This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels the recommendations in **Sections 11 & 12** 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 Stuart Street. 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 ~6.5m is required to construct the proposed new house with basement parking below.

Another excavation to a maximum depth of ~1.6m is required to construct the proposed granny flat/entrance to the granny flat.

The excavations are expected to be through fill, sandy soil and sandy clays, with Extremely Low to Medium Strength Rock expected at depths from between ~1.1m to ~2.1m below the current surface.

It is envisaged that excavations through fill, soil, clay and rock up to Low Strength can be carried out with an excavator and bucket. Excavations through Medium Strength Rock or better will require grinding or rock sawing and breaking.

12. Vibrations

Possible vibrations generated during excavations through fill, soil, clay and rock up to Low Strength will be below the threshold limit for building damage.

Excavations through Medium Strength Rock or better should be carried out to minimise the potential to cause vibration damage to the neighbouring properties to the E and W. Allowing for backwall-drainage, the excavation for the house is set back ~4.0m from the E neighbouring house and ~3.8m from the W neighbouring garage.

Dilapidation reporting carried out on the E and W neighbouring properties is recommended prior to the excavation works commencing.

Excavation methods are to be used that limit peak particle velocity to 5mm/sec at the property boundaries. Vibration monitoring will be required to verify this is achieved. Vibration monitoring must include a light/alarm so the operator knows if vibration limits have been exceeded the equipment is to log and record vibrations throughout the excavation works.

In rock up to Low Strength we expect a machine up to 20 tonnes with a bucket only will be capable to remove the material. Vibrations from this type of equipment are expected to be below the threshold limit outlined.

In Medium Strength rock or better techniques to minimise vibration transmission will be required. These include rock sawing the excavation perimeter to at least 1.0m deep prior to any rock breaking with hammers, limiting rock hammer size, rock hammering in short bursts so vibrations do not amplify, rock breaking with the hammer angled away from the nearby sensitive structures and creating more saw breaks in the rock where vibration limits are exceeded.

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 8.5m 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 depths of the excavations, 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.

An excavation to a maximum depth of ~6.5m is required to construct the proposed new house with basement parking below. Another excavation to a maximum depth of ~1.6m is required to construct the proposed granny flat/entrance to the granny flat. The excavation for the granny flat is set back sufficiently from the surrounding structures and boundaries.

Allowing for backwall-drainage, the house excavation and is set back ~1.5m from the E common boundary, ~2.4m from the W common boundary, ~2.4m from the timber retaining wall that runs along part of the W common boundary (Photos 18 & 19) and ~0.7m from the subject concrete retaining wall (Photo 10).

Due to the depth of the excavation and its proximity to the neighbouring properties, neighbouring structures and subject concrete retaining walls (Photos 7, 10, 11) all sides of the garage floor and lower ground floor excavations will require ground support installed prior to the commencement of the excavation and prior to the demolition of the existing concrete retaining walls. See the Garage Plan and Lower Ground Floor plans attached for the minimum required extent of the shoring shown in blue.

A Spaced Pile Retaining Wall is one of the suitable methods of support. Pier spacing is typically ~2.0m but can vary between 1.6 to 2.4m depending on the design. As the excavation is lowered in 1.5m lifts infill sprayed concrete panels or similar are added between the piers to form the wall. Drainage is installed behind the panels. To drill the pier holes for the walls, a pilling rig that can excavate through Medium Strength Rock will be required. The piers can be supported by embedment or by a combination of embedment and propping. The walls are to be tied into the house structure to provide permanent bracing after which any temporary bracing can be released.

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.

The house excavation requires the removal of the existing concrete retaining walls on the uphill side of the house (Photos 7, 10, 11) and the brick retaining walls supporting the cut for the existing garage (Photos 1 & 2). The retaining walls are to be demolished from the top down prior to the excavations commencing. The fill, soil and clay behind the walls is to be battered at 1.0 Vertical to 1.7 Horizontal (30°) as the walls are demolished.

Where shoring is not required the cut batters through fill and soil the portion are to be battered temporarily at 1.0 Vertical to 2.0 Horizontal (26°) until the retaining walls are in place. Excavations through clay and Rock up to Low Strength will stand unsupported for a short period of time until the retaining walls are in place, provided the cut batters are kept from becoming saturated. Medium Strength Rock or better will stand at vertical angles unsupported subject to approval by the geotechnical consultant.

During the excavation process, the geotechnical consultant is to inspect the cut face in 1.5m intervals as it is lowered to ensure ground materials are as expected and that additional support is not required.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters through fill, soil, clay and rock up to Low Strength are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. The materials and labour to construct the retaining walls are to be organised so on completion of the excavation they can be constructed as soon as possible. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast. For the unsupported cut batters, if the retaining walls are not constructed within a few days of the excavation being completed temporary shoring will be required.

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

14. Retaining Structures

For cantilever or singly-propped retaining 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 ON NEXT PAGE

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
Fill, Soil 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
Medium Strength Rock	24	0.00	0.01	2.0MPa 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 surcharge loads from the existing cut and fill above supported by the existing timber retaining wall (Photos 18 & 19) 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.

A multi-propped or anchored shoring system can be designed using a rectangular lateral earth pressure distribution using a magnitude of 4H kPa for soil/clay and 3H kPa for rock up to low strength, where H is the depth of the excavation in metres (or to the top of competent medium strength rock). Where small movements are not tolerable, the wall can be designed using a magnitude of 6H kPa for soil/clay and 4H kPa for rock up to low strength. Permanent support of the retaining wall is to be provided by bracing from the proposed building.

All retaining structures are to have sufficient back-wall drainage and be backfilled immediately behind the structure with free draining material (such as gravel). This material is to be wrapped in a non-woven Geotextile fabric (i.e. Bidim A34 or similar), to prevent the drainage from becoming clogged with silt and clay. If no back-wall drainage is installed in retaining structures the full hydrostatic pressures are to be accounted for in the retaining structure design.

15. Foundations

The proposed new driveway is suspended over the existing cut for the old brick garage that will be demolished. The suspended driveway is to be supported on piers embedded at least 0.6m into Extremely Low Strength Rock or better. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Rock or better.

The uphill sides of the proposed garage floor and lower ground floor are expected to be seated in Extremely Low Strength Rock or better. Where the house and granny flat are not cut into the weathered rock, piers taken to this material will be required to maintain a uniform foundation material across the structure.

The downhill edge of the proposed house comes flush with the southern brick retaining wall supporting the cut for the existing garage. The footings supporting downhill edge of the house are to be taken to at least 0.3m beyond the base of the cut below.

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.

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.

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.

- During the excavation process, the geotechnical consultant is to inspect the cut face in 1.5m intervals as it is lowered to ensure ground materials are as expected and that additional support is not required.

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

White Geotechnical Group Pty Ltd.

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Engineering Geologist.

Photo 1

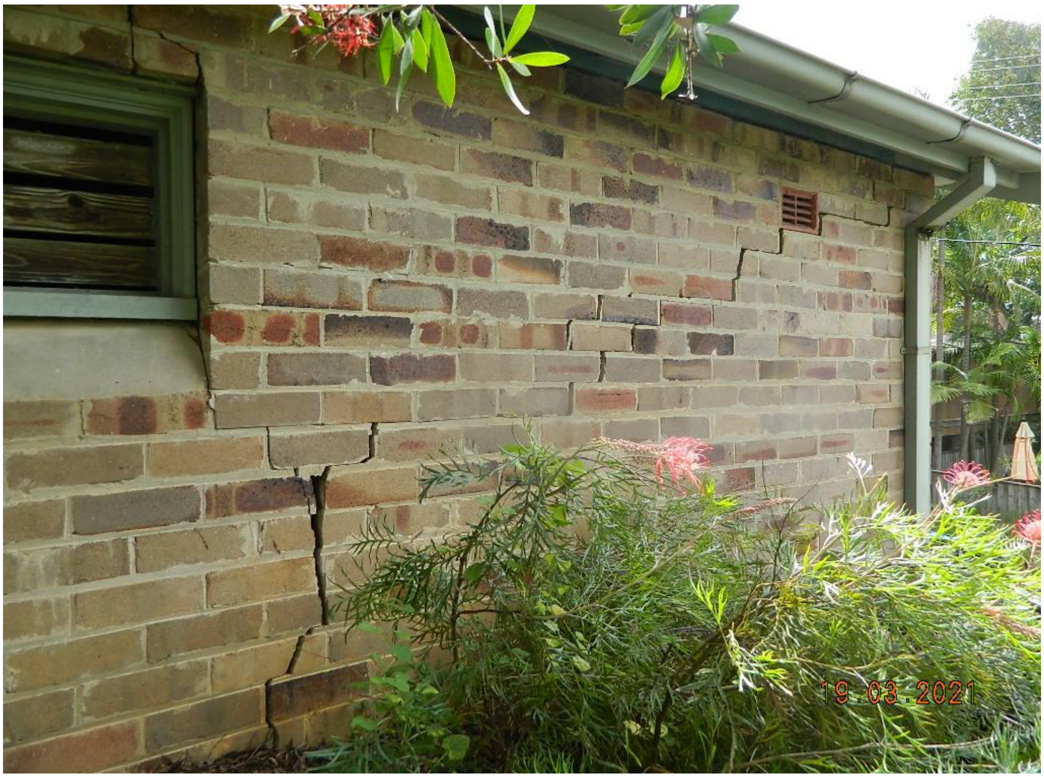


Photo 2

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

Photo 17

Photo 18

Photo 19

Photo 20

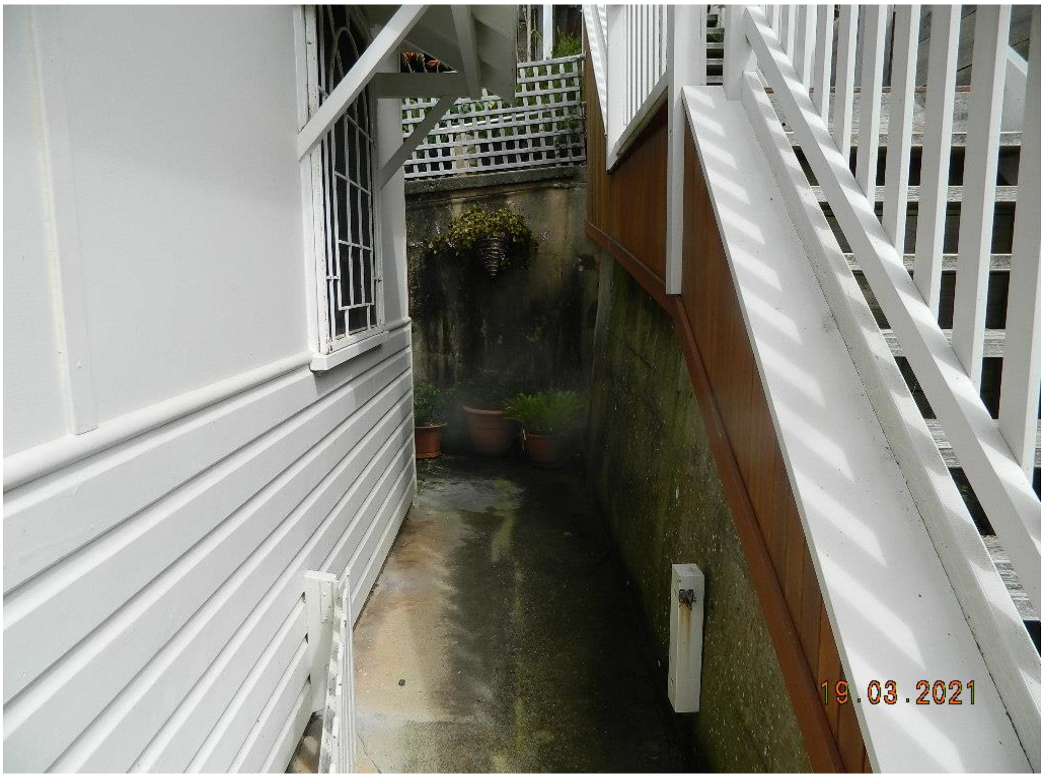


Photo 21

Photo 22: AH1 – Downhole is from left to right.

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.

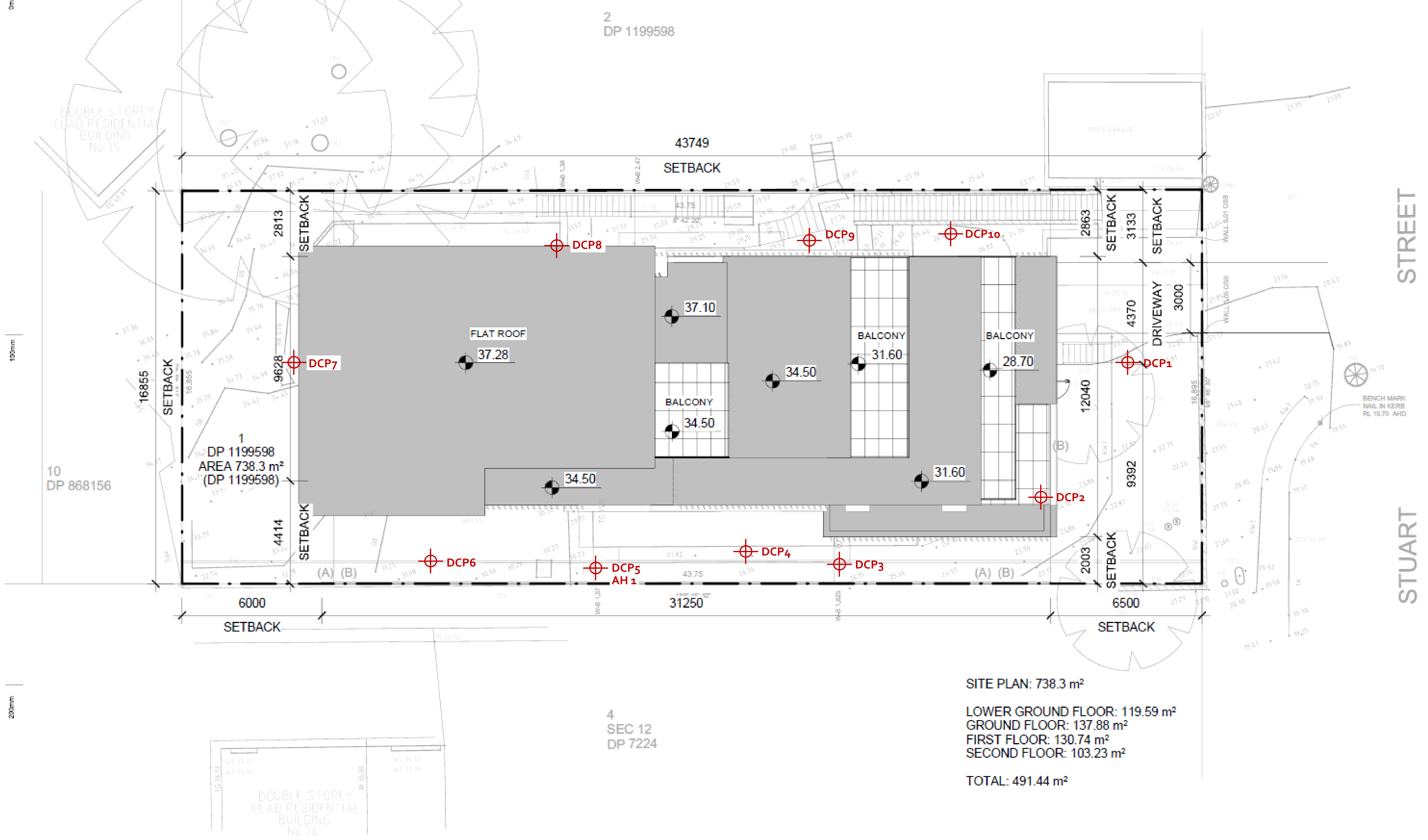
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- 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



SITE PLAN: 738.3 m²

LOWER GROUND FLOOR: 119.59 m²
GROUND FLOOR: 137.88 m²
FIRST FLOOR: 130.74 m²
SECOND FLOOR: 103.23 m²

TOTAL: 491.44 m²

Date	Rev	Amendment

Project:
PROPOSED SINGLE HOUSE

DA

28 Stuart St, Collaroy NSW 2097

VIGOR MASTER
Land Development
Architecture Design
Construction Management

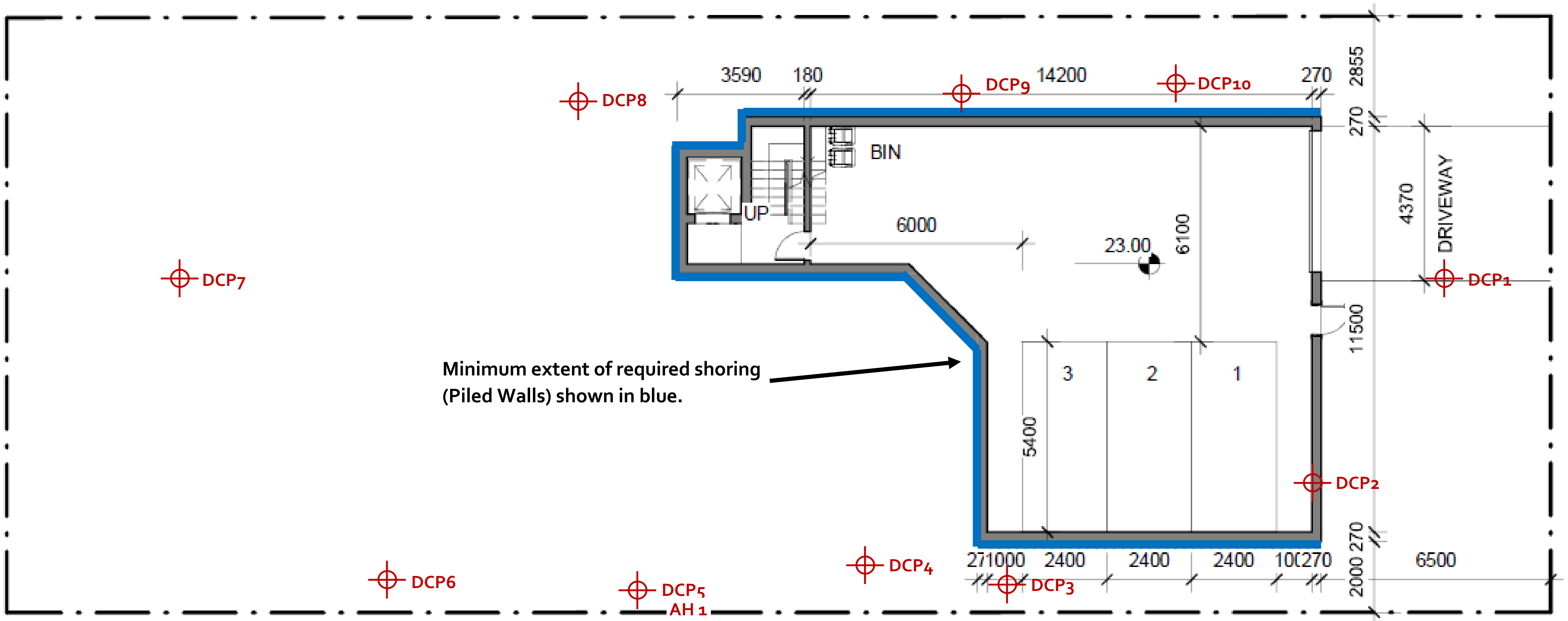
Vigor Master Pty Ltd
Suite 201A, 24 Thomas St, Chatswood NSW 2067
Tel. 02 9411 3998
Fax. 02 9413 3983
Email. info@vigormaster.com.au

Drawn by: RT
Checked by: MW
Title: SITE PLAN

Job NO.: DA28SS
Scale @ A1:
Scale @ A3: 1 : 150
Date: 28.09.2021
Drawing NO.: A001
Rev:

N

GARAGE PLAN – showing test locations



Date	Rev	Amendment

Project:
PROPOSED SINGLE HOUSE

DA

28 Stuart St, Collaroy NSW 2097

VIGOR MASTER
Land Development
Architecture Design
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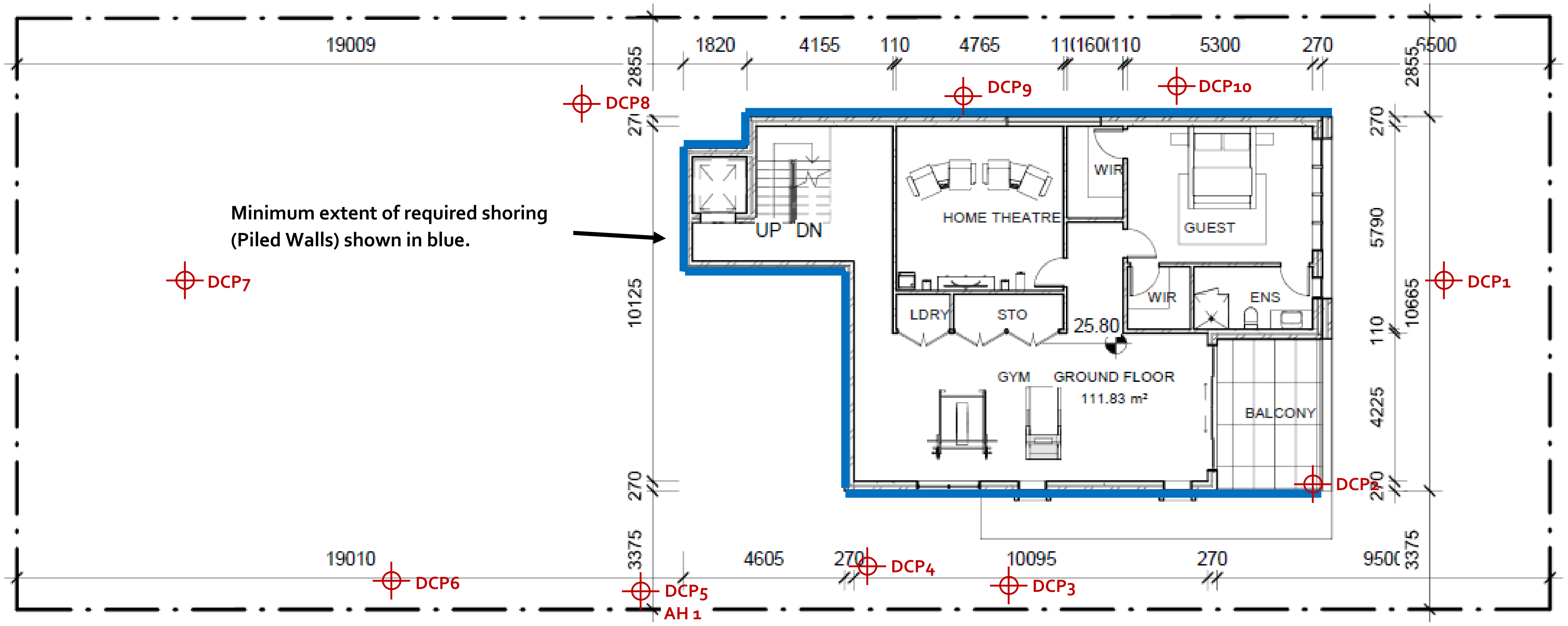
Drawn by: RT
Checked by: MW
Title: GARAGE PLAN

Scale @ A1:
Job NO.: DA28SS
Scale @ A3: 1 : 150
Date: 28.09.2021
Drawing NO.: A101
Rev:

N

0mm 100mm 300mm

Ground Floor – showing test locations



Date	Rev	Amendment

Project:
PROPOSED SINGLE HOUSE

DA

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Email. info@vigormaster.com.au

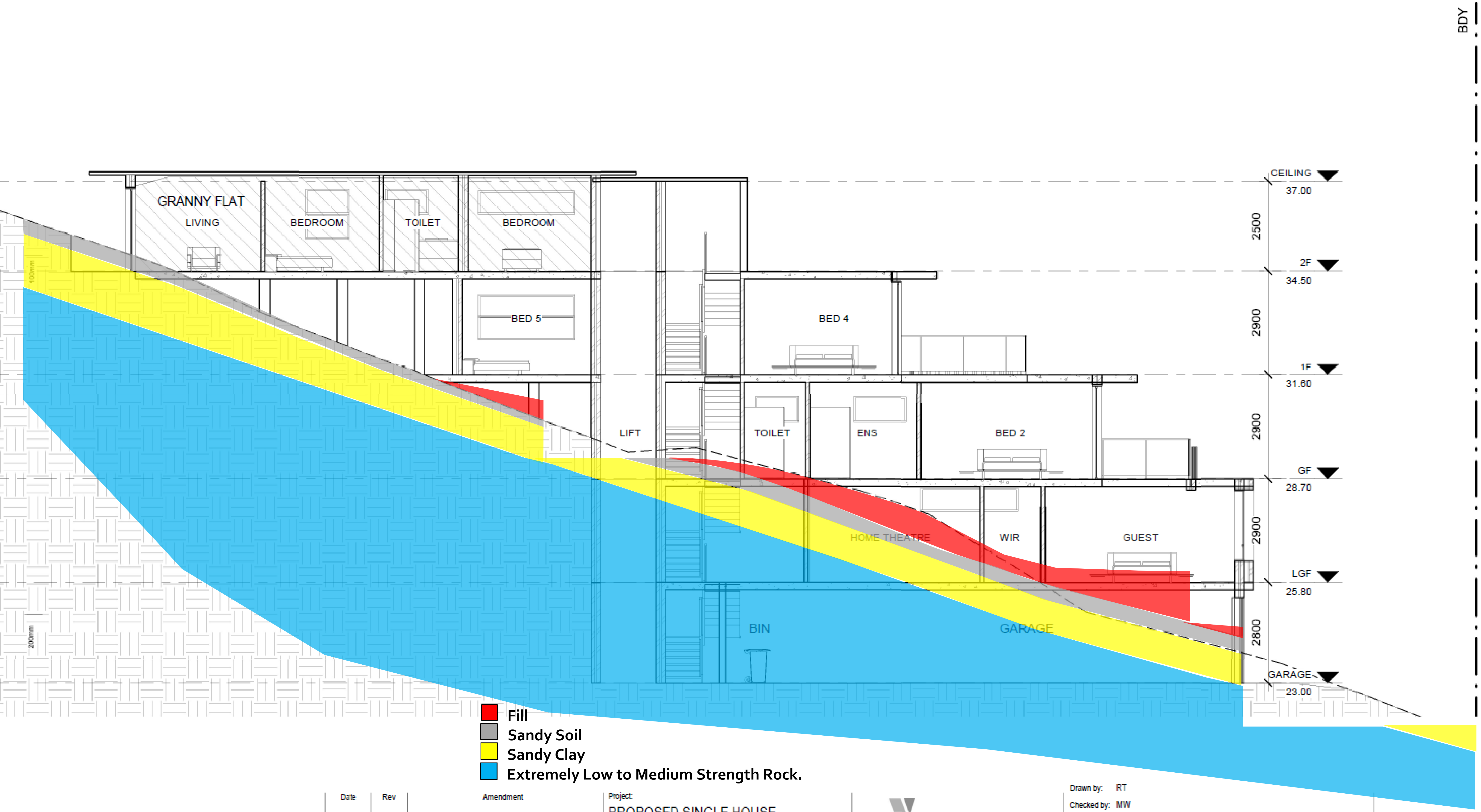
Drawn by: RT
Checked by: MW
Title: LOWER GROUND FLOOR PLAN

Job NO.: DA28SS
Scale @ A1:
Scale @ A3: 1 : 150
Date: 28.09.2021
Drawing NO.: A102
Rev:

N

0mm 100mm 200mm 300mm

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials



Date	Rev	Amendment

Project:
PROPOSED SINGLE HOUSE

DA

28 Stuart St, Collaroy NSW 2097

VIGOR MASTER
Land Development
Architecture Design
Construction Management

Vigor Master Pty Ltd
Suite 201A, 24 Thomas St,
Chatswood NSW 2067
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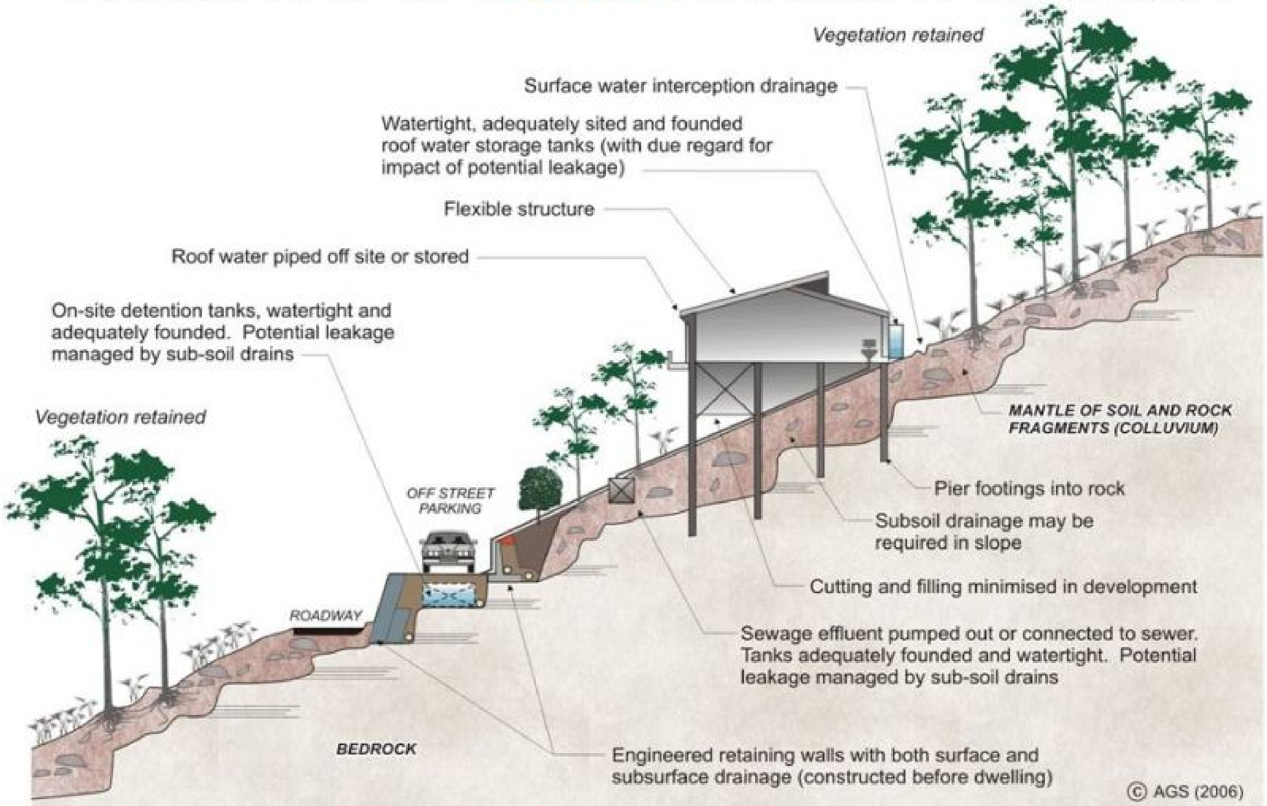
Drawn by: RT
Checked by: MW
Title: SECTION 1

Job NO.: DA28SS
Scale @ A1:
Scale @ A3: 1 : 100
Date: 28.09.2021
Drawing NO.: A204
Rev:

EXAMPLES OF GOOD HILLSIDE PRACTICE



EXAMPLES OF POOR HILLSIDE PRACTICE