GEOTECHNICAL SITE ASSESSMENT REPORT

PROJECT:	**16 Roscommon Crescent, Killarney Heights**
CLIENT:	**Green Design Sydney**
DATE:	**19/05/21**
REPORT No.:	**NE929**

GEOTESTA

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1. INTRODUCTION

The aim of the investigation was to conduct a geotechnical assessment of the site at 16 Roscommon Crescent, Killarney Heights NSW 2087 for the construction of a retaining wall and alterations and additions works. Due to site accessibility and geology only one borehole (BH-1) could be conducted along with two DCPs as shown in Figure 1. Bedrock was encountered at the location nearby the retaining wall to the right side of the property boundary thus no augering could be carried out. The client intends to construct granny flat within the building existing boundary conditions with no extension. This report is based only on the information provided at the time of this report preparation and may not be valid if changes are made to the site or to the construction method and satisfy the council requirements for Clause E10- Landslip Risk.

2. SITE DESCRIPTION

The site is situated at 16 Roscommon Crescent, Killarney Heights NSW 2087, on the northern side of Roscommon Crescent. At the time of investigation, the site was occupied by a double storey residential house. The site is situated at the same level with Roscommon Crescent and was sloping at an angle of approximately 5 degrees towards western direction. A small brick retaining wall of about 0.75m in height and 0.23 m in width was present at the right-hand side boundary of the property (eastern side) over sandstone outcrop at about 1.3 from the face of building wall. The site features with the borehole location is shown in Figure 1. Some detached sandstone blocks were seen on the front yard of the house which does not falls in the zone of construction of retaining wall. It should be noted that, the depth of building foundation level is about 2.0 m from base of retaining wall and founded on sandstone. A concrete block of about 2.3m in length and 0.3m in width and 2 m depth was observed below the brick retaining wall. Some Fill was found behind the brick retaining wall, with few trees. One detached sandstone was observed near the backside of the building. Sandstone outcrops were observed in the backyard. No excavation or site filling will occur in in the vicinity of the sandstone outcrops in the backyard. There is a swimming pool in the eastern property toward the end of the lot.

Figure 1: Site plan and Borehole locations

3. FIELD INVESTIGATION

The site was visited by Geotesta's Geotechnical engineer on 17th May 2021. One (1) borehole (BHs) was drilled using hand auger methods. Three (3) Dynamic Cone Penetrometer (DCP) tests were undertaken one next to the borehole and others as shown in Figure 1 to determine the soil consistency/relative density. The DCP test results is shown tin Table 1. The soil profiles encountered are described in the attached bore logs. The site subsurface materials comprised topsoil materials to a depth of 0.2m underlain by fill Clayey Sand with wood chips to a depth of 0.4m. The fill was following by medium dense Sand with Clay to a depth of 0.6m. The medium dense Sand with Clay was underlain by Sandstone bedrock. The site area was approximately 754 m^2. On the eastern boundary of the site where approximately 1.8 m high retaining wall to be constructed is about 3 m away from the adjacent building/ property.

Table 1: Dynamic Cone Penetration Results

DCP1 (blows/100mm)	DCP2 (blows/100mm)	DCP3 (blows/100mm) (Fill behind retaining wall)
2	2	2
2	3	2
2	3	2
2	R (Double Bouncing)	2
2		4
3		3
R (Double Bouncing)		R (Double Bouncing)

4. GEOLOGY

The geological origin of the soil profile was identified from our visual examination of the soil samples, geotechnical experience, and reference to geological maps of the area. The geological map of the area indicates that the site is underlain by Hawkesbury Sandstone of Middle Triassic Period consisting of medium to coarse grained quartz, sandstone, very minor shale and laminate lenses (Rh) (Department of Mineral Resources, Sydney, Australia 1:100 000 Geological Series Sheet 9130, Edition 1, 1983). The materials encountered in the boreholes confirmed the information on the geological map indicating presence of Sandstone at depths below 0.6m below the existing ground surface.

5. GROUNDWATER

Groundwater was not encountered in the borehole.

6. FOOTING RECOMMENDATIONS

6.1 Pad/Strip Footing/Slab

An engineer designed Class "S" strip and/or pad footing system can be used on this site for the proposed retaining wall provided that the footings are founded on the medium dense Sand/ Sandstone. We recommend that the designing engineer refer to AS2870-2011 to ensure design compliance to this document.

The strip or pad footings should be founded on the medium dense Sand/ Sandstone and should penetrate through any fill material, tree roots and sand layer. As a guide with information obtained from the test locations, the strip or pad footings of the retaining wall should be founded at a minimum depth of 0.7 at these locations. An allowable bearing capacity of 150 kPa can be adopted for the design of pad/strip footings. If the retaining wall foundation is founded on the sandstone a bearing capacity of 1000kPa can be adopted.

7. EXCAVATION, EARTHWORKS, RETAINING WALL & LATERAL EARTH PRESSURES

Based on the architectural drawings provided by the client no major excavation will occur on site. A new retaining wall with the maximum height of 1.8m will be constructed on the eastern boundary adjacent to the sandstone to replace the existing brick retaining wall. The retaining wall foundation will be founded on the existing sandstone bedrock or medium dense sand. For the granny flat alteration, no excavation/filling will be executed. The only minor excavation for the project will be for the foundation of the retaining wall which is not deeper than 0.7m. Any proposed retaining wall at the site with the height greater than 1.5m should be engineer designed. The following materials geotechnical parameters summarised in Table 2 can be adopted for the design.

Table 2: Retaining wall design parameters

Unit/ Soil Type	γ (kN/m3)	K_0	K_a	K_p
Fill	18	0.63	0.45	2.20
Medium Dense Sand (0.4-0.6m)	18	0.47	0.31	3.25

Excavation within the uppermost topsoil layer and the underlying medium dense sand are not expected to encounter any difficulty. Excavations to be performed adjacent to existing footings or structures have the potential to undermine them. Excavations should only be undertaken above the footing pressure projection line which, as a guide, can be taken as a line projected 30-45° from the horizontal at the base of the footing. The proposed retaining wall will be constructed approximately 1.3m to the right side of building wall. This must be taken into consideration when designing the retaining wall structure.

It is recommended that a suitable drainage system be installed and maintained behind all retaining wall structures to ensure the dissipation of any hydrostatic forces which may result from the accumulation of any seepage water behind the wall structures. Such seepage water flows should readily be able to be intercepted by the construction of a suitable sub-surface cut-off drain on the high side of the subject site.

8. PRELIMINARY LANDSLIP RISK ASSESSMENT AND CONCLUSIONS

The site is located within 'Area B' on the Warringah Local Environmental Plan 2011 Landslip Risk Map. Area B is a site described as with flanking topography with sloping angle varying

from 5 to 25 degrees. Area B includes Colluvial and residual soils, possibly deeper than in Class A, developed on Hawkesbury Sandstone. Minor detached sandstone blocks, occasional exposures of sandstone in cliffs and road cuts. Slope angle is between 5 to 25 degrees. Occasional fill areas associated with playing fields, roads and some developments. To ensure the development was geotechnically stable a site visit was conducted by geotechnical engineer on 17th May 2021. A preliminary assessment of the site was carried out in accordance with the Checklist of Council's Assessment of site conditions. The assessment carried out is described in detail below and results concluded.

Review of Historical Data

The site and surrounding properties were observed to be constructed on early 1970's. After reviewing the site development condition along with surrounding properties, it can be concluded that there was no (unknown) history of slope instability on the site.

Existing Site Condition and Proposed Development

No excavations or fill deeper/higher than 2m is proposed for construction of granny flat and the proposed retaining wall. As no major excavations occur for the construction of the proposed retaining wall, the proposed development including construction of the retaining wall does not have adverse effect on the stability of the sandstone bedrock and outcrops on the eastern boundary of the site. There will be no construction works on the other side of the building. No possible slope instability noted during the inspection. Care must be taken for the foundation of the existing swimming pool adjacent to the retaining wall. We assume no excavation activities will occur in the vicinity of the swimming pool affecting the pool stability.

Conclusions

Based on the site inspection observations and the proposed construction plan provided by the client, it is the opinion of Geotesta that replacing the existing brick retaining wall with a new retaining wall with the maximum heigh of 1.8m, does not results in any slope instability. The site at its existing condition is stable from the landslip risk point of view and no further report is required for Landslip Risk Assessment. This conclusion assumes no major excavation occurs for the construction of the retaining wall. If the site conditions during the development change from the assumption considered in this report, the site must be re-assessed.

7. GENERAL RECOMMENDATIONS

- Good drainage is an important part of any footing design. The Builder should follow all of the drainage requirements in AS 2870 to prevent water accumulation near the retaining wall footings.
- Avoid excavations close to footings since those founded on possible sandy soils can experience settlements while those founded in clayey soils can also move due to the shrinking and swelling of the clay. Plumbers and drainers should follow all the recommendations made in AS 2870 and other appropriate codes with respect to drainage works.
- It is also recommended that the Owners follow the requirements of AS 2870 and the C.S.I.R.O. BTF18 (www.csiro.au), which requires Owners to carry out regular maintenance of drainage and care for the soil moisture conditions.

11. CONDITIONS OF THE RECOMMENDATIONS

- This report is a preliminary geotechnical report only and the information provided shall not be regarded as an engineering design nor shall it replace a design by engineering principles although it may contribute information for such designs. It shall be read in conjunction with AS 2870 and must be reproduced only in total.
- The advice given in this report is based on the assumption that the test results are representative of the overall subsurface conditions. However, it should be noted that actual conditions in some parts of the building site may differ from those found in our test holes. If excavations reveal soil conditions significantly different from those shown in our attached Borehole/Test Pit Log(s), Geotesta must be consulted and excavations stopped immediately.
- Any sketches in this report should be considered as only an approximate pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions or slope information should not be used for any building cost calculations and/or positioning of the building.
- Whilst Geotesta has accepted the commission for the work reported herein, the ownership of the report and any liabilities associated with it, remain with Geotesta until all relevant accounts have been paid.

For and on behalf of
GEOTESTA PTY LTD

Dr. Mohammad Hossein Bazyar
BEng MEng PhD MIE Aust CPEng NER
Senior Geotechnical Engineer

Information about This Report

The report contains the results of a geotechnical investigation conducted for a specific purpose and client. The results should not be used by other parties, or for other purposes, as they may contain neither adequate nor appropriate information. In particular, the investigation does not cover contamination issues unless specifically required to do so by the client.

Test Hole Logging

The information on the test hole logs (boreholes, test pits, exposures etc.) is based on a visual and tactile assessment, except at the discrete locations where test information is available (field and/or laboratory results). The test hole logs include both factual data and inferred information.

Groundwater

Unless otherwise indicated, the water levels presented on the test hole logs are the levels of free water or seepage in the test hole recorded at the given time of measuring. The actual groundwater level may differ from this recorded level depending on material permeability (i.e. depending on response time of the measuring instrument). Further, variations of this level could occur with time due to such effects as seasonal, environmental and tidal fluctuations or construction activities. Confirmation of groundwater levels, phreatic surfaces or piezometric pressures can only be made by appropriate instrumentation techniques and monitoring programmes.

Interpretation of Results

The discussion or recommendations contained within this report normally are based on a site evaluation from discrete test hole data. Generalized, idealized or inferred subsurface conditions (including any geotechnical cross-sections) have been assumed or prepared by interpolation and/or extrapolation of these data. As such these conditions are an interpretation and must be considered as a guide only.

Change in Conditions

Local variations or anomalies in the generalized ground conditions do occur in the natural environment, particularly between discrete test hole locations. Additionally, certain design or construction procedures may have been assumed in assessing the soil-structure interaction behaviour of the site. Furthermore, conditions may change at the site from those encountered at the time of the geotechnical investigation through construction activities and constantly changing natural forces.

Any change in design, in construction methods, or in ground conditions as noted during construction, from those assumed or reported should be referred to GEOTESTA for appropriate assessment and comment.

Geotechnical Verification

Verification of the geotechnical assumptions and/or model is an integral part of the design process - investigation, construction verification, and performance monitoring. Variability is a feature of the natural environment and, in many instances, verification of soil or rock quality, or foundation levels, is required. There may be a requirement to extend foundation depths, to modify a foundation system or to conduct monitoring as a result of this natural variability. Allowance for verification by geotechnical personnel accordingly should be recognized and programmed during construction.

Reproduction of Reports

Where it is desired to reproduce the information contained in our geotechnical report, or other technical information, for the inclusion in contract documents or engineering specification of the subject development, such reproductions should include at least all of the relevant test hole and test data, together with the appropriate standard description sheets and remarks made in the written report of a factual or descriptive nature. Reports are the subject of copyright and shall not be reproduced either totally or in part without the express permission of Geotesta.

Appendix A
Borehole Logs

BOREHOLE LOG

BOREHOLE No: BH1

Page: 1 **of** 1

Client:	Green Design Sydney	Drilling Co:	Geotesta	Easting:	---
Project:	16 Roscommon Crescent-Killary Heights	Driller:	BB	Northing:	---
Job No:	NE929	Rig Type:	Hand Auger	Grid Ref:	See Figure 1
Location:	16 Roscommon Crescent-Killary	Inclination:	Vertical	Collar RL:	
Date Drilled:	17/05/21	Bearing:	Vertical	Logged by:	BB Checked by: M.H.B

Test Method: AS 1289.6.3.2-1997 & AS 1726-2017

Depth (m)	Drilling Method	Graphic Log	Group Symbol	MATERIAL DESCRIPTION Type, colour, particle size and shape, structure	Moisture	Consistency / Strength	DCP blows/100mm	FIELD TESTS & NOTES	Sampling / Runs	Water Levels Depth (m)
0.00										0.00
				TOPSOIL: Silty CLAY with rootlets, brown	M		2 2			
				Fill: Clayey Sand, red/ yellow brown, wood chips	M		2 2			
0.50			CL	Sand with **CLAY**, light brown and red brown,well graded, angular	M	MD	2 3			0.50
				Sandstone, grey,extremely weathered, fine to medium grained	M	H	R	Double Bouncing		
1.00				Borehole terminated at 0.70m depth, due to refusal						1.00
1.50	Hand Auger									1.50
2.00										2.00
2.50										2.50
3.00										3.00
3.50										3.50
4.00										4.00
4.50										4.50
5.00										5.00

consistency:

VS	very soft		
S	soft		
F	firm		
ST	stiff		
VST	very stiff		
H	hard		
WC	well compacted		

relative density:

VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

EL: extremly low strength

moisture:

D	Dry
M	Moist
W	Wet
S	Saturated

water:

▼ water level

▼ level risen to

water inflow

Notes:

No groundwater was encountered

Disturbed Sample

sampling / testing:

intact sample from core

T intact tube sample

Standard Penetration Test

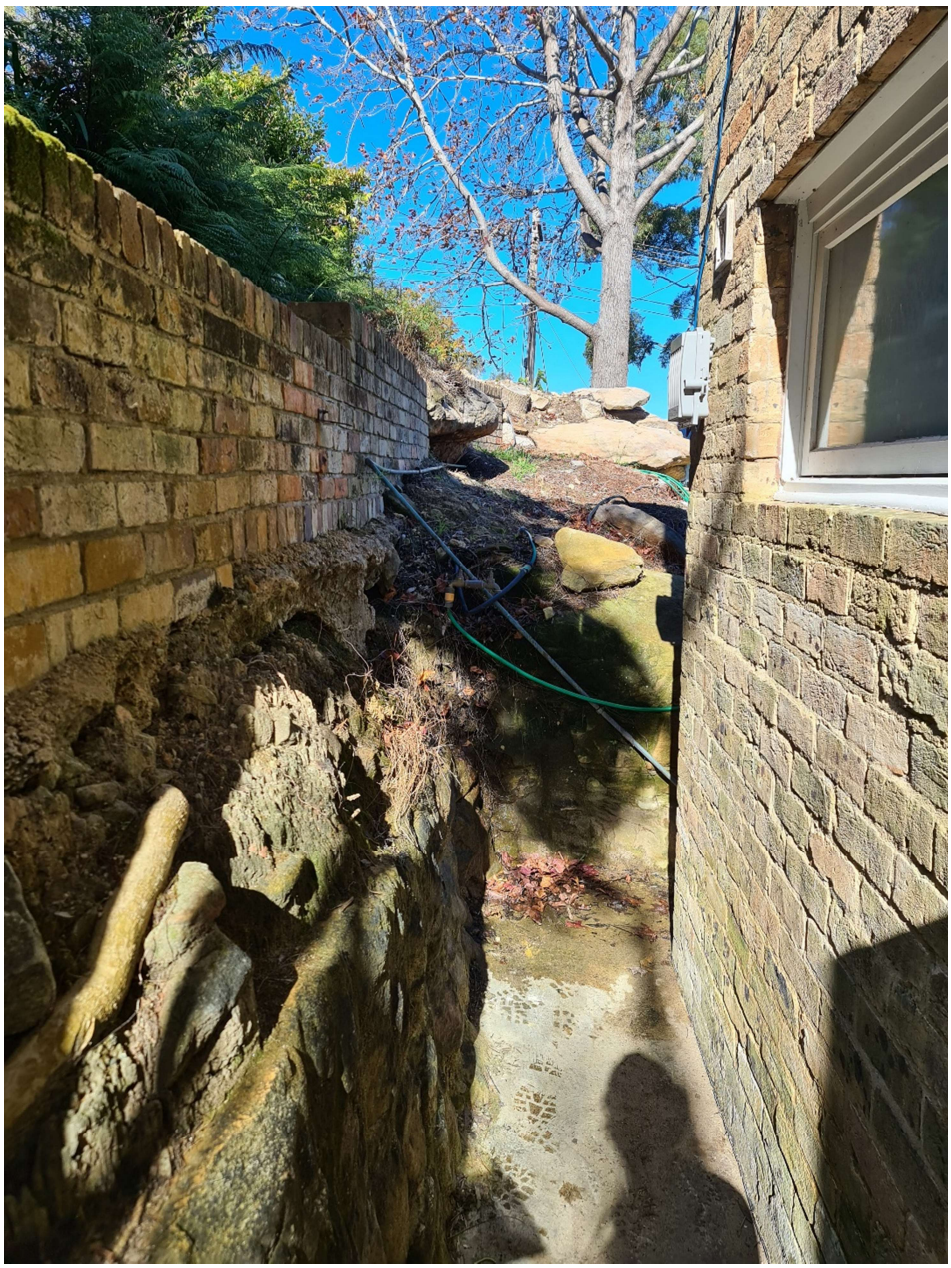
B Bulk sample

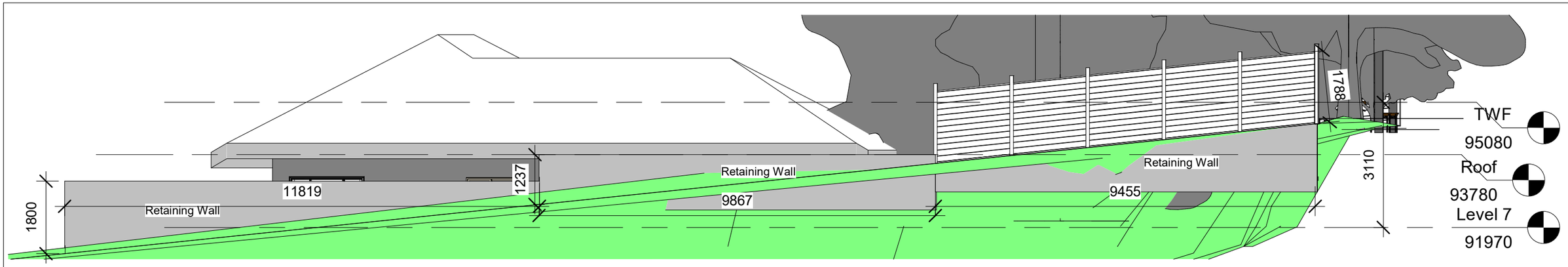
Supp Su from Pocket Penetrometer

Suv Su from Field Vane Shear test

soil classification:
soil is classified in accordance with AS1726 unless otherwise noted

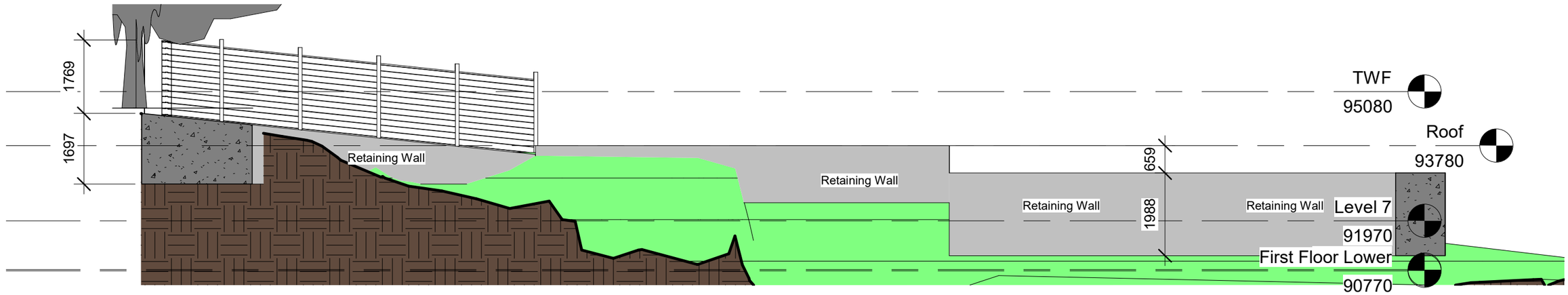
Site Photos





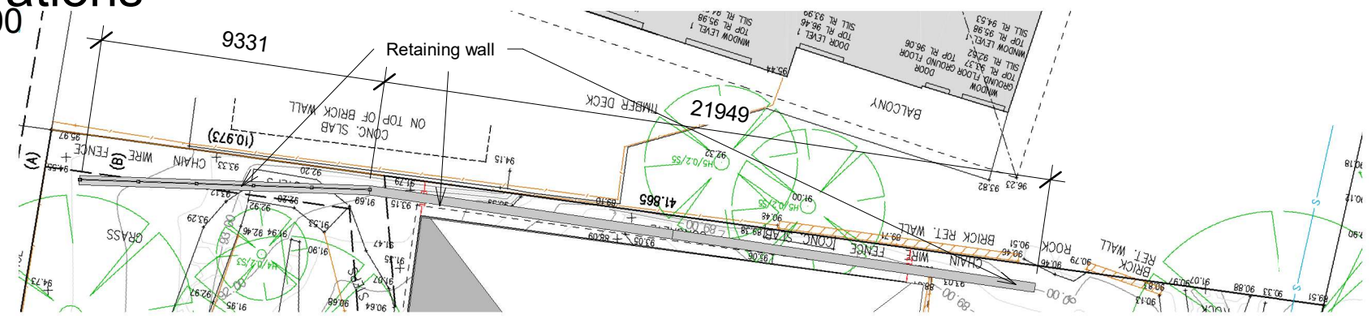
1 Retaining Wall East elevations

1 : 100



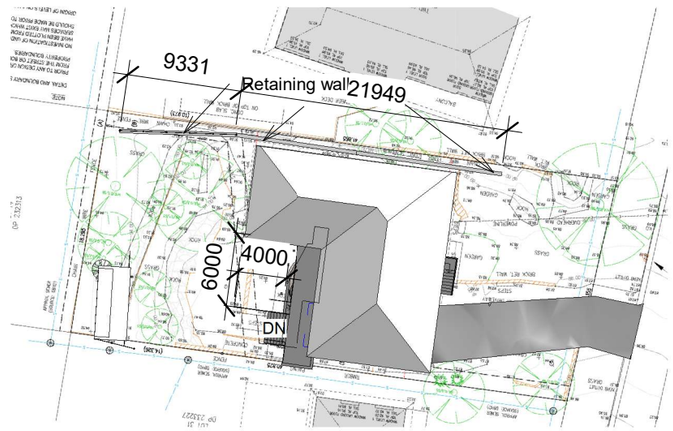
2 Retining Wall West Elevations

1 : 100



3 Retining Wall Plan

1 : 200



4 Retining Wall Location

1 : 500

GREEN DESIGN SYDNEY PTY LTD
ACN : 55432032
L 13 465 Victoria Avenue Chatswood 2067
Www.GreenDesignSydney.com.au
GreenDesignSydney@gmail.com
T : 0282871288

CLIENT : Simon

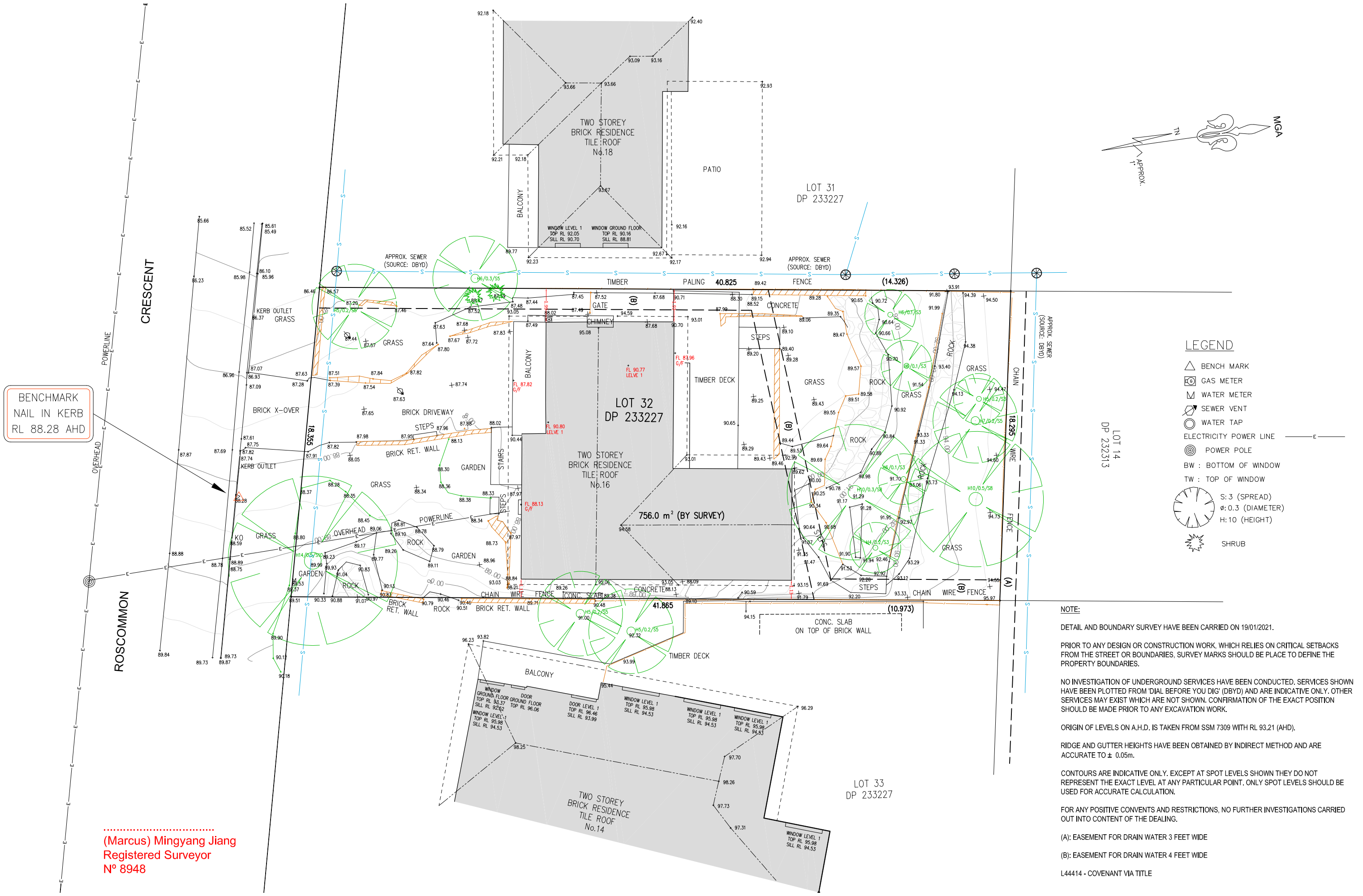
PROJECT Granny Flat

PROJECT ADDRESS

St Number **16**
St NAME **Roscommon Crescent**
SUBURB **Killarney Heights**

DRAWING **RETAINING WALL**
DRAWING No. A110

DRAWN **Farshid Hosseini**
SCALE
REVISION -
DATE 28/04/2021



LEGEND

- BENCH MARK
- GAS METER
- WATER METER
- SEWER VENT
- WATER TAP
- ELECTRICITY POWER LINE
- POWER POLE
- BW : BOTTOM OF WINDOW
- TW : TOP OF WINDOW
- S: 3 (SPREAD)
- ø: 0.3 (DIAMETER)
- H: 10 (HEIGHT)
- SHRUB

NOTE:

DETAIL AND BOUNDARY SURVEY HAVE BEEN CARRIED ON 19/01/2021.

PRIOR TO ANY DESIGN OR CONSTRUCTION WORK, WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR BOUNDARIES, SURVEY MARKS SHOULD BE PLACE TO DEFINE THE PROPERTY BOUNDARIES.

NO INVESTIGATION OF UNDERGROUND SERVICES HAVE BEEN CONDUCTED. SERVICES SHOWN HAVE BEEN PLOTTED FROM 'DIAL BEFORE YOU DIG' (DBYD) AND ARE INDICATIVE ONLY. OTHER SERVICES MAY EXIST WHICH ARE NOT SHOWN. CONFIRMATION OF THE EXACT POSITION SHOULD BE MADE PRIOR TO ANY EXCAVATION WORK.

ORIGIN OF LEVELS ON A.H.D. IS TAKEN FROM SSM 7309 WITH RL 93.21 (AHD).

RIDGE AND GUTTER HEIGHTS HAVE BEEN OBTAINED BY INDIRECT METHOD AND ARE ACCURATE TO ± 0.05m.

CONTOURS ARE INDICATIVE ONLY. EXCEPT AT SPOT LEVELS SHOWN THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR ACCURATE CALCULATION.

FOR ANY POSITIVE CONVENTS AND RESTRICTIONS, NO FURTHER INVESTIGATIONS CARRIED OUT INTO CONTENT OF THE DEALING.

(A): EASEMENT FOR DRAIN WATER 3 FEET WIDE

(B): EASEMENT FOR DRAIN WATER 4 FEET WIDE

L44414 - COVENANT VIA TITLE

.....
(Marcus) Mingyang Jiang
Registered Surveyor
Nº 8948

INNOVATIVE SURVEYING ASSOCIATES
CADASTRAL | ENGINEERING | CONSTRUCTION

ABN: 80 637 354 306

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Website: www.isagroups.com.au
Mobile Number: 0422879956 / 0430641006

AMENDMENT:	PLAN SHOWING DETAIL & LEVELS OVER LOT 32 IN DP 233227	JOB No.: 200314	LGA: NORTHERN BEACHES
		PLAN No.: 200314_A	DATUM: AHD
	CLIENT: GREEN DESIGN SYDNEY	DATE: 18/01/2021	SCALE: 1:200@A3
	PROJECT: PROJECT/SUBURB	DRAWN: CY	CONT. INTERVAL: 0.50m
	ADDRESS: 16 ROSCOMMON CRESCENT, KILLARNEY HEIGHTS	CHK: MJ	SHEET 1 OF 1