General Notes

CONST. TO BE IN ACCORD. WITH THE QLD. BUILDING ACT 1975-1998 & THE STANDARD BUILDING REGULATION 1993 AND SHALL COMPLY WITH ALL LOCAL AUTHORITY REGULATIONS AND REQUIREMENTS.

DO NOT SCALE

OF LININGS/FINISHES

VERIFY ALL DIMENSIONS AND LEVELS ON SITE BEFORE STARTING WORK. WHERE CAVITY SLIDER DOORS ARE FITTED IT IS RECOMMENDED TO USE STEEL FRAMED CAVITY SLIDERS OR 90mm WALL FRAMES FOR TIMBER FRAMED CAVITY SLIDERS.

TOILET DOORS MUST OPEN OUTWARDS, SLIDE OR BE FITTED WITH DEMOUNTABLE HINGES IF THE DISTANCE BETWEEN THE PAN AND NEAREST PART OF THE DOORWAY IS LESS THAN 1200mm.

Site Details

REFER TO SITE DEVELOPMENT PLAN BY OTHERS WHERE PROVIDED. SITE LEVELS AND FINISHED FLOOR LEVELS ARE TO BE VERIFIED BY THE

BUILDER BEFORE STARTING WORK. ALL CUT & FILLED EARTH EMBANKMENTS ARE TO BE MAX. SLOPE OF 1 IN 3 UNO ON CONSULTANTS PLAN. BANKS TO BE GRASSED UNO.

FOR LEVEL SITES FALL GROUND AWAY FROM BUILDING 50mm IN A MINIMUM DISTANCE OF 1m ON ALL SIDES.

FOR SLOPING SITES DIVERT SURFACE WATER FROM UPHILL SIDE AWAY FROM BUILDING.

PROVIDE FALLS TO FINISH GROUND SURFACE TO PREVENT WATER PONDING AT ANY POINT IN THE VICINITY OF THE BUILDING OR ON THE COMMON BOUNDARY OF ADJOINING ALLOTMENTS.

Stormwater Drainage

ALL STORM WATER DRAINAGE WORK TO BE IN ACCORDANCE WITH AS

DISCHARGE RAIN WATER DOWN PIPES TO INTER-ALLOTMENT DRAINAGE SYSTEM IF AVAILABLE, KERB AND CHANNEL IF FALL PERMITS OR SPLASH PADS (SPLASH PADS NOT PERMITTED ON CLASS H & E SITES). ENSURE RAIN MATER IS DIRECTED AWAY FOR THE BUILDING. 1005qm OF ROOF AREA (MIN.) TO DISCHARGE TO RAIN WATER TANK FOR NEW HOUSES & UNITS.

Sewer Drainage

ALL PLUMBING & DRAINAGE WORK TO BE IN ACCORDANCE WITH WATER & SEWERAGE SUPPLY ACT AND AS 3500.

FOR SEWERED SITES DISCHARGE WASTE WATER TO COUNCIL SEWER. THE LOCATION OF THE SEWER MAIN HAS BEEN SCALED FROM COUNCIL PLANS. WHERE THE SEWER LINE IS 2m OR LESS FROM THE BUILDING STRUCTURE IT IS THE RESPONSIBILITY OF THE BUILDER TO PHYSICALLY LOCATE THE SEWER MAIN BEFORE STARTING WORK

FOR UNSEWERED SITES DISCHARGE WASTE WATER TO MINI TREATMENT SYSTEM, SEPTIC TANK OR HOLDING TANK AS SHOWN ON CONSULTANTS PLANS.

Slab & Footings

CONCRETE WORK TO BE IN ACCORDANCE WITH AS 3600.

Morking At Heights

FOR CONSTRUCTION, CLEANING AND MAINTENANCE PROCEDURES WHERE THERE IS A RISK OF FALLING, COMPLY WITH THE FOLLOWING CLAUSE FROM DIV. 4 OF PART 18 OF THE "WORKPLACE HEALTH AND SAFETY REGULATION". (CLASS 188 - FALL ARREST HARNESS SYSTEM)

Masonry

ALL MASONRY WORK TO COMPLY WITH AS 3700. CONSTRUCT MASONRY CONTROL JOINTS AT LOCATIONS SHOWN ON ENGINEERS FOOTING PLAN

Roofing

METAL ROOFING TO BE IN ACCORDANCE WITH AS 1562.1 AND FIXED TO MANUFACTURERS SPECIFICATIONS.

TILE ROOFING TO BE IN ACCORDANCE WITH AS 2049 AND FIXED TO MANUFACTURERS SPECIFICATIONS.

Timber Framing

ALL TIMBER SIZES AND CONNECTIONS NOT SHOWN TO BE IN ACCORDANCE WITH AS 1684.2 OR AS 1684.3 (DEPENDING ON WIND SPEED)

EXTERNAL TIMBER MEMBERS TO BE DURABILITY CLASS 1 OR 2 WITH SAPWOOD REMOVED OR PRESERVATIVE TREATED TO H3 UNLESS STATED ALL WALL DIMENSIONS ARE TO STRUCTURAL COMPONENTS - NOT TO THE FACE OTHERWISE. ALL PINE TO BE LOSP TREATED TO H3 LEVEL.

ALL STRUCTURAL PLY IS TO BE IN ACCORDANCE WITH AS/NZ 2269 AND FIXED TO MANUFACTURERS SPECIFICATIONS. ALL EXTERNAL NAILED AND SCREWED FIXING IN COASTAL AREAS FOR (BUT

NOT LIMITED TO) CLADDING, FLOORING, SHEET LININGS, WINDOWS, DOOR FRAMES AND HINGES TO BE STAINLESS STEEL OR SILICON BRONZE.

TIMBER ROOF BATTENS TO BE FIXED IN ACCORDANCE WITH AS 1684.2 OR AS 1684.3 (DEPENDING ON WIND SPEED) AND WPHS REQUIREMENTS. METAL ROOF BATTENS TO BE FIXED IN ACCORDANCE WITH MANUFACTURERS

TIONS AND WPHS REQUIREMENTS. TILE ROOF BATTENS TO BE FIXED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS AND WPHS REQUIREMENTS

ROOF TRUSSES - TIE DOWN, CONNECTIONS AND BRACING TO TRUSS MANUFACTURERS DETAILS

WALL FRAMES - TO BE DESIGNED, CERTIFIED & SUPPLIED BY WALL FRAME MANUFACTURER UNLESS DETAILED ON PLAN.

FLOOR FRAMING - FOR LVL MEMBERS IT IS RECOMMENDED THAT THE TOP EDGE BE PROTECTED FROM WATER PENETRATION DURING CONSTRUCTION. THIS CAN BE ACHIEVED BY THE APPLICATION OF A WATERPROOF TAPE OR PAINTING THE TOP EDGE OF THE MEMBER WITH DURAM "DURABIT" ACRYLIC. (PAINTING IS RECOMMENDED WHILE MEMBERS ARE STACKED). ALL OTHER MEMBERS EXCLUDING HARDWOOD SHOULD BE PROTECTED AS PER MANUFACTURERS SPECIFICATIONS.

INTERNAL STRIP FLOORING IS TO BE WEATHER PROTECTED AT ALL TIMES AND TO HAVE A MOISTURE CONTENT NOT GREATER THAN 15%.

Termite Protection

PROVIDE PROTECTION FOR NEW BUILDINGS IN ACCORD. WITH THE B.C.A. -QUEENSLAND AMENDMENTS AND AS 3660.1 - 2000. 'TERMITE MANAGEMENT - NEW BUILDING WORK".

PROVIDE PROTECTION FOR EXISTING BUILDINGS IN ACCORD. WITH THE B.C.A. - QUEENSLAND AMENDMENTS AND AS 3660.2 - 2000. "TERMITE MANAGEMENT - IN AND AROUND EXISTING BUILDINGS AND STRUCTURES".

MINIMUM 75mm SLAB EDGE

CHEMICAL PERIMETER &

ELEMENTS OF TERMITE

RESISTANT MATERIALS

PENETRATIONS SYSTEM

EXPOSURE

OPTION SELECTED :-

- GRADED STONE BARRIERS
- CHEMICAL IMPREGNATED PLASTIC
- SHEET

STAINLESS STEEL MESH SHIELDING

MONOLITHIC CONCRETE SLAB

SHIELDING

OTHER:

SUBSEQUENT INSPECTIONS ARE TO BE CARRIED OUT TO INSTALLERS REQUIREMENTS

Stair Treads, Landings & Ramps

TREADS MUST HAVE A SLIP-RESISTANT FINISH OR A SUITABLE NON-SKID STRIP NEAR THE EDGE OF THE NOSINGS AND EDGE OF LANDINGS IN ACCORD. WITH NCC VOL. 2 PART 3.9.1.4 SLIP-RESISTANCE.

APPLICATION	SURFACE CONDITIONS	
	DRY	MET
RAMP NOT STEEPER THAN 1:8	P4 or R10	P5 or R12
TREAD SURFACE	P3 or R10	P4 or R11
NOSING OR LANDING EDGE STRIP	P3	P4

Wall Cladding

WALL CLADDING TO BE FIXED TO MANUFACTURERS SPECIFICATIONS.

Aluminium Windows & Doors

ALUMINIUM WINDOWS AND DOORS TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH AS 2047/48.

Structural Steel

RHS & SHS STEEL SECTIONS TO BE FIRST GRADE STEEL COMPLYING WITH AS 1163 AND HOT ROLLED SECTIONS TO COMPLY WITH AS 3679. ALL STRUCTURAL STEEL MATERIALS, WORKMANSHIP, FABRICATION &

ERECTION SHALL COMPLY WITH THE REQUIREMENTS OF AS 4100, AS 1538, AS 1554 AND ANY OTHER RELEVANT SPECIFICATIONS. ALL BOLTS, NUTS, WASHERS, BRACKETS ETC. IN COASTAL AREAS TO BE HOT

DIPPED GALVANIZED. Wet Areas

WATER PROOFING OF WET AREAS IS TO BE CARRIED OUT IN

ACCORDANCE WITH THE BCA AND AS 3740

FLOORS TO WET AREAS - CERAMIC TILES OR OTHER APPROVED MATERIALS

SPLASH BACKS

IN. HEIGHT	FIXTURE	MATERIAL				
150mm	BATHS, BASINS & SINKS	CERAMIC TILES*				
1800mm	SHOWERS	CERAMIC TILES*				
OR OTHER APPROVED MATERIAL						

Insulation

- REFER TO THE ATTACHED ENERGY EFFICIENCY REPORT FOR DETAIL

Sustainability Requirements

NEW HOUSES/ADDITIONS WITH PLUMBING (NEW WORK ONLY):

-PROVIDE AAA-RATED SHOWER ROSES WITH MIN. 3 STAR WATER EFFICIENCY AND STANDARDS RATING

-PROVIDE DUAL-FLUSH TOILETS WITH MIN. 4-STAR WATER EFFICIENCY AND STANDARDS RATING

- PROVIDE TAPWARE WITH MIN. 3-STAR WATER EFFICIENCY LABELING AND STANDARDS RATING FOR TAPS SERVING: (A) LAUNDRY TUBS &

(B) KITCHEN SINKS & (C) BASINS

CHEMICAL RETICULATION SYSTEMS -PROVIDE WATER PRESSURE-LIMITING DEVICES (WHERE WATER PRESSURE EXCEEDS 500 KILOPASCALS)

-ENERGY EFFICIENT LIGHTING TO A MINIMUM OF 80% OF THE ENCLOSED SPACE.

ADDITIONS WITHOUT PLUMBING (NEW WORK ONLY):

-ENERGY EFFICIENT LIGHTING TO A MINIMUM OF 80% OF THE ENCLOSED

IF PROVIDED AIR CONDITIONERS ARE TO HAVE A MINIMUM EFFICIENCY RATIO (EER) OF 2.9

REFER TO ENERGY EFFICIENCY REPORT BY OTHERS FOR ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS IF SUPPLIED.

Other Consultants

REFER TO DETAILS BY OTHER CONSULTANTS FOR:

- SLAB & FOOTING DESIGN

SOIL TEST - TIMBER FLOOR FRAMING

SPACE.

RETAINING WALL DETAILS

- ENERGY EFFICIENCY REPORT

ROCKHAMPTON REGIONAL COUNCIL

S				PROPOSED RESIDENCE	this drawing
Ž					Site P
3				FOR B. & T. ARMSTRONG	
$ \frac{\delta i}{2}$				AT LOT 21 (#13) HAVEN CLOSE	
Ш					
L M	NO.	DESCRIPTION	DATE	NORMAN GARDENS	

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.: D/44-2019** Dated: 18 June 2019





Site TBM Plug in kerb RL55.93



Facsimile 61 7 49266579

E-mail mailbox@rufusdesigngroup.com

STYLE · QUALITY · INNOVATIO

CHKD

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Ŋ				PROPOSED RESIDENCE	this drawi
Q				FOR B. & T. ARMSTRONG	17100
				AT LOT 21 (#13) HAVEN CLOSE	
۶Z	NO.	DESCRIPTION	DATE	NORMAN GARDENS	



NOT FOR CONSTRUCTION

Window Legend

- 1218 1200 high x 1800 wide XO Sliding / Fixed X Sliding O Fixed D Davida Uwaa
- Double Hung
- D
- A Awning CMT Casement
- Louvre F.G. - Fixed Glass
- Glazing to wet areas to be clear/obscure

Glazing to remainder to be clear/solarblock

Plan Legend				
BTC	Benchtop Cupboards			
BTH	Bath			
CF	1200mm dia Ceiling Fan			
CTR	Cooktop with Range Hood Over			
DP	Down Pipe			
DW	Dishwasher			
EF	Mechanical exhaust fan discharging to outside air			
FW	Floor Waste			
FZ	Freezer			
HC	Hose Cock			
HGD	Half Glass Door			
HS	Hobless Shower			
HWS	Hot Water System			
KS	Kitchen Sink			
LT	Laundry Tub			
MH	Man Hole			
RF	Refrigerator			
SA	Photoelectric Smoke Alarm			
TR	Towel Rail			
UBO	Under Bench Oven			
WB	Wash Basin			
WM	Washing Machine			

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.:** D/44-2019 Dated: 18 June 2019



Floo	or Areas
Habitable	207.5 m ²
Patio/Porch	50.3 m ²
Garage	39.1 m²
Grand total	296.9 m ²

ing or Plan



MEMBER Licenced under	PROJECT : T.J.R.	MINI
ASSOC. OF QLD INC. Lic No.	DRAWN J.P.	
Telephone 61 7 49288011		PLA
Facsimile 61 7 49266579 E-mail mailbox@rufusdesigngroup.com	CHKD :	SIZE

PROJECT T.J.R.		$\mathcal{C}\mathcal{O}$	PROJECT NUMBER
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CQ SOIL TESTING

Servicing all of Central Queensland



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/44-2019 Dated: 18 June 2019

REPORT ON

SITE CLASSIFICATION

<u>&</u>

SITE SPECIFIC LANDSLIDE HAZARD RISK AND SLOPE STABILITY ANALYSIS

CLIENT:

Brendan Armstrong

SITE ADDRESS:

Lot 21 (SP179522) 13 Haven Close, Norman Gardens QLD 4701

JOB NUMBER:

CQ15862

ISSUE DATE:

3/04/2019



Client & Document Information

Client:	
Project:	

Brendan Armstrong Lot 21 (SP179522) 13 Haven Close, Norman Gardens QLD 4701

Investigation Type:	Site Classification & Landslide Hazard and Slope Stability
	Report
Job Number:	CQ15862
Date of Issue:	3/04/2019

Contact Information

CQ SOIL TESTING		
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Document Control

Version	Date	Author	Design	Reviewer/	Reviewer/Approver
			Drawings	Approver	Initials
А	3/04/2019	T Warne/Sam Jeyan	N/A	Scott	SWW
				Walton	



Site Classification and Target Strata

Based on the findings of the site investigation and subsequent laboratory testing, the predicted surface movement for this site in the absence of abnormal moisture would be 31 - 40 mm:

CLASS "M"

(Moderately Reactive)

in accordance with Australian Standard 2870, Residential Slabs and Footings. The above classification has not allowed for the possibility of differential surface movement as a result of differing soil types throughout the site or as a result of construction activities. It is the responsibility of the engineer to allow for this possibility in the footing design.

An indicative bearing capacity of greater than 100 kPa was encountered throughout all strata. Any fill placed over the existing ground shall be piered through into the existing suitable material. Further note that the placement of reactive material as fill or cutting of the site may change the site's classification.

If you should have any queries regarding this report please do not hesitate to contact the undersigned at your convenience.

Yours faithfully

SCOTT WALTON Laboratory Manager



Site Specific Landslide Hazard Risk and Slope Stability Analysis

1. <u>Introduction</u>

CQ Soil Testing (CQ) was commissioned to undertake site-specific landslide hazard risk and slope stability analysis for the proposed residential development to be located at 13 Haven Closet, Norman Gardens QLD. The aim of the assessment was to:

- Identify the site in accordance with "Rockhampton Regional Council (RRC) Landslide Hazard and Steep Sloping Area;
- Carry out site-specific landslide hazard risk assessment based on "Geotechnical Stability Assessment Guidelines" published in March 2016 by Gold Coast City Council (GCCC);
- Carry out slope stability analyses for the proposed residential development and provide advice (where required); and
- Prepare a geotechnical site-specific landslide hazard risk and slope stability analysis report together with RPEQ certification in order to demonstrate general compliance with landslide hazard zone codes.

Architectural drawings were available from the client during the preparation of this reporting.

Note that the "Geotechnical Stability Assessment Guidelines" (by GCCC) incorporated Australian Geomechanics Society (AGS) guidelines for landslide hazard risk assessment. GCCC guidelines are generally accepted guidelines for similar conditions as an appropriate tool to prepare a geotechnical stability assessment and reporting in accordance with landslide hazard planning scheme policy.

2. <u>Site Description and Geotechnical Investigation</u>

On relevant 1:100,000 Geological map, site plots within Early Permian Aged Lakes Creek Sedimentary Rock Formation.



Evidence of reasonably gentle slope geometry and near surface bedrock were observed during the testing programme. Photographs taken during the testing programme are presented below.



Figures 1-2: Typical Site Condition Observed During the Drilling Programme.

Three boreholes (BH1 – BH3) were drilled using power auger rig on 22/03/19 and ground conditions generally comprised gravelly/sandy/silty clay to depths between 0.4 m and 3.2 m followed by very low strength or stronger weathered rock.

3. <u>Rockhampton Regional Council (RRC) Map Area and Landslide</u> <u>Susceptibility Analysis</u>

Based on the RRC interacting mapping database, the site lies within steep land area. A check was made using GCCC flowchart of geotechnical stability assessments. Based on this, site-specific landslide hazard risk assessment and slope stability analysis are required for the proposed residential development. A copy of such flowchart is attached at the end of this report for further confirmation.

The following Table 1 summarises the outcome of the site-specific landslide hazard risk assessment.

Assessment Type	<u>Output</u>	Susceptibility
Existing Slope Including the Consideration of the Proposed		
Residential Development	0.51	Low

Borehole logs, site photographs and test location plan are attached at the end of this report.

4. <u>Slope Stability Analysis</u>

Appropriate Elevation 4, extracted from client supplied drawings, was used for slope stability analysis using commercially available *Slope/W* software. The assumed boulder wall, soil, rock and its parameters adopted in the stability analysis are presented in Table 2 below.

<u>Material</u>	<u>Drained</u> <u>Cohesion,</u> <u>C' (kPa)</u>	<u>Drained Friction</u> <u>Angle, Φ' (</u> °)	<u>Unit Weight, γ</u> (kN/m³)
Boulder Wall	0	36	21
Compacted Fill	5	25	19
Very Stiff to Hard	5	26	19
Gravelly/Sandy/Silty Clay			
Very Low Strength or Stronger Weathered Rock	10	32	20

The slope profiles were modelled using the parameters given in Table 2 in line with the Morgenstern and Price method. Surcharge load of 20 kPa was adopted for residential load. Appropriate groundwater level has been incorporated into the modelling.

The analysis has considered a minimum long-term Factor of Safety (FOS) of 1.50 as required by "Geotechnical Stability Assessment Guidelines" by GCCC and current industry practice for permanent civil engineering slope works.

Slope Stability Model Set-Up

Model adopted in this stability analysis is presented below.



Figure 3: Elevation 4 Adopted in this Analysis



The results of the stability analysis with groundwater conditions are presented in Table 3 below.

Analysis Area	Analysis Condition	Long Term Factor of Safety (FOS) Achieved	Required Long Term FOS by "Geotechnical Stability Assessment Guidelines"
Elevation 4	Existing/Proposed Slope/Wall Geometry with Surcharge Load and Appropriate Groundwater (LHS)	1.55 (>1.50) (Drawing 1)	1.50
	Existing/Proposed Slope Geometry with Surcharge Load and Appropriate Groundwater (RHS)	2.87 (>1.50) (Drawing 2)	

Stability analysis outputs are attached at the end of this report.

5. <u>Safety in Design and Geotechnical Risk</u>

The current industry practice incorporates and details risks which may be associated with the geotechnical design addressed in this report. This section outlines risks which may have an affect during construction and also outlines relevant risks which may exists in the operation, maintenance and demolition stages of the residential development or design.

We do believe that the following potential geotechnical risks may be associated with this design component and need to be managed by the builder/contractor:

- Ground strata encountered differing from design assumptions can be managed by engaging a suitably qualified geotechnical engineer during the construction stage.
- Plants and equipment's movements with possible slips and falls can be managed by safety checks and using an appropriate safe work method statements (SWMS).
- Temporary slope stability of the proposed excavation (if required) can be managed by safety checks, using appropriate SWMS and by engaging a suitably qualified geotechnical engineer during construction.
- Unexpected groundwater flow or seepage encountered in the sub-surface (if observed) – can be managed by installing drainage pipes and discharge pipes to enhance the drainage system.



As far as practical, we have included appropriate control measures associated with the above-mentioned risks. It is contractor's responsibility to reduce such risks practically low as possible to abide by relevant regulations and standards including safe working practices and methods.

6. <u>Foundation Options and Founding Conditions</u>

Given the expected foundation conditions, high level strip/pad or short bored pier foundations are expected to be suitable to support the proposed residential development. Any elements (including footings and slabs) that require support at ground level will need to be founded through very stiff to hard gravelly/sandy/silty clay and/or underlying shallow weathered rock.

The selection of the foundation option is to be at the discussing by the structural engineer.

Allowable end bearing pressures for high level strip/pad footings are given below;

- 300 kPa Founded minimum 0.5 m and deeper into natural very stiff to hard gravelly/sandy/silty clay.
- 500 kPa Founded minimum 0.5 m and deeper into very low strength weathered rock.
- > 900 kPa Founded below the depth of Tungsten Carbide (TC) bit refusal.

High level footing settlements are not generally to be expected to exceed 1% to 2% of the footing width.

Allowable pile end bearing pressures for bored pier foundation are given below;

- 500 kPa Founded minimum three pile diameters and deeper into natural very stiff to hard gravelly/sandy/silty clay.
- > 750 kPa Founded minimum 0.5 m and deeper into very low strength weathered rock.
- > 1400 kPa Founded below the depth of Tungsten Carbide TC bit refusal.

The following allowable skin friction values are available below the base of the excavation;

Material	Allowable Skin Friction
Upper 1.0 m	Ignore
Natural very stiff to hard gravelly/sandy/silty clay	30 kPa
Very Low Strength Weathered Rock	60 kPa
Below the Depth of TC Bit Refusal	90 kPa

Bored pier foundation settlements are not generally to be expected to exceed 1% to 2% of the pile diameter.

Reference can be made to AS2159-2009 for the detail pile design and construction procedures.

It is appropriate that footing excavations be inspected by a suitably qualified geotechnician or geotechnical engineer.

7. <u>Recommendations</u>

There are no specific recommendations required for the proposed residential development. However, the following recommendations are generally followed where necessary:

- Reference should be made to "Australian Geomechanics Society's Guidelines" for Good and Bad Hillside Construction Practices and Hillside Constructions. A copy of such extract is attached at the end of this report for further recommendations for hillside constructions.
- Instability is mainly caused by excavation and erosion. Unsupported/erosion prone excavation is not recommended.
- Stormwater, rainwater and overflow is to be properly diverted and piped to be away from the proposed residential development. All drainage is to be maintained in good working condition and regular inspections and maintenance are essential.
- Ongoing long term stability will be subject to adequate crest and toe drainages and also slopes be vegetated (or any similar type of available erosion control methods) in order to prevent erosion and associated long term stability concerns.

- All site earthworks should be carried out in accordance with AS3798-2007 'Guidelines on Earthworks for Commercial and Residential Developments'.
- Retaining walls generally over 1.0 m high should be engineered and be certified by a suitably qualified structural engineer.

8. <u>Conclusions and Certification</u>

Based on the above assessment and outcome, the site-specific landslide hazard risk assessment indicated that the existing site and the proposed residential development has a landslide hazard risk of 'low' based on site-specific geotechnical information and landslide hazard risk assessment outcome.

Slope stability analysis indicates that the existing and the proposed residential development slope geometry (as included in the attached Drawings 1-2) have FOS greater than "Geotechnical Stability Assessment Guidelines" by GCCC and current industry practice for permanent civil engineering slope works of 1.50.

Seismic hazard is considered to be very low and not been adopted in this assessment.

Based on the above information, we certify that the existing site and the proposed residential development lie with a landslide hazard risk of 'low' which is considered to be acceptable for RRC and current engineering practice for permanent civil engineering slope works.

9. <u>Limitations</u>

The statements presented in this document are intended to advise the reader of recommendations in line with stated assumptions.

This report has been prepared for the sole use of the client for the purpose described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

The comments given in this report and the opinions expressed herein are based on the information received from the client, the conditions encountered during the geotechnical investigation and associated landslide susceptibility & slope stability analysis. However, there may be conditions prevailing at the site which have not been disclosed by the client/geotechnical investigation/landslide susceptibility & slope stability analysis and which have not been taken into account in the report.



This report does not contain any further geotechnical assessment on structural design components such as structural footings and retaining walls which are to be confirmed and certified by the structural engineer.

This report has been reasonably reviewed to eliminate human errors, inappropriateness, and omissions.

On Behalf of CQ Soil Testing

Sam Jeyan Senior Geotechnical Engineer Registered Professional Engineer of Queensland (RPEQ - 13339) in Civil and Subdivisional Geotechnics Registered Professional Engineer of Professionals Australia, (RPEng - 0969) Accredited Slope Risk Assessor – RMS Guide to Slope Risk Assessment Version 4

Approved By

<u>Scott Walton</u> Proprietor/Manager

Attachments:

Extracts from RRC Landslide Hazard Overlay Map GCCC Flowchart of Geotechnical Stability Assessments Site-Specific Landslide Hazard Risk Assessment Report Architectural Drawings by the Client Borehole Logs, Site Photographs and Test Location Plan Extract from Australian Geomechanics Society's Guidelines for Good and Bad Hillside Construction Practices and Hillside Constructions Slope Stability Analysis Outputs Completed Standard Pro-forma for Geotechnical Certification

10. <u>References</u>

The following papers, reports or books have been consulted in preparing this report:

- "Geotechnical Stability Assessment Guidelines" by Gold Coast City Council (GCCC) – March 2016.
- SMEC (2011): Landslide Susceptibility Assessment Report for the City of the Gold Coast, August 2011.
- Australian Geomechnics Society (2007): Practice Note Guideline for Landslide Risk Management 2007, Journal of the Australian Geomechnics Society, Vol 42, No. 1, March 2007.
- Australian Standard AS 4678: Earth-Retaining Structures, February 2002.



Figure 1 shows a flowchart for various geotechnical stability assessments that should be carried out and include in a *Geotechnical Report.*





LANDSLIDE SUSCEPTIBILITY ANALYSIS

Site Address: 13 Haven Close, Norman Gardens QLD 4701.

Geology: Early Permian Aged Lakes Creek Sedimentary Rock Formation. Landslide Hazard Overlay Map: Located within Rockhampton Regioanl Council (RRC) Steep Land Area.

1	Natural Surface Slope				
Site		Level	Factor		
	Less than 5 degrees	L	0.1		
	Between 5 and 15 degrees	М	0.5		
	Between 15 and 30 degrees	М	0.8		
	Between 30 and 45 degrees	Н	1.2		
	More than 45 degrees	М	0.8		
2 Slope Shape					
Site		Level	Factor		
	Crest or ridge	L	0.7		
	Planar / Convex	М	0.9		
	Rough / Irregular	Н	1.2		
	Concave	Н	1.5		
3	Site geology		·		
Site		Level	Factor		
	Volcanic Extrusive rock	Н	1.1		
	Sedimentary rock	M	1		
	Low grade metamorphic rock	M	1		
	High grade metamorphic rock		0.9		
	Volcanic Intrusive rock	M	1		
4	Soils		<u> </u>		
Site		Level	Factor		
Site	Rock at surface	Level VL	Factor 0.1		
Site	Rock at surface Residual soil < 1m deep	Level VL L	Factor 0.1 0.5		
Site	Rock at surface Residual soil < 1m deep Residual soil 1-3m deep	Level VL L M	Factor 0.1 0.5 0.9		
Site	Rock at surface Residual soil < 1m deep Residual soil 1-3m deep Residual soil > 3m deep	Level VL L M H	Factor 0.1 0.5 0.9 1.5		
Site	Rock at surface Residual soil < 1m deep Residual soil 1-3m deep Residual soil > 3m deep Colluvial soil < 1m deep	Level VL L M H H	Factor 0.1 0.5 0.9 1.5 1.5		
Site	Rock at surface Residual soil < 1m deep Residual soil 1-3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil 1-3m deep	Level VL L M H H VH	Factor 0.1 0.5 0.9 1.5 1.5 2		
Site	Rock at surface Residual soil < 1m deep Residual soil 1-3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil 1-3m deep Colluvial soil > 3m deep	Level VL L H H VH VH	Factor 0.1 0.5 0.9 1.5 1.5 2 4		
Site	Rock at surface Residual soil < 1m deep Residual soil 1-3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil 1-3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed	Level VL M H H VH VH	Factor 0.1 0.9 1.5 1.5 2 4		
Site 5 Site	Rock at surface Residual soil < 1m deep Residual soil - 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil - 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed	Level VL L M H H VH VH VH	Factor 0.1 0.9 1.5 1.5 2 4 Factor		
Site 5 Site	Rock at surface Residual soil < 1m deep Residual soil - 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil - 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed	Level VL M H H VH VH VH Level L	Factor 0.1 0.9 1.5 1.5 2 4 Factor 0.9		
Site 5 Site	Rock at surface Residual soil < 1m deep Residual soil - 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil - 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m	Level VL M H H VH VH Level L M	Factor 0.1 0.9 1.5 1.5 2 4 Factor 0.9 1.1		
Site 5 Site	Rock at surface Residual soil < 1m deep Residual soil - 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil - 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m Between 1 and 3m	Level VL M H H VH VH Level L M M	Factor 0.1 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3		
Site	Rock at surface Residual soil < 1m deep Residual soil < 1m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil > 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m Between 1 and 3m Between 3 and 6m	Level VL M H VH VH Level L M M H	Factor 0.1 0.5 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3 1.7		
Site 5 Site	Rock at surface Residual soil < 1m deep Residual soil < 1m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil < 1m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m Between 1 and 3m Between 3 and 6m More than 6m	Level VL M H H VH VH Level L M M H VH	Factor 0.1 0.5 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3 1.7 2.5		
Site 5 Site	Rock at surface Residual soil < 1m deep Residual soil - 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil > 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m Between 1 and 3m Between 3 and 6m More than 6m Evidence of groundwater	Level VL M H H VH VH VH Level L M M H VH	Factor 0.1 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3 1.7 2.5		
Site 5 Site 6 Site	Rock at surface Residual soil < 1m deep	Level VL H H VH VH VH Level L M M H VH	Factor 0.1 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3 1.7 2.5 Factor		
Site 5 Site 6 Site	Rock at surface Residual soil < 1m deep Residual soil - 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil > 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m Between 1 and 3m Between 3 and 6m More than 6m Evidence of groundwater None apparent	Level VL H H VH VH VH Level L M H VH Level L Level L	Factor 0.1 0.5 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3 1.7 2.5 Factor 0.7		
Site 5 Site 6 Site	Rock at surface Residual soil < 1m deep Residual soil - 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil > 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m Between 1 and 3m Between 3 and 6m More than 6m Evidence of groundwater None apparent Minor moistness	Level VL H H VH VH Level L M H VH Level L Level L M	Factor 0.1 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3 1.7 2.5 Factor 0.7 0.9		
Site 5 Site 6 Site	Rock at surface Residual soil < 1m deep Residual soil > 3m deep Residual soil > 3m deep Colluvial soil < 1m deep Colluvial soil > 3m deep Colluvial soil > 3m deep Fill height - Existing/Proposed None Less than 1m Between 1 and 3m Between 3 and 6m More than 6m Evidence of groundwater None apparent Minor moistness Generally wet	Level VL H H VH VH VH Level L M H Level L M H H H	Factor 0.1 0.5 0.9 1.5 1.5 2 4 Factor 0.9 1.1 1.3 1.7 2.5 Factor 0.7 0.9 1.5		

9	Material in cutting		
Site	-	Level	Factor
	High strength rock	L	0.5
	Medium strength rock	L	1
	Low strength rock	Μ	1.2
	Very low strength rock and soil	Н	1.5
	Soil	VH	2
10	Cut slope support - N/A		
10 Site	Cut slope support - N/A	Level	Factor
10 Site	Cut slope support - N/A Concrete/Block wall	Level L	Factor 0.5
10 Site	Cut slope support - N/A Concrete/Block wall Crib wall	Level L M	Factor 0.5 0.9
10 Site	Cut slope support - N/A Concrete/Block wall Crib wall Gabion wall	Level L M M	Factor 0.5 0.9 1
10 Site	Cut slope support - N/A Concrete/Block wall Crib wall Gabion wall Rock wall	Level L M M H	Factor 0.5 0.9 1 1.5

11 Concentration of surface water

Site		Level	Factor
	Ridge	L	0.7
	Crest	М	0.8
	Upper slope	М	0.9
	Mid slope	Н	1.2
	Lower slope	Н	1.5
12	Wastewater Disposal		
Site	-	Level	Factor
	Fully Sewered	М	1
	Onsite disposal – Surface	М	1.2
	Onsite disposal – Soak Pit/Trenches	Н	1.5

13 **Stormwater Disposal**

Site	-	Level	Factor
	All stormwater piped into road drainage	L	0.7
	Rain water tank with overflows	М	1
	Stormwater discharge on site	Н	1.5

Evidence of instability 14

Site		Level	Factor
	No sign of instability	L	0.8
	Soil Creep	Η	1.2
	Minor irregularity	VH	2
	Major irregularity	VH	5
	Active instability	VH	10

Summary

		Factor
1	Natural Surface Slope	0.5
2	Slope Shape	0.9
3	Site Geology	1.0
4	Soils	0.5
5	Fill Height	1.1
6	Evidence of Groundwater	0.7
7	Cut height	1.3
8	Slope of Cut Face	2.0
9	Material in Cutting	1.5
10	Cut Slope Support	1.5
11	Concentration of Surface Water	0.9
12	Wastewater Disposal	1.0
13	Stormwater Disposal	0.7
14	Evidence of Instability	0.8

Relative Susceptibility (1x2x3x4x5x6x7x8x9x10x11x12x13x14) 0.51

Low

Cut height - Existing/Proposed Site Level Factor

	NULLE	L	0.9
	Less than 1m	Μ	1.1
	Between 1 and 3m	Μ	1.3
	Between 3 and 6m	Н	1.7
	More than 6m	VH	25

Slope of Cut Face - Existing/Proposed

0			
Site		Level	Factor
	Less than 30 degrees	L	0.5
	Between 30 and 45 degrees	Μ	1
	Between 45 and 60 degrees	Н	1.5
	More than 60 degrees	VH	2

Q

Correlation between relative susceptibility and susceptibility rating

Relative Susceptibility	Susceptibility Rating
Less than 0.2	Very Low
0.2 - 0.6	Low
0.6 - 2.0	Moderate
2.0 - 6.0	High
Greater than 6.0	Very High

General Notes

CONST. TO BE IN ACCORD. WITH THE QLD. BUILDING ACT 1975-1998 & THE STANDARD BUILDING REGULATION 1993 AND SHALL COMPLY WITH ALL LOCAL AUTHORITY REGULATIONS AND REQUIREMENTS.

DO NOT SCALE

OF LININGS/FINISHES

VERIFY ALL DIMENSIONS AND LEVELS ON SITE BEFORE STARTING WORK. WHERE CAVITY SLIDER DOORS ARE FITTED IT IS RECOMMENDED TO USE STEEL FRAMED CAVITY SLIDERS OR 90mm WALL FRAMES FOR TIMBER FRAMED CAVITY SLIDERS.

TOILET DOORS MUST OPEN OUTWARDS, SLIDE OR BE FITTED WITH DEMOUNTABLE HINGES IF THE DISTANCE BETWEEN THE PAN AND NEAREST PART OF THE DOORWAY IS LESS THAN 1200mm.

Site Details

REFER TO SITE DEVELOPMENT PLAN BY OTHERS WHERE PROVIDED. SITE LEVELS AND FINISHED FLOOR LEVELS ARE TO BE VERIFIED BY THE

BUILDER BEFORE STARTING WORK. ALL CUT & FILLED EARTH EMBANKMENTS ARE TO BE MAX. SLOPE OF 1 IN 3 UNO ON CONSULTANTS PLAN. BANKS TO BE GRASSED UNO.

FOR LEVEL SITES FALL GROUND AWAY FROM BUILDING 50mm IN A MINIMUM DISTANCE OF 1m ON ALL SIDES.

FOR SLOPING SITES DIVERT SURFACE WATER FROM UPHILL SIDE AWAY FROM BUILDING.

PROVIDE FALLS TO FINISH GROUND SURFACE TO PREVENT WATER PONDING AT ANY POINT IN THE VICINITY OF THE BUILDING OR ON THE COMMON BOUNDARY OF ADJOINING ALLOTMENTS.

Stormwater Drainage

ALL STORM WATER DRAINAGE WORK TO BE IN ACCORDANCE WITH AS

DISCHARGE RAIN WATER DOWN PIPES TO INTER-ALLOTMENT DRAINAGE SYSTEM IF AVAILABLE, KERB AND CHANNEL IF FALL PERMITS OR SPLASH PADS (SPLASH PADS NOT PERMITTED ON CLASS H & E SITES). ENSURE RAIN MATER IS DIRECTED AWAY FOR THE BUILDING. 1005qm OF ROOF AREA (MIN.) TO DISCHARGE TO RAIN WATER TANK FOR NEW HOUSES & UNITS.

Sewer Drainage

ALL PLUMBING & DRAINAGE WORK TO BE IN ACCORDANCE WITH WATER & SEWERAGE SUPPLY ACT AND AS 3500.

FOR SEWERED SITES DISCHARGE WASTE WATER TO COUNCIL SEWER. THE LOCATION OF THE SEWER MAIN HAS BEEN SCALED FROM COUNCIL PLANS. WHERE THE SEWER LINE IS 2m OR LESS FROM THE BUILDING STRUCTURE IT IS THE RESPONSIBILITY OF THE BUILDER TO PHYSICALLY LOCATE THE SEWER MAIN BEFORE STARTING WORK

FOR UNSEWERED SITES DISCHARGE WASTE WATER TO MINI TREATMENT SYSTEM, SEPTIC TANK OR HOLDING TANK AS SHOWN ON CONSULTANTS PLANS.

Slab & Footings

CONCRETE WORK TO BE IN ACCORDANCE WITH AS 3600.

Morking At Heights

FOR CONSTRUCTION, CLEANING AND MAINTENANCE PROCEDURES WHERE THERE IS A RISK OF FALLING, COMPLY WITH THE FOLLOWING CLAUSE FROM DIV. 4 OF PART 18 OF THE "WORKPLACE HEALTH AND SAFETY REGULATION". (CLASS 188 - FALL ARREST HARNESS SYSTEM)

Masonry

ALL MASONRY WORK TO COMPLY WITH AS 3700. CONSTRUCT MASONRY CONTROL JOINTS AT LOCATIONS SHOWN ON ENGINEERS FOOTING PLAN

Roofing

METAL ROOFING TO BE IN ACCORDANCE WITH AS 1562.1 AND FIXED TO MANUFACTURERS SPECIFICATIONS.

TILE ROOFING TO BE IN ACCORDANCE WITH AS 2049 AND FIXED TO MANUFACTURERS SPECIFICATIONS.

Timber Framing

ALL TIMBER SIZES AND CONNECTIONS NOT SHOWN TO BE IN ACCORDANCE WITH AS 1684.2 OR AS 1684.3 (DEPENDING ON WIND SPEED)

EXTERNAL TIMBER MEMBERS TO BE DURABILITY CLASS 1 OR 2 WITH SAPWOOD REMOVED OR PRESERVATIVE TREATED TO H3 UNLESS STATED ALL WALL DIMENSIONS ARE TO STRUCTURAL COMPONENTS - NOT TO THE FACE OTHERWISE. ALL PINE TO BE LOSP TREATED TO H3 LEVEL.

ALL STRUCTURAL PLY IS TO BE IN ACCORDANCE WITH AS/NZ 2269 AND FIXED TO MANUFACTURERS SPECIFICATIONS. ALL EXTERNAL NAILED AND SCREWED FIXING IN COASTAL AREAS FOR (BUT

NOT LIMITED TO) CLADDING, FLOORING, SHEET LININGS, WINDOWS, DOOR FRAMES AND HINGES TO BE STAINLESS STEEL OR SILICON BRONZE.

TIMBER ROOF BATTENS TO BE FIXED IN ACCORDANCE WITH AS 1684.2 OR AS 1684.3 (DEPENDING ON WIND SPEED) AND WPHS REQUIREMENTS. METAL ROOF BATTENS TO BE FIXED IN ACCORDANCE WITH MANUFACTURERS

TIONS AND WPHS REQUIREMENTS. TILE ROOF BATTENS TO BE FIXED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS AND WPHS REQUIREMENTS

ROOF TRUSSES - TIE DOWN, CONNECTIONS AND BRACING TO TRUSS

MANUFACTURERS DETAILS WALL FRAMES - TO BE DESIGNED, CERTIFIED & SUPPLIED BY WALL FRAME

MANUFACTURER UNLESS DETAILED ON PLAN.

FLOOR FRAMING - FOR LVL MEMBERS IT IS RECOMMENDED THAT THE TOP EDGE BE PROTECTED FROM WATER PENETRATION DURING CONSTRUCTION. THIS CAN BE ACHIEVED BY THE APPLICATION OF A WATERPROOF TAPE OR PAINTING THE TOP EDGE OF THE MEMBER WITH DURAM "DURABIT" ACRYLIC. (PAINTING IS RECOMMENDED WHILE MEMBERS ARE STACKED). ALL OTHER MEMBERS EXCLUDING HARDWOOD SHOULD BE PROTECTED AS PER MANUFACTURERS SPECIFICATIONS.

INTERNAL STRIP FLOORING IS TO BE WEATHER PROTECTED AT ALL TIMES AND TO HAVE A MOISTURE CONTENT NOT GREATER THAN 15%.

PROVIDE PROTECTION FOR NEW BUILDINGS IN ACCORD. WITH THE B.C.A. -QUEENSLAND AMENDMENTS AND AS 3660.1 - 2000.

PROVIDE PROTECTION FOR EXISTING BUILDINGS IN ACCORD. WITH THE

MINIMUM 75mm SLAB EDGE

CHEMICAL PERIMETER &

ELEMENTS OF TERMITE

RESISTANT MATERIALS

PENETRATIONS SYSTEM

EXPOSURE

- SHEET

SHIELDING

OTHER:

SUBSEQUENT INSPECTIONS ARE TO BE CARRIED OUT TO INSTALLERS REQUIREMENTS

Stair Treads, Landings & Ramps

TREADS MUST HAVE A SLIP-RESISTANT FINISH OR A SUITABLE NON-SKID STRIP NEAR THE EDGE OF THE NOSINGS AND EDGE OF LANDINGS IN ACCORD. WITH NCC VOL. 2 PART 3.9.1.4 SLIP-RESISTANCE.

APPLICATION	SURFACE CONDITIONS		
	DRY	MET	
RAMP NOT STEEPER THAN 1:8	P4 or R10	P5 or R12	
TREAD SURFACE	P3 or R10	P4 or R11	
NOSING OR LANDING EDGE STRIP	P3	P4	

Wall Cladding

WALL CLADDING TO BE FIXED TO MANUFACTURERS SPECIFICATIONS.

Aluminium Windows & Doors

ALUMINIUM WINDOWS AND DOORS TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH AS 2047/48.

Structural Steel

RHS & SHS STEEL SECTIONS TO BE FIRST GRADE STEEL COMPLYING WITH AS 1163 AND HOT ROLLED SECTIONS TO COMPLY WITH AS 3679. ALL STRUCTURAL STEEL MATERIALS, WORKMANSHIP, FABRICATION &

ERECTION SHALL COMPLY WITH THE REQUIREMENTS OF AS 4100, AS 1538, AS 1554 AND ANY OTHER RELEVANT SPECIFICATIONS. ALL BOLTS, NUTS, WASHERS, BRACKETS ETC. IN COASTAL AREAS TO BE HOT

DIPPED GALVANIZED. Wet Areas

WATER PROOFING OF WET AREAS IS TO BE CARRIED OUT IN

ACCORDANCE WITH THE BCA AND AS 3740

FLOORS TO WET AREAS - CERAMIC TILES OR OTHER APPROVED

MATERIALS. SPLASH BACKS

FLASH DACKS-								
IIN. HEIGHT	FIXTURE	MATERIAL						
150mm	BATHS, BASINS & SINKS	CERAMIC TILES*						
1800mm	SHOWERS	CERAMIC TILES*						
OR OTHER APPROVED MATERIAL								

Insulation

- REFER TO THE ATTACHED ENERGY EFFICIENCY REPORT FOR DETAIL

Sustainability Requirements

NEW HOUSES/ADDITIONS WITH PLUMBING (NEW WORK ONLY):

-PROVIDE AAA-RATED SHOWER ROSES WITH MIN. 3 STAR WATER EFFICIENCY AND STANDARDS RATING -PROVIDE DUAL-FLUSH TOILETS WITH MIN. 4-STAR WATER EFFICIENCY AND

STANDARDS RATING - PROVIDE TAPWARE WITH MIN. 3-STAR WATER EFFICIENCY LABELING AND STANDARDS RATING FOR TAPS SERVING:

(A) LAUNDRY TUBS & (B) KITCHEN SINKS &

(C) BASINS

CHEMICAL RETICULATION SYSTEMS -PROVIDE WATER PRESSURE-LIMITING DEVICES (WHERE WATER PRESSURE EXCEEDS 500 KILOPASCALS)

-ENERGY EFFICIENT LIGHTING TO A MINIMUM OF 80% OF THE ENCLOSED SPACE.

ADDITIONS WITHOUT PLUMBING (NEW WORK ONLY):

-ENERGY EFFICIENT LIGHTING TO A MINIMUM OF 80% OF THE ENCLOSED

IF PROVIDED AIR CONDITIONERS ARE TO HAVE A MINIMUM EFFICIENCY RATIO (EER) OF 2.9

REFER TO ENERGY EFFICIENCY REPORT BY OTHERS FOR ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS IF SUPPLIED.

Other Consultants

REFER TO DETAILS BY OTHER CONSULTANTS FOR:

- SLAB & FOOTING DESIGN

SOIL TEST - TIMBER FLOOR FRAMING

SPACE.

RETAINING WALL DETAILS

- ENERGY EFFICIENCY REPORT

REVISIONS				PROPOSED RESIDENCE FOR B. & T. ARMSTRONG AT LOT 21 (#13) HAVEN CLOSE	^{this draw}
Ŕ	NO.	DESCRIPTION	DATE	NORMAN GARDENS	

Termite Protection 'TERMITE MANAGEMENT - NEW BUILDING WORK".

B.C.A. - QUEENSLAND AMENDMENTS AND AS 3660.2 - 2000. "TERMITE MANAGEMENT - IN AND AROUND EXISTING BUILDINGS AND STRUCTURES".

OPTION SELECTED :-

GRADED STONE BARRIERS

CHEMICAL IMPREGNATED PLASTIC

STAINLESS STEEL MESH

SHIELDING

MONOLITHIC CONCRETE SLAB





Site TBM Plug in kerb RL55.93



Facsimile 61 7 49266579

E-mail mailbox@rufusdesigngroup.com

STYLE · QUALITY · INNOVATION

CHKD

PRINT DATE : 18/03/2019 8:38:35 PM

REVISION

SIZE:

SHEET OI OF O3 SHEETS



Ŋ				PROPOSED RESIDENCE	this drawi
Q				FOR B. & T. ARMSTRONG	17100
				AT LOT 21 (#13) HAVEN CLOSE	
۶Z	NO.	DESCRIPTION	DATE	NORMAN GARDENS	



NOT FOR CONSTRUCTION

Window Legend 1218 - 1200 high x 1800 wide X0 - Sliding / Fixed X - Sliding 0 - Fixed D Double Hung

- Double Hung D
- A Awning CMT Casement
- Louvre F.G. - Fixed Glass
- Glazing to wet areas to be clear/obscure

Glazing to remainder to be clear/solarblock

	Plan Legend							
BTC	Benchtop Cupboards							
BTH	Bath							
CF	1200mm dia Ceiling Fan							
CTR	Cooktop with Range Hood Over							
DP	Down Pipe							
DW	Dishwasher							
EF	Mechanical exhaust fan discharging to outside air							
FW	Floor Waste							
FZ	Freezer							
HC	Hose Cock							
HGD	Half Glass Door							
HS	Hobless Shower							
HWS	Hot Water System							
KS	Kitchen Sink							
LT	Laundry Tub							
MH	Man Hole							
RF	Refrigerator							
SA	Photoelectric Smoke Alarm							
TR	Towel Rail							
UBO	Under Bench Oven							
WB	Wash Basin							
WM	Washing Machine							





Floor Areas				
Habitable	207.5 m ²			
Patio/Porch	50.3 m ²			
Garage	39.1 m²			
Grand total	296.9 m ²			

ing





bì	MEMBER BUILDING DESIGNERS	Licenced under the QBSA Act
	ASSOC. OF QLD INC.	Lic No.
		1180286
	Telephone 61	7 49288011
	Facsimile 61	7 49266579
E-m	nail mailbox@rufusde	signgroup.com

PROJECT : T.J.R.	WIND	()	PROJECT NUMBER
DRAWN : J.P.	SPEED	02	181023 ⁻ 02
	PLAN SIZE:	A2	SHEET 02 OF 03 SHEETS
CHKD :			REVISION



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SPT - N

		1					1			
		Project I	name	Slope St	ability					
		Client		B Armst	rong				DCP	
RI RI	41	Date dri	lled	22/03/2	019		Т	EST	RESU	LTS
		Driller		Scott Wa	alton					
		Method		Drillman					E	_
		Logged I	бу	Scott Wa	alton		bt	Ē	₽ §	
		Notes		Geotech	inical report	1	ڪ ۾			5
D I	Visual				1	6				
Depth (m)	Class'n Symbol		Visu	ial Descript	tion of Material	Sample	100		4	
0.0		Gravell	v Sandy (IAV mo	dium plasticity fine to		200		5	
0.0	CI	coarse	grained I	hrown F			300		6	
		course	granica, i	510 WII, E	, 101, 0.51.		400		>15	
04		**With f	loaters thro	ughout			500			
0.4	GC/XW	Clavey	Sandy GR	AVEL fir	ne to coarse grained low		600			
0.4	UC/XW	nlastici	ty fines v	ellowish	hrown D VD		700			
		plastici	cy mics, y	00001511			800			
0.5		Weath	ered rock	r			900			
0.5		Tr Cutin					1000	'		
			TC Bit re	fusal at	0.5 m		1100			-
							1200	+		
							1400			
							1500			
							1500			
							1700			
							1800			
							1900			
							2000	1		
							2100	,		
							2200	,		
							2300	1		-
							2400	1		
							2500	1		
							2600	1		-
							2700	1		-
							2800	1		
							2900	1		
							3000	1		
							3100	1		
							3200	1		
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							3400	·		
							3500			
							3600			
							3700			
							3800			
							3900			
							4000			
							4100	1		
							4200	'		
							4300	'		
MOISTUR	RE CON	SISTENCY	RELATIVE	DENSITY			4400			
CONDITIC	DN						4500			
D – Dry	VS-	Very Soft	VL-Ver	y Loose	DCP test results are to be used as a guid density and consistency of soils. Chan	le only to relative ges in moisture	4600			
W – Wet	t F	– Firm	MD – Me	ed Dense	contents or the presence of coarse grai	ned material can f this test.	4700			
	ST	– Stiff	D – D	ense	greaty innucice the outcome of		4800			
	V/ST -	- Very Stiff	VD – Ver	y Dense			4900			_
	Н	– Hard					5000	'		



-	Project n	ame Slo	ne Stahility				
	Client	Client B Armstrong				DCP	
	Date dril	led 22/	22/03/2019			T RESU	LTS
BH2	Driller	Sco	tt Walton			1 112501	-10
	Method	Dril	Iman			_	
	Logged b	v Sco	tt Walton		로 달	م م	Z
	Notes	Geo	otechnical report		Dep (mr	DC/sw	Ъ
Vis	sual		·			Blo	S
Depth Cla (m) Syn	ss'n nbol	Visual De	scription of Material	Sample	100 200	drill drill	_
0.0 (Gravelly	/ Sandy CLAY	, medium plasticity, fine to		300	drill	
	coarse g	grained, brov	vn, D-M, VST.		400	drill	
	**\^/:+fl				500	4	
0.4	** with fi	baters through	out		600	5	
0.4 C	H <u>CLAY</u> , h	igh plasticity,	trace of fine to coarse		700	5	
	grained	sand, brown	-reddish brown mottled, D-		800	5	
	M, VST.				900	6	
0.9					1000	8	
0.9 (J <u>Silty CL/</u>	<u>xr</u> , meaium p	d brown M. D. w/donth		1100	7	
		i gramed san v/donth	u, brown, w-b w/depth,		1200	8	
3.2	V 11-11 V	v ucpui.			1300	6	
3.2 60			I fine to coarse grained low		1400	8	
3.2 (C)	nlasticit	v fines vello	wish brown D VD		1500	9	
	plasticit	y mics, yeno			1600	10	
3.6	Weathe	ered rock			1700	10	
					1800	9	
	-	FC Bit refusa	l at 3.6 m		2000	>15	
					2100	, 13	
					2200		
					2300		
					2400		
					2500		
					2600		
					2700		
					2800		
					2900		
					3000		
					3100		
					3200		
0.5 –0.8 m			0.5 –1.0 m		3300		
% Passing 75 um	ND		% Passing 75 um	ND	3400		
Natural MC%	22		Natural MC%	17	3500		
Plastic Index	ND		Plastic Index	ND	3000		
lss	3.2		lss	1.3	3700		
Emerson Class	ND		Emerson Class	ND	3900		
Test Methods:			Test Methods:		4000		
AS 1289 2.1.1, 3.1.1, 3.1. 3.8.1, 3.9.1, 3.9.2: Moiste	2, 3.3.1, 3.3.2, 3.4.1, 3.6.1 are content (oven drving)	,	AS 1289 2.1.1, 3.1.1, 3.1.2, 3.3.1, 3 3.8.1, 3.9.1, 3.9.2: Moisture contex	.3.2, 3.4.1, 3.6.1, nt (oven drying):	4100		
liquid limit (Casagrande); index: cone plasticity ind	plastic limit; plasticity		liquid limit (Casagrande); plastic lin	nit; plasticity	4200		
analysis; Emerson class n	umber		analysis; Emerson class number		4300		
MOISTURE	CONSISTENCY		SITY		4400		
CONDITION	CONSISTENCE				4500		
D – Dry	VS – Very Soft	VL – Very Loo	Se DCP test results are to be used as a gui	de only to relative	4600		
M – Moist	S – Soft	L – Loose	contents or the presence of coarse gra	nges in moisture ined material can	4700		
vv – vvet	F – Firm ST – Stiff	D – Dense	greatly influence the outcome o	of this test.	4800		
l	V/ST _ Vony Stiff	VD – Very Der	150		4900		
	v/si = very suit		isc -				

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r							1		
		Project r	name	Slope St	ability				
		Client		B Armsti	rong			DCP	
BI	12	Date dri	led	22/03/2	019		TES	ST RESU	LTS
	J	Driller		Scott Wa	alton				
		Method		Drillman	1			E	-
		Logged b	ру	Scott Wa	alton		j br	- C -	ے ا
		Notes		Geotech	nical report		E D L		SP
Depth (m)	Visual Class'n Symbol		Visu	ual Descript	ion of Material	Sample	100	8	
0.0	Symbol	Gravall	(Sandy (<u>`I AV mo</u>	dium plasticity fina to		200	6	
0.0	C	coarse	grained,	brown, D	o-M, VST.		300 400	8 9	
0.3		**With fl	oaters thro	oughout			500 600	11 10	
0.3	CI	Silty CL	AY, medi	um plast	icity, with fine to		700	9	
		mediun	n grained	l sand, br	rown, M-D w/depth,		800	8	
		VST-H v	v/depth.				900	>15	
0.9			-				1000		
0.9	GC/XW	V Clayey	Sandy GF	RAVEL, fir	ne to coarse grained, low		1100		
	/	plasticit	ty fines, y	/ellowish	brown, D, VD.		1200		
			, ,,				1200		
1.1		Weathe	ered rock	(1400		
							1500		
			TC Bit re	fusal at	1.1 m		1600		
							1700		
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							4200	+	
							4300		
	-		DEL	DEMO			4400		
		UNSISTENCY	RELATIVE	DENSITY			4500		
D – Drv	V	S – Verv Soft	VL – Ver	v Loose	DCP test results are to be used as a guid	le only to relative	4600		
M – Mois	st	S – Soft	L-L	oose	density and consistency of soils. Char	ges in moisture	4700		
W – We	t	F – Firm	MD – Me	ed Dense	greatly influence the outcome o	f this test.	4800		
		ST – Stiff		ense			4900		
	V/S	H – Hard	vu – Ver	y Dense			5000	1	
L		uu							



Photographs



Figure 2 Proposed construction site



Photographs











R.P.D. Lot Number : 21 Red./Survey Plan Number : 6P174522 Parilish : MuRCAIGON County : Livingstone Area : T69sqm



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Site Plan

1:200

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007



Possible travel downslope which impacts other development downhill

See also AGS (2000) Appendix J

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

APPENDIX G - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

GOOD ENGINEERING PRACTICE

POOR ENGINEERING PRACTICE

ADVICE							
GEOTECHNICAL	Obtain advice from a qualified, experienced geotechnical practitioner at early	Prepare detailed plan and start site works before					
ASSESSMENT	stage of planning and before site works.	geotechnical advice.					
PLANNING							
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk	Plan development without regard for the Risk.					
DESIGN AND CONS	TRUCTION						
DESIGN AND CON	Use flexible structures which incorporate properly designed brickwork, timber	Floor plans which require extensive cutting and					
HOUSE DESIGN	or steel frames, timber or panel cladding.	filling.					
HOUSE DESIGN	Consider use of split levels.	Movement intolerant structures.					
OTTE OF EX DD IO	Use decks for recreational areas where appropriate.	x 4 4 4 4					
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.					
DRIVEWAYS	Council specifications for grades may need to be modified.	geotechnical advice.					
	Driveways and parking areas may need to be fully supported on piers.	0					
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.					
Crumo	Minimise depth.	Large scale cuts and benching.					
CUIS	Provide drainage measures and erosion control	Unsupported cuts. Ignore drainage requirements					
	Minimise height.	Loose or poorly compacted fill, which if it fails,					
	Strip vegetation and topsoil and key into natural slopes prior to filling.	may flow a considerable distance including					
Euro	Use clean fill materials and compact to engineering standards.	onto property below.					
FILLS	Provide surface drainage and appropriate subsurface drainage	Fill over existing vegetation and tonsoil					
		Include stumps, trees, vegetation, topsoil,					
		boulders, building rubble etc in fill.					
ROCK OUTCROPS	Remove or stabilise boulders which may have unacceptable risk.	Disturb or undercut detached blocks or					
& BOULDERS	Engineer design to resist applied soil and water forces.	Construct a structurally inadequate wall such as					
DETAINING	Found on rock where practicable.	sandstone flagging, brick or unreinforced					
WALLS	Provide subsurface drainage within wall backfill and surface drainage on slope	blockwork.					
	above.	Lack of subsurface drains and weepholes.					
	Found within rock where practicable.	Found on topsoil, loose fill, detached boulders					
FOOTINGS	Use rows of piers or strip footings oriented up and down slope.	or undercut cliffs.					
10011105	Design for lateral creep pressures if necessary.						
	Engineer designed						
	Support on piers to rock where practicable.						
SWIMMING POOLS	Provide with under-drainage and gravity drain outlet where practicable.						
	Design for high soil pressures which may develop on uphill side whilst there						
DRAINAGE	may be nutle or no lateral support on downnin side.						
Diamanop	Provide at tops of cut and fill slopes.	Discharge at top of fills and cuts.					
	Discharge to street drainage or natural water courses.	Allow water to pond on bench areas.					
SURFACE	Provide general falls to prevent blockage by siltation and incorporate silt traps.						
	Special structures to dissipate energy at changes of slope and/or direction.						
	Provide filter around subsurface drain.	Discharge roof runoff into absorption trenches.					
SUBSURFACE	Provide drain behind retaining walls.						
	Use flexible pipelines with access for maintenance.						
	Usually requires pump-out or mains sewer systems; absorption trenches may	Discharge sullage directly onto and into slopes.					
SEPTIC &	be possible in some areas if risk is acceptable.	Use absorption trenches without consideration					
SULLAGE	Storage tanks should be water-tight and adequately founded.	of landslide risk.					
ERUSION	Control erosion as this may lead to instability.	Failure to observe earthworks and drainage					
LANDSCAPING	iceregetate eleated alea.	recommendations when failuscaping.					
DRAWINGS AND SITE VISITS DURING CONSTRUCTION							
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant						
SITE VISITS	Site Visits by consultant may be appropriate during construction/						
INSPECTION AND MAINTENANCE BY OWNER							
OWNER'S	Clean drainage systems; repair broken joints in drains and leaks in supply						
AESFONSIBILITY	Where structural distress is evident see advice.						
	If seepage observed, determine causes or seek advice on consequences						





Appendix D – Standard pro-forma for geotechnical certification

Property details				
Lot Number If Applicable	Lot 21			
Registered Plan Number	SP 179522			
Site Address	13 Haven Close, Norman Gardens QLD 4701			

Proposed works	
Description	Proposed Residential Development

Proposed development	
D	Proposed Residential Development
Description	

Declaration									
I,		Sam Jeyan	Registered Profession Engineer of Queenslar (RPEQ) number	al Id	13339				
of	CQ	Soil Testing				(Consulting engineer's firm)			
being duly authorised on this behalf, do certify that:									
the existing site and the proposed residential development lie with a slope instability									
hazard risk of 'low' based on site-specific geotechnical information and landslip hazard risk									
assessment outcome.									
I am awar	e that Roc	khampton Regional Cour	ncil (RRC) will rely u	pon this c	ertific	cate and ar	ıy		
associated	l maps, str	uctural & drainage plans,	drawings, tables and	attachme	nts				
etc. produced as a consequence of commissioning this development proposal.									
Accredited Slope Risk Assessor - RMS Guide to Slope Risk Assessment - Version 4									
Signature		Fired	Designation	Senior G	nior Geotechnical Engineer				
Certified th	is	3	Day of	April		Year	2019		