



**ENGINEERING REPORT
FOR
S & R BANKS
KAPOWAI BAY, D'URVILLE ISLAND**

**Ref: 26204
Date: March 2017**

Our Ref: 26204

28 March 2017

**ENGINEERING REPORT
FOR
S & R BANKS**

LOCATION DETAILS: Te Akau Point, Kapowai Bay, D'Urville Island
LEGAL DESCRIPTION: Lot 5 DP 321686
DATE OF SITE VISIT: 21 June 1993, 11 March 2002, 3 February 2017
ZONING: Rural One (MSRMP) and Coastal Environment Zone (MEP)

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A. SYNOPSIS

A1. Scope of the Investigation

We have carried out numerous investigations in this area in the past 24 years, including the initial one on this site in 1993.

This report updates a previous report dated 23 September 2002 carried out for the owner at the time, D'Urville Island Development Ltd, and for an inspection carried out in February 2017.

A2. Summary and Conclusions

A2.1 There is a large stable area available for the construction of a dwelling.

A2.2 Treated wastewater can be disposed of on site in an area to the east of the building site.

A2.3 Vehicle access is available to the site from Kapowai Bay.

A3. Recommendations

A suitable house site is available, provided that;

- a) the building site is confined to the area shown on the drawings attached to this report,
- b) water from the roof and storage overflow be collected and piped directly to the foreshore, and
- c) drinking water is tested to ensure it complies with current Council drinking water standards.

B. REPORT

B1. Site Description

The property is located on Te Akau Point in Kapowai Bay at the south-eastern end of D'Urville Island. The site is elevated with panoramic views to French Pass and Admiralty Bay.

The ridge tops have been cleared of vegetation but the side slopes have a good native cover consisting mainly of kanuka. The ridge line itself is gently sloping (less than 5°). The side slopes are steep, over 40°, to the foreshore.



View of Te Akau Point from the South

B2. Geotechnical Investigation

The New Zealand Geological Maps describe the base rock in this area as argillite and hard mudstone overlain with stony silt loams which is subject to sheet erosion and slips on very steep slopes.

The access track formed to the site from the center of Kapowai Bay confirms the existence of argillite outcrops on the west facing slopes and shallow overburden which show a history of slumps and sheet erosion on the steeper slopes. The argillite was weathered and highly fractured in the exposed cuts.

An inspection from the water of the slopes to the sea confirmed the existence of some slips on the steep slopes, but none appear to be actually on this property.

The ridge crest had been excavated by machine prior to our first inspection in 1993 with the excavated material side cast. This work created a long, wide and flat building site, exposing weathered and highly fractured rock and firm silty clay.

Where the ridge drops off steeply to the sea, these slopes show signs of soil movement due to erosion at sea level and the steepness of the slopes (up to 50°).

The width of the ridge varies from 7 - 15 metres along its length narrowing at the south-western end.

The building site identified in 2002 for the purpose of subdivision was located at the northern end of this ridgeline. Subsequently, in the process of determining the legal boundaries, much of the approved building site was inadvertently cut through, leaving a much diminished site.

The currently proposed building site is located at the southern end and straddles the bench and side cast material. The steep slope to the sea to the south appears to be subject to slope movement but the eastern and western slopes are much more stable. The whole of the ridge line however has a solid weathered rock base and is stable.

Four scala penetrometer tests were carried out at the building site.



Proposed house site

The tests confirm soft, unconsolidated material (side cast) along the perimeter of the excavated area (less than 2 blows/50 mm) up to 800 mm lying over firm soils to 1.5 - 2.0 m and weathered rock at greater depths.

B3. Geotechnical Assessment

While there have been slips on the steep slopes extending to the foreshore around the property, especially to the south and on the lower slopes to the west, there were no signs of movement on the excavated building platform along the ridge line.

A large stable area has been identified as suitable of a dwelling and this is shown on the drawings attached to this report.

It is recommended however that a 'no build' zone extends back 5 m from the edge of the very steep slope dropping from the southern end of the bench to mitigate against the risk of further movement on that face.

B4. Building Foundations

Foundations constructed in accordance with NZS 3604 'Timber Framed Buildings' would be suitable for this building site, ensuring that they are well founded in the competent soils and rock below the side cast material.

B5. Wastewater Investigation

A suitable disposal area has been identified just east of the building site where shown on the plans.

The proposed system to be used is primary treatment to a Flout (dosing system) to a Low Pressure Effluent Distribution (LPED) land application field. Refer to the Wastewater Report for more details.

B6. Stormwater Disposal

Stormwater from the roof, other hard areas and the water tank overflow shall be collected and piped directly to the foreshore below.

B7. Water Supply

The average rainfall in this area is about 1,300 mm. This would suit a roof water supply if sufficient storage was available. At least 30,000 litres storage is recommended.

The current New Zealand drinking water standards will also require filtration for Giardia and cryptosporidium and UV exposure for faecal coliforms, proceeded by prefiltration and tank storage for settling. Domestic treatment kits are available on the market.

B8. Vegetation Clearance

The vegetation along the ridge has been removed at least 24 years ago. Any further vegetation clearance is allowed but should be minimised due to its ability to enhance stability to the surface soils and control soil moisture.

Furthermore, the uptake by plants of treated wastewater discharged to the ground assists the reliable functioning of land application systems. Vegetation should be maintained and encouraged over the effluent field.

B9. Access

An access track has been previously formed to the building site and is adequate for four wheel drive vehicles.

B10. Disclaimer

B10.1 The Marlborough Sounds area is a high rainfall area and prone to high intensity and localized rainfall events.

While the instability on building sites in the Sounds is higher than for building sites on flat ground not close to hills, (where the risk is practically nil), we consider that the building

sites identified should remain stable for the life of the buildings. However, given the variable nature of the ground and weather patterns, no guarantee can be provided.

If instability of the land surrounding the building sites were to occur during the lifetime of the buildings, some remedial work may be required if this threatens to undermine the foundations.

B10.2 This report has been prepared solely for the benefit of the relevant Local Authority and our client, according to their instructions. No liability is accepted by this firm or by any principal, or director, or any servant or agent of this firm, in respect of its use by any other person, and any other person who relies upon any matter contained in this report does so entirely at their own risk.

The assessments made shall not be made available to or relied upon by any other party without the specific approval of Davidson Group Ltd.

B10.3 This disclaimer shall apply notwithstanding that the report may be made available to any other person in connection with any application for permission or approval, or pursuant to any requirement of law.

This report is based on conditions presently found on site and is consistent with standards currently being applied.

B11. References

B11.1 AS/NZS 1547:2000 'On-Site Wastewater Management'.

B11.2 Marlborough Sounds Resource Management Plan.

B11.3 Marlborough Environment Plan.

B11.4 Rainfall Contours (Isohyets) for Marlborough Sounds - Source Unknown.

B11.5 Stereoscopic aerial photographs, flown by NZ Aerial Mapping in 1973, Numbers SN 3684 I5/I6.

B11.6 NZ Geological Map, Sheet 14, Marlborough Sounds.

B11.7 Institute of Geological & Nuclear Science, Geological Map 16, 'Geology of the D'Urville Area' by M R Johnston.

B11.8 Davidson Partners, 23 September 2002 'Engineering Report for D'Urville Island Development Ltd'.

DAVIDSON GROUP LTD



W L McGlynn

WLM: LW

Encl.

APPENDIX

1. Professional Opinion
2. Risk Matrix
3. Foundation Test Results
4. Plan 26204 sheets;
 - R1 Location and Site Plan
 - R2 Sections

Our Ref: 26204

28 March 2017

**STATEMENT OF PROFESSIONAL
OPINION AS TO LAND STABILITY**

DESCRIPTION: Lot 5 DP 321686, Te Akau Point, Kapowai Bay, D'Urville Island

FOR: S & R Banks

I, **William Leigh McGlynn**, of Davidson Group Ltd, PO Box 256, Blenheim,

hereby confirm that:

1. I am experienced in the field of soils engineering and more particularly land and foundation stability and am formally recognised by the Marlborough District Council. I am familiar with and understand the purpose of the Marlborough District Council's geotechnical reporting standards. This professional opinion is furnished to the Marlborough District Council alone, on the express condition that it will not be communicated to or be relied upon by any other person. It is based on conditions presently found on site and is consistent with standards currently being applied.
2. Site investigations have been carried out under my direction and are described in our site investigation report dated 28 March 2017, attached. The following professional opinion is based on the assumption that the data obtained from these investigations is representative of the whole area under consideration. In my professional opinion having examined the site, it is reasonable for Council to assume that the data referred to above is representative of the whole area under consideration.
3. Detailed residential building and engineering drawings and specifications have yet to be prepared for this site.



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Principals

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Stephen Sheat, CPEng, MIPENZ, BE
Leigh McGlynn, CPEng, MIPENZ, BE

4. In my professional opinion, not to be construed as a guarantee, and having regard to the specifics of the site which I have investigated to the extent that acceptable engineering practices require giving due regard to acceptable engineering principles and practices for land and foundation stability, then the site shown on the plans is suitable for a house, providing that the following recommendations described in our accompanying report (Engineering Report for S & R Banks) are adhered to:
 - a) The building site is confined to the area shown on the drawings attached to this report.
 - b) Water from the roof and storage overflow be collected and piped directly to the foreshore.
5. This professional opinion shall remain current for a maximum of two years.

DAVIDSON GROUP LTD

A handwritten signature in blue ink, appearing to read 'W L McGlynn', with a horizontal line extending to the right.

W L McGlynn

WLM: LW

Our Ref: 26204

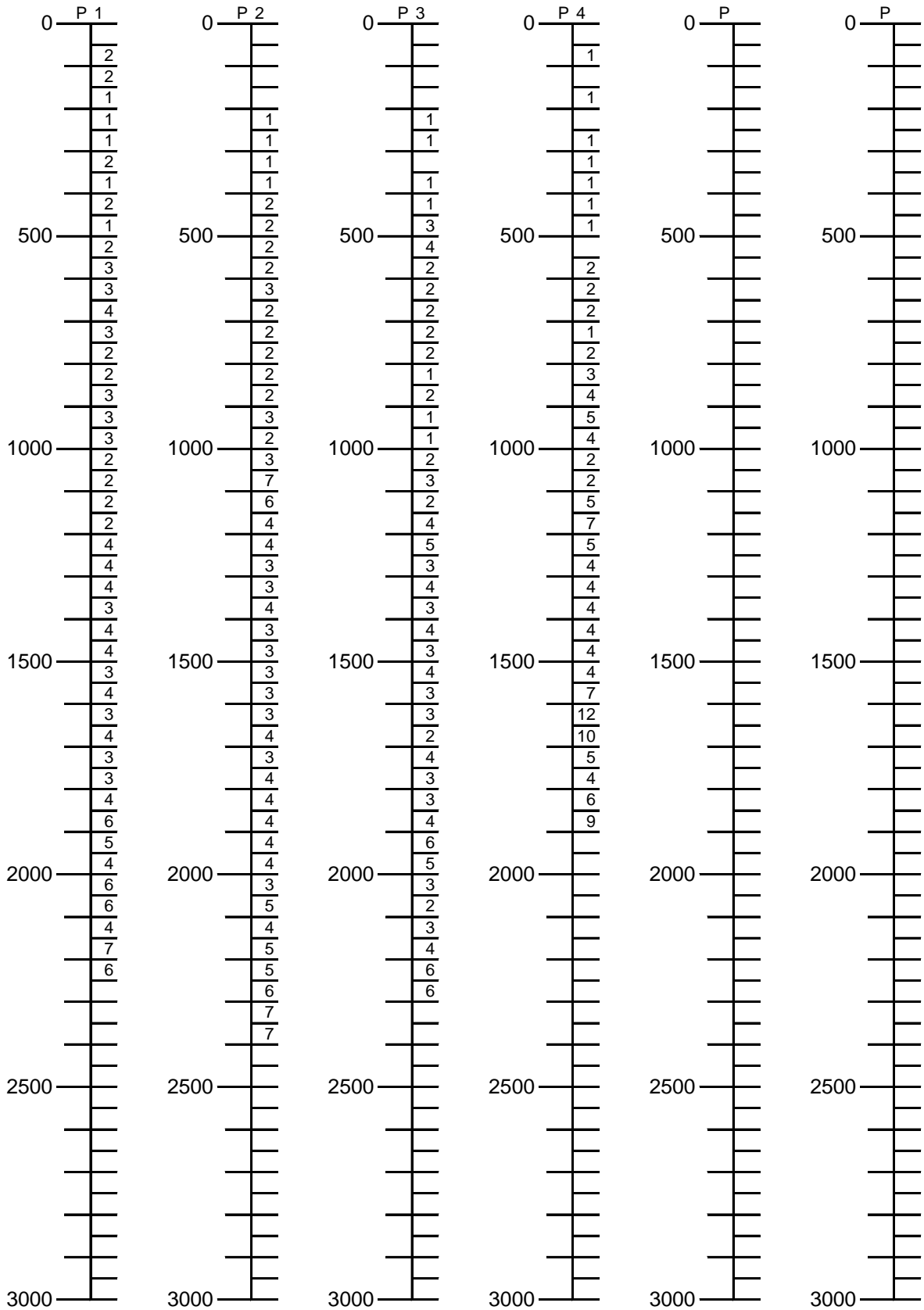
28 March 2017

**S & R BANKS
 TE AKAU POINT, D'URVILLE ISLAND
 LOT 5 DP 321686
GEOTECHNICAL RISK MATRIX**

(ex MDC 'Geotechnical Reporting Requirements 2005')

		Consequence				
		No risk to life, minor financial loss (<\$5k). Potential for small-scale instability only.	No risk to life, minor financial loss (<\$50k). Potential for small-scale instability only.	Very low risk to life, moderate damage and financial loss (<\$150k). Potential for moderate scale instability.	Low risk for loss of life, significant damage and financial loss (<\$500k). Potential for large-scale instability.	High risk for loss of life, extensive and significant damage and financial loss (>\$500k). Potential for large-scale instability.
Likelihood						
Almost Certain	Extensive evidence of active creep and active instability. Steep Slope.	M	H	H	E	E
Likely	Evidence of active creep and/or historic instability. Steep to Moderate Slopes.	M	M	H	H	E
Moderate	Evidence of historic soil creep and/or historic instability. Steep to Moderate Slopes.	L	M	M	H	H
Unlikely	No evidence of soil creep or historic instability, but evidence of instability on similar slopes. Moderate Slopes.	L	L	L	M	H

scala penetrometer results



PENETRATION IN BLOWS PER 50mm



SITE PLAN
1:500



PROJECT PLANNERS
RESOURCE MANAGERS
CIVIL & STRUCTURAL ENGINEERS
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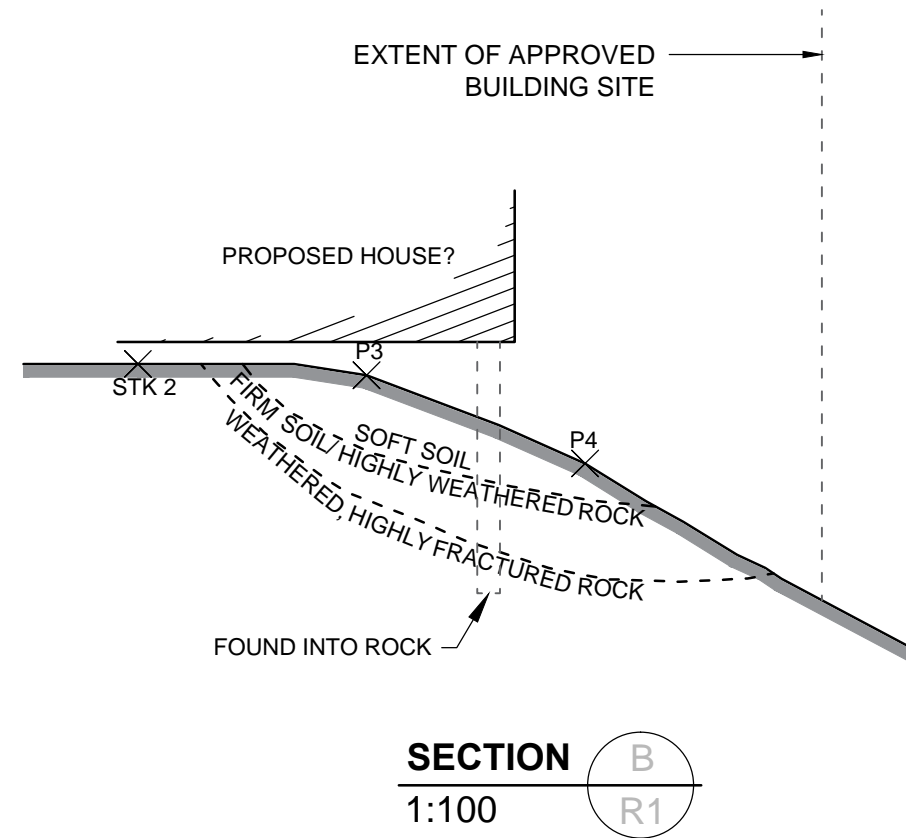
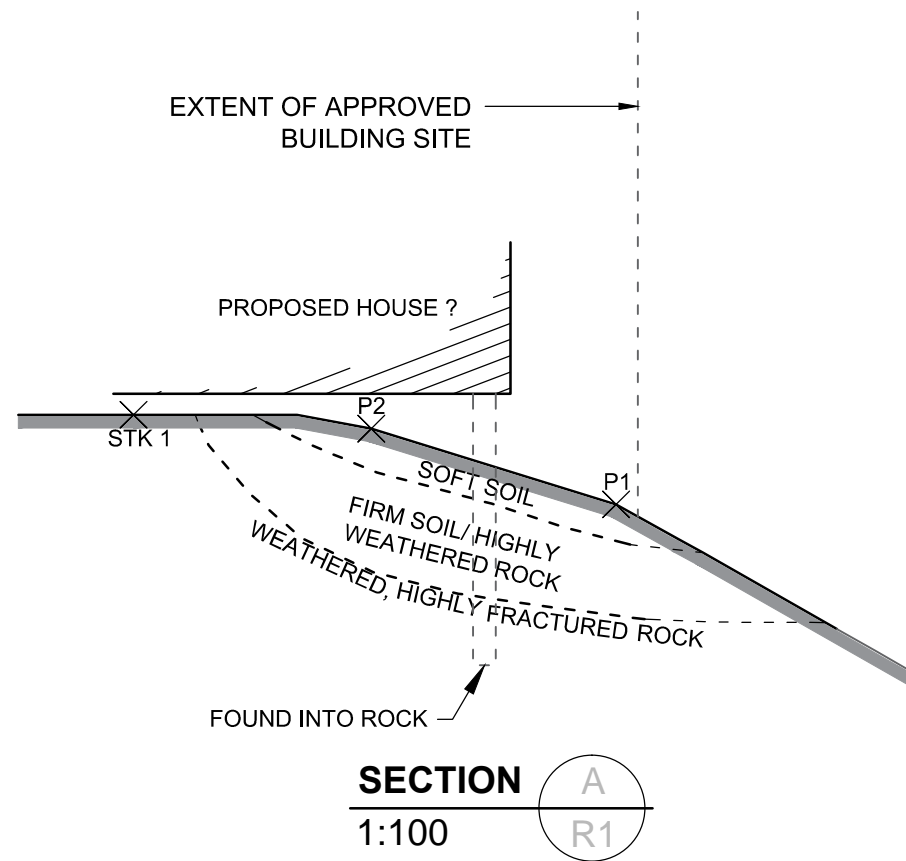
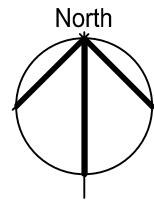
location & site plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
03/17	A3	26204	R1	A
DES LM	DRN GK	CK	REF	

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sections

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
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