

Geotechnical Assessment

Client:

Bruce Forlong

Located at:

3579 State Highway 63, Wairau Valley

Date: 20 November 2018

Ref: 0740

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Appendix A – Testing Results

1. Introduction

- 1.1. Bruce Forlong intends to construct a winery at his property at 3579 State Highway 63 in the Wairau Valley.
- 1.2. We have been engaged to provide a geotechnical assessment of the winery site.

2. Site Description

- 2.1. The subject property is located 45km west of Blenheim township.
- 2.2. The property has been historically used for farming, and now partially developed as a vineyard.
- 2.3. The properties are legally described as PT SEC 28 BLK VII Mt Olympus SD and has a parcel size of 166.97ha.
- 2.4. The winery site is located on the terrace offset 100m from the hillside, the site is essentially flat topography, largely vegetated in grass.
- 2.5. A site plan is attached in Appendix A.

3. Geotechnical Investigations

- 3.1. A desktop study consisting of review of geological maps, historic aerial photographs and the Marlborough District Councils GIS system was undertaken.
- 3.2. Investigations were carried out on 21 November 2018 and comprised of twelve (12) scala penetrometer tests and nine (6) test pits. Test locations are shown on the site plan attached in Appendix A.

Geology

- 3.3. The geology of the area is identified on the GNS regional mapping¹ as being Gravel, largely unweathered and forming extensive aggradational surface (Wairau Surface) 15-20m above the valley floor (sg).

¹ Begg, J.G and Johnston, M.R (compilers) 2000. New Zealand Geological Map 12: Geology of the Richmond Range, 1: 50,000

- 3.4. Approximately 100m below the gravels is sandstone / mudstone, therefore the site subsoil classification is assumed to be Class D².

Test Pits

- 3.5. The test pits indicated a shallow layer of topsoil (200-250mm) over sandy silty gravel (typically less than 1.0m), underlain by sandy gravel to 3.0m. A summary of the test pits is shown in Appendix A.
- 3.6. Groundwater was not identified.

Scala Penetrometer Testing

- 3.7. 12 scala penetrometer tests were carried out throughout the winery site. The testing was carried out to assess the soil bearing capacity of the soil and depth to the gravels.
- 3.8. Many of the tests were unable to penetrate more than 1.0m due to the gravel.
- 3.9. We consider an ultimate bearing capacity of 300 kPa to be appropriate for foundations bearing on a subgrade free of topsoil and organics and a minimum of 300mm of compacted AP40 hardfill.
- 3.10. Test results are attached in Appendix A.

4. Recommendations

- 4.1. We recommend stripping the site between 400mm to 600mm and the use of engineered fill to bring the site up to a suitable level for the winery (minimum 300mm thickness).
- 4.2. The fill material should comprise well graded sandy gravel (AP40) a minimum thickness of 150mm. AP65 can be used below the AP40 provided a minimum thickness of 200mm is achieved, placed and compacted in lifts no greater than 200 mm thick (loose thickness) and compacted with a vibrating compactor. If lower parts of the fill are drawing water during compaction, a static roller is to be used but only on the base lift. Compaction testing should be undertaken on every lift using a nuclear densometer or Clegg Hammer. If a nuclear densometer is used, fill should be compacted to a target of 95% of the material's maximum dry density. Maximum dry density can be obtained from the

² In accordance with NZS1170.5

supplier if regular testing is undertaken, or from an independent soil testing laboratory. If a Clegg Hammer is used, a minimum Clegg Impact Value (CIV) of 20 should be achieved.

- 4.3. Confirmation of the subgrade (excavation) and filling – in accordance with this report is to be undertaken by a Chartered Professional Engineer.

5. Limitations

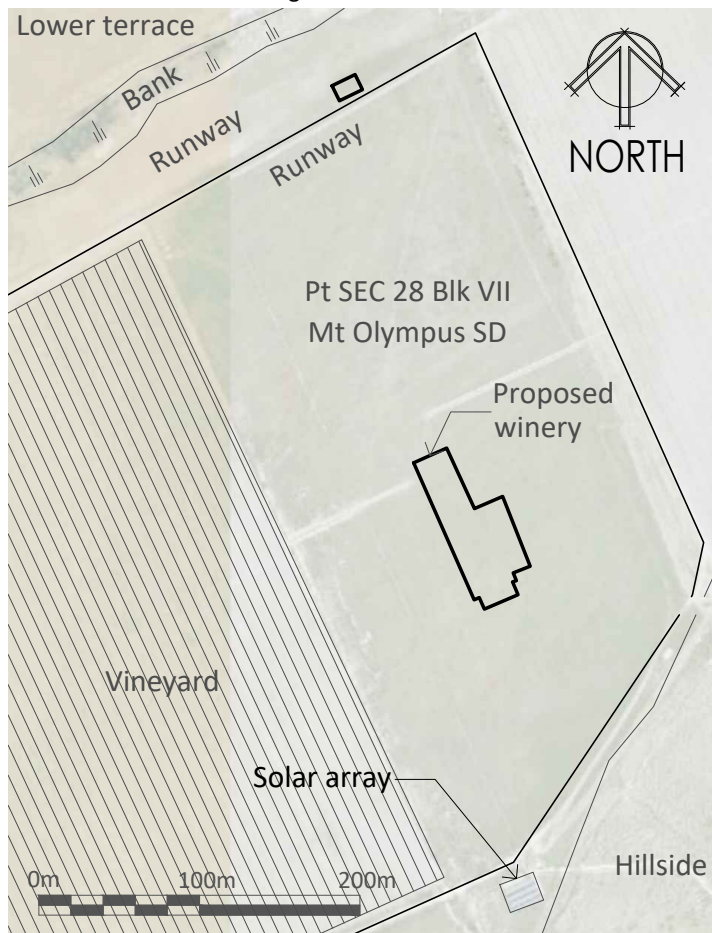
- 5.1. This report has been prepared for Bruce Forlong for the purposes of constructing a winery.
- 5.2. The conclusions and recommendations are based on review of the subsurface tests outlined in the report and visual observation. No guarantee as to the nature and continuity of the subsurface materials can be made. The possibility that variation from the assumed conditions between the test and observation locations cannot be ruled out.
- 5.3. If substantial variation between the assumed conditions expressed in this report is encountered, then it is recommended that Seng Engineering Consultancy be consulted in order to establish whether any revisions to the recommendations for building development should be adopted.
- 5.4. This report is valid for five (5) years.



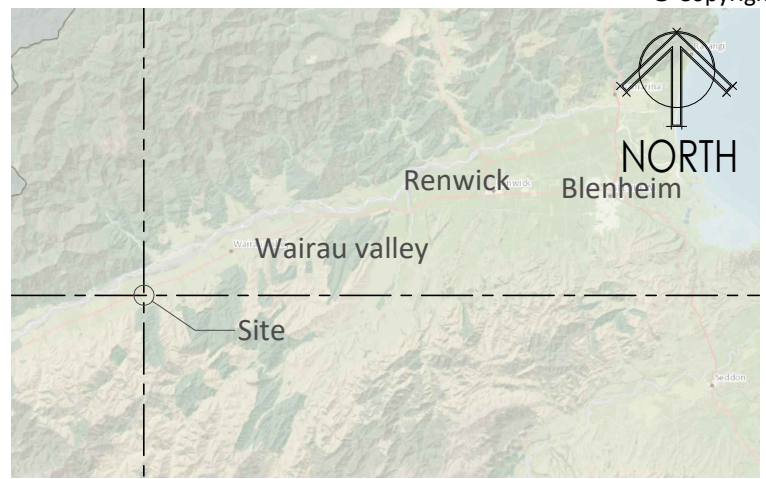
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Appendix A – Testing Results

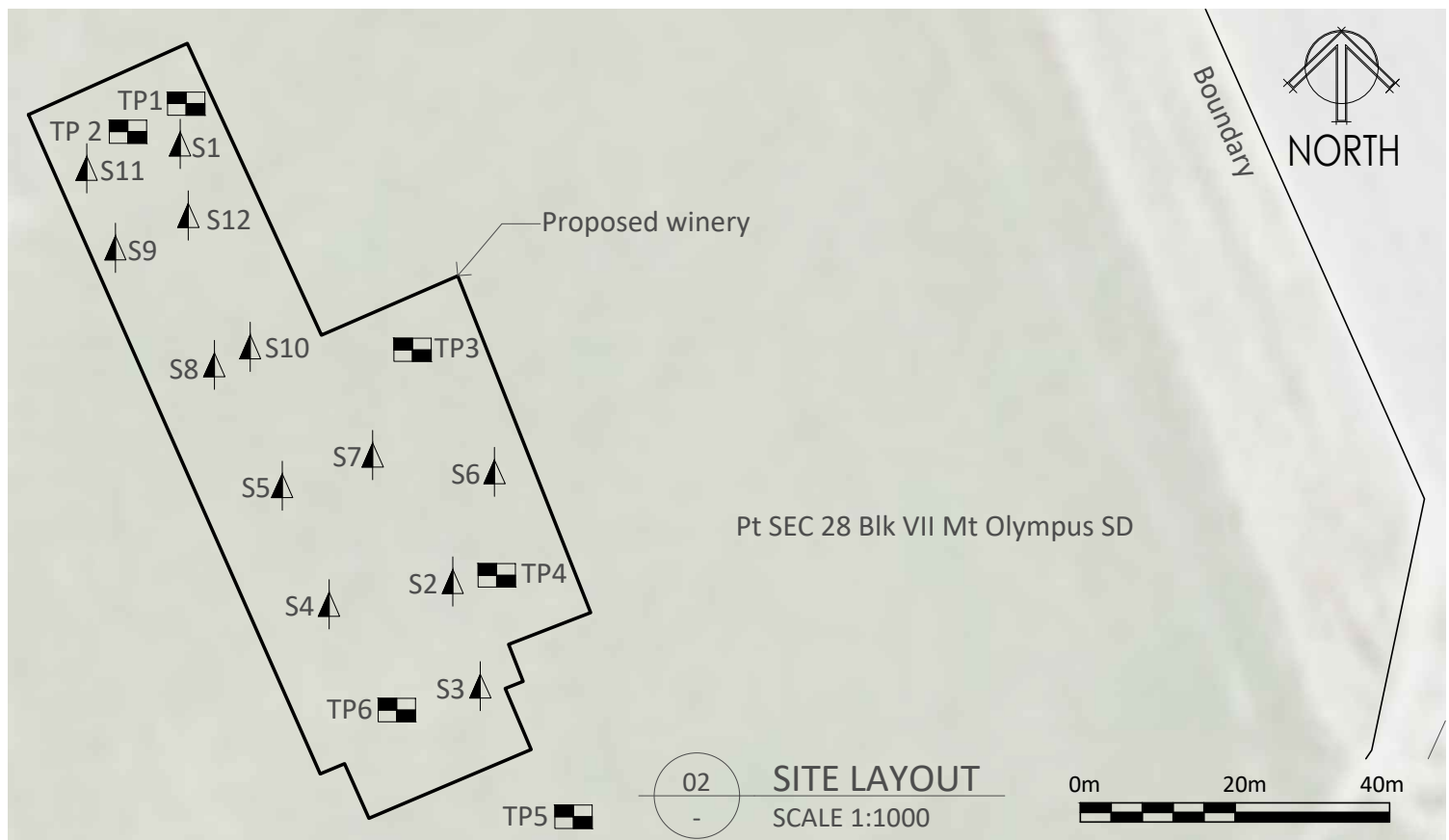


01
- LOCATION
SCALE 1:5000



01
- LOCATION
SCALE 1:750000

Soil Testing Key	
	Testpit
	Scala Penetrometer



02
- SITE LAYOUT
SCALE 1:1000

Project:	New Winery							<div>seng</div> <div>ENGINEERING CONSULTANCY</div> <div>P 021 281 8889 E info@seng.co.nz W www.seng.co.nz P.O Box 707, Blenheim 7240</div>
Client:	Forlong							
Location:	3888 SH63, Wairau Valley							
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Scala Penetrometer Testing

Test 1		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
2	250	25
4	300	13
10	350	5
Bouncing		

Test 2		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
3	200	17
3	250	17
4	300	13
4	350	13
5	400	10
Bouncing		

Test 3		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
2	250	25
2	300	25
3	350	17
3	400	17
10	450	5
Bouncing		

Test 4		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
2	250	25
2	300	25
5	350	10
10	400	5
Bouncing		

Test 5		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
2	250	25
4	300	13
4	350	13
5	400	10
5	450	10
8	500	6
Bouncing		

Test 6		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
4	250	13
5	300	10
5	350	10
10	400	5
Bouncing		

Test 7		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
3	150	17
2	200	25
2	250	25
5	300	10
6	350	8
10	400	5
Bouncing		

Test 8		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
4	150	13
4	200	13
5	250	10
8	300	6
10	350	5
Bouncing		

Test 9		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
3	250	17
10	300	5
Bouncing		

Test 10		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
3	250	17
4	300	13
4	350	13
10	400	5
Bouncing		

Test 11		
Blows	Depth	mm/blow
st	0	
2	50	25
3	100	17
2	150	25
2	200	25
5	250	10
4	300	13
5	350	10
10	400	5
Bouncing		

Test 12		
Blows	Depth	mm/blow
st	0	
2	50	25
2	100	25
2	150	25
2	200	25
5	250	10
8	300	6
10	350	5
Bouncing		


Notes:

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Project:	Winery, Upper terrace					 ENGINEERING CONSULTANCY P 021 281 8889 W www.seng.co.nz E info@seng.co.nz P.O Box 707, Blenheim 7240
Client:	Bruce Forlong					
Location:	3579 SH63, Wairau Valley					
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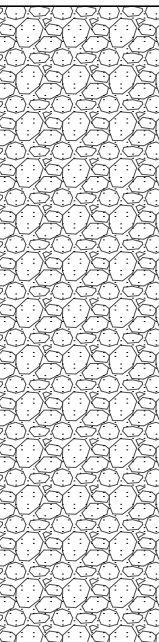
TESTPIT 4 (TP 4)

Depth (m)	Graphic Log	Ground Water	Description of Material	Depth (m)
			Organic silt, dark brown, firm, low plasticity TOPSOIL	
0.5m			0.25m: Sandy silt with minor gravels, light yellowy brown firm, dry, low plasticity	0.5m
1.0m			Sandy fine to coarse GRAVEL with minor cobbles and boulders and trace silt; dry; well graded; angular to subrounded; sand is fine to coarse TP04 terminated at 0.6m	1.0m
1.5m				1.5m
2.0m				2.0m
2.5m				2.5m
3.0m				3.0m

NOTES:

Project:	Winery, Upper terrace					<div><div>seng</div><div>ENGINEERING CONSULTANCY</div></div> <div><div>P 021 281 8889</div><div>E info@seng.co.nz</div></div> <div><div>W www.seng.co.nz</div><div>P.O Box 707, Blenheim 7240</div></div>
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TESTPIT 5 (TP 5)

Depth (m)	Graphic Log	Ground Water	Description of Material	Depth (m)
			Organic silt, light brown, firm, moist, low plasticity TOPSOIL	
0.5m			0.15m: Sandy silt with minor gravels, light yellowy brown firm, dry, low plasticity	0.5m
1.0m			0.60m: Sandy fine to coarse GRAVEL with minor cobbles and boulders and trace silt; greyish brown.; dry; well graded; angular to subrounded; sand is fine to coarse	1.0m
1.5m				1.5m
2.0m				2.0m
2.5m			2.0m: Sandy fine to coarse GRAVEL with minor cobbles and boulders and trace silt; greyish brown. Dense; moist; well graded; angular to subrounded; sand is fine to coarse	2.5m
3.0m			2.8m: Sandy silty fine to coarse GRAVEL with minor cobbles; brown. Dense; dry; poorly graded; angular to subrounded.	3.0m
			TP05 terminated at 3.0m	

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