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HARTLEY ROAD PARTNERSHIP
PLAN CHANGE APPLICATION

INFRASTRUCTURE REPORT

PROJECT:	Clyde Industrial Park
PRINCIPAL:	Hartley Road Partnership
OUR REF:	A5202
DATE:	October 2024

DUNEDIN: P.O. Box 5933, Dunedin 9058. **T** 03 477 3245
CHRISTCHURCH: P.O. Box 160094, Christchurch 8441. **T** 03 928 1533
ALEXANDRA: P.O. Box 103, Alexandra 9340. **T** 03 448 8775
CROMWELL: P.O. Box 84, Cromwell 9342. **T** 03 445 1826
QUEENSTOWN: P.O. Box 2645, Queenstown 9349. **T** 03 441 4715
WANAKA: P.O. Box 283, Wanaka 9305. **T** 03 443 0110

REVISION / APPROVAL PANEL

Rev:	Date:	Prepared By:	Reviewed By:	Comments:
0	20 May 2024	MG	SW & PLD	Initial
1	28 May 2024			Final
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Prepared by:
Paterson Pitts Limited Partnership
(Cromwell Office)
30 The Mall
P O Box 84
Cromwell 9342
Telephone: +64 3 445 1826
Email: cromwell@ppgroup.co.nz
Web: www.ppgroup.co.nz

Job No: A5202
Date: October 2024
Report Prepared for: Hartley Road Partnership

Contents

1. Scope

Paterson Pitts Limited Partnership (PPLP) has been engaged by the Hartley Road Partnership to provide an infrastructure report to support an application for a private Industrial plan change at Springvale Road and SH8, Clyde, comprised in Record of Title 51710, being Section 1 Block XXXIV Town of Clyde and Part Block XXXI Town of Clyde and Block XXXII Town of Clyde and Part Block XXXIII and Part Block XXXIV Town of Clyde.

This report covers the availability of the following infrastructure elements.

(a) Wastewater
(b) Stormwater
(c) Water Supply – Potable, Firefighting and Irrigation
(d) Network Utility Services (electricity and telecommunications)
(e) Road Construction and Earthworks

It addresses erosion and sediment control measures and on-site management of construction activity including dust.

Investigations have been carried out, including test pits and soakage tests.

2. Executive Summary

2.1 Stormwater

The site is underlain by a considerable depth of glacial out wash gravels, with depth to groundwater in excess of 36 metres below ground level. Soakage tests have shown these gravels to vary between medium to very highly permeable. No issues are anticipated with the discharge of stormwater from roading, hard stand and roof run off direct to ground via suitably designed soak pits, as is the norm for all recent land development within the area. Similarly, new sites can discharge stormwater to ground soakage.

2.2 Wastewater

The District Council has recently installed a new wastewater reticulation network in the Clyde area. At a meeting with Julie Muir and Ann Rogers from Council on the 1st Feb 2024, Council's officers indicated that a connection to the Clyde reticulation was possible but that issues with the capacity of the Alexandra Wastewater Treatment Plant to serve the site would need to be resolved .

A preliminary plan showing one option for this connection is attached as **Appendix 3**. It is acknowledged that specific connections to Council's network , location of pumpstations etc are matters for consideration at the time of subdivision .

2.3 Water Supply

The District Council has recently installed a new water reticulation network for the Clyde and Alexandra townships. The preliminary plan at **Appendix 3** shows one option for connection to the network , subject to consideration at the time of subdivision .

2.4 Network Utility Services

Chorus New Zealand Ltd have confirmed that a suitable telecommunications (fibre) supply can be made available to the proposed development of the site.

Aurora Energy has advised that a suitable power supply can be made available to serve the proposed development of the site.

All power and telecommunication services are to be located underground. There will be no overhead cabling.

2.5 Road Construction & Earthworks

All roads will be constructed on sand and gravels, with some small pockets of silt that may require a subgrade improvement layer. Reported bearing capacity tests on likely road subgrades were well in excess of the minimum requirement (CBR >7). No issues are expected with designing and constructing road pavements in compliance with the procedures of "Austroads" and the subdivisional pavement design standards of the Central Otago District Council. Road typology designs and geometry are anticipated to be in accordance with "Austroads" and NZS 4404:2004. No significant bulk earthworks are required to develop the site and there is no possibility of any discharge of sediment from the site.

3. Stormwater

There is no reticulated stormwater system available that would ultimately have to discharge into the Clutha (Mata Au) River to service this development and, even if there was, this form of stormwater management is no longer considered to be best practice.

The bore log for the site shows that the site is underlain by a considerable depth of glacial outwash sand and gravel with depth to groundwater in excess of 36 metres below the ground surface. Test pitting by Paterson Pitts shows near surface topology to be minimal topsoil over outwash sands and gravel, down to the depth of all test pits.

A location plan, test pit logs and the bore log are attached in **Appendix 1.**

Soakage tests were carried out on 3 of the test pits. Infiltration rates of 1163mm/hr to 3100mm/hr were recorded. This equates to soakage rates for a typical "Cauldwell" type soak pit of 0.24L/s to 0.82L/s.

The NIWA HIRDS program was used to calculate a 2% Annual Exceeding Probability (AEP) short duration rainfall event of 83.3 mm/hr using a 4.5 deg temperature risk factor to allow for climate change. This resulted in a runoff of 0.0208L/s/m^2 to cater for.

Council's engineering standards require a pair of road drainage sumps at a maximum spacing of 90m. This equates to a soakage rate requirement of 18.76L/s for each soak pit, draining a 13m wide road carriageway. Soakage tests, infiltration calculations and rainfall intensity calculations are attached in **Appendix 2.**

Direct discharge to ground for stormwater from roading, impermeable surfaces and roof run-off will therefore be possible. The standard solution acceptable to Council is a "Cauldwell type" soak pit, one per sump outlet. This method of stormwater disposal is universally used for land development over glacial outwash gravels in Cromwell, Alexandra and Clyde. See Fig 1.
The Central Otago District Council, in its addendum to NZS4404:2004; July 2008 which is the current Engineering standard adopted by the council for land development, adds to Clause 4.3.8.2 Soakpits:

"A standard 'Cauldwell' type soakpit in accordance with Appendix 2 (which is the Cauldwell Soakpit Detail – see Fig 1) *of the Addendum shall be required for each separate sump."*
And
"Silt traps shall be installed in the stormwater system prior to discharge to any soakpit."

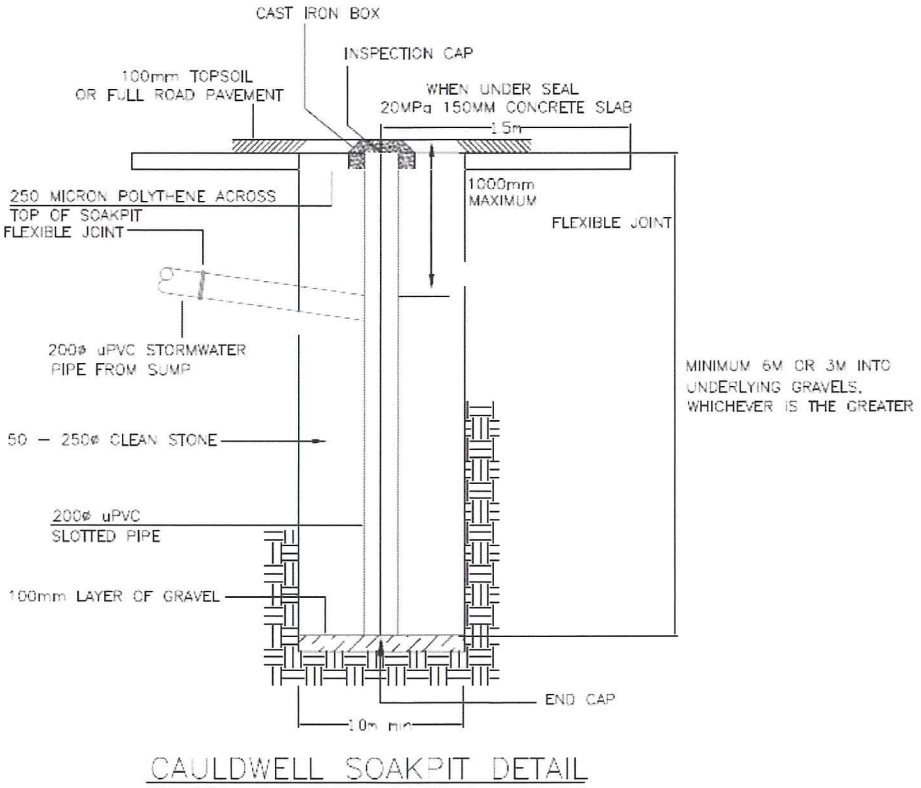
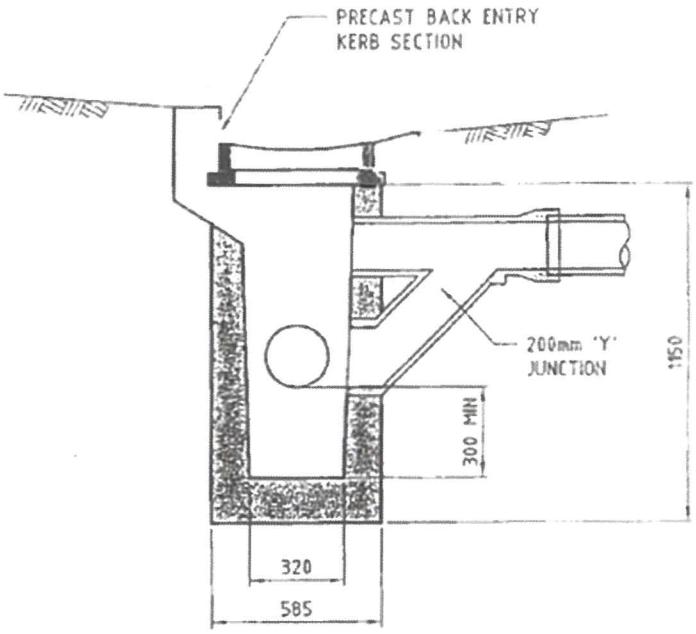


Fig 1

In order to comply with the Regional Water Plan rules, a silt and debris trap is required before discharge of stormwater to a soak pit. This will be provided by an "inverted syphon" type mud tank. See Fig 2.



TYPICAL SUMP DETAIL

Fig 2

The Otago Regional Council's Regional Plan: Water for Otago, provides for the discharge of stormwater into land as being a permitted activity. The ORC has always accepted the use of Cauldwell type soakpits, in conjunction with a silt trap provided by an inverted syphon type mud tank (Typical Sump Detail – see Fig 2), to satisfy these requirements.

Regional Plan: Water:

Rule 12.B.1.9

"The discharge of stormwater from any road not connected to a reticulated stormwater system to water, or onto or into land, is a ***permitted*** *activity, providing:*

(a) The discharge does not cause flooding of any other person's property, erosion, land instability, sedimentation, or property damage; and

(b) Where the road is subject to works, provision is made for the interception of any contaminant to avoid, after reasonable mixing, the following effects in the receiving water:

i) The production of any conspicuous oil or grease films, scums, or foams, or floatable or suspended materials; or

ii) Any conspicuous change in the colour or visual clarity; or

iii) Any emission of objectionable odour; or

iv) The rendering of fresh water unsuitable for consumption by farm animals; or

v) Any significant adverse effects on aquatic life."

This stormwater management approach proposed for the development meets these requirements:

- Ground soakage testing demonstrates there will be no surface flooding.
- There are no overland flow paths that would create the risk of erosion.
- The inverted siphon mud tank/Caudwell soak pit system will remove any contaminants, grease scum or floatable / suspended materials.
- The discharge direct to groundwater means there is no impact on aquatic life or risk to humans or animals.

There is a depth of at least 20m of gravel and sand below each soak pit, which will further filter stormwater before it is eventually discharged to groundwater. The inverted siphon mud tank/Caudwell soak pit system effectively provides for 3 stage treatment of stormwater. The mud tank (which is periodically sucked out by Council) removes silt, trash and gross pollutants, while the Caudwell soak pit (also periodically sucked out by Council) provides secondary treatment by removing finer silt and debris, with the 9m of sand and gravel below the soak pit providing tertiary filtration.

For roof run off, Council has a "rule of thumb" that $1m^3$ of soak pit volume is required for every $50m^2$ of roof area draining into a soak pit.

As per the Geosolve Geotechnical report, it is proposed to retain and utilise the now defunct water race cutting across the slope above the site to divert overland flows away from the development, as is already occurring.

The developable area of the site is relatively flat. This means there will be a lack of secondary flow paths. From a stormwater/road design aspect this means that most roads will need to be cut into the surrounding terrain by a least 150-300 mm, in order to provide longitudinal road drainage. This also allows for a conservative approach for the industrial buildings to be treated similar to dwellings by providing compliance with Building Code requirements (E1/AS1) for minimum floor levels above the road crown. See Fig 3

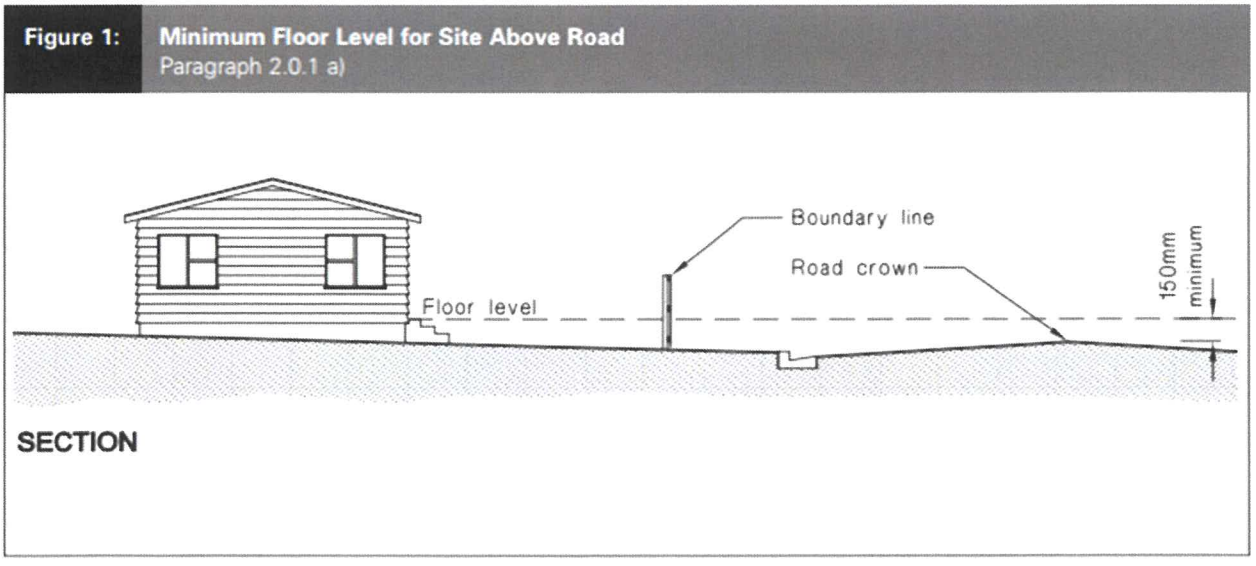


Figure 3

Essentially the roads act as temporary overflow ponding areas in the event of exceptional rain events and/or occasional blockage of mud tanks.

Stormwater management on individual sites is addressed at building consent stage. Our analysis has demonstrated that all sites will be able to deal with stormwater from commercial buildings by way of ground soakage.

Stormwater from a SH8 side channel discharges into a 10m wide x 200m long formed swale between the toe of the SH8 batter and the site boundary fence . Given the very high permeability of the outwash gravels underlying the swale , 2000m2 of dispersal field is more than adequate for a 1% AEP rain event without any discharge of state highway stormwater onto the site itself .

In conclusion:

(a) All stormwater can be managed on site through ground soakage.
(b) Ground soakage is the best practice method of managing stormwater on this site.
(c) Appropriate treatment devices are put in place for road stormwater catchpits.
(d) Soakage will follow the standard CODC method and engineering standards.
(e) No district consents are required.
(f) Managed in the way proposed, the stormwater effects of this development will be less than minor.
(g) This method of stormwater discharge does not trigger any regional consents under the Regional Plan: Water.

4. Wastewater

The most likely option for the location of a sewer pumping station to service the development as well as potential further development along Springvale Road is shown on the preliminary plan at **Appendix 3 .**

The specific location of the sewer pump station and route of the pumping main are to be determined at the detailed engineering design and approval stage under NZS 4404:2004 (Council's Subdivision and Land Development Code of Practice).

The pump station will be designed in accordance with Section 5.3.10 of CODC's addendum to NZS4404:2204, dated July 2008. This requires 24 hours of average dry weather flow.

5. Water Supply

5.1 Irrigation

From the Otago Regional Council's "grow Otago" data base:

(a) "Dry summer rainfall" is 81-100mm for Clyde
(b) "Median potential evapotranspiration" (Jan-Feb) is 231-235mm

Irrigation would therefore be essential to establish and maintain all public and private landscaping within the development. This is particularly so given the very low Plant Available Water (PAW) of the site, due to its light sandy/gravelly soils.

The Council's preferred option is that public space irrigation be supplied from a bore, rather than the town reticulation.

An attempt to establish a bore on the site in 1999 failed, therefore there is no possibility of using bore water for public space irrigation. However , no public space is proposed or required for an industrial subdivision.

5.2 Industrial and Firefighting

The recently constructed trunk main servicing Alexandra runs along the SH8 boundary of the site and it is proposed to connect into this with a suitably sized main to serve the proposed development as well as providing for its extension along Springvale and Dunstan Roads to land re-zoned under Plan Change 19.

This connection is subject to the detailed engineering design and approval stage under NZS 4404:2004. A likely alignment is shown on the attached **Appendix 3** plans. A supply to SNZ PAS 4509:2008 FW3 Standard for the industrial development is possible with this proposed connection.

6. Network Utility Services

6.1 Telecommunications

Chorus New Zealand Ltd have confirmed that a suitable fibre reticulation can be supplied to the proposed development. See **Appendix 6**.

Individual lot owners will also have the alternative option of the cellular network and several wi-fi providers for their telecommunications and computer media service.

6.2 Electricity

Aurora Energy have confirmed that a suitable power supply can be made available to service development of the site. See **Appendix 6**.

6.3 Underground services

All services are "underground". There is no above ground cabling of power or telecommunications.

7. Road Construction & Earthworks

No difficulty is expected in designing and constructing suitable road pavements within the site, in compliance with "Austroads" and the subdivision engineering pavement design standards of the Central Otago District Council.

All roads will be formed on sand and gravel with some very small pockets of silt anticipated. Laboratory Soaked California Bearing Ratio (CBR) tests were taken at the likely road subgrade at three of the test pits. See **Appendix 7**. Soaked CBR's varied from CBR 16% – 30%, well above the normal minimum requirement of 7% for road pavement design in terms of the "Austroads" standard. Small pockets of silt are expected to be encountered within the site. These can be dealt with by "bridging" with a subgrade improvement layer of compacted gravel.

Council's current subdivisional roading engineering design standard is NZ 4404:2004 and its July 2008 amendments thereto.
It is proposed that road typologies on any subsequent subdivision and development of the site will be in accordance with this standard.

The proposed typical sections (Roading Typologies) are attached in **Appendix 4** and these, or similar, will be used for the roads servicing all allotments within the development.

The developable area of the site is basically flat, therefore no significant earthworks are anticipated for the development of the site, apart from the normal utility service trenching and roading. There may possibly be very minor areas of shallow fill which will be certified in accordance with NZS 4431:2022 "Earth fill for Residential Development".

All earthworks for industrial development are a permitted activity under the Operative Central Otago District Plan. The detailed design and management of earthworks is managed under the process of NZS 4404:2004.

An earthworks consent for industrial developments is not required from the Otago Regional Council as only earthworks for residential development are subject to the rules of the Regional Plan: Water.

- There will be no discharge of any sediment off the site as that part of the site that will be subject to roading construction is flat and the materials are highly permeable gravel and sand.
- The nearest water body (Clutha / Mata Au River) is 900m from the site and there is no overland flow path to the river.

The principal issue with earthworks on this site (and all other land development sites in Clyde) is the control of dust discharge from the site, not sediment. This will be managed by the application of water, by water cart, and dragline pod spray irrigation.

8. Construction management

Normal 'best practice' construction management measures are put in place. This includes:

(a) Erosion and sediment control measures. The site benefits from there being no stream or waterways traversing the site. Erosion and sediment control focuses largely on dust mitigation. This is achieved through:
- undertaking the development in stages and therefore limiting the land area exposed to excavation work at any one time.
- use of water spray jets and water carts for dust suppression.
- use of dust suppression agents.

- construction of a trench adjacent to the northern properties to manage vibration.
- management of truck movements for safety and amenity reasons.

(b) It is anticipated that any subdivision consent will require the development of a "Construction Management Plan" and a "Construction Traffic Management Plan".

9. Conclusion

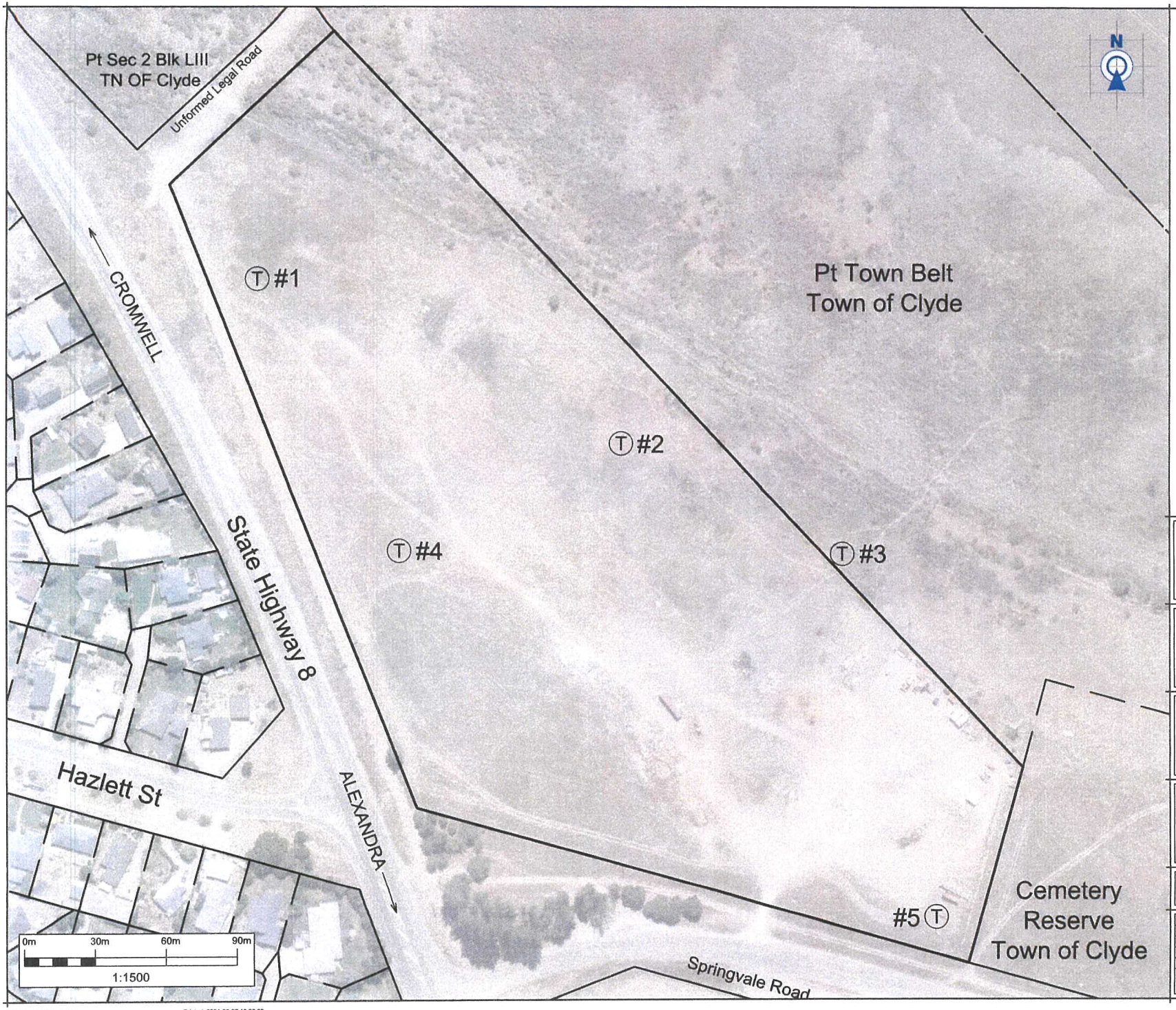
Suitable provision can be made for roading, stormwater, wastewater, water supply and network utility services to the proposed development.

Prepared:
Myles Garmonsway
B.Surv$_{(dist)}$, RPSurv, MS+SNZ, CSNZ
Paterson Pitts Limited Partnership (Cromwell)

Reviewed:
Steve Winter
RPSurv, MS+SNZ, CSNZ
Paterson Pitts Limited Partnership (Cromwell, Queenstown)

APPENDIX 1

Location Plan of Test Pits / Test Pit Logs & Bore Log



Coordinates are in terms of
Lindis Peak 2000.

Elevation in Terms of:
NZVD 2016 Level Datum

Origin of Levels
IT DP 23081 (EWEG)
RL= 166.30m

Key

Ⓣ Testpit Location

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www.ppgroup.co.nz
0800 PPGROUP

ALEXANDRA
8 Skird Street
Alexandra 9320

T +64 (3) 448 8775
E alexandra@ppgroup.co.nz

Client & Location:

Hartley Road Partnership

Purpose & Drawing Title:

TEST PITS
LOCATION PLAN

FOR INFORMATION

Surveyed by:	BD	Original Size:	Scale:
Designed by:		A3	1:1500
Drawn by:	KWG		
Checked by:	PD		DO NOT SCALE
Approved by:	PD		

Job No:	Drawing No:	Sheet No:	Revision No:	Date:
A5202	PLAN	3	A	27/05/2024

APPENDIX 2

Soakage Tests, Infiltration Calculations & Rainfall Intensity Calculations

TEST PIT 1

Ground	0.00
Topsoil	-0.1
sandy SILT Dispersements of Small rounded gravels 1mm-5mm	-0.40
Coarse sandy GRAVELS Well graded Angular 5mm-50mm	-0.70
Sandy GRAVEL Poorly graded Rounded Free flowing 5mm - 50mm	-1.40
sandy SILT Fine moist	-1.70
SAND fine	-2.00
sandy GRAVEL Well graded Angular Large rocks ADL 150mm-200mm	-2.30
Coarse sands Poorly graded Angular	-2.6

LOCATION:

LINDIS PEAK 2000		NZTM		
mN	mE	mN	mE	NAME
749312	389435	4989284	1311952	TP 1

TEST PIT 2

Ground 0.00

Topsoil
-0.25

Sandy SILT
Compact
Dispersements of
Small rounded gravels
1mm-5mm
-0.75

Coarse sandy GRAVELS
Well graded
Angular
5mm-50mm
-0.90

Downhill side	Uphill side Fine Silt calcification -1.00
Fine sand	Fine-Medium Silty/sand
-1.40	-1.40

sandy SILT
Coarse
-1.50

sandy GRAVEL

Well graded
Rounded
Free Flowing
10mm 100mm
-2.00

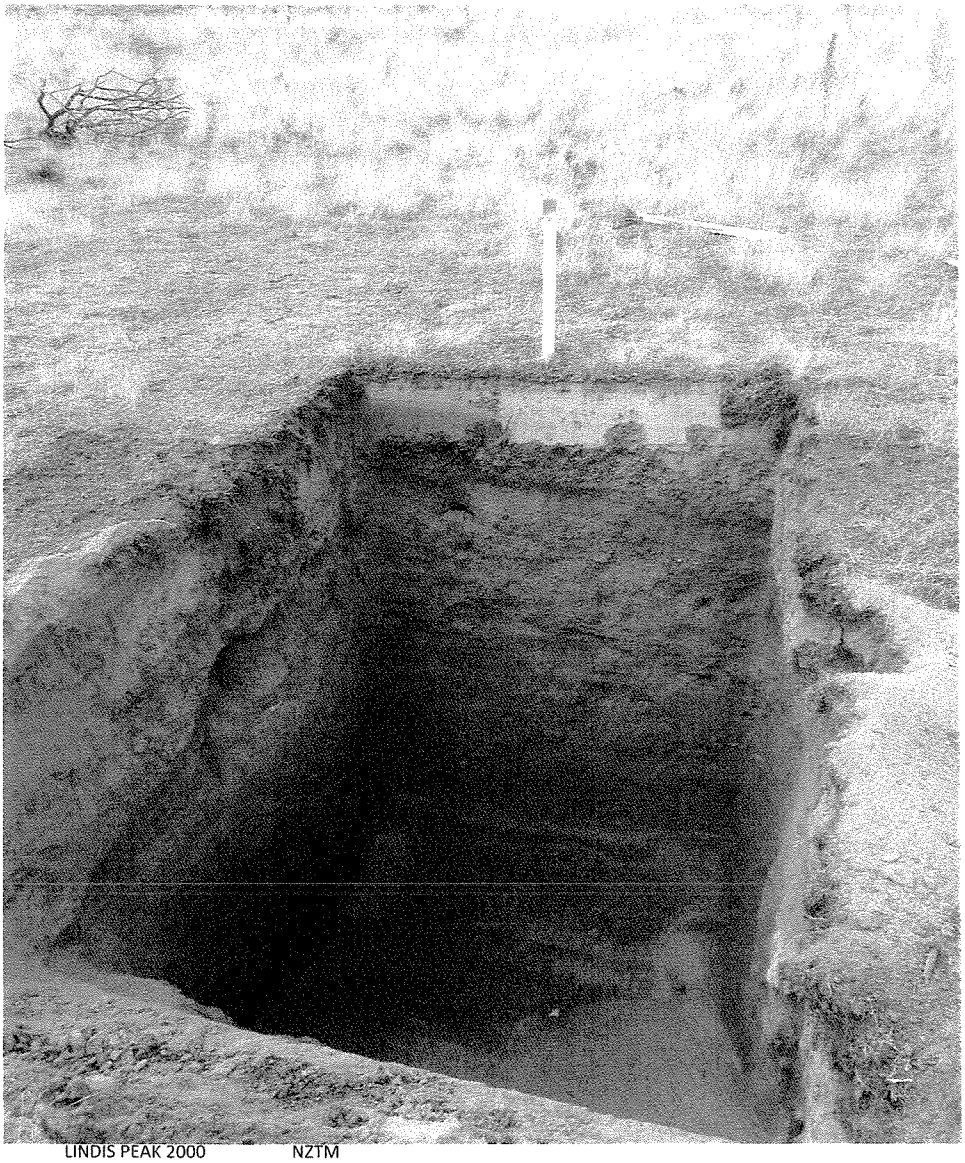
Coarse Sandy Gravel
Poorly graded
Angular
5mm-50mm
-2.2

LOCATION:

LINDIS PEAK 2000		NZTM		
mN	mE	mN	mE	NAME
749242	389590	4989221	1312110	TP 2

TEST PIT 3

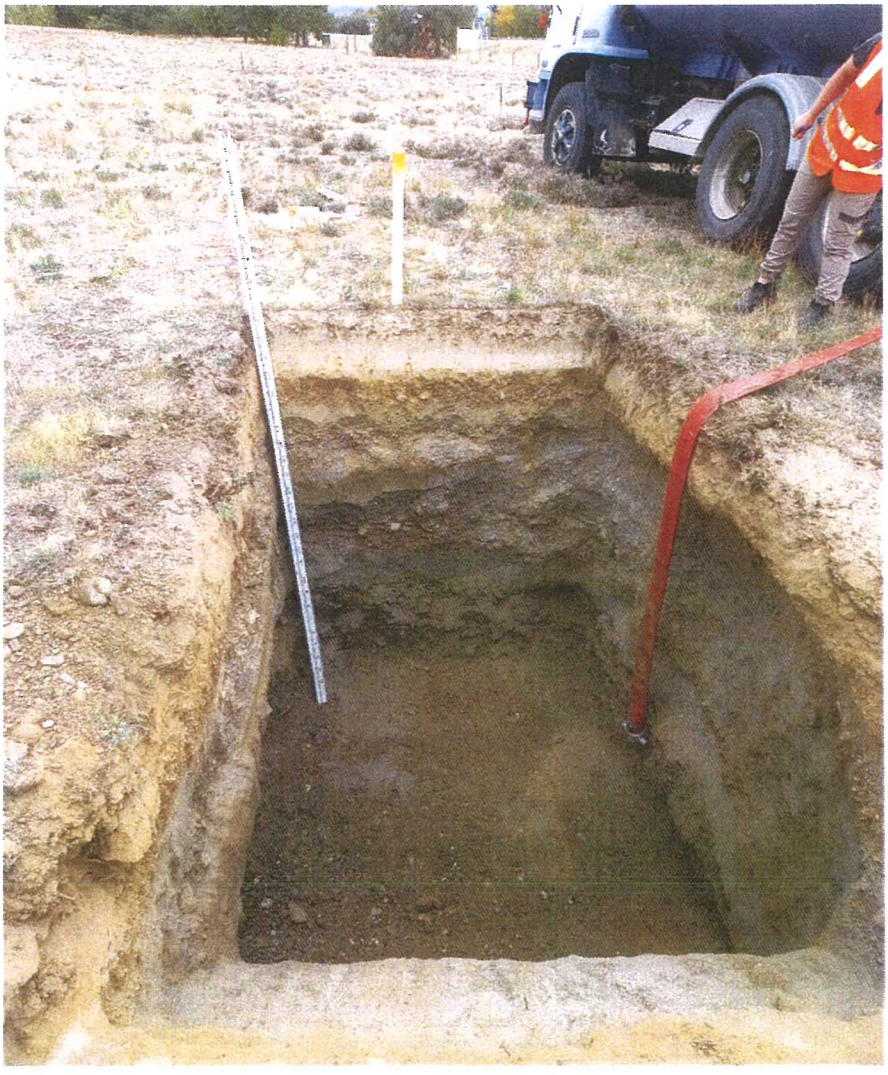
Ground	0.00	
Topsoil	-0.40	
Sandy SILT Dispersements of Small rounded gravels 1mm-5mm	-0.60	
Coarse Sand	-0.90	
Grey Sand Well graded Some calcification	-1.40	
Coarse sand	-2.7	



LINDIS PEAK 2000		NZTM		
mN	mE	mN	mE	NAME
749195	389684	4989178	1312206	TP 3

TEST PIT 4

Ground	0.00
Topsoil	-0.15
sandy SILT Coarse Compact	-0.40
Fine sand Some rounded gravels 1mm-5mm	-0.65
Coarse Sand Compact	-1.10
Very fine sand	-1.25
Coarse sand Gravel lenses	-1.70
Coarse sandy GRAVELS Well graded, Angular Some Large rocks ALD 50mm-100mm	-1.90
Coarse sandy GRAVELS Well graded Rounded Free flowing 5mm-50mm	-2.6



LOCATION:

LINDIS PEAK 2000		NZTM		
mN	mE	mN	mE	NAME
749196	389495	4989171	1312017	TP 4

TEST PIT 5

Ground	0.00
Topsoil	-0.1
sandy SILT Compact	-0.45
Coarse sand and gravels Free Gravels 1mm-10mm	-0.65
Clean Grey Sand Medium - Coarse	-0.90
Coarse sand Clean Compact Some rocks ALD<150mm	-1.50
Fine sand Clean Compact	-2.7

LOCATION:

LINDIS PEAK 2000		NZTM		
mN	mE	mN	mE	NAME
749041	389724	4989026	1312253	TP 5

APPENDIX 3

Water Supply & Wastewater Infrastructure Proposals

A5202 Stormwater Calcs

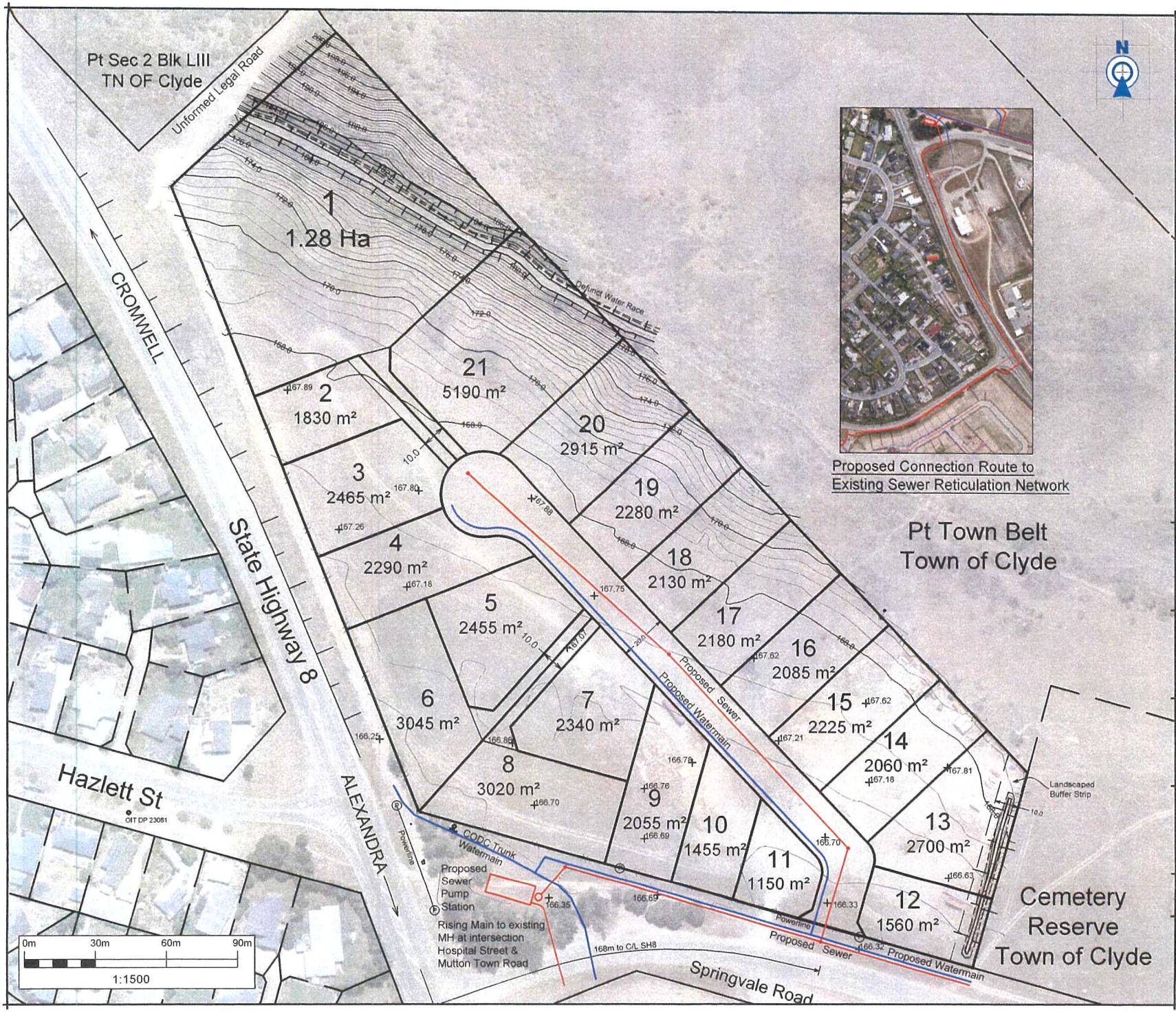
Soakage Calculations	A5202		Hartley Road													
From Onsite Soakage Test:		area pit	4.75													
Pit Dimensions			Area		Test Pit	1										
Length	2.5		4.75													
Width	1.9															
Time (s)	Depth	dVolume	dTime (s)		Soakage (l/s)		l/s/m²									
0	0.275	0.055	60		0.9		0.19									
60	0.22	0.055	60		0.9		0.19									
120	0.165	0.045	60		0.8		0.16					Soaking	Infiltration Rate		3100	mm/hr
180	0.12			Average	0.86		0.18									
		0.73625	180		4.1		0.9	For time period				Total Soakage Rate		(overall)	0.42	l/s/m²
Note.	5000	l poured in over	34	minutes to get to water depth of		0.275	m					Filling	Infiltration Rate		1372	mm/hr
	Soakage over filling time =		3693.75	litres												
		=	1.810661765	(l/s)								Weighted	Soakage Rate		0.38	l/s/m²
		=	0.38	l/s/m²												
				From HIRDS:	10 year	20 year	50 year	RCP4.5, (2081 - 2100)								
Weighted soakage rate:	0.38	l/s/m²		Intensity	50	62.9	83.3	mm/hr								
Safety factor	1.5			Depth	8.34	10.5	13.9	mm								
Soakage rate to use	0.25	l/s/m²		TC 10 minutes												
Runoff Co-efficient	0.90															
									CODC max							
	Area (m²)						Road Area		90m spacing							
Runoff Flows Q=2.78CiA l/s	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400		
10 year	1.25	2.50	3.75	5.00	6.26	7.51	8.76	10.01	11.26	12.51	13.76	15.01	16.26	17.51		
20 year	1.57	3.15	4.72	6.30	7.87	9.44	11.02	12.59	14.16	15.74	17.31	18.89	20.46	22.03		
50 year	2.084	4.17	6.25	8.34	10.42	12.50	14.59	16.67	18.76	20.84	22.93	25.01	27.09	29.18		
check on maths	2.316667												Above capacity of soakpit			
	Below capacity of soakpit										Below capacity of soakpit					
Soakpit Base =			0.8	m2							Near capacity of soakpit					
Effective soakage @1.75m deep			15.9	m2	45 deg angle influence						Above capacity of soakpit					
			4.0	l/s	Soakage Rate											

A5202 Stormwater Calcs

Soakage Calculations	A5202		Hartley Road												
From Onsite Soakage Test.		area pit	3												
Pit Dimensions			Area		Test Pit	4									
Length	2		3												
Width	1.5														
Time (s)	Depth	dVolume	dTime (s)		Soakage (l/s)		l/s/m²								
0	0	0	0		0.0		0.00				Soaking	Infiltration Rate		0	mm/hr
				Average	0.00		0.00								
		0	0		0.0		0.0	For time period			Total Soakage Rate		(overall)	0.82	l/s/m²
Note	5000	l poured in over	34	minutes to get to water depth of		0	m				Filling	Infiltration Rate		2941	mm/hr
	Soakage over filling time =		5000	litres											
		=	2.450980392	(l/s)							Weighted	Soakage Rate		0.82	l/s/m²
		=	0.82	l/s/m²											
				From HIRDS:	10 year	20 year	50 year	RCP4.5, (2081 - 2100)							
Weighted soakage rate:	0.82	l/s/m²		Intensity	50	62.9	83.3	mm/hr							
Safety factor	1.5			Depth	8.34	10.5	13.9	mm							
Soakage rate to use	0.54	l/s/m²		TC 10 minutes											
Runoff Co-efficient	0.90														
									CODC max						
	Area (m²)						Road Area		90m spacing						
Runoff Flows Q=2.78CiA l/s	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	
10 year	1.25	2.50	3.75	5.00	6.26	7.51	8.76	10.01	11.26	12.51	13.76	15.01	16.26	17.51	
20 year	1.57	3.15	4.72	6.30	7.87	9.44	11.02	12.59	14.16	15.74	17.31	18.89	20.46	22.03	
50 year	2.084	4.17	6.25	8.34	10.42	12.50	14.59	16.67	18.76	20.84	22.93	25.01	27.09	29.18	
check on maths	2.316667												Above capacity of soakpit		
	Below capacity of soakpit										Below capacity of soakpit				
Soakpit Base =			0.8	m2							Near capacity of soakpit				
Effective soakage @1.75m deep			15.9	m2	45 deg angle influence						Above capacity of soakpit				
			8.6	l/s	Soakage Rate										

A5202 Stormwater Calcs

Soakage Calculations	A5202			Hartley Road												
From Onsite Soakage Test:		area pit	3.91													
Pit Dimensions			Area		Test Pit	5										
Length	2.3		3.91													
Width	1.7															
Time (s)	Depth	dVolume	dTime (s)		Soakage (l/s)		l/s/m²									
0	0.93	0.01	60		0.2		0.04									
60	0.92	0.01	60		0.2		0.04									
120	0.91	0.02	60		0.3		0.09					Soaking	Infiltration Rate		1163	mm/hr
180	0.89	0.02	60		0.3		0.09									
240	0.87	0.03	60		0.5		0.13									
300	0.84	0.025	60		0.4		0.11									
360	0.815	0.015	60		0.2		0.06									
420	0.8	0.025	60		0.4		0.11									
480	0.775															
				Average	0.32		0.08									
		0.60605	480		1.3		0.3	For time period				Total Soakage Rate		(overall)	0.27	l/s/m²
Note:	5000	l poured in over	28	minutes to get to water depth of		0.93	m					Filling	Infiltration Rate		747	mm/hr
	Soakage over filling time =		1363.7	litres												
		=	0.81172619	(l/s)								Weighted	Soakage Rate		0.24	l/s/m²
		=	0.21	l/s/m²												
				From HIRDS:	10 year	20 year	50 year	RCP4.5, (2081 - 2100)								
Weighted soakage rate	0.24	l/s/m²		Intensity	50	62.9	83.3	mm/hr								
Safety factor	1.5			Depth	8.34	10.5	13.9	mm								
Soakage rate to use	0.16	l/s/m²		TC 10 minutes												
Runoff Co-efficient	0.90															
									CODC max							
	Area (m²)						Road Area		90m spacing							
Runoff Flows Q=2.78CiA l/s	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400		
10 year	1.25	2.50	3.75	5.00	6.26	7.51	8.76	10.01	11.26	12.51	13.76	15.01	16.26	17.51		
20 year	1.57	3.15	4.72	6.30	7.87	9.44	11.02	12.59	14.16	15.74	17.31	18.89	20.46	22.03		
50 year	2.084	4.17	6.25	8.34	10.42	12.50	14.59	16.67	18.76	20.84	22.93	25.01	27.09	29.18		
check on maths	2.316667												Above capacity of soakpit			
	Below capacity of soakpit										Below capacity of soakpit					
Soakpit Base =			0.8	m2							Near capacity of soakpit					
Effective soakage @1.75m deep			15.9	m2	45 deg angle influence						Above capacity of soakpit					
			2.5	l/s	Soakage Rate											



Proposed Connection Route to Existing Sewer Reticulation Network

Coordinates are in terms of Lindis Peak 2000.

Elevation in Terms of:
NZVD 2016 Level Datum

Origin of Levels
IT DP 23081 (EWEG)
RL= 166.30m

Contour Intervals = 0.50m

Note!

Preliminary proposed layout
- all sizes and locations subject to specific design and approvals.

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0800 PPGROUP

ALEXANDRA
8 Skird Street
Alexandra 9320

T +64 (3) 448 8775
E alexandra@ppgroup.co.nz

Client & Location

Hartley Road Partnership

Purpose & Drawing Title

SERVICES
CONCEPT PLAN

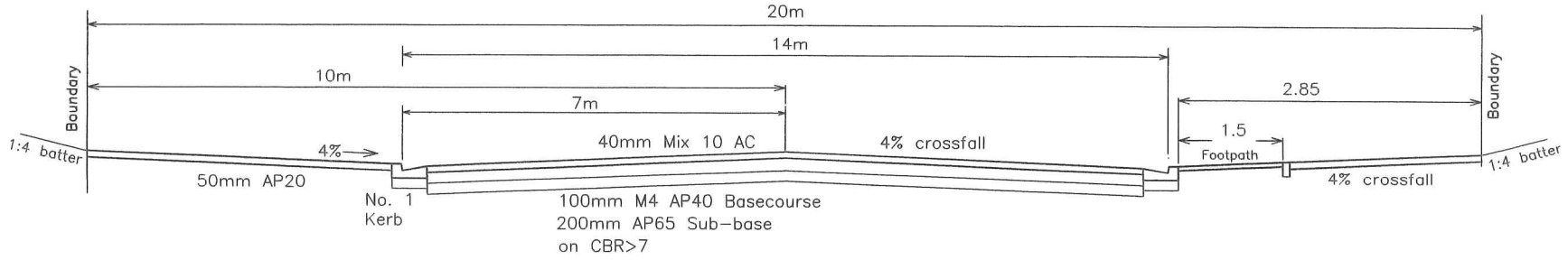
FOR INFORMATION

Surveyed by	BD	Original Size	Scale	
Designed by		A3	1:1500	
Drawn by	KW3			
Checked by	PD			
Approved by	PD		DO NOT SCALE	
Job No	Drawing No	Sheet No	Revision No	Date
A5202	PLAN	2	A	14/05/2024

User: KathrynGarmonsway
Printed: 2024-05-14 14:33:41
Filename: J:\A_5202 Hartley Road\Cad\A5202_PLAN_2A.dwg

APPENDIX 4

Roading Typologies



Road Typology

Not To Scale

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www.ppgroup.co.nz
0800 PPGROUP

CROMWELL
30 The Mall
Cromwell 9310

T +64 (3) 445 1826
E cromwell@ppgroup.co.nz

Client & Location: Hartley Road Partnership

Purpose & Drawing Title: Road
Typical Cross-section

FOR INFORMATION

Surveyed by		Original Size	Scale		
Designed by		A3	N.T.S.		
Drawn by	KWG				
Checked by	MG		DO NOT SCALE		
Approved by	MG				
Job No	Drawing No	Sheet No	Revision No	Date	
A5202	PLAN	4	A	27/05/2024	

APPENDIX 5

Confirmation of Telecom Supply

Peter Dymock

From: Chorus Property Development Do Not Reply <npdnoreply@chorus.co.nz>
Sent: Tuesday, 2 April 2024 3:51 pm
To: npdnoreply@chorus.co.nz
Subject: Chorus 10803117: Your enquiry has been closed

Hi

Development address: 16 Springvale Road , Clyde, Central Otago District, 9391

This enquiry has been closed.

Message subject: Confirmation that reticulation is able to be made available
Hi Miles, Please request a quote for the development via the Portal. You do not have to accept this quote, but once produced, you will be able to print this out and it will serve the same purpose as a letter confirming that we can reticulate your development with Fibre. Your current request is for an early design. Please select "design and build" when applying for your new quote. Kind Regards, Jason Chorus Property Development Team

You can reopen and respond to the enquiry if you need to. If there's no further action within 30 days, then the enquiry will be archived, and you'd need to raise a new enquiry if required.

You can also view the message trail by logging in to your account.

Chorus New Property Development Team

Please do not reply to this email as this inbox is not monitored. For any follow up queries please visit www.chorus.co.nz/develop-with-chorus or log in to your account. If you do not yet have an account with us, you will need to create an account to view your job progress and documentation.

Chorus New Zealand Limited

24 May 2024

Chorus reference: 10861569

Attention: Peter Dymock

Quote: New Property Development

21 connections at 16 Springvale Road, Clyde, Central Otago District, 9391

Your project reference: Hartley Road Partnership Industrial

Thank you for your enquiry about having Chorus network provided for the above development.

Chorus is pleased to advise that, as at the date of this letter, we are able to provide reticulation for this property development based upon the information that has been provided:

Fibre network	$21,000.00

The total contribution we would require from you is **$24,150.00 (including GST)**. This fee is a contribution towards the overall cost that Chorus incurs to link your development to our network. This quote is valid for 90 days from 24 May 2024. This quote is conditional on you accepting a New Property Development Contract with us for the above development.

If you choose to have Chorus provide reticulation for your property development, please log back into your account and finalise your details. If there are any changes to the information you have supplied, please amend them online and a new quote will be generated. This quote is based on information given by you and any errors or omissions are your responsibility. We reserve the right to withdraw this quote and requote should we become aware of additional information that would impact the scope of this letter.

Once you would like to proceed with this quote and have confirmed all your details, we will provide you with the full New Property Development Contract, and upon confirmation you have accepted the terms and paid the required contribution, we will start on the design and then build.

For more information on what's involved in getting your development connected, visit our website www.chorus.co.nz/develop-with-chorus

Kind Regards

Chorus New Property Development Team

APPENDIX 6

Confirmation of Power Supply

AURORA ENERGY LIMITED
PO Box 5140, Dunedin 9058
PH 0800 22 00 05
WEB www.auroraenergy.co.nz

04/04/2024

Myles Garmonsway
Paterson Pitts Group

Sent via email only: Myles.Garmonsway@ppgroup.co.nz

Dear Myles,

ELECTRICITY SUPPLY AVAILABILITY FOR A PROPOSED TWENTY ONE LOT SUBDIVISION.
16 SPRINGVALE ROAD, CLYDE. PT BLK XXXIV TN OF CLYDE, SEC 1 BLK XXXIV TN OF CLYDE, PT BLK XXXIII TN OF CIYDE, PT BLK XXXI TN OF CLYDE & BLK XXXII TN OF CLYDE. RT 51710.

Thank you for your inquiry outlining the above proposed development.

Subject to technical, legal and commercial requirements, Aurora Energy can make a Point of Supply[1] (PoS) available for this development.

Disclaimer

This letter confirms that a PoS **can** be made available. This letter **does not** imply that a PoS is available now, or that Aurora Energy will make a PoS available at its cost.

Next Steps

To arrange an electricity connection to the Aurora Energy network, a connection application will be required. General and technical requirements for electricity connections are contained in Aurora Energy's Network Connection Standard. Connection application forms and the Network Connection Standard are available from www.auroraenergy.co.nz.

Yours sincerely

Niel Frear
CUSTOMER INITIATED WORKS MANAGER

[1] Point of Supply is defined in section 2(3) of the Electricity Act 1993.

APPENDIX 7

CBR TESTS

Central Testing Services
18 Ngapara St, P.O. Box 397, Alexandra 9340, Central Otago, New Zealand
P: 03 4487644, W: www.centraltesting.co.nz, E: info@centraltesting.co.nz

Reference No: 24/1183

Date: 10 May 2024

TEST REPORT - LABORATORY SOAKED CBR'S

Client Details:	Hartley Road Partnership, Leon@benchmarkconstruction.co.nz	**Attention:**	L. Van Voxel
Job Description:	Corner of SH8 / Springvale Road		
Sample Description:	Subgrade – See Below	**Client Order No:**	N/A
Sample Source:	Insitu – See Below	**Sample Label No:**	N/A
Date & Time Sampled:	Unknown	**Sampled By:**	Unknown
Sample Method:	Unknown	**Date Received:**	10-Apr-24
Test Method:	NZS 4407:2015, Test 3.15		

LABORATORY CBR RESULTS			
Sample Source: (cs)	S#1	S#2	S#3
Sample Depth: (mm)	0 - 300	0 - 300	0 - 300
Sample Description:	GRAVEL & SAND with some / minor silt	SAND	SAND with minor gravel & trace of silt
Condition of Sample:	Soaked	Soaked	Soaked
Surcharge Mass: (kg)	4.0	4.0	4.0
Time Soaked:	5 days	5 days	5 days
Swell: (%)	0.0	-0.2	-0.2
Water Content as Compacted: (%)	1.4	1.9	0.9
Water Content From Under Plunger: (%)	9.3	14.8	13.0
Dry Density As Compacted: (t/m^3)	2.04	1.75	1.86
CBR Value @ 2.5 mm Penetration:	12	15	25
CBR Value @ 5.0 mm Penetration:	16	20	30
Reported CBR Value:	16	20	30
Contract Specification Requirement	Minimum 7		

Notes:

- *The material was received in a natural state.*
- *The material tested was the fraction passing the 19.0mm test sieve.*
- *The sample was compacted to NZ Standard Compaction at the water content as received.*
- *The rate of penetration was 1.00 mm / min.*
- *Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information (cs) and sampling.*
- *This report may not be reproduced except in full.*

Tested By: C. Pearson **Date:** 21 to 27-Apr-24

Checked By:

Approved Signatory

L.T. Smith
Key Technical Personnel

ACCREDITED IANZ TESTING LABORATORY №434

Test results indicated as not accredited are outside the scope of the laboratory's accreditation