

Our Ref: A5202

Date : 16 August 2024

Planning Manager
Central Otago District Council
P O Box 122
ALEXANDRA

Attention: Lee Webster

Dear Lee

Re: Request for a Private Plan Change

1. The Hartley Road Partnership hereby requests a change to the Central Otago Operative District Plan to rezone its land at Springvale Road and State Highway 8 , from Rural Resource Area to Industrial Resource Area.
2. In support of the Request, the following documents are attached:
 - The Requested Change to the District Plan
 - Sec 32 RMA91 evaluation
 - Assessment of Environmental Effects
 - Economic Assessment
 - Transportation Assessment
 - Soil Contamination Assessment (PSI)
 - Infrastructure Report
 - Geotechnical Review and Natural Hazards Assessment
 - Landscape Effects Assessment Report
 - Land Productivity Report
3. Please invoice the lodgement fee (deposit) to:

Hartley Road Partnership
c/- Leon van Boxtel
1 Jennings Way
RD1 ALEXANDRA

Email: leon@benchmarkconstruction.co.nz

patersons.co.nz

Dunedin
PO Box 5933
Dunedin 9054
03 477 3245

Queenstown
PO Box 2645
Wakatipu
Queenstown 9349
03 441 4715

Wānaka
PO Box 283
Wānaka 9343
03 443 0110

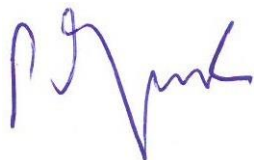
Cromwell
PO Box 84
Cromwell 9342
03 445 1826

Alexandra
PO Box 103
Alexandra 9340
03 448 8775

Oamaru
Level 2
19 Eden Street
Oamaru 9400
03 443 8727

Christchurch
PO Box 9194
Tower Junction
Christchurch 8149
03 928 1533

Yours faithfully

A handwritten signature in blue ink, appearing to read 'P Dymock', with a stylized, cursive script.

Peter Dymock
PATERSON PITTS LIMITED PARTNERSHIP

REQUEST FOR A CHANGE
TO THE OPERATIVE
CENTRAL OTAGO DISTRICT PLAN

HARTLEY ROAD PARTNERSHIP

patersons.co.nz

Dunedin
PO Box 5933
Dunedin 9054

03 477 3245

Queenstown
PO Box 2645
Wakatipu
Queenstown 9349
03 441 4715

Wānaka
PO Box 283
Wānaka 9343

Cromwell
PO Box 84
Cromwell 9342

03 445 1826

Alexandra
PO Box 103
Alexandra 9340

03 448 8775

Oamaru
Level 2
19 Eden Street
Oamaru 9400
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Christchurch
PO Box 9194
Tower Junction
Christchurch 8149
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DOCUMENT CONTROL

Project	
Client	Hartley Road Partnership
Project No.	A502
Version	FINAL
Date of issue	16 August 2024

AUTHOR(S)

Prepared	Peter Dymock Patersons – Alexandra Office
Reviewed	Duncan White Partner / Senior Planner Patersons – Wanaka Office

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1.0 INTRODUCTION

1.1 The Requestor

The requestor is:

Hartley Road Partnership
c/- Leon van Boxel
Hartley Road Partnership
RD1 Alexandra
Email: leon@benchmarkconstruction.co.nz

The address for service is:

c/- Paterson Pitts Limited Partnership
P O Box 103
ALEXANDRA 9340

Attn: Peter Dymock
Email: peter.dymock@patersons.co.nz
Phone: (03) 448 8775 (0274) 377 910

1.2 Overview

Hartley Road Partnership (“HRP”) requests a change to the Operative Central Otago District Plan (“the ODP”) to re-zone approximately 6.6ha of land, located at the intersection of State Highway 8 (“SH8”) and Springvale Road, from Rural Resource Area [R] to **Industrial Resource Area [I]**.

The amendments proposed to the Plan are:

- The addition of **Industrial Resource Area [I]** zoning to the Council’s on-line GIS planning maps.
- An addition to Rule 12.7.1. (iii) *Access to Rural State Highways and Arterial Roads* to provide that there be no direct access to any subdivided allotment from the site to SH8 and Springvale Road and to provide for a suitable left turning lane from State Highway 8 into Springvale Road.
- An addition to Rule 9.3.5 (iv) Screening to provide for a landscaped buffer and prevention of development on the terrace riser above the historic water race traversing the site

No changes are proposed to the issues, objectives, methods of implementation, principle reasons for adopting objectives, policies and methods and environmental results anticipated in Section 9 of the Plan.

The existing provisions in the ODP for the Industrial Resource Area are very enabling and will allow a wide range of industrial and commercial uses to establish within the site similar to that in the various existing industrial areas in the District, including limited residential and retail activity subject to existing rules restricting scale and activity and addressing reverse sensitivity effects.

2.0 THE SITE

A plan of the land subject to the request, along with an indicative subdivision layout is shown at **Appendix A**. Note this plan is not a plan of subdivision or a structure plan, but is simply provided as an illustration of the sort of development that could possibly eventuate on the site and as an aid to assessing the environmental impact of the Request.

The land is currently contained within the following record of title:

- Sec 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 (title area 6.1663 ha) RT 51710 l owned by L F van Boxtel , JM Scott , CE Ramage & LMA Lodge (“HRP”) .

A copy of the above title is at **Appendix B**. The title is an amalgam of original town sections of Clyde and is “limited as to parcels”. The area of the title has been deduced by LINZ from a series of surveys taking land for roads and severances since the original town survey of Clyde in 1867. A survey (LT 600773) has been undertaken to remove the limitations as to parcels and a copy is at **Appendix B** . By the time the Request is likely to become operative , the legal description of the site will be Lot 1 DP 600773 (6.6070ha) , RT 1170203. The title is currently subject to an easement in favour of the Manuherikia Irrigation Co-operative Irrigation Society Ltd over a defunct water race. This easement is being removed from the title.

The site is currently zoned “Rural” in the ODP and is not subject to any other notation on the planning maps. The terrace riser above the site is subject to a Significant Amenity Landscape Overlay (“SAL”). An extract from Council’s GIS planning mapping is at **Appendix C**. The site was formerly zoned “Industrial “ under the Transitional (Vincent) District Plan. See attached map from the Vincent Plan at **Appendix C**.

3.0 THE EXSISTING ENVIRONMENT

The site is located at north- east corner of the intersection of SH8 and Springvale Road on the periphery of the township of Clyde. The site is described in detail in the attached infrastructure, geotechnical, soil contamination and landscape reports at **Appendices H-K**

In summary the site is a triangle of land bound by :

- SH8 which is elevated above the site by the Clyde hill approach embankment.
- Springvale Road , part of the berm of which is occupied by a small pine plantation next to the SH8 intersection which is used as an informal carpark . Springvale Road adjacent to the site was formerly named Hartley Road and before that Hull Street. Springvale Road is identified in Schedule 19.7 of the ODP as an Arterial Road.
- A steep 60-80m high terrace riser, part of the more gentle lower slopes of which are included in the site. The riser immediately adjacent to the site forms part of the Clyde Town Belt Reserve. The terrace riser is in depleted dryland pasture, not currently being actively used for pastoral purposes . The riser forms an important landscape backdrop to Clyde and the wider Dunstan – Earnsclough Flat and is subject to an SAL. The SAL notation does not cover any part of the site.

- The NW boundary is an unformed legal road, a severed remnant stub of what was originally surveyed in 1867 as Orchard Street (formerly named Bridlington Street). It is highly unlikely this unformed legal road will ever be formed, not least that its gradient is a minimum of 1 in 3 and that there is no practical entrance to it off SH8.
- The Clyde Cemetery Reserve forms the eastern boundary, although it is noted that the historic stone wall “apparent boundary” of the cemetery is some 160m east of the site boundary.

The site has been used in the past as a poultry farm by the applicant’s parents and is presently used as a contractor’s storage yard. The site does not have an irrigation supply and has never been used for any productive rural use. Its present appearance is generally that of a bare, gravel wasteland.

The terminus of the Central Otago Rail Trail is directly across the opposite side of Springvale Road, as is land owned by Contact Energy Ltd which used for industrial storage purposes associated with the Contact’s operation of the Clyde and Roxburgh Dams, subject to a scheduled activity overlay of the site’s “Rural Residential Resource Area” zoning in the ODP.

Further along Springvale Road, the land is used for lifestyle block purposes with lot sizes being in the 1ha range, in accordance with its “Rural Residential” zoning in the ODP. The decision on PC 19 has re-zoned this area to “Future Growth – Large Lot Residential” which would allow subdivision down to 1500m².

On the opposite side of SH8 is the Clyde township, generally consisting of lots averaging 800-1000m² with large standalone dwellings, a reflection of the minimum lot size required for un-reticulated areas in the ODP. The site is conveniently linked to Clyde township for walking and biking access by the Daphne Hull underpass linking Albert Drive with the Rail Trail terminus.

In summary, this end of Springvale Road close to its intersection with SH8 does not exhibit a rural pastoral character and none of the adjoining properties are being used for any productive rural use.

4.0 PURPOSE AND REASON FOR REQUEST

Clyde is the only significant urban area in the Central Otago District without any provision for Industrial land in the ODP. Even small rural townships such as Millers Flat, Patearoa, Naseby and Omakau have provision for industrial zoned land in the ODP.

A small parcel of land on the opposite side of Springvale Road is used for industrial storage purposes under a scheduled activity in the ODP. However industrial use of the site is restricted to the specific scheduled activity. The Economics Assessment prepared by Savvy Consulting Ltd at **Appendix F** in support of the Request has identified that there is a demand for Industrial land in close proximity to the Clyde Township. Industrial sites require good access to the transport network which is suitable for heavy vehicles and need to be well separated from incompatible land uses, in particular residential land. The site subject to the Request fulfils both of these requirements.

The purpose of the Request is therefore to provide a suitable site for industrial use in close proximity to the Clyde township to meet an identified demand for industrial land at Clyde. In effect this is a return to previous zoning of the site under the Transitional District Plan.

5.0 PROPOSED CHANGES TO THE DISTRICT PLAN

The proposed changes to the District Plan are as follows:

- (i) Amend the on-line planning maps to insert a new Industrial Resource Area notation incorporating Lot 1 DP 600773.
- (ii) Amend/add to Rule 12.7.1 (iii) Access to Rural State Highways and Arterial Roads as follows:
 - (h) *There shall be no access to State Highway 8 from any development or subdivision of Lot 1 DP 600773 and no direct access to Springvale Road from any lot subdivided from Lot 1 DP 600773*
 - (i) *Prior to subdivision and industrial development occurring on Lot 1 DP 600773 the State Highway 8 / Springvale Road intersection shall be improved by providing a painted median such that the view to the right from Springvale Road is not obscured by a vehicle slowing in the left turn lane on State Highway 8 (that may otherwise obscure a following straight through vehicle).*
- (iii) Add Rule 12.7.1 (ix) Breach of Standards as follows:

Any activity that does not comply with the standards stated in Rule 12.7.1 (iii) h) –(i) shall be considered as a non-complying activity.
- (iv) Amend/add to Rule 9.3.6 (iv) Screening as follows :
 - (d) *Within lot 1 DP 600773 a landscaped buffer strip with a minimum width of 10 metres shall be provided alongside the boundaries of State Highway 8 , Springvale Road , the Clyde Cemetery Reserve and the unformed legal road to the north of the site below an historic water race . The entire landscape strip shall be established at the time of initial subdivision of the site and its retention and future maintenance shall be provided for as a condition of subdivision consent that is to be subject to a consent notice.*
 - (e) *Within Lot 1 DP 600773 , there shall be no buildings , or earthworks, undertaken that would impact on the integrity of the pre 1900 water race intersecting the site , nor on the slopes above the water race.*

A breach of these proposed additions to Rule 9.3.6 (iv) is a restricted discretionary activity under existing Rule 9.3.3.

Proposed Rules 12.7.1 (iii) (i) and 12.7.1 (ix) have been adapted from Rules 7.3.6(vi) (i) and 7.3.6 (vi) (h) introduced into the ODP under PC15 (Clyde Residential Extension) for a similar reason at the State Highway 8 / Sunderland Street intersection at Clyde.

Proposed Rules 9.3.6 (iv) (d) and (e) have been adapted from Rule 9.3.6 (iv) (c) introduced into the ODP under PC11 (Old Cromwell Saleyard Industrial Zone extension) in accordance with the recommendations in the Landscape Assessment at **Appendix K**.

The request includes any necessary consequential changes to the plan required by the Council to accommodate the above proposed changes to the Plan.

6.0 STATUTORY MATTERS

6.1 Part 2 RMA91

5. Purpose

- (1) *The purpose of this Act is to promote the sustainable management of natural and physical resources.*
- (2) *In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while –*
 - a. *Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
 - b. *Safeguarding the life-supporting capacity of air, water, soil, and ecosystems, and*
 - c. *Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The request enables the well-being of the Clyde community and surrounding area by expanding the Industrial area to accommodate an identified demand for land in close proximity to Clyde in the most logical location for expansion. The life supporting capacity of air, water and soil will be maintained by the reticulation and disposal of wastewater into an established reticulation and treatment scheme.

The request includes provisions to avoid, remedy and mitigate adverse effects on the environment as to increased traffic generation and provision of suitable infrastructure.

6. Matters of National Importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

- (a) *The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development.*
- (b) *The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development.*
- (c) *The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.*

- (d) *The maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers.*
- (e) *The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.*
- (f) *The protection of historic heritage from inappropriate subdivision, use, and development.*
- (g) *The protection of protected customary rights.*
- (h) *The management of significant risks from natural hazards.*

Paragraphs (a) and (d) are not relevant to this Request.

- (b) The site does not contain any outstanding natural features or landscapes.
- (c) The site does not contain any areas of significant indigenous vegetation and significant habitats of indigenous fauna.
- (e) & (g) So far as is known, the site does not contain any sites of particular importance to Maori. The best way to deal with this issue is by way of discovery protocols as a condition of consent on any subsequent resource consents to subdivide or develop the site.
- (f) A defunct pre- 1900 water race intersects the steep upper part of the site . The race will be preserved as a stormwater intercept drain as recommended in the attached geotechnical assessment at **Appendix J**.
- (h) The site is not subject to any significant risk from natural hazards as per the attached geotechnical assessment.

7. Other Matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development and protection of natural and physical resources, shall have particular regard to –

- (a) *Kaitiakitanga*
- [(aa) *The ethic of stewardship*]
- (b) *The efficient use and development of natural and physical resources*
- [(ba) *The efficiency of the end use of energy*]
- (c) *The maintenance and enhancement of amenity values*
- (d) *Intrinsic values of ecosystems*
- (e) *Repealed*
- (f) *Maintenance and enhancement of the quality of the environment*
- (g) *Any finite characteristics of natural and physical resources*
- (h) *The protection of the habitat of trout and salmon*
- [(i) *The effects of climate change*]
- [(j) *The benefits to be derived from the use and development of renewable energy*]

Paragraphs (a), (aa), (ba), (d), (g), (h), (i), and (j) are not relevant to this Request.

- (b) It is efficient to provide for industrial land that is close to and well linked to the existing township and the transport infrastructure.
- (c) & (f) As discussed in the assessment of environmental effects in **Appendix D** , the site of the Request is a location that is well separated and buffered from other incompatible land uses, therefore there will be no adverse amenity effects on surrounding land owners or on the quality of the environment

No matters arise regarding Sec 8 (Treaty of Waitangi) of Part 2.

6.2 Section 73 and Schedule 1 RMA91

Under Section 73(2) of the Act any person may request a territorial authority to change a district plan, and the plan may be changed in the manner set out in Schedule 1. Clause 22 of Schedule 1 (Form of Request) requires that the request:

- *Shall be made in writing and shall explain the purpose of, and reasons for, the change to the plan and contain an evaluation report prepared in accordance with Section 32 for the proposed plan or change; and*

A Section 32 evaluation is attached at **Appendix E**.

- *Where environmental effects are anticipated, shall describe those effects, taking into account clauses 6 and 7 of Schedule 4, in such detail as corresponds with the scale and significance of the actual or potential environmental effects anticipated from the implementation of the change.*

An Assessment of Environmental Effects is attached at **Appendix D**.

Under Clause 25 of Schedule (1) the Council may reject the request in whole or in part but only on certain grounds:

- (a) *The request or part of the request is frivolous or vexatious; or*
 - (b) *Within the last 2 years, the substance of the request or part of the request –*
 - (i) *Has been considered and given effect to, or rejected by, the local authority or the Environment Court; or*
 - (ii) *Has been given effect to by regulations made under Section 360A; or*
 - (c) *The request or part of the request is not in accordance with sound resource management practice; or*
 - (d) *The request or part of the request would make the policy statement or plan inconsistent with Part 5; or*
 - (e) *In the case of a proposed change to a policy statement or plan, the policy statement or plan has been operative for less than 2 years.*
- The request is not frivolous or vexatious.
 - Within the last 2 years, the substance of the request has not been considered by the Council or the Environment Court.
 - The request accords with sound resource management practice.
 - The request would not make the Operative Plan inconsistent with Part 5 of the Act.
 - The District Plan has been operative for more than 2 years.

Preliminary discussions were held with Council's Planning & Engineering/3 Waters Departments in this matter and Council staff informally indicated that Council saw no insurmountable obstacles to this proposed Request from either a planning or infrastructure perspective.

6.3 Section 74 RMA91

Section 74 (2) (a) requires consideration of any Proposed Regional Policy Statement (PRPS) or Proposed Regional Plan (PRP). The PRPS is considered in the Sec 32 evaluation at **Appendix E**.

In summary, the Request is consistent with and gives effect to the PRPS. There are no relevant PRPs.

With regard to Section 74 (2) (b):

- The Otago Southland Regional Land Transport Plan prepared under the Land Transport Management Act 2003 is considered in the Sec 32 evaluation at **Appendix E**.
- There are no relevant entries on the NZ Heritage List/Rarangi Korero.

With regard to Section 74(2A). The Kai Tahu ki Otago Natural Resource Management Plan 2005 (NRMP) is considered in the Sec 32 evaluation at **Appendix E**.

With regard to Sec 74 (3), the Request does not involve any trade competition (other than competition in the industrial land and property market).

6.4 Sec 75 RMA91

With regard to Sec 75 (3) any relevant National Policy Statement, National Environmental Standard and the Regional Policy Statement (RPS) are considered in the Sec 32 evaluation at **Appendix E**.

In summary, the Request is consistent with all relevant NPS and NES and is consistent with and gives effect to the RPS.

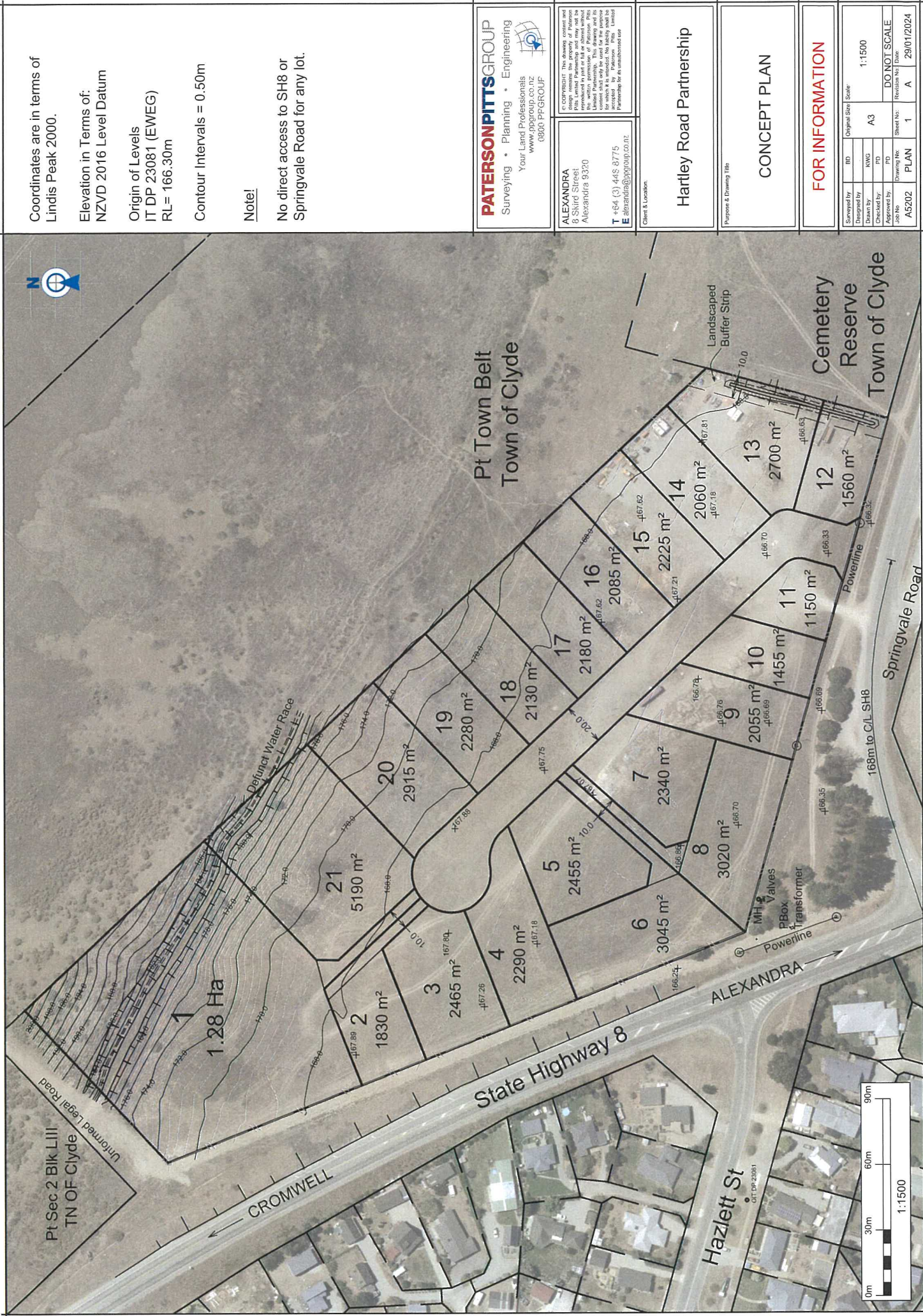
Under Sec 75 (4) there are no relevant Regional Plan considerations. Any consents required under the Regional Plan to give effect to the development enabled by the Request will be applied for at the time of subsequent subdivision and/or development.

7.0 DOCUMENTS TO SUPPORT THE REQUEST

The following additional documents are appended to and form an integral part of the Request :

Appendix	Assessment	Title/Author	Date
D	Assessment of Environmental Effects	Paterson Pitts Limited Partnership (Peter Dymock)	August 2024
E	Sec 32 Evaluation	Paterson Pitts Limited Partnership (Peter Dymock)	August 2024
F	Economics Assessment	Economic Assessment : Savvy Consulting Ltd (Natalie Hampson)	May 2024
G	Integrated Transport Assessment	Carriageway Consulting (Andy Carr) Transport Assessment:	May 2024
H	Soil Contamination Assessment	Preliminary Site Investigation: Insight Engineering (Claude Midgely)	March 2024
I	Infrastructure Assessment	Paterson Pitts Limited Partnership (Myles Garmonsway)	May 2024
J	Geotechnical Assessment	Geosolve (James Stewart)	June 2024
K	Landscape Assessment	Mike Moore Landscape Architect	June 2024
L	Land Productivity Report	Paterson Pitts Limited Partnership (Peter Dymock)	May 2024

Appendix 'A' - Land Subject to the Request



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!

No direct access to SH8 or
Springvale Road for any lot.

PATERSONPITTSGROUP
Surveying • Planning • Engineering
Your Land Professionals
www.ppgroup.co.nz
0800 PPGROUP

ALEXANDRA
8 Skird Street
Alexandria 9320
T +64 (3) 445 8775
E alexandra@ppgroup.co.nz

Client & Location

Hartley Road Partnership

Purpose & Drawing Title

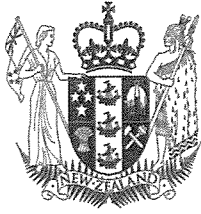
CONCEPT PLAN

FOR INFORMATION

Surveyed by	RD	Original Size	Scale
Designed by	KWG	A3	1:1500
Drawn by	PD		DO NOT SCALE
Checked by	PD		
Approved by	PD		
Drawing No.	PLAN 1	Sheet No.	29/01/2024
Job Ref	AS202		



Appendix 'B' - Records of Title



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD**

Limited as to Parcels

Search Copy




R.W. Muir
Registrar-General
of Land

Identifier 51710
Land Registration District Otago
Date Issued 07 February 2003

Prior References
34384

Estate	Fee Simple
Area	6.1663 hectares more or less
Legal Description	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

Registered Owners

Leon Francis Van Boxtel, Jane Marie Scott, Christine Elizabeth Ramage and Lianneke Mechelina Adriana Lodge

Interests

483128 Proclamation defining the middle line of a portion of State Highway (Timaru- Milton) - 15.8.1977 at 9.39 am

627969 Gazette Notice declaring the part of State Highway No 8 (Timaru-Milton via Cromwell) adjoining the within land to be a limited access road - 20.12.1984 at 11.33 am

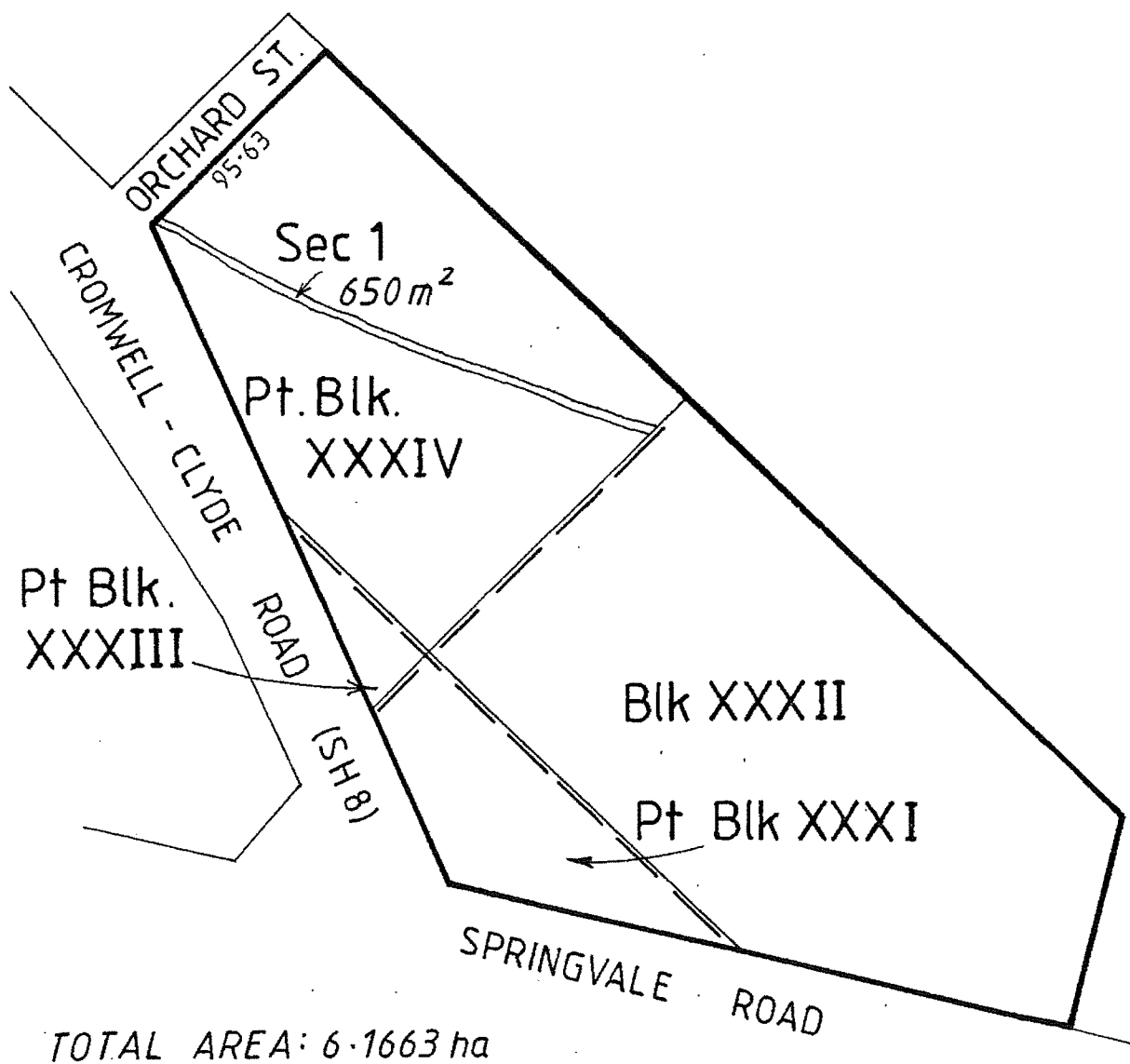
Subject to a right to convey water in gross over part Block XXXIV marked as a black line on diagram annexed to Transfer 885846 to Manuherikia Irrigation Co-operative Society Limited created by said Transfer- 30.6.1995 at 2:16 pm

Title Diagram Diagram

Cpy - 01/01, Pgs - 001, 11/02/03, 09:44



DocID: 110424971





Title Plan - LT 600773

Survey Number	LT 600773
Surveyor Reference	A5202 Hartley Road
Surveyor	Elizabeth Sarah Whyte
Survey Firm	Paterson Pitts Limited Partnership (Cromwell)
Surveyor Declaration	I Elizabeth Sarah Whyte, being a licensed cadastral surveyor, certify that-- (a) this dataset provided by me and its related survey are accurate, correct and in accordance with the Cadastral Survey Act 2002 and Cadastral Survey Rules 2021; and (b) the survey was undertaken by me or under my personal direction. Declared on 02 May 2024 11:13 AM

Survey Details

Dataset Description	LOT 1 BEING SECTION 1 BLOCK XXXIV & PART BLOCK XXXI & BLOCK XXXII & PART BLOCK XXXIII & PART BLOCK XXXIV TOWN OF CLYDE		
Status	Approved as to Survey		
Land District	Otago	Survey Class	Class B
Submitted Date	02/05/2024	Survey Approval Date	03/05/2024
		Deposit Date	

Territorial Authorities

Central Otago District

Comprised In

RT 51710 Ltd

Created Parcels

Parcels	Parcel Intent	Area	RT Reference
Area A Deposited Plan 600773	Easement		
Lot 1 Deposited Plan 600773	Fee Simple Title	6.6070 Ha	1170203
Total Area		6.6070 Ha	

LT 600773 Schedule/Memorandum

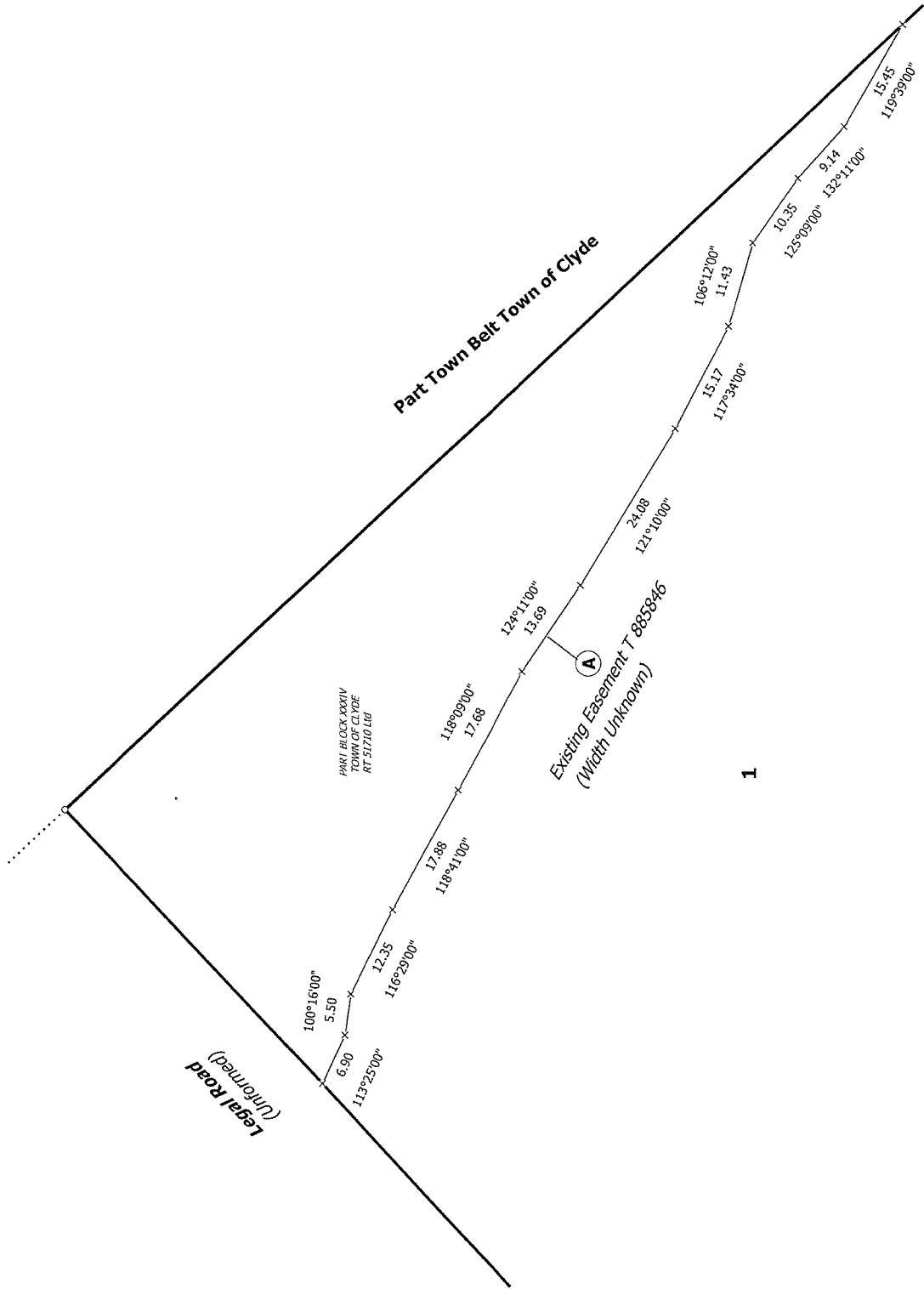
Land registration district
Otago

Territorial authority
Central Otago District

Schedule of Existing Easements in Gross		Parcels shown with a prefix of <i>HL</i> - include height-limited boundaries	
PURPOSE	SHOWN	BURDENED LAND	CREATING DOCUMENT
Right to convey water	A	Lot 1	885846



Diag. A
Non Primary



T 2/2

Land District: Otago

Digitally Generated Plan

Generated on: 03/05/2024 07:07am Page 4 of 4

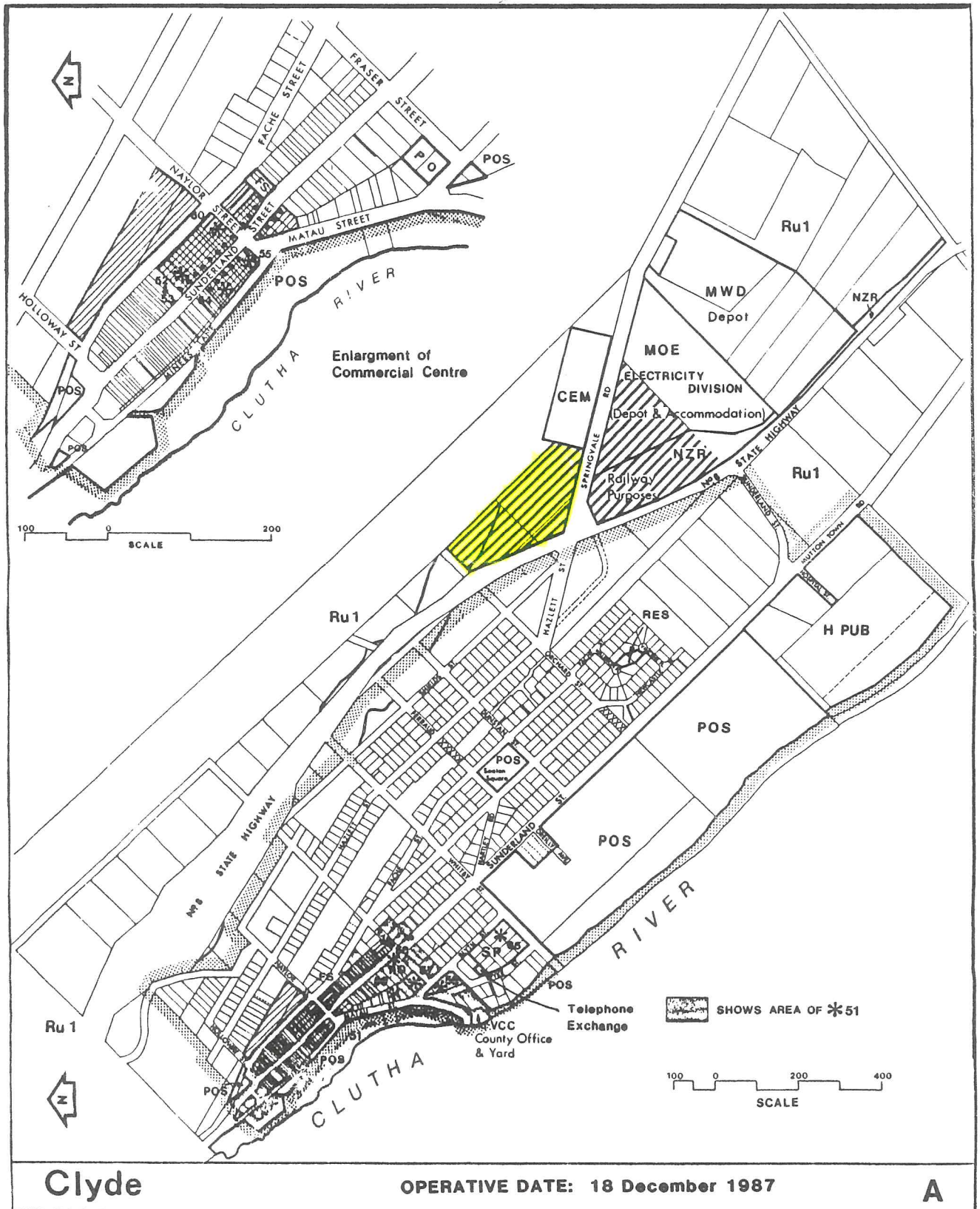
LOT 1 BEING SECTION 1 BLOCK XXXIV & PART BLOCK XXXI & BLOCK XXXII & PART BLOCK XXXIII & PART BLOCK XXXIV TOWN OF CLYDE

Surveyor: Elizabeth Sarah Whyte
Firm: Paterson Pitts Limited Partnership (C

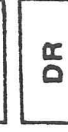
Title Plan
LT 600773
Approved on: 3/05/2024

Appendix 'C' - District Plan Maps

Former Transitional (Vincent) District Plan.



LEGEND ZONES

	Residential
	Residential Bannockburn
	Residential Lowburn
	Comprehensive Residential Development
	Residential Lakeshore A
	Residential Lakeshore B
	Residential Marina
	Deferred Residential
	Commercial
	Industrial
	Rural 1
	Rural 2 Landscape Protection
	Rural 3 Tourist Service

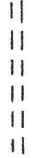
DESIGNATED AREAS

	Existing
	Existing
	

DESIGNATIONS

BCNZ	Broadcasting Corporation
HFS	High Frequency Station
CBC	Cromwell Borough Council
CEM	Cemetery
DSIR	Department of Scientific & Industrial Research
Au Stn	Auroral Station
FS	Fire Station
GOVT	Government purposes
H PUB	Hospital Public
HR	Historic Reserve
MWD	Ministry of Works & Development
NZR	Railway Purposes
NP	National Park
NZED	Electricity Department
NZFS	Generation of Electricity
SF	Forest Service
NZPO	State Forest
PO	Post Office Purposes
TE	Post Office
POS	Telephone Exchange
RES	Public Open Space Reserve
REC RES	Recreation Reserve
SC RES	Scenic Reserve
GQ	Gravel Quarry
VCC	Vincent County Council
ABC	Alexandra Borough Council
XXXX	Road to be Stopped

NOTATIONS

	County/Borough Boundary
	Area Map
	Township Map
	Limited Access Road
	Shopping Street
	Front yard Requirement
	Building Restriction Area
PrOS	Private Open Space
PPL	Protected Private Land
W	Wetland Habitat
F	Forest Habitat
*	Objects and Places of special interest as listed in the Scheme
	High Potential Soils
U.Z.	Underlying Zoning
	Suggested Road Alignment

() Anticipated Future Zoning

Hartley Road Partnership ODP Zoning

Created Date: 28/05/2024
Created Time: 1:37 PM
Created By: anonymous



Scale: 1:8000
Original Sheet Size A4
Projection: NZTM2000
Bounds: 1310786.50053715,4988226.71274488
1313646.34375065,4989810.23921172

The information displayed in the Geographic Information System (GIS) has been taken from Central Otago District Council's (CODC) databases and maps. Digital map data sourced from Land Information New Zealand (LINZ).
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If the information is relied on in support of a resource consent it should be verified independently.

Appendix 'D' - Assessment of Environmental Effects

REQUEST FOR A CHANGE
TO THE OPERATIVE
CENTRAL OTAGO DISTRICT PLAN

Assessment Of
Environmental Effects

HARTLEY ROAD PARTNERSHIP

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DOCUMENT CONTROL

Project	
Client	Hartley Road Partnership
Project No.	A502
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Reviewed	Duncan White Partner / Senior Planner Patersons – Wanaka Office

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1.0 INTRODUCTION

1.1 The Requestor

Section 22 of the RMA 91 requires that

- (2) *where environmental effects are anticipated, the request shall describe those effects, taking into account [[clauses 6 and 7]] of Schedule 4, in such detail as corresponds with the scale and significance of the actual or potential environmental effects anticipated from the implementation of the change, policy statement, or plan]*

Schedule (4) provides that the following matters taken into account with any such environmental assessment.

(6) Information required in assessment of environmental effects

- (1) *An assessment of the activity's effects on the environment must include the following information:*
- a) If it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity:*
 - b) An assessment of the actual or potential effect on the environment of the activity:*
 - c) If the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use:*
 - d) If the activity includes the discharge of any contaminant, a description of –*
 - i. The nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
 - ii. Any possible alternative methods of discharge, including discharge into any other receiving environment:*
 - e) a description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect:*
 - f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:*
- if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved:*
- if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of*

possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).

(7) Matters that must be addressed by assessment of environmental effects

(1) *An assessment of the activity's effects on the environment must address the following matters:*

- a) Any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:*
- b) Any physical effect on the locality, including any landscape and visual effects:*
- c) Any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:*
- d) Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations:*
- e) Any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:*
- f) Any risk to the neighbourhood, the wider community, or the environment through natural hazards ... or hazardous installations.*

This assessment takes into account the technical reports in **Attachments E to L** of the Request, which form an integral part of the Request.

2.0 THE SITE

Emails including a copy of the preliminary concept plan for a subdivision of the site, were sent out on 8 February 2024 to the following owners of immediately adjoining land who are considered to be affected persons, seeking preliminary comments on the Request:

Address	Person/Organisation	Response
Springvale Road, Clyde Cemetery Reserve & Town Belt	Roading, Reserves & Property Departments of CODC	No
SH8	New Zealand Transport Agency	Yes

The response received is attached at **Appendix 1** of this AEE. The New Zealand Transport Agency's (NZTA) comments are addressed in the Integrated Transport Assessment prepared by Carriageway Consultants at **Appendix G** of the Request.

Several meetings were held with Council's Planning & Infrastructure staff. No infrastructure issues were identified by Council staff. Council staff indicated that a computer network analysis by Mott MacDonald of the Council's water and wastewater infrastructure would not be required. No insurmountable planning impediments were raised by Council planners.

An application was made to Aukaha via its on-line portal on 8th February 2024, seeking preliminary comment on the Request. Aukaha's response on behalf of Te Rūnanga o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki is at **Appendix 1** of this AEE. Kā Rūnaka do not have any immediate concerns regarding the proposed re-zoning and advise that a cultural values assessment is not expected to be necessary. With regard to Kā Rūnaka concerns about the disposal of wastewater and stormwater, wastewater will be connected to a reticulated network and there is no reticulated stormwater system to connect to. Stormwater will be treated and disposed of to ground within the site as outlined in the Infrastructure Report at **Appendix I** of the Request. Aukaha and its constituent Kā Rūnaka will also have further opportunity to participate in the plan change Request via the normal notification and hearings process for a private plan change provided for under Schedule 1 of the RMA91.

3.0 EFFECTS RELATING TO INDUSTRIAL LAND SUPPLY & GROWTH

An economic assessment of the Request has been prepared by Savvy Consulting and is attached at **Appendix F** of the Request.

In summary, the report finds that the key economic benefits arising from the proposed plan change include:

- *Development of the land and future construction of new buildings will generate value adding to the Central Otago economy , sustaining jobs and household incomes.*
- *Provides a range of additional jobs in the Clyde township and therefore provides opportunities for some current and future residents of Clyde to work close to where they live . Reduced commuting travel compared to the status quo.*
- *Provides a range of industrial services in the Clyde township , improving the accessibility of these services for current and future residents of Clyde (with reduced road travel time compared to the status quo of travelling to Alexandra (most likely) for those services). Increased local functional amenity (attractiveness of Clyde as a place to live).*
- *Increases the self-sufficiency and resilience of the Clyde community while still maintaining economic and social connections with Alexandra (being the higher order urban area).*
- *Potential to attract net additional businesses and investment in the Vincent ward, including net additional households (business owners and staff) . Flow on benefits for local businesses and service providers.*
- *Supports a competitive industrial land market by introducing a new landowner to the market, and an alternative location to meet demand.*
- *Supports the provision of at least sufficient Industrial Zone capacity in Clyde, the Vincent Ward and district overall to meet projected medium term demand for Industrial Zoned Land.*

The assessment concludes that the anticipated economic benefits of the private plan change will outweigh the potential economic costs. The plan change would positively contribute to the economic wellbeing of the Clyde community and is consistent with strategic planning options being considered by Council.

The request will therefore have positive effects on the environment in relation to urban land supply and population growth.

4.0 EFFECTS IN RELATION TO TRANSPORTATION

The effects of the Request on associated transportation issues are addressed in the supporting Transport Assessment at **Appendix G** of the Request. The Assessment concludes as follows:

- *There is an existing shortfall in the intersection geometry because there is no left turning lane from SH8 (north) to Springvale Road (7.2.1, 9.3).*
- *The crash history at the intersections of SH8 and Springvale & Hartley Roads does not indicate any inherent safety issues at the intersections, but it is plausible that the crash record at the SH8/Springvale Road intersection is influenced by the lack of the required left turning lane (4.3.3 , 7.4.1 & 9.5).*
- *There are no impediments to forming a suitable intersection into the site from Springvale Road, the detailed design of which should be confirmed at the resource consent stage (7.2.4 , 7.4.2, 7.4.3 & 9.4).*
- *No revisions are required to existing carriageway widths of Springvale Road or SH8 as a result of additional traffic generated by development of the site (7.2.3 & 7.2.5).*
- *It is not considered that additional infrastructure is required for pedestrians and cyclists who will be served by the Rail Trail and existing SH 8 underpass. The limited size, industrial purpose and proximity of the subdivision to Clyde means that there will be no need for a public transport service (7.3.1 , 7.3.2 , 7.3.3, 8.2.3 & 9.4.1).*
- *Although there is presently only an indicative plan of subdivision proposed, it is likely that there will be a high degree of compliance with the transportation requirements of the District Plan and at this stage no non-compliances are expected. The plan change is also aligned with overarching strategic documents for the area (8.2, 8.3, 8.4,8.5 ,8.6 & 9.5.1).*
- *Overall, and subject to the preceding comments, the plan change request can be supported from a traffic and transportation perspective and it is considered that there are no traffic and transportation reasons why the plan change could not be approved (9.6).*

Comment: The Request proposes to introduce a new rule in the District Plan that requires the construction of a left turning lane on SH8, prior to any subdivision or development of the site.

5.0 EFFECTS IN RELATION TO INFRASTRUCTURE

The supporting infrastructure report at **Appendix I** of the Request addresses stormwater disposal, wastewater, water supply, reticulated utility services and roading construction.

In summary, development facilitated by this Request is able to be serviced for infrastructure and no adverse effects will arise in relation to infrastructural services.

6.0 EFFECTS IN RELATION TO NATURAL HAZARDS OR HAZARDOUS INSTALLATIONS

A search of the Otago Regional Council's Natural Hazards Database showed that the Otago Regional Council has no record of any natural hazard affecting the site, including fault lines, liquefaction, flooding, landslides and alluvial fans. The site specific geotechnical analysis by Geosolve at **Appendix J** of the Request concluded the site was suitable for Industrial development, subject to site-specific ground investigations and stormwater assessment, reporting and design during the resource consent and design phases as per para 6 (Recommendations and Considerations) of the report.

None of the test pits excavated for the infrastructure report showed any sign of deleterious material. Any engineered fills will need to be placed, compacted and certified in accordance with NZS4431: 2022. This is addressed at the resource consent/land use consent stage of subsequent subdivision and development of the site.

The proposed Industrial Resource Area zoning of the site does anticipate that some activities could establish on the site that may involve the use of hazardous materials or hazardous installations. This is managed under Objectives 9.1.1 and 9.1.2 Policies 9.2.3 and 17.4.5 and Rule 9.3.4 of the ODP. The Regional Policy Statements and Regional Plans: Waste & Water also include objectives, policies and rules controlling the use of hazardous materials and installations.

7.0 EFFECTS IN RELATION TO SOIL CONTAMINATION

The Preliminary Site Investigation (PSI) prepared by Insight Engineering at **Appendix H** of the Request addresses this issue.

The report concluded (para 7) that, “it is considered highly unlikely that there will be a risk to human health if the Zone was changed to industrial/commercial”. It also recommended (para 8) that “.....soil disturbance of the site does not meet the criteria to require Consent under Rule 5.6.1 of the Regional Plan Waste”.

8.0 EFFECTS ON CULTURAL VALUES & OTHER SPECIAL VALUES

So far as the Requestors are aware, the site does not contain any special ecosystems, natural habitats, or sites of recreational, cultural or scientific value. Aukaha have advised that there are no recorded Maori archaeological sites or sites of cultural significance in the immediate area and

that a cultural values assessment is not considered to be necessary. The Clutha River/ Mata- Au is subject to a statutory recognition under the Ngai Tahu Claims Settlement Act 1998. However the river is remote from the site and there is no overland flow path from the site to the river.

A pre-1900 water-race traverses the upper slopes of the site. This will be protected by its retention as a stormwater intercept drain as recommended by the Geotechnical Report at **Appendix J** of the Request. It is anticipated that this protection will be secured by way of a consent notice and/or easements registered against the relevant titles at the subsequent subdivision stage.

Possible disturbance of unknown cultural remains is best covered at the subsequent resource consent stage of developing the site by conditions of resource consent imposing an accidental discovery protocol. Possible disturbance of unknown archaeological sites by earthworks is governed by the requirements of the Heritage NZ Pouhere Taonga Act (2014).

Although the site is adjacent to the Clyde Cemetery Reserve, the actual walled cemetery is some considerable distance from the site. The proposed landscape screening will further insulate and screen the cemetery reserve from industrial activity within the site. It is also noted that Council has recently re-zoned former rural land owned by itself to industrial, immediately adjacent to the Cromwell Cemetery with no provision for screening.

9.0 DISCHARGE OF CONTAMINATES AND UNREASONABLE EMISSION OF NOISE

Wastewater will be discharged to the Council reticulation and stormwater direct to land within the site. Noise emission is governed by existing District Plan Rules 9.3.6 (iii) and 12.7.4.

10.0 DISCHARGE OF CONTAMINATES AND UNREASONABLE EMISSION OF NOISE

The land subject to this Request is in an “Other Rural Landscape” (ORL), the third tier landscape classification in the District Plan, being less sensitive than an Outstanding Natural Landscape (ONL) or a Significant Amenity Landscape (SAL).

A landscape assessment at **Appendix K** by Mike Moore, landscape architect, has been prepared in support of the Request. In summary the assessment finds that:

- The site is largely flat and has no landscape, natural character or rural amenity values of any special significance and that rural character in this area is already modified by its peri-urban location.
- Mitigation measures, including a landscape buffer and protection of the terrace riser within the site above the historic water race are required to soften and

screen views of the site and to maintain the landform coherence of the terrace riser within the SAL above the site.

- Comment: The Request includes suitable additions to the rules of the ODP that incorporate these mitigation measures.
- The adverse physical effects on landscape values are assessed as low/moderate (minor) in degree and can be adequately mitigated by the proposed rules.
- The site is screened by the SH8 embankment from most of the residential area of Clyde.
- The State Highway and moving traffic on it already reduce amenity from the few properties near the Hazlett Street/SH8 intersection that have a view of the site through varying extents of existing screening and that once the proposed landscaped buffer plantings mature, any adverse amenity effects will be further screened and softened.
- Overall the sensitivity of the site to the proposed change is low.
- The zone change is generally consistent with the statutory provisions relating to landscape values and effects.

The attached plan at **Appendix 2** of this AEE illustrates one possible option for the ultimate development of the site.

As illustrated by this plan, the inevitable result of the re-zoning of the site will be a change from a predominately open aspect to that of an built-up industrial character. Landscape effects cannot therefore be avoided, but they are not necessarily adverse and are compatible with the surrounding environment. Landscape change is inevitable if suitable industrial development land is to be made available to provide for the future growth of Clyde and the District as a whole.

It is concluded that the positive effects of this proposal in providing for the future growth of Clyde in a matter that satisfies the demand for industrial development not provided for in the current District Plan outweigh any minor adverse effects on landscape values.

11.0 EFFECTS IN RELATION TO THE LAND RESOURCE

Part of the site is identified on Landcare Research's land use capability database as being LUC 3 and the site is therefore subject to the National Policy Statement on Highly Productive Land (NPS-HPL) .

The NPS-HPL is addressed in the Land Productivity Report at **Appendix L** of the Request. The report concludes that "although the topography of a large part of the site and the site's climate and soils make it suitable for highly productive use, the lack of an irrigation and frost fighting water supply means that its productive potential cannot be realised. Potential reverse sensitivity issues with the adjacent Clyde Township, including a hospital and retirement village, further inhibit realisation of the site's productive potential."

The report also concludes that "*the Request complies with all of the exception criteria in the NPS-HPL that enables Council to rezone a site of highly productive land for non-rural use.*"

Part 4 of the Economic Assessment at **Appendix F** of the Request also considers clause 3.6 (4) of the NPS-HPL and concludes that the economic benefits of rezoning outweigh the economic costs of foregoing land-based primary production, in particular because the use of the site for highly productive land-based activity cannot be realised because of the lack of a supply of irrigation water.

12.0 EFFECTS ON ADJOINING PROPERTIES AND REVERSE SENSITIVITY EFFECTS ON SH8

The site is remote from any land currently used for highly productive rural use, therefore reverse sensitivity with rural land is highly unlikely to be an issue. The site is well separated from the residential areas of Clyde by a wide state highway corridor.

The state highway carriageway adjacent to the site is on an elevated fill embankment up to 8m high that provides for very effective visual screening of the site from the Clyde residential area and this screening will be further enhanced by the proposed landscape amenity strip. Adjoining land on the other side of Springvale Road is used for industrial purposes (storage shed and yard) and the terminus of the Central Otago Rail Trail. Industrial use of the site is completely compatible with these activities. Land bordering the site to the north and east is bare, dryland, unoccupied and un-farmed pasture and likely to remain so for the foreseeable future. Industrial use of the site will have no adverse effect on this land. The Request also provides for the ongoing protection of the terrace riser within the site above and including the historic water-race.

NZTA requires residential dwellings located within 100m of the edge line of a State Highway to have provision for additional sound proofing insulation. Given the industrial use proposed for the site, it is not considered that this is required to be specifically provided for as part of this Request. Existing standard 9.3.6 (iii) (b) of the ODP already provides for an insulation requirement for noise sensitive activities that locate anywhere within the Industrial Resource Area. A breach of this standard is a restricted discretionary activity under Rule 9.3.3 with one of the matters that Council has restricted the exercise of its discretion being *“The effect on the safe and efficient operation of the roading network”*. The proposed landscape screening also provides an additional buffer from reverse sensitivity effects from the highway.

13.0 CONCLUSION

In summary, the Request will have no significant adverse effects on the environment. Any adverse effects are less than minor, have been recognised and their avoidance or mitigation has been provided for in the Request.

It would be difficult to find a more suitable site for industrial activity in the vicinity of the Clyde Township.

The net effects of the Request are, on balance, overwhelmingly positive.

Appendix '1' - Response to Consultation

Peter Dymock

From: Cailin Richardson Hall <Cailin.RichardsonHall@nzta.govt.nz>
Sent: Wednesday, 28 February 2024 10:35 am
To: Peter Dymock
Cc: Andy Carr; Andy Carr; Andy Carr; Andy Carr; Andy Carr; Central Otago District Council; Duncan White; Duncan White; leon@benchmarkconstruction.co.nz
Subject: RE: Springvale Rd & SH 8, Clyde - Application-2024-0140 CRM:0304000277

Kia ora Peter,

Thank you for your patience whilst I sought feedback from NZTA subject matter experts regarding the proposed plan change. I have now received preliminary feedback based on the information provided to be considered when putting together the application and ITA for the proposal:

- The State highway in the vicinity of the site is declared a Limited Access Road to ensure the efficiency and functionality is maintained.
- Depending on the data provided in the ITA such as the traffic generation, improvements may be required at the intersection. For example, decreasing shoulder to incorporate a left turn lane into Springvale Road.
- Should improvements of the intersection for Springvale Rd and SH8 be required, the design, review and construction requirements will be outlined based on the level of improvements that are required. This could include (but not limited to):
 - Development of a robust pavement design for any pavement widenings undertaken and/or reviewed by a suitably qualified engineer with experience in state highway road design.
 - Consideration for movement of stormwater eg. all stormwater will be managed within the property.
 - If construction is required, a suitable contractor who is pre-approved to work on the state highways shall provide ITP's to support construction and CAR shall be submitted and approved prior to any works being undertaken on or near the state highway.
- Clyde Township is situated on the south side of SH8 whilst the proposed site is on the northern side. This would generate cross highway movements and therefore consideration of this should also be included in the ITA.
- NZTA also suggests any Section 32 analysis needs to show the need for additional Industrial land.

Please let me know if you have any further questions.

Ngā mihi,

Cailin Richardson Hall

Planner – Environmental Planning (South)

Poutiaki Taiao | Environmental Planning

Email: Cailin.RichardsonHall@nzta.govt.nz

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Waka Kotahi NZ Transport Agency

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----- Original Message -----

From: Peter Dymock <peter.dymock@ppgroup.co.nz>;

Received: Fri Feb 09 2024 09:57:38 GMT+1300 (New Zealand Daylight Time)

To: Cailin Richardson Hall <cailin.richardsonhall@nzta.govt.nz>;

Cc: Andy Carr <andy.carr@carriageway.co.nz>; Andy Carr <andy.carr@carriageway.co.nz>; Andy Carr <andy.carr@carriageway.co.nz>; Andy Carr <andy.carr@carriageway.co.nz>; Andy Carr <andy.carr@carriageway.co.nz>;

Andy Carr <andy.carr@carriageway.co.nz>; Central Otago District Council <andy.carr@carriageway.co.nz>; Duncan



Aukaha ref: J005586

10 June 2024

Attention: Peter Dymock
Email: peter.dymock@patersons.co.nz

Tēnā koe Peter,

Re: Hartley Road Partnership Private Plan Change

Te Rūnanga o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki (Kā Rūnaka) understand that Hartley Road Partnership intends to lodge a private plan change request to the Central Otago District Council (CODC) to rezone a site from rural to industrial, at the intersection of SH8 and Springvale Road in Clyde, and is seeking initial feedback from Kā Rūnaka.

Aukaha writes this letter on behalf of Te Rūnanga o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki. Kā Rūnaka exercise rakatirataka and kaitiakitaka over all the natural resources within their takiwā which the proposed site sits within.

Kā Rūnaka do not have any immediate concerns regarding the proposed rezoning based on the information provided to date. There are no recorded Māori archaeological sites or sites of significance in the immediate area affected by the proposed rezoning, therefore, a cultural values assessment is not expected to be necessary for this proposal. However, Kā Rūnaka have ongoing concerns about how wastewater and stormwater is managed within their takiwā and it is their strong preference that any development is connected to a reticulated wastewater and stormwater network. If there is no reticulated stormwater network available, the preference is that soft (nature-based) solutions are used to attenuate and treat stormwater run-off.

This letter is specific to the above proposal and Kā Rūnaka would like to be kept informed as more information becomes available and as this plan change request progresses through the council process.

Nāku noa, nā

Dr Kate Timms-Dean
General Manager, Mana Taiao

cc: Te Rūnanga o Ōtākou
Kāti Huirapa Rūnaka ki Puketeraki

Appendix '2' – Possible Subdivision



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!

No direct access to SH8 or
Springvale Road for any lot.

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Client & Location
Hartley Road Partnership

Purpose & Drawing Title
CONCEPT PLAN

FOR INFORMATION

Surveyed by	BD	Original Size	Scale
Designed by	KWG	A3	1:1500
Drawn by	PD		
Checked by	PD		
Approved by	PD		
Job No	PLAN	Sheet No	Revision No
AS202	1	A	29/01/2024

Appendix 'E' - Sec 32 Evaluation

REQUEST FOR A CHANGE
TO THE OPERATIVE
CENTRAL OTAGO DISTRICT PLAN

Evaluation under Section 32 of the
Resource Management Act 1991

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Prepared	Peter Dymock Patersons – Alexandra Office
Reviewed	Duncan White Partner / Senior Planner Patersons – Wanaka Office

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1.0 INTRODUCTION

The Request needs to be evaluated in accordance with Sec 32 of the Resource Management Act 1992. Sec 32 states:

“32 Requirements for preparing and publishing evaluation reports

1. *An evaluation report required under this Act must –*
 - a) *Examine the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of this Act; and*
 - b) *Examine whether the provisions in the proposal are the most appropriate way to achieve the objectives by –*
 - i. *Identifying other reasonably practicable options for achieving the objectives; and*
 - ii. *Assessing the efficiency and effectiveness of the provisions in achieving the objectives; and*
 - iii. *Summarising the reasons for deciding on the provisions; and*
 - c) *Contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal.*
2. *An assessment under subsection (1)(b)(ii) must –*
 - a) *Identify and assess the benefits and costs of the environmental, economic, social and cultural effects that are anticipated from the implementation of the provisions, including the opportunities for –*
 - i. *Economic growth that are anticipated to be provided or reduced; and*
 - ii. *Employment that are anticipated to be provided or reduced; and*
 - b) *If practicable, quantify the benefits and costs referred to in paragraph (a); and*
 - c) *Assess the risk of action or not acting if there is uncertain or insufficient information about the subject matter of the provisions.*
3. *If the proposal (an amending proposal) will amend a standard, statement, regulation, plan, or change that is already proposed or that already exists (an existing proposal), the examination under subsection (1)(b) must relate to –*
 - a) *The provisions and objectives of the amending proposal; and*
 - b) *the objectives of the existing proposal to the extent that those objectives –*
 - i. *are relevant to the objectives of the amending proposal; and*
 - ii. *would remain if the amending proposal were to take effect...”*

The Economic Assessment at **Appendix F** has identified that there is only 1ha of vacant developable Industrial Zoned land remaining in Alexandra and there is no Industrial Zoned land in Clyde . This is insufficient to provide for the foreseeable demand in the short, medium and long term for Industrial Land in the District .

The objectives of the Request therefore are:

- To provide sufficient industrial development capacity to satisfy the reasonably foreseeable demand for such development in the Clyde area as determined by the Economic Assessment.
- To retain flexibility to respond to changing market place preferences in an efficient manner.

- To locate industrial development in close proximity to Clyde township on a site that ensures that reverse sensitivity and adverse amenity effects on residential land are minimised and that there is no effective loss of highly productive land
- To locate industrial development on a site that ensures a safe and efficient transport network that integrates well into the existing roading network.

The Economic Assessment at **Appendix F** of the Request has identified, quantified and assessed the economic, employment and social benefits and costs that are anticipated from the implementation of the Request. These are also traversed in para 3.0 (Effects Relating to Industrial Land Supply & Growth) of the Assessment of Environmental Effects at **Appendix D** of the Request. In summary the anticipated economic benefits of the Request will outweigh the potential economic costs. The plan change will positively contribute to the economic well being of the Clyde community and is not inconsistent with the strategic planning options being considered by Council.

2.0 OPTIONS FOR ACHIEVING THE OBJECTIVES OF THE REQUEST

There are a number of options to achieve the objectives of the Request which are outlined and discussed below.

Potential Options	Discussion
Do nothing: Retain the Rural zoning of the site	This option would require resource consents to achieve the objectives of the Request. This creates the following costs: (a) Non-complying subdivision and land use consents would be required to breach almost all of the Rural Resource Area Rules for industrial activity. (b) This would create significant transaction costs for applicants and an administrative burden for Council which would be incurred repeatedly and be extremely inefficient for achieving the objectives of the Request. (c) Uncertain outcomes from numerous, public processes. This potential option is not reasonably practical will not be considered further in this evaluation.
Await Council District Plan Review	The Central Otago District Plan is due for review and an option may be to await the review and then submit requesting suitable zoning for the site. (a) There is no firm timetable for this review and it is now unlikely to happen given the pending Central Government replacement of the RMA91. (b) Council initiated changes to the Operative District Plan to provide for Industrial Activity consequent upon the Vincent Spatial Plan (VSP) may be years away. The VSP also does not provide for any additional industrial land capacity in Clyde. Given the immediate lack of vacant industrial land in Clyde, the Requestor wishes to proceed with its re-zoning proposal now, rather than wait for Council's initiated plan changes. Accordingly, this option will not be considered further in this evaluation.
Request a Private Plan Change that seeks to rezone the site to an existing resource area, subject to modifying the zoning provisions to enable site specific requirements.	This option is potentially efficient as it utilises and minimally modifies an existing resource area (the Industrial Resource Area) within the District Plan. This option is reasonably practical and is considered further below.

Request a Private Plan Change to create an entirely new resource area with bespoke planning provisions.	This option is for a "Master planned" form of development This option may have some advantages and is considered further below.
---	--

Based on the evaluation above, the potential options that are reasonably practical and worth considering further are:

Option 1 Request a Private Plan Change to change the zoning of the site to an existing resource area and to modify the zoning provisions (policies and rules) of the resource area to enable site-specific requirements.

Option 2 Request a Private Plan Change to create a new bespoke resource area.

3.0 EVALUATION OF THE COSTS & BENEFITS OF THE PREFERRED OPTIONS

Option 1	Re-zone the site with an existing zone (Industrial Resource Area)
Benefits	* The existing zoning is well understood and can be easily implemented. * Compatible with the existing zoning provisions in the District Plan. * Provides flexibility to respond to changing market and social and economic preferences. * Provides for a comprehensive range of industrial and commercial uses.
Costs	* Provides less certainty to Council and community as to the detailed form of development of the site.
Efficiency	* Only minor amendments required to District Plan, therefore less costs to Council and requester. * Avoids over-complicating the District Plan.
Effectiveness	* Simple and effective method of achieving the objectives of the Request.
Risk of acting (or not acting)	* By not acting, there is the risk that the land ownership would be fragmented by rural - residential development of the site which would be a lost opportunity to achieve a more efficient and effective use of the land and infrastructure resources. There is no significant risk with proceeding with the Request.

Option 2	Re-zone the site with a bespoke zoning
Benefits	* Provides some certainty to Council and Community as the outcome of the development of the site, typically by way of a "masterplan".
Costs	* Expensive to implement for both the Council and the Requestors requiring detailed design at the outset. * Does not respond well to changing market preferences and socio-economic conditions which can often require further plan changes, and/or non-complying resource consents to implement. * Users of the plan may be unfamiliar with the bespoke provisions.
Efficiency	* Complex changes required to District Plan.

Effectiveness	* Can be an effective way of achieving the objectives of the Request.
Risk of acting (or not acting)	* As above

On balance, it is considered that the most preferable option is to request a Private Plan Change to change the zoning of the site to the District Plan's existing Industrial Resource Area with minor additions modifications to the rules to enable site-specific requirements to be met.

4.0 EVALUATION OF THE REQUEST AGAINST THE DISTRICT PLAN'S OBJECTIVES AND POLICIES

Section 9 of the District Plan has a number of objectives and supporting policies that are relevant to the proposed change:

It is proposed that these existing objectives and policies be retained with no amendments. An evaluation of the Request against these provisions follows.

4.1 Objectives

Obj 9.1.1 Protection of Amenity Values

To manage industrial activities to ensure that :

- (a) Adverse effects on other land uses are avoided, remedied or mitigated ; and
- (b) Amenity values of neighbouring resource areas are maintained.

Obj 9.1.2 Management of Effects of Industrial Activities

To manage industrial activities within the Industrial Resource Area to ensure that :

- (a) A reasonable working environment for other industrial activities is maintained , and
- (b) The sustainable management of network utility services including roading is promoted, while
- (c) Enabling the operation of a wide range of activities

Comment: The site subject to the Request is well separated from the Clyde Residential Area by a wide state highway road reserve that is elevated above both the site and the residential area by an embankment which provides both a visual and sound barrier . Further landscape screening is also proposed in the Request. Land use on the immediate boundaries of the site (ie unoccupied and undeveloped bare land that is likely to remain so) and across Springvale Road (industrial and commercial use) are compatible with industrial use of the site. The site is well connected to the roading network and can be connected to all reticulated utility services including water supply , wastewater , power and telecommunications . The existing zoning rules in the District Plan provide for a wide range of activities in the Industrial Resource Area .

4.2 Policies

Pol 9.2.1 Provision for Industrial Activities

To provide for the location of industrial activities to avoid , remedy or mitigate adverse effects on other land use activities

Pol 9.2.2 Maintenance of Visual Amenity Values

To avoid , remedy or mitigate the adverse visual appearance that some industrial area and activities can have by :

- (a) Ensuring appropriate separation and screening from adjacent resource areas.
- (b) Ensuring the bulk and location of buildings does not dominate adjacent resource areas.
- (c) Reducing the visual intrusion of signs.

Comment: Policy 9.2.1 directs Council to provide for appropriate locations for the growth of industrial activity where effects can be managed. The site is well screened and separated from the Clyde Residential Resource Area by the State Highway embankment and by proposed landscape screening . There will be no adverse effects on other land use activities which are already industrial / commercial in nature or undeveloped bare land that is likely to remain so for the foreseeable future .

Pol 9.2.3 Adverse Effects

To ensure industrial activities are managed so that :

- (a) Waste products are disposed of adequately ,and
- (b) The effects of noise , odour, dust , light spill and electrical interference on neighbouring areas are avoided, remedied or mitigated , and
- (c) The community's safety and wellbeing is safeguarded from the effects of noxious or objectionable processes.

Pol 9.2.4 Maintenance of Industrial Resource Area

To ensure that the amenity values of residential sites, including privacy and ability to access adequate daylight and sunlight, are not significantly compromised by the effects of adjoining development.

Pol 9.2.5 Infrastructure

To ensure that industrial activities avoid, remedy or mitigate adverse effects on infrastructure by:

- (a) Providing appropriate access and facilities for the loading and manoeuvring of vehicles.
- (b) Maintaining and enhancing the safe and efficient operation of the roading network.
- (c) Contributing to a fair and reasonable proportion to any upgrading or development of infrastructure that may be required as a result of the activity

Comment: The rules that give effect to Policies 9.2.3 , 9.2.4 and 9.2.5 will remain unchanged, apart from minor site specific additions to achieve Policy 9.2.5 (b).

In summary, the Request complies with and gives effect to the District Plan's relevant objectives and policies.

5.0 EVALUATION OF THE REQUEST'S METHODS & RULES

Plan provision/Rule	Discussion
12.7.1(iii) (h) & (i), 12.7.1 (ix) Addition to this rule to provide that a left turning slip lane be constructed on SH 8 at the SH8/Springvale Rd intersection prior to development on the site and a breach of this rule to be non-complying.	This rule is required to ensure the safety and efficiency of the SH8/Springvale Road intersection which the Transport Assessment at Appendix G has identified as already being required. The Request will generate increased traffic onto this intersection.
9.3.6 (iv) (d) & (e) Addition to this rule to provide for a 10m wide landscaped buffer strip along the road and Clyde Cemetery Reserve frontages of the site and to protect the historic water race and the slopes above it from development.	As identified in the landscape assessment at Appendix K , the site has a high level visibility from the roading network and a framework of trees is required to soften and screen views of industrial buildings, yard and signs etc. The restriction on development above and including the historic water race is required to maintain the landform coherence of the terrace riser above the site which is subject to a SAL.

6.0 EVALUATION OF THE REQUEST UNDER NATIONAL PLANNING INSTRUMENTS

6.1 National Policy Statements

The following National Policy Statements (NPS) are in effect:

- NPS on Urban Development
- NPS for Highly Productive Land
- NPS for Freshwater Management
- NPS for Greenhouse Gas Emissions from Industrial Process Heat
- NPS for Indigenous Biodiversity
- NPS for Renewal Electricity Generation
- NPS on Electricity Transmission
- NZ Coastal Policy Statement

Legal advice provided by MacTodd to the hearings panel for PC19 indicates that Cromwell is an urban environment in accordance with the NPS on Urban Development (NPS-UD), and therefore the Central Otago District Council is a Tier 3 territorial authority.

With a population of under 1,500 Clyde is not an “urban environment”, as defined in the NPS on Urban Development Capacity (NPS-UD) as:

“.....any area of land (regardless of size, and irrespective of local authority or statistical boundaries) that

- (a) is, or is intended to be predominantly urban in character; and*
- (b) is, or is intended to be, part of a housing and labour market of at least 10,000 people”*

Accordingly the NPS-UD is not a directly relevant planning document in the context of the Request.

Nevertheless the NPS-UD is of some application as Council, as a Tier 3 territorial authority, is subject to Policy 2 (and clauses 3.2 and 3.3) of the NPS-UD that require Council to generally provide at least sufficient development capacity to meet expected demand for business land over the short, medium and long term in its District. This reinforces Council's function under Sec 31(1) (aa) RMA91 for *"the establishment, implementation and review of objectives, policies and methods to ensure that there is sufficient development capacity in respect of housing and business land to meet the expected demands of the district"*. (my underlining).

The application of the NPS for Highly Productive Land (NPS-HPL) to the site is addressed in the Land Productivity Report at **Appendix L**. The report concludes that although part of the site is potentially suitable for highly productive rural use, the lack of a suitable irrigation water supply and noise reverse sensitivity effects with the Clyde residential area means that this potential cannot be realised and that the Request complies with all of the exception criteria in the NPS-HPL.

The Economic Assessment at **Appendix F** (para 4) also finds that the Request complies with clause 3.6 (4) of the NPS-HPL in that:

- the re-zoning is required to provide sufficient development capacity in the District
- there are no other reasonably practical and feasible options to provide the development capacity
- the economic benefits of rezoning outweigh the economic costs of foregoing land-based primary production

There is no other NPS relevant to this Request.

6.2 National Environmental Standards

The following National Environmental Standards (NES) are in effect:

- NES for Air Quality
- NES for Sources of Human Drinking Water
- NES for Telecommunication Facilities
- NES for Electricity Transmission Activities
- NES for Assessing and Managing Contaminants in Soil to Protect Human Health
- NES for Commercial Forestry
- NES for Greenhouse Gases from Industrial Process Heat
- NES for Marine Aquaculture
- NES for Storing Tyres Outdoors
- NES for Freshwater

The NES for Air Quality makes the Otago Regional Council responsible for managing air quality under the RMA91 and the Central Otago District Council responsible for issuing permits for

qualifying solid fuel heaters in air sheds 1 & 2 under the Regional Plan: Air. The site is not within either air shed (1) or air shed (2).

The NES for Assessing and Managing Contaminants in Soil to Protect Human Health has been dealt with under the Preliminary Site Assessment at **Appendix H**.

In summary, there will be no risk to human health from soil contamination by subdivision and development of the site for industrial use.

There is no other NES relevant to this Request.

7.0 EVALUATION OF THE REQUEST UNDER REGIONAL PLANNING INSTAMENTS

7.1 National Policy Statement 1998

The Regional Policy Statement 1998 was fully revoked as of 15 March 2021.

7.2 Operative Regional Policy Statement 2019 (ORPS)

The objectives and policies of the ORPS are addressed as follows:

Objectives and Policies	Comment/Analysis
2.1 to 2.2 (Kai Tahu values and interests)	The oRPS requires that Kai Tahu values and interests are recognised and kaitiakitaka is expressed. Discovery protocols can best be put in place at the subsequent resource consent stage to develop the site. The site is not subject to any statutory acknowledgement in the Ngai Tahu Claims Settlement Act 1998. Aukaha will be notified of the Plan Change and will have further opportunity to submit.
3.1 to 3.2 (Functions and values of Otago's ecosystems and natural resources)	The site does not contain any significant natural ecosystems and habitats of indigenous species, fresh water bodies or wetlands. The site is not in an area of outstanding natural features or landscapes. Any significant use of the site for primary production cannot be realised due to the absence of a suitable source of irrigation water.
4.1 (Risk that natural hazards pose to Otago's communities are minimal)	A search of the Otago Regional Council's Natural Hazards Database shows that the site is not subject to any natural hazard. The site specific Geotechnical Assessment at Appendix J also finds that the site is not subject to natural hazards. The Request enables increased development within a site that is not hazard prone and does not pose a risk to ecosystem values. It does not compromise the safety of the local road network. The proposal does not increase the risk or the consequences of risk of natural hazards affecting human life, infrastructure and property.
4.3 (infrastructure managed and developed in a sustainable way)	The site will be connected to the Council water and wastewater reticulations and is well integrated into the transport infrastructure, with no adverse effects on existing infrastructure.
4.5 (urban growth and development is well designed, occurs in a strategic and co-ordinated way and integrates effectively with adjoining urban and rural environments)	The Plan Change enables development that can integrate effectively with the adjoining urban and rural environments, to ensure there is sufficient industrial land development capacity. All necessary infrastructure is, or will be, in place to enable industrial development of the site. The site is underlain by a considerable depth of highly permeable glacial out wash gravels which will

	facilitate direct disposal of stormwater to ground, in compliance with low impact design principles.
4.6 Hazardous substances, contaminated land and waste materials do not harm human health or the quality of the environment in Otago.	The PSI at Appendix H has been provided with the Request and confirms the site is suitable for industrial activity.
5.2 Historic heritage resources are recognised and contribute to the region's character and sense of identity	The pre-1900 water race intersecting the upper part of the site is recognised and will be preserved and protected by use as a stormwater intercept and can be further protected by a consent notice at time of subdivision.
5.3 Sufficient land is managed and protected for economic production	The Request provides a specific area to accommodate the effects of industrial activities and provides a range of land suitable for different industrial activities on a site that will not generate reverse sensitivity effects.

7.3 Proposed Regional Policy Statement 2021 (PRPS)

The PRPS is still subject to decision making and has limited application to this Request, but is briefly evaluated as follows:

Objectives and Policies	Comment/Analysis
MW – Manawhenua	See comments above under 2.1-2.2 of the oRPS.
LF-PW-P15 Stormwater and wastewater discharges	There is no reticulated stormwater system in Clyde. Stormwater will be disposed of direct to ground within the site itself. Wastewater will be discharged into the Council reticulation.
LF -CS- P19 Highly Productive Land	Any significant use of the site for primary production cannot be realised due to the absence of a suitable source of irrigation water and potential reverse sensitivity effects with the Clyde Residential Area.
EIT-INF-P17 Urban Growth and Infrastructure	The site is well integrated into the transport infrastructure and will be connected to existing reticulated infrastructure with no adverse effects on the infrastructure headworks.
EIT – TRAN -P19 Transport System Design	The Request provides for an upgrade of the intersection of SH8 and Springvale Road.
HAZ-NH-O1 Natural Hazards	As per Geotech report at Appendix J . The site is not subject to any natural hazards.
HAZ – CL Contaminated land	A PSI at Appendix H has been provided with the Request and confirms the site is suitable for industrial activity.
HCV – NH Historic heritage	The pre-1900 water race intersecting the upper part of the site is recognised and will be preserved and protected by use as a stormwater intercept and can be further protected by a consent notice at the time of subdivision.
NFL-O7 Outstanding Natural Features	The site does not contain any outstanding natural features or landscapes.
UFD -O2 Development of urban areas UFD-O3 Strategic Planning	The request allows business activities to meet the need of the Clyde community in the short, medium and long term in an appropriate location while respecting historic sites and providing for active transport via a state highway underpass and the Otago Central Rail Trail. The Request minimises conflict between incompatible activities that would occur if the site was developed for intensive rural land use. It achieves integration of land use with existing development infrastructure and facilitates the safe and efficient use of the regionally significant State Highway and arterial road infrastructure. The Request will result in consolidated, well designed and located industrial development that is sustainable and located adjacent to existing urban areas and will be the primary focus for accommodating the area's industrial growth and change.

8.0 EVALUATION OF THE REQUEST AGAINST THE KAI TAHU KI OTGAO NATURAL RESOURCE MANAGEMENT PLAN (2005)

Section 3 of the Operative District Plan puts in place the framework within which issues of concern to Kai Tahu ki Otago in the context of the Act are recognised and provided for in the Central Otago District. Policy 3.4.1 of the Operative District Plan explicitly recognises the 1995 version of the Iwi Management Plan as the principal resource management reference planning document for the Central Otago District.

To the extent that the Request is simply applying an existing (Industrial) zoning provision to the site, the District Plan already incorporates consideration of issues of concern to Kai Tahu on any subsequent subdivision development of the site.

Clyde is located within the Clutha-Mata-au Catchment, and this is described at Section 10.1 of the 2005 Management Plan as:

“The Clutha/Mata-au Catchment centres on the Clutha/Mata-au River and includes all sub catchments within this main Catchment.

Wai Maori Issues:

Land Use:

- *Lack of reticulated community sewerage schemes.*
- *Existing sewage schemes are not effectively treating the waste and do not have the capacity to cope with the expanding population.*
- *Land use intensification, for example dairying in the Poumahaka Catchment.*
- *Increase in the lifestyle farm units is increasing the demand for water.*
- *Sedimentation of waterways from urban development.*

Policies:

Land use:

9. *To encourage the adoption of sound environmental practices, adopted where land use intensification occurs.*
1. *10. To promote sustainable land use in the Clutha-Mata-au Catchment.*
2. *11. To encourage all consents related to subdivision and lifestyle blocks are applied for at the same time including, land use consents, water consents, and discharge consents.*
3. *12. To require reticulated community sewerage schemes that have the capacity to accommodate future population growth.*

10.3 WAHI TAPU

10.3.1 Wahi Tapu in the Clutha/mata-au Catchments

There are a range of wāhi tapu, but physical resources such as mountain tops, springs and vegetation remnants are other examples. Urupā and some significant sites of conflict are located all along the Clutha Mata-au River.

10.3.3 Wāhi Tapu Policies in the Clutha/Mata-au Catchment

1. *To require that wāhi tapu sites are protected from further loss or destruction*
2. *To require accidental discovery protocols for any earth disturbance activities.”*

The Mata-au/Clutha River is also an area of statutory acknowledgement in schedule 11 RMA91 (Ngai Tahu claim Settlement Act 1998).

The site will connect to reticulated wastewater and water services that have the capacity to accommodate the growth. All stormwater will be disposed of direct to ground within the confines of the site and the site is not adjacent to the Mata-Au/Clutha River. No water take consents will be required to subdivide and develop the site. There is no known waahi tapu associated with the site. An accidental discovery protocol can be imposed by resource consent conditions.

The Request therefore accords with the issues, objectives and policies of the Management Plan.

9.0 EVALUATION OF THE REQUEST AGAINST THE OTAGO SOUTHLAND REGIONAL LAND TRANSPORT PLAN

The Request fully complies with the long-term strategic objectives of the Plan in that:

- Alternative transport modes are available by the Rail Trail & SH 8 underpass (cycling and walking) close to the Clyde township (the Plan provides that 10km for cycling and 2km for walking is considered to be the normal limit for these transport methods).
- A suitable intersection onto Springvale Road will provide for reliable, resilient and safe access to the network. Section (9.5.1) of the Transport Assessment in **Appendix G** also concludes that the Request complies with the Regional Land Transportation Plan.

10.0 EVALUATION AGAINST THE VINCENT SPATIAL PLAN (VSP)

The VSP is not a statutory instrument and can therefore have limited application to the consideration of this Request. Nevertheless, it does indicate the strategic direction to accommodate growth in the Clyde- Alexandra area envisaged by Council and the community.

The VSP proposes an industrial area adjacent to the Clyde Railhead “*to recognise existing activities*” (ie those subject to scheduled activity SA1051 – the Contact Energy storage shed/yard and a rural fire station site). However that does not provide for future industrial activity growth. This request is a logical extension of this existing industrial node on the only possible remaining vacant site suitable for industrial activity close to Clyde and just over Springvale Road from this existing activity.

CLYDE SPATIAL PLAN

Clyde's managed growth would progressively consolidate and expand southwards from the historic town centre, near the Clyde Dam and Clyde Bridge gateways. Like Alexandra, it is highly adaptable to more intensive infill opportunities near the town centre. There are also clear urban boundaries where comprehensive greenfield development could occur including the Mata-au/Clutha River, Waikerikeri Creek, Clyde town belt reserve and the proposed amenity buffer along the steep terrace embankment on the town's eastern edge.

KEY FEATURES:

- ① A small extension of the existing town centre and associated heritage precinct is proposed to maintain Clyde's character as it grows.
- ② Medium density residential infill of the existing street grid close to the Clyde town centre is proposed, led by character guidelines.
- ③ An industrial area adjacent to the Clyde Railhead is proposed to recognise existing activities.
- ④ Lower density residential greenfield expansion would continue further into the Muttonville area and rural residential properties could be downsized to large lots at the top of Springvale Road.
- ⑤ A new cross-terrace amenity area provides an opportunity to establish a green corridor and an active travel connection along Waikerikeri Creek that would also define the urban limits of Clyde to the south.

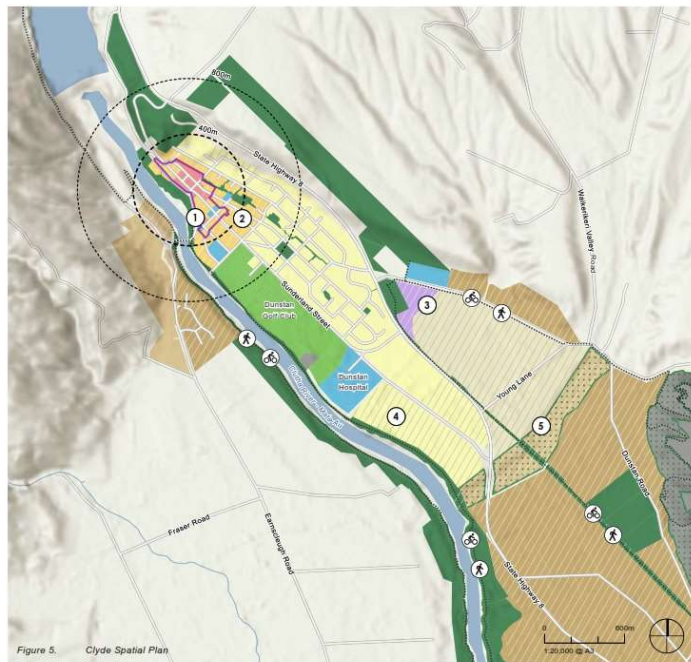


Figure 5. Clyde Spatial Plan.

11.0 CONCLUSION

The above evaluation has assessed the Request under Section 32 of the Resource Management Act 1991. The conclusions from this evaluation can be summarised as follows:

- The objectives of the Request are necessary and are an appropriate way to achieve the purpose of the Resource Management Act.
- The Request complies with and gives effect to the objectives and policies of the District Plan and higher order planning instruments.
- The provisions of the Request will be efficient and effective in achieving the objectives of the Request, taking into account their costs and benefits.
- There is no risk of the activity, given that the provisions of the Request manage the effects of the activity or the wider environment and there is no uncertainty in or in sufficiency of information about these provisions. There is a risk of not acting because the land and infrastructure resource could be lost to inefficient land uses.

Appendix 'F' - Market/Economics Assessment



savvy
CONSULTING

Economic Assessment of Proposed Clyde Industrial Zone

Private Plan Change – Central Otago District

Prepared for: Hartley Road Partnership – May 2024- Draft



Economic Assessment of Proposed Clyde Industrial Zone

Private Plan Change – Central Otago District

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Executive Summary

This report has been prepared by Savvy Consulting Limited (Savvy) to assess the economic costs and benefits of a request to rezone 6.6ha of land in Clyde, Central Otago District (COD), from Rural Resource Area (Rural Zone) to Industrial Resource Area (Industrial Zone). Guided by the relevant district, regional and higher-order objectives and policies related to urban expansion and providing for industrial activities, this report has assessed the current location, role and growth of existing Industrial Zones, their vacant capacity, the medium-term demand for industrial zoned land, the sufficiency of existing Industrial Zones to meet that, and the overall suitability of the proposed site for industrial zoning.

Generally, it is more economically efficient to consider options for expansion of existing industrial zones before creating new ones, to ensure that the adverse effects of industrial activities are consolidated in relatively few locations. However, this is not always practicable where other land uses have developed around existing Industrial Zones as they have in Alexandra, foreclosing further expansion. Further, this approach must be balanced with the need to provide for industrial activities in locations of demand.

Clyde is an urban area that already sustains industrial activity, but in the absence of a local Industrial Zone (such as provided in most other towns and settlements of the district) the Clyde community has been reliant on supply of industrial activities in Alexandra. This urban form is increasingly inefficient as Clyde grows – and Clyde *has* been identified as an area that is constrained by a lack of local employment and yet, can support substantial residential growth in the medium and long term.

Providing for future housing growth in Clyde as set out in PC19 and the Spatial Plan without also providing increased employment opportunities and business land, will not support a well-functioning urban environment. I consider that the proposed site is a suitable and effective location for an Industrial Zone. I do not consider there to be any other more practicable or feasible alternative locations to provide the equivalent development capacity in the locality. Providing a local Industrial Zone in Clyde responds to an insufficiency (absence) of industrial development capacity in the Clyde urban area and assists with an insufficiency of industrial development capacity in the Alexandra urban area in the short-medium term. Zoning of the proposed site will support the provision of at least sufficient Industrial Zone capacity in the Vincent Ward and district overall.

Having considered the economic costs and benefits of the proposal, I conclude that the economic benefits far outweigh any potential costs. I support the rezoning from an economic perspective.



1 Introduction

This report has been prepared by Savvy Consulting Limited (Savvy) to assess the economic costs and benefits of a request to rezone a piece area of land in Clyde, Central Otago District (COD), from Rural Resource Area (Rural Zone) to Industrial Resource Area (Industrial Zone). The scope of this independent economic assessment has been designed to assist with section 32A reporting as well as assessment against district and regional planning provisions, and higher order statutory documents (namely the National Policy Statement on Urban Development (NPS-UD) and National Policy Statement for Highly Productive Land (NPS-HPL), from an economic perspective.

1.1 Proposal

Hartley Road Partnership are seeking to provide for a 6.6ha (gross) Industrial Zone in Clyde at the intersection of State Highway 8 and Springvale Road. The greenfield site is shown in Figure 1.1 and sits to the east of the main urban area of Clyde, separated by State Highway 8. It is also bounded to its east by the cemetery on Springvale Road and a steep hill to the rear of the site, meaning that the site is well contained.



Figure 1.1 – Proposed Industrial Zone Site Relative to Clyde Township



1.2 Policy Framework for Industrial Zoning

The following selected planning provisions help to set the context of what economic effects (costs and benefits) are of key relevance for this plan change request.

1.2.1 National Policy Statement – Urban Development

Legal advice provided by MacTodd to the hearings panel for PC19¹ indicates that Cromwell is an urban environment in accordance with the NPS-UD, and therefore COD is a Tier 3 territorial authority (TA). As a Tier 3 TA, Central Otago District Council (CODC) is “*strongly encouraged to do the things that Tier 1 or 2 local authorities are obliged to do under Parts 2 and 3 of the NPS-UD*”.² In other words, observe the objectives and policies of the NPS-UD.

Most objectives and policies relate to decisions that affect the urban environment (i.e., Cromwell). That said, Policy 2 (and related Clauses 3.2 and 3.3) simply require that Tier 3 TAs provide at least sufficient development capacity to meet expected demand for housing and for business land over the short, medium, and long term,³ with clause 3.2 referring to urban areas (not limited to the urban environment). This is also the requirement of s31(1)(aa) of the RMA. As such, my interpretation of the legal advice and the NPS-UD is that Policy 2 is the key backdrop to this economic assessment.

1.2.2 Regional Policy Statement (RPS)

Objective 4.5 and Policy 4.5.1 of the Operative RPS (2019) require that urban growth occurs in a strategic and coordinated way and integrates effectively with adjoining urban and rural environments. It directs that supply and demand of industrial zoned land is monitored, that sufficient industrial land is made available (i.e. relative to demand), and that land is used efficiently. Policy 5.3.3 acknowledges that land suitable for industrial activities is a finite resource and directs local councils to provide specific Industrial Zones.

The Proposed RPS 2021 includes similar direction. For example, UFD-02 (Development of urban areas) requires that urban areas develop and change to allow business and other non-residential activities to meet the needs of communities in appropriate locations. UFD-03 reflects the requirements of the NPS-UD – that there is sufficient development capacity for business needs in the short, medium and long term. The requirement for strategic planning to

¹ Council initiated plan change on residential zones in the district.

² Clause 1.5, NPS-UD.

³ I.e. the next 3, 10 and 30 years.



take place prior to development, expansion or redevelopment of urban areas is strengthened in the Proposed RPS.

1.2.3 Operative District Plan

The operative District Plan pre-dates both RPSs and the NPS-UD (and its predecessor the NPS-UDC). Objective 6.3.1 of the COD District Plan requires that planning decisions meet the present and reasonably foreseeable needs of people and communities in urban areas in order to promote the sustainable management of those areas. This includes providing for growth (demand) in urban areas in efficient locations when needed. Policy 6.4.2 sets out the effects that must be avoided, remedied or mitigated when enabling expansion of urban areas generally.

Objective 9.1.1 recognises that industrial activities, while an essential part of the economy that must be provided for in urban areas, have the potential to adversely affect the amenity values of neighbouring land uses, or create reverse sensitivity effects on other land uses. Policy 9.2.1 and 9.2.3 therefore direct planning decisions to provide appropriate locations for the growth of industrial activities where effects can be managed.

My interpretation of the District Plan is that there is no strategic guidance on which urban areas should include an Industrial Zone(s). Rather, where there is a need to provide Industrial Zone capacity in urban areas to provide for industrial activity demand, the emphasis is on finding an appropriate location for that zone where adverse effects (including reverse sensitivity effects) can be managed. That said, the Vincent Spatial Plan (2022) now gives effect to the strategic planning requirement from the RPS for urban growth in Clyde, Alexandra and Omakau/Ophir and will guide future changes to the District Plan. This is discussed later in the report with respect to strategic planning for new industrial zones.

1.2.4 Summary of Relevant Economic Effects to Consider

Based on the above planning and policy framework, the key economic concepts that need to be addressed for this plan change relate to demand for industrial development capacity (zoning) over the short, medium and long term; the location of that demand and where it is most efficiently met; the capacity of existing and identified future industrial zones; the sufficiency of existing and identified industrial zones to meet projected demand; the suitability of the proposed site for industrial development (i.e. does it represent feasible development capacity); and the economic costs and benefits of the proposal to test if it is an efficient use the land and supports an efficient urban form.



1.3 Report Scope

To meet the requirements set out above, the approach of this economic assessment considers:

- a) the town and settlement pattern of the district and the economic inter-dependencies of those areas, including how they are currently served by industrial zones;
- b) the relative function/role of existing industrial zones (relative to the towns/settlements they are located in and relative to each other);
- c) the vacant capacity of existing and identified future industrial zones (as an indication of their ability to provide for future growth);
- d) the demand for industrial zoned land, driven by projected population and dwelling growth;
- e) the indicative sufficiency of industrial zoned and identified land relative to locations of demand;
- f) the economic costs and benefits of the proposed zoning, taking into account any forgone primary productive capacity; and
- g) conclusion on the efficiency of the proposed zoning from an economic perspective.

1.3.1 Data Sources

This report has considered and/or relied on a range of data sources to inform the analysis. This includes:

- CODC's 2020 and 2022 growth projections prepared by Rationale,
- CODC's GIS data for Operative and notified PC19 zoning,
- the Operative District Plan,
- PC19 Section 42A report (2023) and PC18 S32A Report,
- CODC's Vincent Spatial Plan 2022,
- StatisticsNZ population estimates, projections, residential consents and business demography data,
- aerial imagery, and
- the Primary Production Capacity Report (PPG, 2024).



2 Existing & Planned Industrial Zones

2.1 Study Area and Urban Structure

The study area for this assessment is the whole of COD, although particular focus is given to the locations where there are operative Industrial Zones and the area covered by the recent Vincent Spatial Plan (2022) prepared by CODC. That is, the townships of Clyde, Alexandra and Omakau within Vincent Ward.⁴ Figure 1.2 identifies the locations of the main towns/settlements in COD. While Clyde and Alexandra are relatively close to each other, the district is characterised by a small number of urban and rural centres spread over a large geographic area.

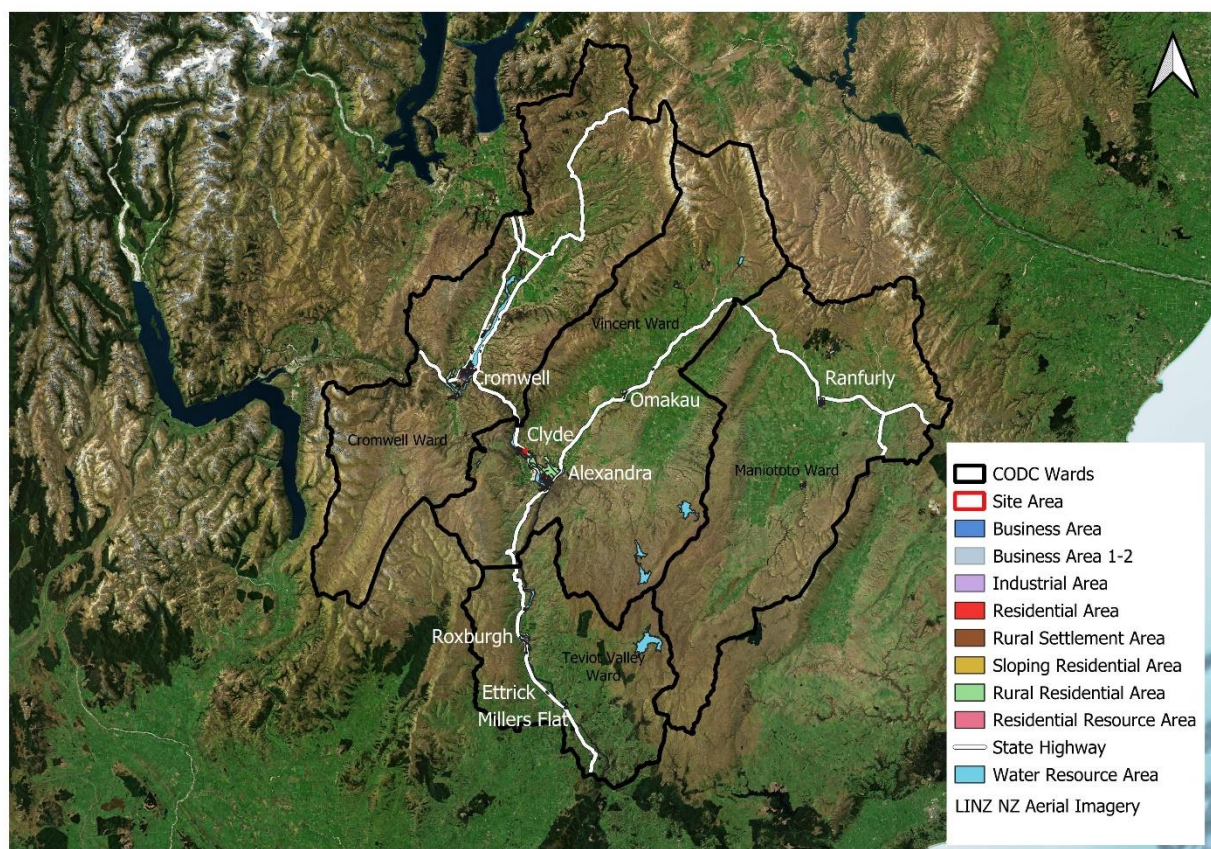


Figure 2.1 – Study Area for Assessment – Main Towns & Settlements of COD

In terms of an urban hierarchy, Cromwell, Alexandra, Ranfurly and Roxburgh are the main centres within each ward. Cromwell has taken over as the largest centre in the district in

⁴ StatisticsNZ 2023 Ward Boundaries.



population terms⁵ (although not in employment terms) and serves primarily the Cromwell Ward.⁶ Alexandra is the second largest centre in population terms and the largest in employment terms and serves the higher order needs of those living in the Vincent, Maniototo and Teviot Valley Wards – so a much larger geographic catchment. In population terms, Clyde is the third largest of the discrete townships/settlements in the district (Figure 2.2) in population terms.

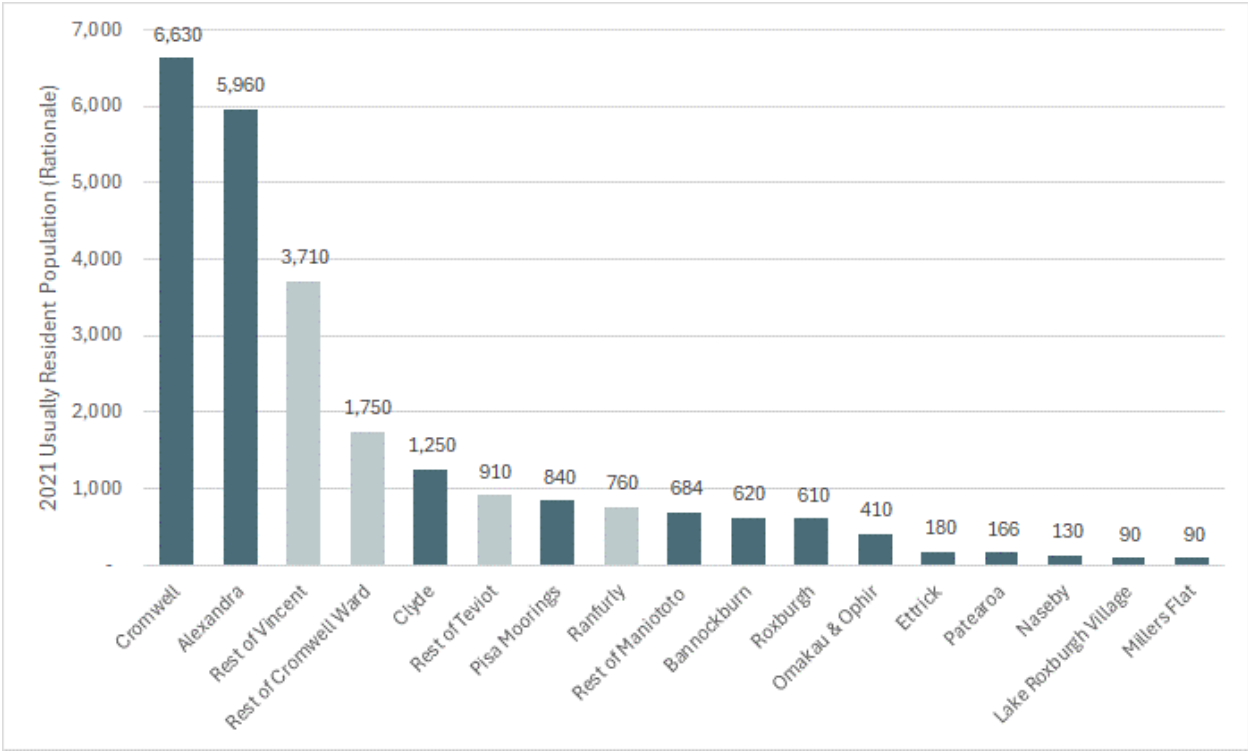


Figure 2.2 –COD Towns & Settlements Usually Resident Population 2021(Rationale)

This urban structure is directly relevant to the role of Industrial Zones within the district, including where growth in demand for Industrial Zones is most efficiently met.

2.2 Operative District Plan Urban Area Zoning

Table 2.1 provides a list of the main towns and settlements in COD that contain either Residential Zoning or Settlement Zoning. The ward that they fall within is noted, and for completeness, the ‘rest of ward’ area is represented (and which may include rural settlements not otherwise listed).

⁵ StatisticsNZ 2023 Estimates.

⁶ Cromwell also has some economic and workforce linkages with Queenstown and Wanaka in Queenstown Lakes District.



Some key trends are evident in the approach to zoning in the operative District Plan. This includes that most urban areas include some Rural Residential zoning adjoining or near the Residential or Settlement Zone. This is appropriate to provide for a range of dwelling types to meet community needs.

Table 2.1 – Current Operative Plan Zone Provision by Urban Area

Ward	Town/Settlement	Zone Category *				
		Residential	Rural Settlement	Rural Residential (in close proximity)	Business	Industrial
Cromwell	Cromwell	Y	-	Y	Y	Y
Cromwell	Pisa Moorings	Y	-	-	PPC21	PPC21
Cromwell	Bannockburn	Y	-	Y	-	-
Cromwell	Rest of Cromwell Ward	-	Y	Y	-	-
Vincent	Alexandra	Y	-	Y	Y	Y
Vincent	Clyde	Y	-	Y	Y	-
Vincent	Omakau & Ophir	Y	-	Y	Y	Y
Vincent	Rest of Vincent	Y	Y	Y	-	-
Maniototo	Ranfurly	Y	-	Y	Y	Y
Maniototo	Naseby	Y	-	Y	Y	Y
Maniototo	Patearoa	Y	-	Y	-	Y
Maniototo	Rest of Maniototo	-	Y	Y	-	-
Teviot Valley	Roxburgh	Y	-	Y	Y	Y
Teviot Valley	Lake Roxburgh Village	Y	-	-	-	-
Teviot Valley	Ettrick	Y	-	-	-	Y
Teviot Valley	Millers Flat	Y	-	Y	-	Y
Teviot Valley	Rest of Teviot	-	-	-	-	-

Source: CODC Operative Zone Maps. * Rural zone excluded.

Next, seven of the urban areas include a Business Zone. Where an urban area does not include a Business Zone, they are generally dependent on the nearest Business Zone for convenience retail and service needs. As discussed above, higher order retail and service needs are generally directed to either Cromwell or Alexandra (whichever is closest).

While not every settlement can sustain a viable Business Zone, the operative District Plan has sought to provide most towns and settlements with an Industrial Zone. Nine urban areas in the district include a local Industrial Zone (Table 2.1). Not only does this concentrate employment opportunities within urban areas (close to places of residence), but it consolidates industrial activities that might otherwise be dispersed in the Rural Zone⁷ into a suitable location where effects can be appropriately managed (and agglomeration benefits can be realised for co-located businesses).

⁷ Or seek to take up capacity in a Business Zone (where enabled or approved).



The only areas that do not include an Industrial Zone are Pisa Moorings and Bannockburn in Cromwell Ward, Clyde in the Vincent Ward and Lake Roxburgh Village in the Teviot Valley Ward, with Clyde being larger than each of these areas in terms of resident population, and much larger than some towns and settlements that already contain Industrial Zones.

Currently, any demand for industrial activities arising from homes or businesses in or near Pisa Moorings and Bannockburn will be met in Cromwell. Any demand arising in or near Clyde will be met in Alexandra and any demand arising in or near Roxburgh Village will be met in Roxburgh.

At the same time, there will be some industrial activities located in the two main towns (Cromwell and Alexandra) that service much wider catchments (in addition to local demand), in the same way as the Business Zones in these towns function at the top of the commercial centre hierarchy. As such, a portion of industrial demand from each urban area can be met locally (if a zone is provided) and a portion of demand will be met in the Cromwell and Alexandra Industrial Zones (whichever is closest).

2.2.1 Current Private Plan Changes

While Pisa Moorings does not currently include a Business Zone or its own local Industrial Zone (Table 2.1), PPC21 (Parkburn Quarry) seeks to include provision for both zone types, in addition to further Residential Zone capacity, to provide for local demand and projected growth in this urban area. While pending a decision, the PPC21 would significantly increase the self-sufficiency of the Pisa Mooring community and reduce the need for road travel to Cromwell for work and convenience shopping.

Should PPC21 be approved, the only urban areas not provided with a local Industrial Zone will then be Clyde, Bannockburn and Roxburgh Village.

2.3 Current Role of Industrial Zones & Recent Growth

Table 2.2 summarises, in a general sense, the role of the various Industrial Zones provided throughout COD. As stated above, all Industrial Zones have a local role – serving the household and business needs of the local and surrounding community – but Alexandra and Cromwell Industrial Zones have a wider catchment role. This wider role arises from their strategic location (geographically) within the district, and from being within urban areas with the largest workforce and supporting infrastructure. The large local demand in these two main townships sustains a greater number of industrial activities, but the strategic location makes it efficient for some of those businesses to also service a wider catchment from a centralised location.



Table 2.2 – Functional Role of Existing Industrial Zones

Ward	Town/Settlement	Existing Industrial Zone	Industrial Zone Role / Catchment	Main Industrial Service Hub
Cromwell	Cromwell	Y	Local & Ward	Cromwell
Cromwell	Pisa Moorings	-	N/A	Cromwell
Cromwell	Bannockburn	-	N/A	Cromwell
Cromwell	Rest of Cromwell Ward	-	N/A	Cromwell
Vincent	Alexandra	Y	Local & Ward	Alexandra
Vincent	Clyde	-	N/A	Alexandra
Vincent	Omakau & Ophir	Y	Local	Alexandra
Vincent	Rest of Vincent	-	N/A	Alexandra
Maniototo	Ranfurly	Y	Local	Alexandra
Maniototo	Naseby	Y	Local	Alexandra
Maniototo	Patearoa	Y	Local	Alexandra
Maniototo	Rest of Maniototo	-	N/A	Alexandra
Teviot Valley	Roxburgh	Y	Local	Alexandra
Teviot Valley	Lake Roxburgh Village	-	N/A	Alexandra
Teviot Valley	Ettrick	Y	Local	Alexandra
Teviot Valley	Millers Flat	Y	Local	Alexandra
Teviot Valley	Rest of Teviot	-	N/A	Alexandra

Source: CODC Operative Zone Maps, Savvy.

The following sub-section provides a closer look at the two main industrial zones in COD – Cromwell and Alexandra. This analysis is based on business and employment data reported by StatisticsNZ⁸ at a Statistical Area 1 (SA1) level.⁹

SA1 boundaries do not perfectly match the Industrial Zone boundaries and as such, may include land uses outside the Industrial Zone that contain businesses and employment. The SA1 boundaries are however a relatively close match with the Industrial Zones in these two main towns and while not all business/employment activity outside the Industrial Zone can be identified and removed, primary production activity (farming and horticulture) has been removed from the data where this related to rural land captured within the SAIs.¹⁰ Services to agriculture, forestry and hunting have however been retained in the data (where applicable).

For all other areas with an Industrial Zone, the SA1 boundaries covered land substantially larger than the Industrial Zone, and often the whole settlement and extensive rural areas. As

⁸ Business Demography Statistics.

⁹ SA1 2018 boundaries have been used.

¹⁰ Other data cleaning included removal of hydro power generation where this was appearing (perhaps incorrectly) within the SAIs for the Alexandra Industrial Zones, and removal of most Shearing Services employment where the shearing service business was the place where all shearing gang employment was registered, but is unlikely to be based within the zone.



such, there is too much uncertainty around Industrial Zone activity to provide meaningful analysis of those local Industrial Zones.

2.3.1 Cromwell Industrial Zone

Appendix A contains a detailed table of the analysis for the Cromwell Industrial Zone. Key findings for this zone include:

- There were an estimated 269 businesses in the Industrial Zone in February 2023, which is 68 (34%) more businesses (net) than there was in 2018.
- Approximately 75% of those businesses (47 total) fall within broad industries¹¹ that may be considered more likely to seek an Industrial Zone location than not.¹² This group of businesses grew by 30% since 2018, suggesting that businesses in other sectors (while making up only 25% of total businesses) were growing at an above average rate in the Industrial Zone.
- The two industries experiencing the largest business count growth 2018–2023 were construction and rental, hiring and real estate services, with growth of 22 and 14 businesses respectively.
- Construction businesses make up 21% of all businesses in the Industrial Zone in 2023, followed by rental, hiring and real estate services (16%), wholesale trade (15%) and manufacturing businesses (13%).
- Total estimated employment in the Industrial Zone in 2023 was 1,834.¹³ This increased by 237 (in net terms)¹⁴ or 15% from 2018.
- Average business size in the Industrial Zone has reduced slightly from 8 workers/business in 2018 to just under 7 workers/business in 2023.
- Employment in industries considered more likely to seek an Industrial Zone location than not accounted for 82% of total estimated employment in the zone.

¹¹ Using 1-digit ANZSIC categories (albeit only the support services activity within Agriculture, Forestry and Fishing).

¹² For the purposes of this report, this includes services to agriculture, forestry and hunting, manufacturing, electricity, gas, water and waste services, construction, wholesaling, transport, postal and warehousing. I have also included the total Rental, hiring and real estate services industry on the basis that this includes vehicle hire, machinery and equipment hire, event hire and scaffolding businesses, even though real estate and some hiring services would be expected in business zones and not industrial zones.

¹³ Employment is measured as total jobs – comprising the StatisticsNZ employee count plus estimated working proprietors and sole traders.

¹⁴ Refer Appendix A. There were decreases in some industries and growth in others.



- The two industries experiencing the largest employment count growth 2018–2023 were wholesaling and construction, with growth of 111 and 44 workers respectively.
- Construction businesses make up 32% of all employment in the Industrial Zone in 2023, followed by manufacturing (17%), and wholesaling (16%).
- The Industrial Zone plays a key role in the overall township, accounting for 28% of all businesses and 46% of all employment in Cromwell. Business growth in the Industrial Zone (which is the metric that relates strongly to take up of vacant land) is growing at an above average rate compared to growth in other zones that enable business activity (namely the Business Zones). While accounting for 28% of all businesses, the Industrial Zone accounted for 40% of all Cromwell business growth since 2018.

In light of the strong recent growth in take up of the Industrial Zone in Cromwell, and strong projected growth, PC18 (initiated by Council in response to the Cromwell Master Plan) added substantial development capacity adjoining the existing Industrial Zone.

2.3.2 Alexandra Industrial Zones

There are two discrete areas of Industrial Zoning in Alexandra, on the east and west side of the township. Appendix A contains a detailed table of the analysis for the combined Alexandra Industrial Zones. Key findings for this zoned land include:

- There were an estimated 121 businesses in the Industrial Zone in February 2023 (much less than in Cromwell), which is 9 (8%) more businesses (net) than there was in 2018.
- Approximately 61% of those businesses (74 total) fall within broad industries that may be considered more likely to seek an Industrial Zone location than not. This group of businesses grew by 10% since 2018, suggesting that businesses in other sectors (which make up the remaining 39% of total businesses in the Industrial Zones) were growing at a below average rate.
- The three industries experiencing the largest business count growth 2018–2023 were professional, scientific and technical services (8 additional businesses) and construction and rental, hiring and real estate services, with growth of 4 businesses each over that period.
- Rental, hiring and real estate service businesses make up 18% of all businesses in the Industrial Zone in 2023, followed by construction and professional, scientific and technical services on 16% each.



- Total estimated employment in the Industrial Zones in 2023 was 1,049. This increased by 22 (in net terms) or 2% from 2018.
- Average business size in the Industrial Zone has reduced slightly from 9.2 workers/business in 2018 to 8.7 workers/business in 2023. Businesses in the Alexandra Industrial Zones are on average, slightly larger than businesses in Cromwell's Industrial Zone.
- Employment in industries considered more likely to seek an Industrial Zone location than not accounted for 68% of total estimated employment in the zone.
- The two industries experiencing the largest employment count growth 2018-2023 were construction and food services, with growth of 102 and 29 workers respectively.
- Construction businesses make up 48% of all employment in the Industrial Zones in 2023. All other industries accounted for between 0%-8% each of the total zone employment.
- The Industrial Zone plays a moderate role in the overall township, accounting for 15% of all businesses and 23% of all employment in Alexandra. Business growth in the Industrial Zones (which is a key driver in the take up of vacant land) is growing at an above average rate compared to growth in other zones that enable business activity (namely the Business Zone). While accounting for 15% of all businesses, the Industrial Zone accounted for 27% of all Alexandra business growth since 2018 (albeit that growth was minor).

Figure 2.3 compares the employment composition of the Industrial Zones in Cromwell and Alexandra in 2023. The analysis shows that both zones have a broad mix of business types – suggesting relatively enabling zone provisions. Construction related businesses dominate the Industrial Zones in Alexandra. While construction has a key role in Cromwell's Industrial Zone, manufacturing (which includes processing), wholesaling and transport/warehousing are also a key focus in Cromwell – with much of this driven by the surrounding horticultural activity and its strategic location on the State Highway network.

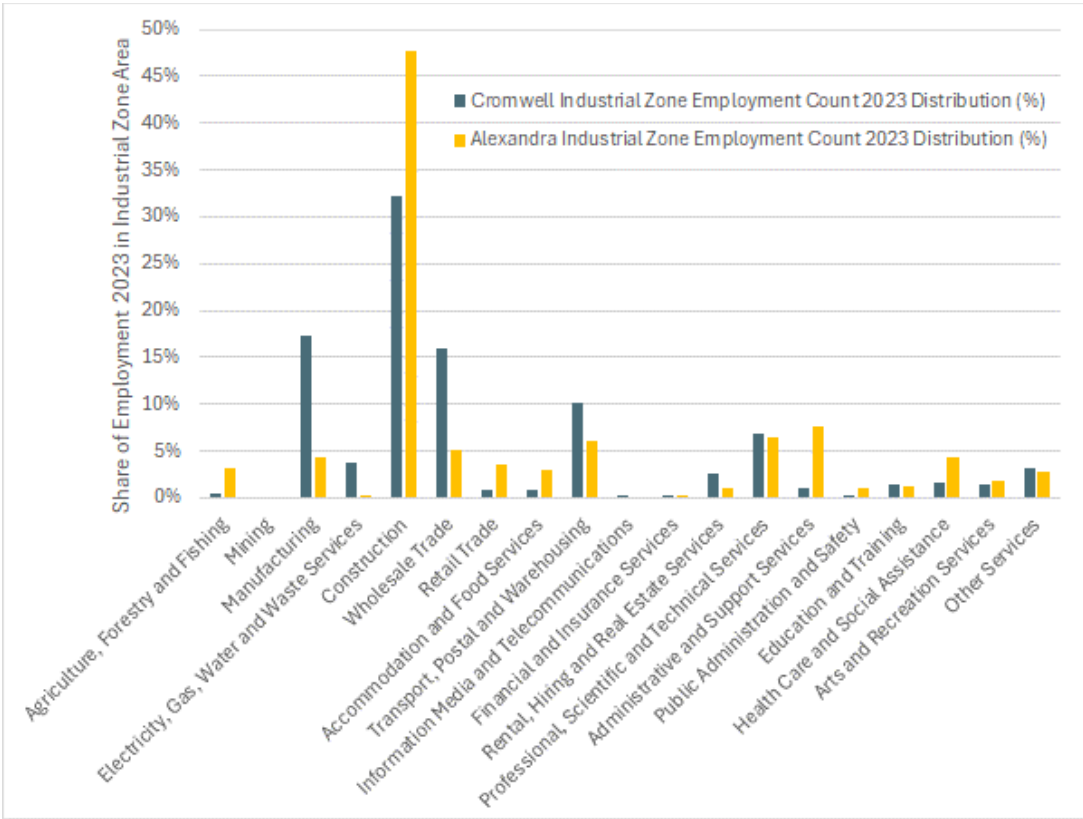


Figure 2.3 – Comparison of Employment Mix in Cromwell and Alexandra Industrial Zone 2023

2.4 Capacity for Growth in Industrial Zones

The following provides a desktop assessment of estimated vacant land capacity in existing Industrial Zones across COD. This analysis has been carried out at the primary parcel level. Where a parcel contained more than one zone, the parcel area was split, and only the Industrial Zone portion was retained. Parcels have also been ‘cookie-cut’ by designations within the Industrial Zone to provide greater insight on existing (or intended) land use.

Figure 2.4 illustrates the results for Alexandra’s two Industrial zones (east and west). Appendix B contains the maps for all other Industrial Zones.

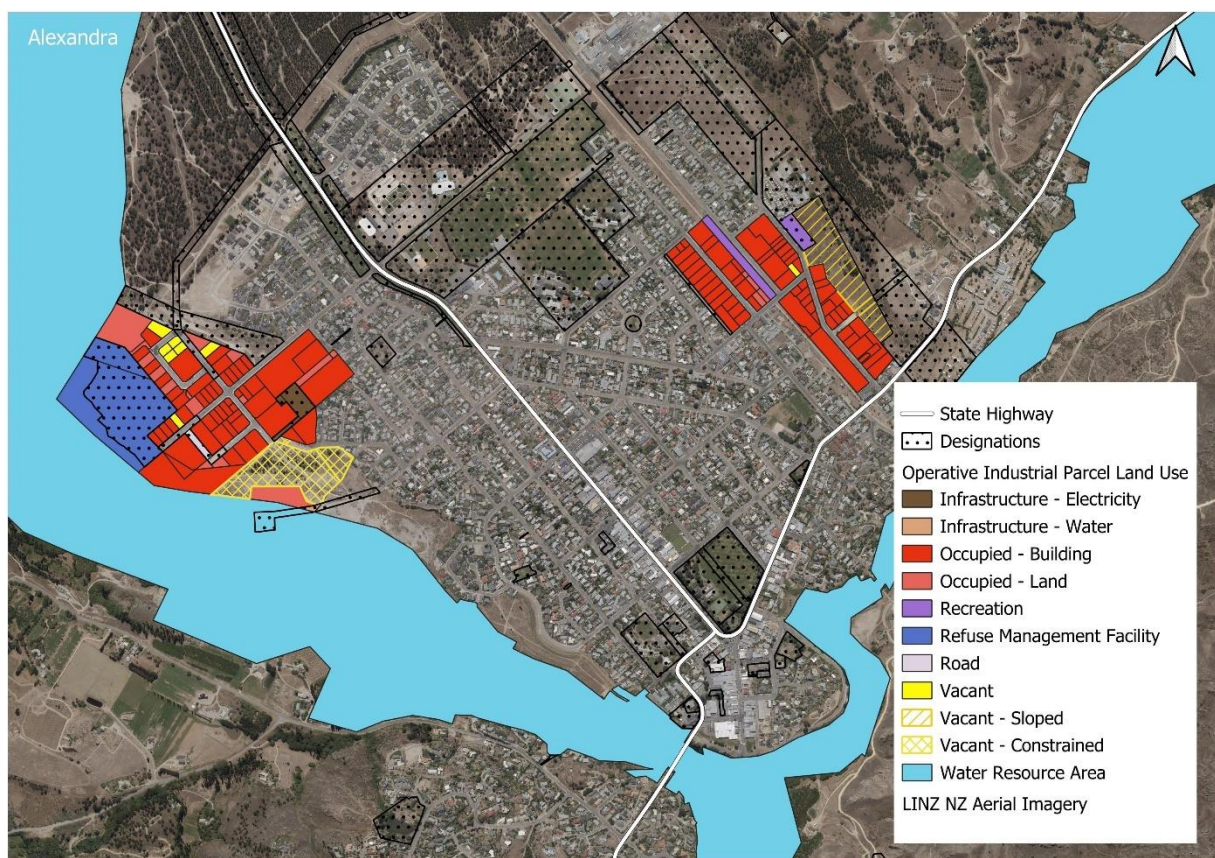


Figure 2.4 – Alexandra Industrial Zone Land Use, Including Vacant Capacity

Table 2.3 provides a high-level summary of the land use that makes up all capacity of each Industrial Zone. Essentially, it identifies land designated for planting, recreation or roading and assumes that this does not represent capacity for industrial activities.¹⁵ Overall, designations not providing for industrial activities makes up between 0%-28% of total Industrial Zone land area – with Naseby's Industrial Zone most impacted by non-developable land area. In Cromwell and Alexandra however, 97-99% of the zoned area in the Industrial Zones is theoretically available for development.

¹⁵ 93% of the planting designations within Industrial Zones occur in Cromwell. 82% of the designated recreational land within Industrial Zones is in Alexandra East. 60% of the designated roading land within industrial Zones is in Alexandra West.



Table 2.3 – High Level Summary of Land Use Capacity in Existing Industrial Zones (2024)

	Alexandra East	Alexandra West	Total Alexandra	Cromwell	Ettrick	Millers Flat	Naseby	Omakau	Patearoa	Ranfurly	Roxburgh	Total Industrial Zone Locations
Land Use Type Area (ha)												
Designation - Planting	-	-	-	4.5	-	-	0.4	-	-	-	-	4.9
Designation - Recreation	0.6	-	0.6	-	-	-	-	-	-	-	0.1	0.7
Designation - Road	-	0.2	0.2	-	-	-	-	-	-	0.2	-	0.4
Industrial Capacity	17.3	34.9	52.1	141.7	4.4	3.3	0.9	5.6	1.0	42.8	33.1	284.9
Total Industrial Zone	17.8	35.1	52.9	146.2	4.4	3.3	1.3	5.6	1.0	42.9	33.2	290.9
Share of Land Use Type Area in Each Location (%)												
Designation - Planting	0%	0%	0%	3%	0%	0%	28%	0%	0%	0%	0%	2%
Designation - Recreation	3%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Designation - Road	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Industrial Capacity	97%	99%	99%	97%	100%	100%	72%	100%	100%	100%	100%	98%
Total Industrial Zone	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Share of Location in Each Land Use Type (%)												
Designation - Planting	0%	0%	0%	93%	0%	0%	7%	0%	0%	0%	0%	100%
Designation - Recreation	82%	0%	82%	0%	0%	0%	0%	0%	0%	0%	18%	100%
Designation - Road	0%	60%	60%	0%	0%	0%	0%	0%	0%	40%	0%	100%
Industrial Capacity	6%	12%	18%	50%	2%	1%	0%	2%	0%	15%	12%	100%
Total Industrial Zone	6%	12%	18%	50%	2%	1%	0%	2%	0%	15%	11%	100%

Source: LINZ, CODC, Savvy. Land use survey as at April 2024.

Table 2.4 drills down into just the parcel land area within existing Industrial Zones that is not already designated for non-industrial (non-development) activities. This is a total parcel area of 284.9ha across the district, of which 50% (or 141.7ha) is in Cromwell, 12% is in Alexandra West, 6% is in Alexandra East (combined 18% in Alexandra), 15% is in Ranfurly and 12% is in Roxburgh. This gives a clear indication of the relative size of Industrial Zones across the district, with Cromwell substantially larger, thanks to PC18.

Useable land area in each of the Industrial Zones is divided into three broad categories of land use:

- infrastructure (electricity, sewage, telecoms and water – most are designated but not all),
- occupied parcels (sites with buildings, sites that are industrial yards, and other land uses where businesses are operating), and
- vacant parcels – with further detail provided on whether that vacant capacity is readily available for development, constrained by slope (a significant deterrent to industrial development), constrained by other physical characteristics, actively used for horticulture at present (which indicates that the capacity is not imminently available for industrial development), or currently covered in bush/forest (which may require a consent for vegetation clearance – also a deterrent for feasible development).



Table 2.4 – Detailed Results of Parcel Land Use in Industrial Zones (April 2024) Excluding Parcels Designated for Non-Industrial Development

	Alexandra East	Alexandra West	Total Alexandra	Cromwell	Ettrick	Millers Flat	Naseby	Omakau	Patearoa	Ranfurly	Roxburgh	Total Industrial Zone Locations
Land Use Category Area (ha)												
Infrastructure - Electricity	-	0.8	0.8	-	-	-	-	-	-	-	-	0.8
Infrastructure - Sewage	-	-	-	-	-	-	-	-	-	-	6.4	6.4
Infrastructure - Telecoms	-	-	-	-	-	-	-	0.0	-	-	-	0.0
Infrastructure - Water	-	0.1	0.1	-	-	-	-	-	-	-	-	0.1
Sub-Total Infrastructure	-	0.9	0.9	-	-	-	-	0.0	-	-	6.4	7.3
Occupied - Building	11.8	15.6	27.4	60.3	4.3	3.3	-	2.0	0.9	18.2	0.7	117.0
Occupied - Land (i.e. Yard)	0.3	4.1	4.4	30.0	0.1	-	-	0.6	-	4.6	2.2	41.9
Occupied - Lifestyle (Dwelling)	-	-	-	-	-	-	-	-	-	4.5	-	4.5
Occupied - Recreation	0.8	-	0.8	-	-	-	-	-	-	-	-	0.8
Occupied - Refuse Management	-	8.5	8.5	10.4	-	-	-	-	-	-	3.2	22.2
Sub-Total Occupied	13.0	28.2	41.2	100.7	4.4	3.3	-	2.5	0.9	27.3	6.1	186.4
Vacant - Readily Available	0.0811	0.9441	1.03	32.6	-	-	-	2.9	0.2	15.5	20.5	72.7
Vacant - Bush Cover	-	-	-	-	-	-	0.9	-	-	-	-	0.9
Vacant - Horticulture Cover	-	-	-	8.4	-	-	-	-	-	-	-	8.4
Vacant - Sloped	4.2	-	4.2	-	-	-	-	0.1	-	-	-	4.3
Vacant - Other Constraints	-	4.8	4.8	-	-	-	-	-	-	-	-	4.8
Sub-Total Vacant	4.3	5.8	10.1	41.0	-	-	0.9	3.0	0.2	15.5	20.5	91.2
Total Industrial Capacity	17.3	34.9	52.1	141.7	4.4	3.3	0.9	5.6	1.0	42.8	33.1	284.9
Share of Land Use Category Area in Each Location (%)												
Sub-Total Infrastructure	0%	2%	2%	0%	0%	0%	0%	1%	0%	0%	19%	3%
Sub-Total Occupied	75%	81%	79%	71%	100%	100%	0%	45%	84%	64%	19%	65%
Sub-Total Vacant	25%	17%	19%	29%	0%	0%	100%	54%	16%	36%	62%	32%
Total Industrial Capacity	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Share of Location in Each Land Use Category (%)												
Sub-Total Infrastructure	0%	12%	12%	0%	0%	0%	0%	1%	0%	0%	87%	100%
Sub-Total Occupied	7%	15%	22%	54%	2%	2%	0%	1%	0%	15%	3%	100%
Sub-Total Vacant	5%	6%	11%	45%	0%	0%	1%	3%	0%	17%	23%	100%
Total Industrial Capacity	6%	12%	18%	50%	2%	1%	0%	2%	0%	15%	12%	100%

Source: LINZ, CODC, Savvy. Land use survey as at April 2024.

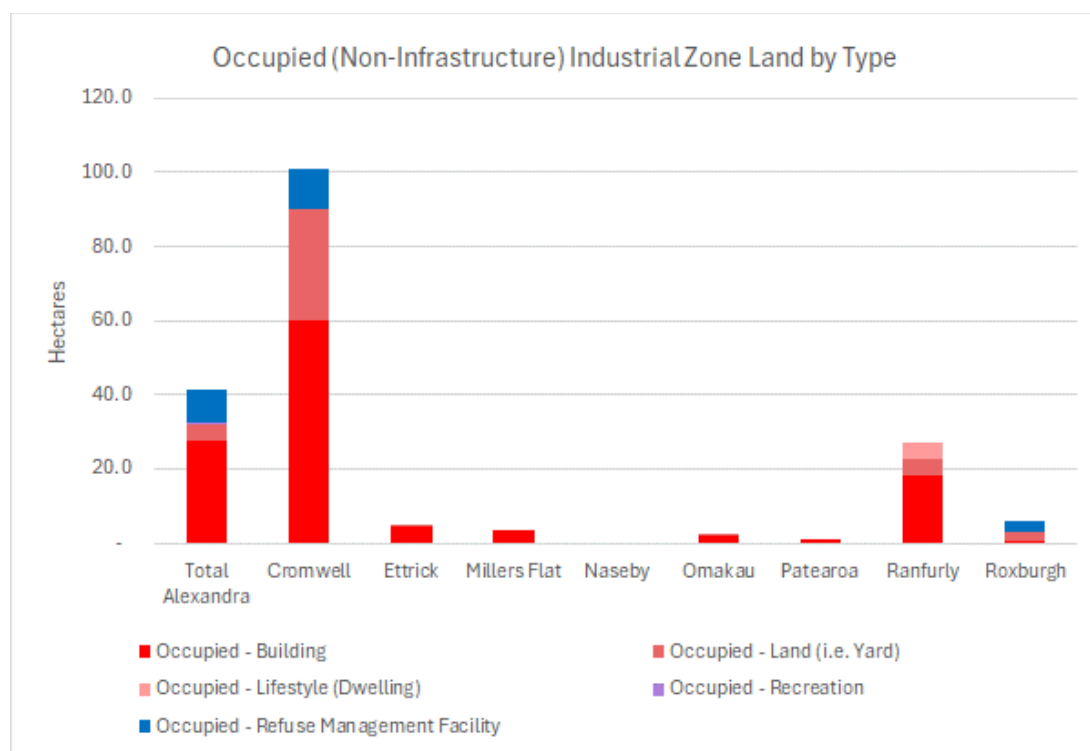


Figure 2.5 – Summary of Occupied Land in Industrial Zones by Urban Area



Figure 2.5 is a graphical summary of occupied land contained in Table 2.4. It shows that approximately 100ha of Industrial Zone land in Cromwell is occupied. Unlike in other Industrial Zones, the Cromwell Industrial Zone includes substantially more yard-based lots with no permanent buildings. Just over 41ha of land in Alexandra’s Industrial Zones is occupied, with parcels assigned to Refuse Management taking up nearly 21% of occupied land. Recreation activity accounts for a minor share of occupied land in Alexandra East (6% – some designated and the rest being zoned area used by the Otago Rail Trail), but this equates to 2% of total east and west occupied Industrial Zone land.

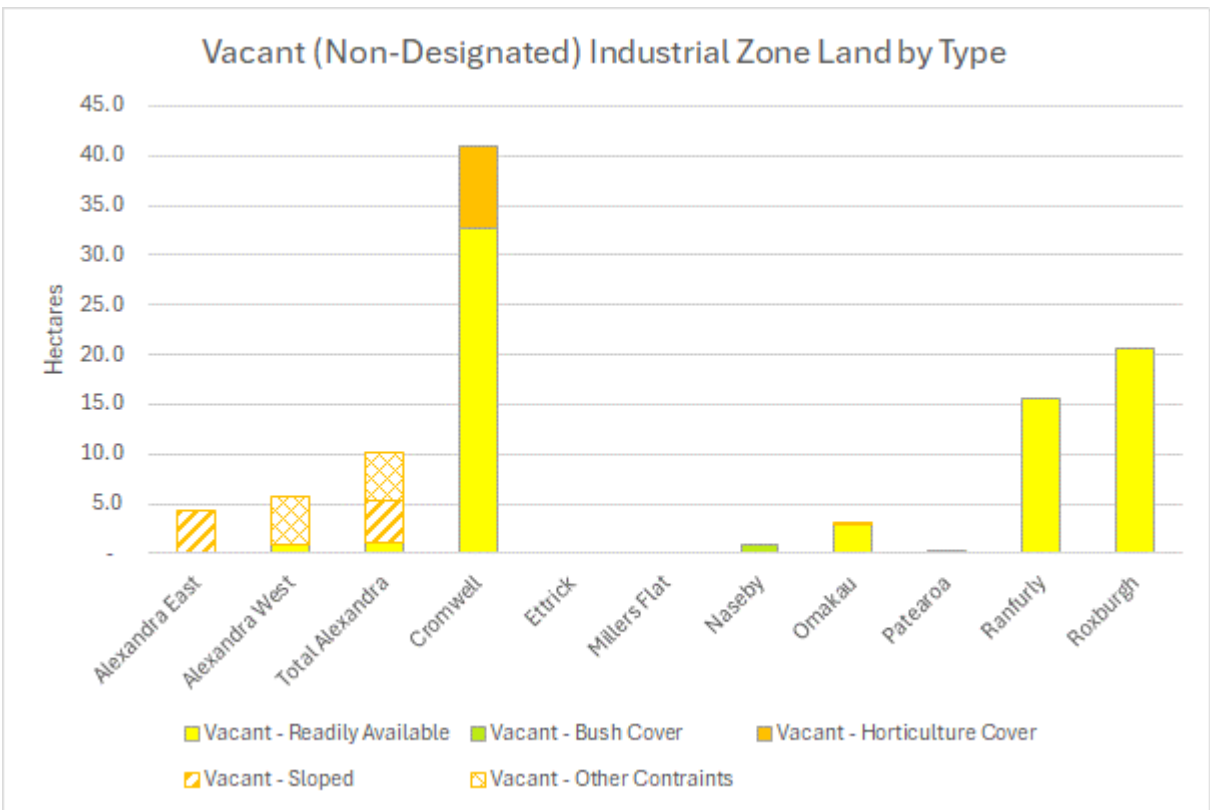


Figure 2.6 – Summary of Vacant Land in Industrial Zones by Urban Area

Figure 2.6 is a graphical summary of vacant land contained in Table 2.4 and is key to this assessment. As a result of PC18, Cromwell has the largest amount of vacant industrial land, with 41ha total, although only 32.6ha is readily available if you exclude (for now) the land used for horticulture. Roxburgh (20.5ha) and Ranfurly (15.5ha) have the second and third largest areas of vacant Industrial Zone land, all of which represents readily available development capacity to the best of my knowledge.

Alexandra has a combined total of 10.1ha of vacant land in the Industrial Zones, although 4.2ha of this is sloped land in Alexandra East and 4.8ha in Alexandra West has a range of other



physical constraints¹⁶ (Figure 2.4). If this constrained land is excluded, there is only one vacant lot in Alexandra East Industrial Zone (around 810sqm) and 7 vacant lots in Alexandra West Industrial Zone (totalling around 9,440sqm). This is total unconstrained and readily available vacant land of 1.03ha.

Alexandra has the fourth lowest share of its useable Industrial Zone area vacant at just 19%. Patearoa has a lower share as vacant capacity (16%). Ettrick and Millers Flat have no remaining vacant capacity when measured at a parcel level. However, in terms of unconstrained, readily available vacant land in Industrial Zones, Alexandra has the third lowest share (2% of total industrial capacity). This is a very low share and quantum of readily available vacant capacity to have in the district's second largest industrial area.

2.5 Vincent Spatial Plans

The Vincent Spatial Plans (for Alexandra-Clyde and Omakau-Ophir) are non-statutory documents that are guiding CODC initiated zoning decisions. The purpose of the Spatial Plans is to provide strategic direction to future urban growth in each of the towns.

The Alexandra-Clyde Spatial Plan identifies a modest new area (6.1ha gross) of future Industrial Zone in Alexandra (on Dunstan Road) (Figure 2.7). It is not contiguous with the Alexandra East Industrial Zone as that zone area is already bordered by Residential Zones and the designated town belt recreation area.¹⁷

Based on aerial photos, this appears to be spot zoning in recognition of existing industrial activities. While some of the land parcels within the identified area are not intensively used at present (most have buildings, but a large site is utilised by yard-based activity), I estimate that there is very little potential to accommodate new activities enabled in the Industrial Zone by the District Plan if these activities remain. The exception may be the northern corner of land which looks vacant in the aerial images. Access to this corner site appears to be via adjoining

¹⁶ According to PPG, this site has geotechnical and land contamination issues on around 70-80% of its area. The site consists of flattened, unconsolidated gold dredge tailings that have been subject to quarrying in the 1980s. The tailings are subject to subsidence and differential settlement. The site is also underlain by historic coal mining tunnels whose spatial extent is unknown. Floor risk is also an issue. The contamination is from dumping of agri-chemicals in the 1970s from orchards that used to exist on adjoining land. If some of the site is developable, I do not have sufficient information to determine where that suitable land sits relative to the existing occupied industrial areas (i.e. if it is contiguous and/or accessible). As such, I have discounted the full site from vacant capacity given this uncertainty.

¹⁷ The Industrial Zone in Alexandra West is also effectively hemmed in by existing and proposed residential zoning meaning that contiguous expansion is not likely.



land at present, so that may limit its ability to be purchased/leased by other businesses in future.

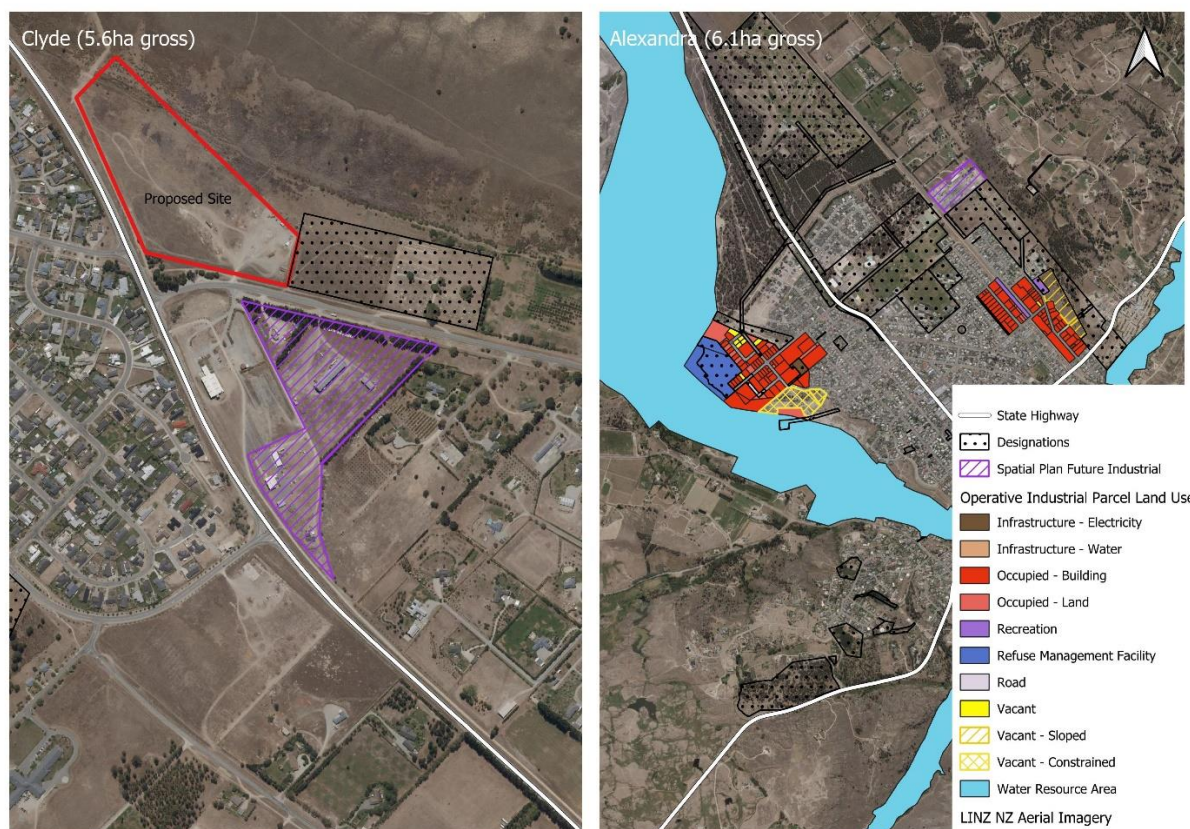


Figure 2.7 – Vincent Spatial Plan – Areas Identified for Future Industrial Zones in Clyde & Alexandra

Overall, I consider that the Spatial Plan will not provide any material additional development capacity for activities enabled in the Industrial Zone in Alexandra, and readily available vacant capacity in the short, medium and long term is therefore limited to the 5.8ha within the existing Industrial Zones.

There is no Industrial Zone presently in Clyde, but the Spatial Plan identifies an area (5.6ha gross) opposite the proposed plan change Site that is intended to be zoned Industrial in the future by CODC (Figure 2.7). Again, the Spatial Plan appears to just recognise existing industrial activities on that land. Use of one of the parcels of land is restricted under Scheduled Activity 105I to a storage shed associated with “*power generation and associated facilities.*” The other parcel contains the Clyde rural fire station. Assuming the Schedule is not lifted, I do not consider that the identified future Industrial Zone in Clyde will provide material development capacity for new activities enabled in the Industrial Zone. This means that the Spatial Plan does not deliver any development capacity for new industrial activities in Clyde in the short, medium or long term.



3 Industrial Zone Demand & Sufficiency

3.1 CODC Growth Projections

CODC's growth projections are produced by Rationale Limited, with the most current projections (as I understand it) being the 2022 projections. These projections include (but are not limited to) population, dwelling and employment projections and are provided at a township/settlement level and total ward level.¹⁸ Projections draw on data by StatisticsNZ and have a 2021 base year. Projected years include 2024, 2034 and 2054, and while 2024 is based on projected data, taking 2024 as the base year allows medium (10 year) and long term (30 year) growth to be calculated consistent with NPS-UD requirements.

Table 3.1 – COD Dwelling Projections by Township/Ward 2024-2054 (Rationale)

Ward	Town/Settlement	Count of Dwellings							Medium Term Growth (2024-34)	Long Term Growth (2024-54)
		2018	2019	2020	2021	2024 (p)	2034 (p)	2054 (p)		
Cromwell	Cromwell	2,736	221	3,002	3,104	3,404	4,202	5,744	798	2,340
Cromwell	Rest of Cromwell Ward	1,338	4,006	1,517	1,560	1,784	2,541	4,012	757	2,228
Cromwell	Sub-Total Cromwell Ward	5,121	5,247	5,384	5,452	5,787	6,828	8,728	1,041	2,941
Vincent	Alexandra	2,631	2,675	2,697	2,715	2,838	3,224	3,983	386	1,145
Vincent	Clyde	786	799	801	802	838	919	971	81	133
Vincent	Omakau & Ophir	222	235	249	249	273	355	513	82	240
Vincent	Rest of Vincent	1,482	1,538	1,637	1,686	1,838	2,330	3,261	492	1,423
Vincent	Sub-Total Vincent Ward	5,121	5,247	5,384	5,452	5,787	6,828	8,728	1,041	2,941
Maniototo	Ranfurly	459	461	458	460	474	510	534	36	60
Maniototo	Naseby	297	298	302	311	318	336	348	18	30
Maniototo	Patearoa	111	111	114	118	121	129	135	8	14
Maniototo	Rest of Maniototo	336	339	345	344	349	361	368	12	19
Maniototo	Sub-Total Maniototo Ward	1,203	1,209	1,219	1,233	1,262	1,336	1,385	74	123
Teviot Valley	Roxburgh	369	369	368	370	380	411	471	31	91
Teviot Valley	Lake Roxburgh Village	45	45	45	45	47	52	62	5	15
Teviot Valley	Ettrick	102	102	102	102	104	110	121	6	17
Teviot Valley	Millers Flat	57	58	58	63	64	68	75	4	11
Teviot Valley	Rest of Teviot	411	418	471	431	451	517	642	66	191
Teviot Valley	Sub-Total Teviot Ward	984	992	1,044	1,011	1,046	1,158	1,371	112	325
Total District		11,382	11,675	12,166	12,360	13,283	16,065	21,240	2,782	7,957

Source: Rationale, 2022.

I have carried out some checks at a township and ward level to see how the Rationale population and dwelling projections are tracking relative to data since released for 2022 and 2023. When inserting June Year End Population Estimates, the Rationale population projection for 2024 looks consistent and appropriate. When inserting June Year End Residential Dwelling Consents (and allowing for a one-year lag following consents for dwellings to be completed),

¹⁸ Using mainly SA2s and 2023 ward boundaries.



the Rationale dwelling projections for 2024 look consistent and appropriate (within +/- 2% of forecast 2024 dwellings). As such, the Rationale projections for dwellings are adopted for this assessment, as published.

Table 3.1 shows that across the district, dwellings are projected to increase by just over 2,780 in the medium term (from just over 13,383 estimated for 2024 to 16,065 by 2034). This is total growth of 21% or an average increase of 278 dwellings over the next 10 years. Growth over the long term is estimated at nearly 7,960 additional dwellings (to reach 21,240 dwellings by 2054).

Cromwell Ward, is anticipated to account for 56% of medium-term dwelling growth in the district, followed by Vincent Ward at a 37% share. These shares are expected to remain relatively stable over the long term (to 2054).

Within the Vincent Ward, the majority of dwellings are in Alexandra (49% share in 2024), followed by the Rest of Vincent Ward area (32% share) which reflects mainly the concentration of dwellings in the Rural Residential Zones east and west of Alexandra and Clyde (Table 3.1 and Figure 3.1). Clyde currently accounts for 14% of Vincent ward dwellings (estimated at 838), and Omakau-Ophir combined account for just 5%.

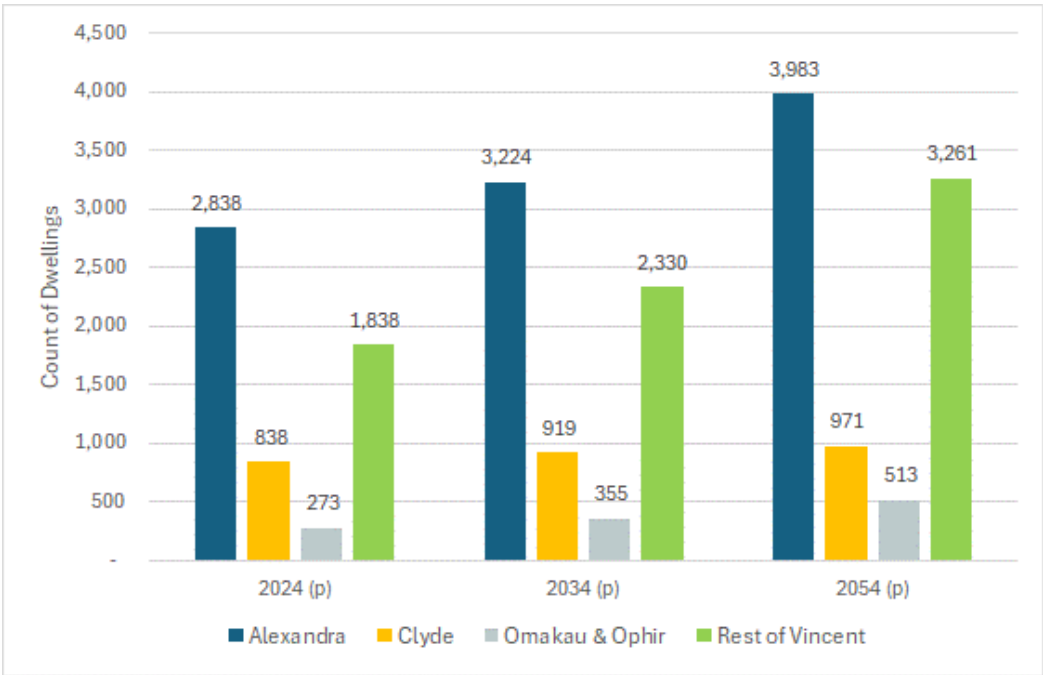


Figure 3.1 – Dwelling Projections by Township, Vincent Ward 2024-2054 (Rationale)

In terms of projected growth within Vincent Ward, Alexandra is anticipated to grow by an average of 39 dwellings per annum over the medium term (to 2034), with a similar average rate (38 per annum) over the long term. Rural Residential growth (in the Rest of Vincent Ward) is expected to be even higher, with an average increase of 49 dwellings/annum over the



medium term and 47/annum over the long term. By contrast, Clyde is projected to grow by an average of 8 dwellings/annum in the medium term, decreasing to 4 dwellings/annum in the long term, and Omakau-Ophir to have consistent growth over the long-term of 8 dwellings per annum.

This means that despite Alexandra accounting for 49% of ward dwellings currently, it is projected to have just 37% of the growth in dwellings over the medium term. Similarly, while Clyde has 14% of current dwellings in Vincent Ward, it is projected to account for just 8% of the dwelling growth to 2034. This is all driven by relatively stronger growth anticipated outside of the urban areas, in the Rural Residential Zones.

3.1.1 Constrained Demand in Clyde

While I understand that the dwelling projections discussed above are not constrained by development capacity for housing (which is preferable for growth projections, especially in the context of NPS-UD assessment), the recommended (medium) growth projections for Clyde are still constrained. The projections show a slow-down of growth in the short term and a plateauing of population and dwelling growth in the long-term. Rationale states that this slow down “*is driven by a projected plateauing of employment opportunities*”.¹⁹ Indeed, employment projections included in the Rationale report for Clyde show an annual average increase over the long term of just 1 additional person employed per annum.

At face value, the employment projections seem conservative for Clyde given strong recent growth in bike tourism, and tourism generally in the town (post Covid-19) and demands on the Dunstan Hospital (which serves a far-reaching catchment, and which has the prospect for some expansion of services/facilities). While the Clyde Business Zone is fixed in size, there is likely to be potential for some additional businesses, and/or existing businesses to sustain additional staff over time. The same applies to the Dunstan Hospital.

It is also surprising, given that Rationale identify Alexandra and Cromwell as places where Clyde workers commute, that local employment opportunities in Clyde itself is treated as a constraint on population growth as presumably commuting will still be a valid option for future residents.

While discussed later on, the provision of a local industrial zone in Clyde would provide for growth in local job opportunities, and may stimulate a transfer in housing demand from elsewhere in the district to Clyde.²⁰ By Rationale’s current logic, the proposed plan change

¹⁹ Rational, 2022, page 30.

²⁰ I do not anticipate that it would sustain net additional dwelling growth at the district level (relative to projected growth).



could (at the very least) help remove the constraints applied to Clyde's growth, and population (and subsequently dwelling) growth assumptions could be elevated (relative to current projections) as a result. A minor to moderate increase in reported medium and long term dwelling growth in Clyde township would be reasonably anticipated under a scenario where the proposed private plan change is approved.

3.1.2 PC19 Implications

Despite only modest (and potentially conservative) growth in dwellings projected for Clyde by Rationale, CODC has identified significant additional residential development capacity in and around Clyde in the Alexandra-Clyde Spatial Plan, which is being implemented by PC19.

Figure 3.2 illustrates the changes proposed (notified) in PC19 for Clyde beyond the existing Residential Zone area. While not shown, PC19 also provides for a Medium Density Residential Zone in and around the town centre (extending to Whitby Road) which will encourage intensification (infill and redevelopment) over time.

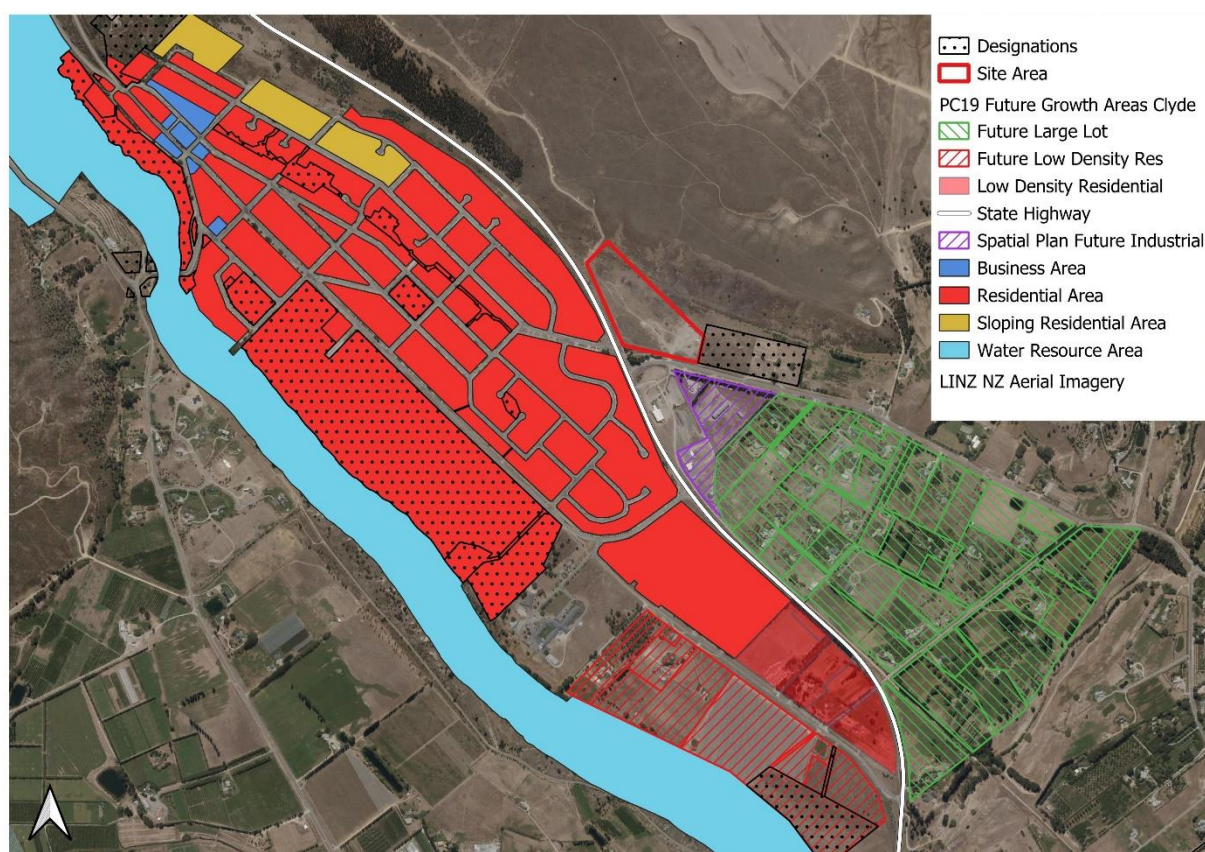


Figure 3.2 – PC19 Proposed Residential Zoning (Outside Existing Residential Zone)



PC19 live zones 12ha of additional Low Density Residential Zone on the northern side of Muttontown Road²¹, and creates a large (29ha) area of Future Low Density Residential Zone on the southern side of Muttontown Road.²² Combined with any existing vacant development capacity in the Residential zone, plus the potential for intensification around the town centre, these areas provide housing capacity that is likely to be sufficient for demand growth well beyond the next 30 years based on Rationale's current growth projections for Clyde township (or even moderately higher growth projections).

In addition, PC19 creates an 80ha Future Large Lot Residential Zone which intensifies the existing Rural Residential Zone currently containing an estimated 37 dwellings. While part of Clyde, this area falls outside the Clyde township SA2 boundary, and therefore provides long term housing capacity for the 'Rest of Vincent Ward' (discussed earlier and projected to have a demand growth rate greater than within any one urban area of Vincent Ward).

In summary, while dwelling growth is not currently constrained in Clyde township (with some vacant capacity available in the Residential Zone at present), and is expected to increase at a moderate (albeit potentially conservative) rate according to Rationale, the zoning that would be put in place by PC19 is considered likely to ensure that supply of housing in and around Clyde is not constrained over the long term future (i.e. the next 30 years).²³

3.2 Projected Demand for Industrial Zoning

This sub-section provides estimates of future demand for Industrial Zoning in COD. A high-level modelling approach has been adopted for the purpose of this report. While considered sufficient in the context of the overall assessment objectives, I acknowledge that the approach is not as robust as modelling that would, for example, be expected for a Housing and Business Development Capacity Assessment (HBA) under the NPS-UD.²⁴ The adopted approach relies on a number of assumptions, and like all models, it comes with a number of limitations.

²¹ This land is currently occupied by 4 dwellings (estimate) which may or may not be retained if the land is developed.

²² This land is currently occupied by 4 dwellings (estimate) which may or may not be retained if the land is live zoned and developed in the future.

²³ This assumes the Future growth zones, are live zoned as required during that period.

²⁴ Such an approach was outside the budget and timeframes available for this assessment.



3.2.1 Approach and Assumptions

In summary, the approach takes existing 2024 dwellings by location (as estimated by Rationale), and current estimates of occupied Industrial Zone land by location (based on the desktop land use survey discussed earlier) to generate 2024 ratios of occupied Industrial Zone land per dwelling. These ratios are then multiplied by projected dwellings in 2034 to give a projected estimate of occupied Industrial Zone land in that year in each location. The modelling is limited to the medium term as any limitations of the approach would be amplified in the long term (i.e. there would be greater uncertainty).

The key assumptions (and therefore limitations) of this high-level approach include:

- It assumes a state of equilibrium exists in 2024 (i.e., there is no redundant occupied land in Industrial Zones and no latent demand). As most existing Industrial Zones have at least some vacant capacity, this helps support the assumption of no latent demand. As the land use survey could not detect any vacant buildings, the assumption about any redundancy cannot be verified.
- It assumes that the 2024 ratio of occupied Industrial Zone land holds constant over the medium term (with no productivity gains). Over the medium term, the risk of overstating demand through this assumption is minimised because a portion of vacant land in existing Industrial Zones is already subdivided into lots. So, even if future businesses require less land than businesses today, a portion of them will be limited to take-up of the existing supply of vacant industrial lots.
- It also assumes that all growth in demand needs to be met through occupation of additional land (either existing businesses expanding or new businesses establishing). In reality, some growth in demand over the medium term is likely to be met by existing businesses and within the existing land footprint of those businesses. That said, this assumption is consistent with the NPS-UD guidance for business demand modelling in HBAs.
- It is neutral on whether there is leakage of Industrial Zone demand in or out of the district. The 2024 occupied Industrial Zone area is a reflection of the net demand supplied in COD and assumes leakage trends remain constant over the medium term.
- It assumes dwelling growth in COD (and each part of COD) is the sole indicator of Industrial Zone demand in the district. That is, it does not take into account wider economic drivers of demand that may increase or decrease demand independent of the trends in dwelling growth. An example of this might include changes in export



values for horticultural products produced in the district which might drive more or less processing, warehousing and transport land use in Industrial Zones in the future.

The approach requires an allocation of Industrial Zone demand 'on the ground'. In recognition that a portion of Industrial Zone demand can be met locally (where there is a local Industrial Zone) and simultaneously a portion of demand is met in one of the two larger industrial areas of Cromwell and Alexandra (whichever is closest), two allocation scenarios have been used.

Scenario 1 generates occupied Industrial Zone land/dwelling ratios at the ward level, and then allocates that demand to existing Industrial Zones using the percentage distribution of occupied Industrial Zone land (2024) within each ward.

Scenario 2 applies the same approach as Scenario 1 for the Cromwell ward, but for the rest of the district,²⁵ it generates a single occupied Industrial Zone land/dwelling ratio for that catchment. It then allocates that demand to existing Industrial Zones using the percentage distribution of occupied Industrial Zone land (2024) within that wider catchment.

Both scenarios are similar and recognise the primary role of Cromwell and Alexandra in servicing industrial activity demand across their broad catchments despite the presence of some local Industrial Zones. However, using localised or catchment wide demand ratios produces slightly different final demand figures. Combined, the two scenarios are used to create a range of medium-term demand results for each location.

3.2.2 Medium Term Demand Results

Table 3.2 shows that across the district, the occupied area of existing Industrial Zones is estimated to increase by 29.1ha – 31.1ha by 2034, assuming no constraints on Industrial Zone capacity. While Cromwell currently has a 54% share of total occupied Industrial Zone land in the district, it is estimated to account for 55–58% of medium term growth in occupied Industrial Zone land, depending on the scenario applied.²⁶ This equates to growth of 18.1ha over the next 10 years.

Demand in the Vincent Ward is estimated to equate to 6.6ha – 7.9ha of additional occupied Industrial Zone land over the medium term. Based on current zoning options, the significant majority is estimated to be met in Alexandra (6.2ha – 7.4ha), with only a small share (0.4ha – 0.5ha) supplied in Omakau.

²⁵ I.e. the sum of Vincent, Maniototo and Teviot Valley Wards.

²⁶ This result is generally consistent with Rationale's employment projections.



Demand in the Maniototo Ward and Teviot Valley Ward is estimated at 1.6ha – 4.3ha and 1.5ha – 2.1ha respectively of additional occupied land in Industrial Zones by 2034.

Table 3.2 – Estimated Medium Term Industrial Zone Demand by Scenario (2024)

Ward	Town/Settlement	Estimated 2024 Dwellings *	Medium Term Dwelling Growth (2024-34) *	Total Occupied Industrial Zone Area 2024 (ha)	Projected Total Occupied Industrial Zone 2034		Projected Net Increase in Occupied Industrial Zone 2034	
					Scenario 1 (ha)	Scenario 2 (ha)	Scenario 1 (ha)	Scenario 2 (ha)
Cromwell	Cromwell	3,404	798	100.7	118.8	118.8	18.1	18.1
Cromwell	Rest of Cromwell Ward	1,784	757	-	-	-	-	-
Cromwell	Sub-Total Cromwell Ward	5,787	1,041	100.7	118.8	118.8	18.1	18.1
Vincent	Alexandra	2,838	386	41.2	48.6	47.4	7.4	6.2
Vincent	Clyde	838	81	-	-	-	-	-
Vincent	Omakau & Ophir	273	82	2.5	3.0	2.9	0.5	0.4
Vincent	Rest of Vincent	1,838	492	-	-	-	-	-
Vincent	Sub-Total Vincent Ward	5,787	1,041	43.7	51.6	50.4	7.9	6.6
Maniototo	Ranfurlly	474	36	27.3	28.9	31.4	1.6	4.1
Maniototo	Naseby	318	18	-	-	-	-	-
Maniototo	Patearoa	121	8	0.9	0.9	1.0	0.1	0.1
Maniototo	Rest of Maniototo	349	12	-	-	-	-	-
Maniototo	Sub-Total Maniototo Ward	1,262	74	28.1	29.8	32.4	1.6	4.3
Teviot Valley	Roxburgh	380	31	6.1	6.8	7.1	0.7	0.9
Teviot Valley	Lake Roxburgh Village	47	5	-	-	-	-	-
Teviot Valley	Ettrick	104	6	4.4	4.9	5.1	0.5	0.7
Teviot Valley	Millers Flat	64	4	3.3	3.7	3.8	0.4	0.5
Teviot Valley	Rest of Teviot	451	66	-	-	-	-	-
Teviot Valley	Sub-Total Teviot Ward	1,046	112	13.9	15.4	16.0	1.5	2.1
Total District		13,283	2,782	186.4	215.5	217.5	29.1	31.1

Source: * Rationale, 2022. Savvy.

3.3 Sufficiency of Existing Industrial Zones

Policy 2 (and related clauses 3.2 and 3.3) of the NPS-UD requires that Tier 3 TAs provide at least sufficient development capacity to meet expected demand for housing and for business land over the short, medium, and long term. Tier 3 territorial authorities are not required to apply the competitiveness margin on top of demand. As such, this sub-section compares the medium term demand growth for Industrial Zones described above with the current estimates of vacant plan enabled capacity in existing Industrial Zones discussed in Section 2.4. As constrained land is not considered suitable (feasible) for industrial development, the analysis does not include sloped or other physically constrained vacant land in the sufficiency calculations.

The results are summarised (by scenario of demand) in Table 3.3. Indicative shortfalls of capacity by 2034 are shown in red. In all wards except Vincent Ward, current zoned vacant



capacity is sufficient to meet projected demand over the medium-term, even without utilising vacant Industrial Zoned land currently used for horticulture or covered in bush.

Table 3.3 – Industrial Zone Capacity Sufficiency Estimates by Scenario – Medium Term

Ward	Town/Settlement	Projected Net Increase in Occupied Industrial Zone 2034		Vacant Capacity - Readily Available Only*	Vacant Readily Available Capacity - Sufficiency Medium Term		Vacant Capacity - Readily Available + Horticulture/ Bush Vacant Land	Vacant Readily Available + Horticulture/ Bush Capacity - Sufficiency Medium Term	
		Scenario 1 (ha)	Scenario 2 (ha)		Scenario 1 (ha)	Scenario 2 (ha)		Scenario 1 (ha)	Scenario 2 (ha)
Cromwell	Cromwell	18.1	18.1	32.6	14.5	14.5	41.0	22.9	22.9
Cromwell	Rest of Cromwell Ward	-	-	-	-	-	-	-	-
Cromwell	Sub-Total Cromwell Ward	18.1	18.1	32.6	14.5	14.5	41.0	22.9	22.9
Vincent	Alexandra	7.4	6.2	1.0	- 6.4	- 5.2	1.0	- 6.4	- 5.2
Vincent	Clyde	-	-	-	-	-	-	-	-
Vincent	Omakau & Ophir	0.5	0.4	2.9	2.4	2.5	2.9	2.4	2.5
Vincent	Rest of Vincent	-	-	-	-	-	-	-	-
Vincent	Sub-Total Vincent Ward	7.9	6.6	3.9	- 4.0	- 2.7	3.9	- 4.0	- 2.7
Maniototo	Ranfurly	1.6	4.1	15.5	13.9	11.4	15.5	13.9	11.4
Maniototo	Naseby	-	-	-	-	-	0.9	0.9	0.9
Maniototo	Patearoa	0.05	0.13	0.17	0.12	0.04	0.17	0.12	0.04
Maniototo	Rest of Maniototo	-	-	-	-	-	-	-	-
Maniototo	Sub-Total Maniototo Ward	1.6	4.3	15.7	14.0	11.4	16.6	14.9	12.3
Teviot Valley	Roxburgh	0.7	0.9	20.5	19.9	19.6	20.5	19.9	19.6
Teviot Valley	Lake Roxburgh Village	-	-	-	-	-	-	-	-
Teviot Valley	Ettrick	0.5	0.7	-	- 0.5	- 0.7	-	- 0.5	- 0.7
Teviot Valley	Millers Flat	0.4	0.5	-	- 0.4	- 0.5	-	- 0.4	- 0.5
Teviot Valley	Rest of Teviot	-	-	-	-	-	-	-	-
Teviot Valley	Sub-Total Teviot Ward	1.5	2.1	20.5	19.0	18.4	20.5	19.0	18.4
Total District		29.1	31.1	72.7	43.6	41.6	82.1	52.9	50.9

* Excludes Vacant Sloped land, Vacant - Other Constraints Land, Vacant Horticultural Land, Vacant Bush Land.

In the Cromwell Ward, Cromwell's Industrial Zone is estimated to have a medium term surplus of between 14.5ha – 22.9ha in 2034, so is well placed to accommodate demand growth into the long term.

In the Maniototo Ward, there is sufficient capacity in all existing Industrial Zones to meet projected demand over the medium term. In Patearoa, it is estimated that the Industrial Zone could be nearly fully occupied by 2034. One response may be to increase plan enabled capacity in Patearoa. Alternatively, any shortfalls beyond the medium term (not modelled) could be supplied instead in Ranfurly where there is estimated to be surplus capacity. This is considered to be an appropriate outcome for this ward in the long term given that Ranfurly is the main centre in the ward.

In the Teviot Valley Ward, there is an implied minor shortfall of capacity in the Ettrick and Millers Flat Industrial Zones by 2034. One response may be to increase plan enabled capacity in each settlement. Alternatively, there is an estimated large surplus of capacity in Roxburgh,



and like in the Maniototo Ward, it would be an appropriate outcome for any unmet demand to be met in Roxburgh, given it is the main centre for the ward.

In the Vincent Ward, there is a net shortfall by 2034 of between 2.7ha and 4.0ha. This is driven by an implied shortfall of capacity in the Alexandra Industrial Zones by 2034 of between 5.2ha – 6.4ha. This result suggests that Alexandra only has sufficient suitable vacant capacity to cater for 1-2 years of demand growth before being fully occupied. While there is a surplus of Industrial Zone capacity in Omakau that could in theory accommodate a portion of this unmet demand, the distance of Omakau from Alexandra (as well as from Clyde and the popular rural residential areas close to Clyde and Alexandra who would be reliant on much of that industrial activity) is such that it would not be an efficient way to address even a portion of the Alexandra shortfall.

The most efficient way to address the projected shortfall in Alexandra is to provide additional plan enabled industrial capacity in Alexandra, or nearby. As both existing Industrial Zones in Alexandra cannot be expanded based on existing or intended zoning for other land uses, any additional Industrial Zone capacity in Alexandra would need to be in a discrete location.

As discussed, the Alexandra-Clyde Spatial Plan identified two new Industrial Zones – one in each town, but as the intent is to recognise existing industrial activities on those sites, live zoning these two areas within the next 10 years is unlikely to materially assist with addressing the projected shortfall in Alexandra.

3.4 Proposed Clyde Industrial Zone

Clyde is in a unique situation of being the third largest discrete township in the district and yet not having its own local Industrial Zone. Much smaller towns and settlements than Clyde, which have not been identified as strategic growth areas, have local Industrial Zones which provide a range of benefits to those local communities. This urban form still allows a large share of local industrial demand to flow to higher order centres (and the ensuing economic benefits that come from having those larger geographic concentrations of business activity).

This has likely been the result of Clyde historically being a popular holiday home destination with a small resident population that is relatively close to Alexandra. However, the resident population of Clyde has grown steadily, and it has (or will have) significant capacity to accommodate further population/dwelling growth over the long term.

While it is still close to Alexandra, the larger its population gets, the less efficient it will be for all of the town's (and surrounding rural catchment's) demand for Industrial Zone activity to be supplied wholly elsewhere (i.e. in Alexandra). Increasing the self-sufficiency of Clyde in terms



of local employment opportunities as well as local access to industrial activities (goods and services) will increase the functional and social amenity of the town and reduce car-based travel (and associated greenhouse gas emissions) over the long-term.

Based on the demand modelling approach outlined earlier,²⁷ applying the ratios of occupied Industrial Zone/dwelling for 2024 to just the dwellings within the Clyde township (and not the rural residential dwellings that may be closest to Clyde), indicatively Clyde already sustains total demand for Industrial Zone land of between 6.3ha – 8.9ha based purely on its share of dwellings (and according to Scenario 1 and 2 approaches). At present all of this demand is assumed to be met in Alexandra. By 2034, and based on potentially conservative growth projections, the Clyde community could sustain demand for 6.9ha – 9.7ha.

Only a portion of this demand is likely to be sustained locally in the medium-term, with much of it still being most efficiently supplied in Alexandra. At 6.6ha (gross), the proposed Industrial Zone for Clyde would, in my view, be sufficient to cater for long term local demand for industrial activities in Clyde. While some activity that may be attracted to the proposed Industrial Zone may represent a redistribution of existing demand away from Alexandra, this distributional effect would be likely to occur gradually.

The remaining portion of activity that may be attracted to the proposed Industrial Zone is likely to be sustained by new local dwelling growth in Clyde. This represents an opportunity cost for growth that may have otherwise occurred in Alexandra but is a minor opportunity cost over time. Slowing the expected rate of demand for Alexandra Industrial Zones over the medium term, will extend the time over which the existing Industrial Zones are 'sufficient', albeit it is only expected to be sufficient for another 1-2 years before there is no capacity remaining. Even with a Clyde Industrial Zone, I conclude that Alexandra cannot meet the test of medium term sufficiency, and more suitable greenfield land needs to be zoned in accordance with the RPS and NPS-UD.²⁸

²⁷ And notwithstanding the limitations of the modelling.

²⁸ Given the lead in times between zoning and lots being available to the market, providing more zoned capacity in Alexandra should not be delayed.



4 Loss of Highly Productive Land

As set out in the Land Productivity Report (PPG, 2024), the proposed site includes some LUC 3 land and therefore qualifies as highly productive land (HPL) under the interim provisions of the NPS-HPL.²⁹ The key clause of the NPS-HPL that is relevant for plan changes seeking urban expansion on HPL in Tier 3 TAs is clause 3.6(4).³⁰ It states that TAs may allow urban rezoning of HPL only if three tests are met. This sub-section considers those three tests.

4.1.1 A) the rezoning is required to provide sufficient development capacity in the district

The relevant time frame for understanding sufficiency in this context is the medium term, as only a medium term shortfall of capacity requires a live zoning response. This contrasts with long term shortfalls which can be responded to with either additional live zoning or the identification of suitable areas for future development in a growth strategy, spatial plan or similar document.

Section 3.3 above has carried out a high-level sufficiency assessment of demand and capacity for industrial zoning in COD in the medium term, broadly consistent with NPS-UD guidance. The key finding was that Clyde is an urban area that generates demand for industrial activity. By 2034, this demand is estimated to sustain an indicative 6.9ha – 9.7ha of occupied Industrial Zone land. There is no Industrial Zone provided in Clyde and the future Industrial Zone areas identified in the Clyde Spatial Plan are not expected to provide development capacity for new business activity. In simple terms, this indicates that insufficient Industrial Zone capacity has been provided in the District Plan for the Clyde urban area and this requires a zoning response.

Alternatively, if the legacy approach of treating Clyde as a satellite residential area of Alexandra is maintained,³¹ whereby Clyde is, and will forever be, 100% dependent on Alexandra for the supply of industrial activity, then the analysis also shows that Alexandra is estimated to face a shortfall of Industrial Zone capacity in the short term. The future Industrial Zone area identified in the Alexandra Spatial Plan is not expected to provide development capacity for new business activity that will materially assist with this projected shortfall.

As the primary industrial area of the Vincent, Maniototo and Teviot Valley Wards, it is not efficient for the projected shortfall of capacity in Alexandra to be met by surplus capacity in

²⁹ Until HPL is mapped by the Otago Regional Council, HPL is defined as LUC 1, 2 and 3.

³⁰ The tests are similar under Clause 3.10.

³¹ Which I do not support as an efficient urban form going forward.



smaller, distant townships like Ranfurly, Roxburgh or even Omakau. Further, it is considered that surplus capacity in Cromwell is needed for future demand arising within the Cromwell Ward and is not an appropriate substitute for providing additional zoned capacity in or near Alexandra. The distance to Cromwell also renders this an inefficient solution.

As such, the projected insufficiency of Industrial Zone capacity in Alexandra in the short term is not able to be offset by capacity already provided elsewhere in the District Plan and therefore requires a zoning response.

Overall, I consider that the test of medium term insufficiency is met – either for Clyde as a location of demand, or for Alexandra (which Clyde is currently dependent on).

4.1.2 B) There are no other reasonably practicable and feasible options to provide the required development capacity

The land in the vicinity of Alexandra and Clyde contains pockets of LUC 3 land. Appendix C contains maps that show the LUC 3 land, operative District Plan zoning, Spatial Plan future industrial areas, and in the case of Clyde, the PC19 greenfield growth areas.

Alexandra does not contain any HPL in Rural Zone areas adjoining the urban zones, and generally there is none adjoining the Rural Residential Zone. While relatively unconstrained by HPL, this does not mean that there are any obviously practicable and feasible options to provide additional Industrial Zone land.

The only potential option that could be feasible (from an industrial development perspective) would be to utilise some of the Large Lot Residential Zone on Dunstan Road identified in the Spatial Plan. This would displace existing dwellings on that land as well as reduce the opportunity to provide for large lot living in a suitable location close to the town. Both considerations may make this option impracticable.

Clyde is relatively more constrained by HPL (Appendix C). HPL covers the flat land right along Springvale Road until just beyond the greenbelt proposed in the Spatial Plan. Similarly, it covers the land on the eastern side of State Highway 8 until just beyond the greenbelt. Assuming any land west of the Clutha River is not an appropriate location for urban expansion, the proposed Industrial Zone site is potentially the only site adjoining the existing urban area that is not already occupied by high value residential properties, notified for higher value urban zoning (i.e. residential) or identified for future residential zoning or large lot infill, that would also provide for a consolidated urban form in Clyde.



The next available option would be a standalone Industrial Zone south of Clyde in the less dense Rural Residential Zone. This is likely to be impracticable and result in a less efficient urban form.

As low value rural land immediately adjacent to the existing urban area of Clyde, and opposite the proposed future Industrial Zone, I consider that the proposed site is the most reasonably practicable and feasible option to provide additional Industrial Zone capacity in either Clyde or Alexandra at this current time. As such, I consider this test to be met.

4.1.3 C) The ... economic benefits of rezoning outweigh the ... economic costs of foregone land-based primary production

While clause 3.6(4)(c) requires environmental, social, cultural and economic costs and benefits to be assessed, I focus here only on the economic costs and benefits. The core tangible economic benefits arising from the proposed Industrial Zone are the GDP and employment effects of:

- completing the one-off land development of the site,
- completing the one-off construction of buildings and/or other improvements³² on the indicative 21 lots,³³ and
- the ongoing operation of new businesses that establish in the zone.

While the land development may be expected to be completed in a single stage, the take up of the future lots by new businesses is expected to be gradual and potentially spread over the medium and long term. As such, the economic benefits will accrue slowly after an initial short-term impact.

The following assumptions have been used to quantify the indicative economic impacts of the construction stages of the proposed zone only (i.e., the first two bullet points above).

- 21 lots delivered and all lots contain a building. Very indicatively, I have adopted an average building size of 400sqm and a commercial construction cost of \$2,000/sqm.

³² Not all future lots in the proposed zone will necessarily contain buildings as they may be used for industrial yards. That said, most yards tend to include some small ancillary building. Other improvements would still include fencing, security, signage, sealed/concreted areas etc.

³³ Based on indicative subdivision plan provided.



- Design, planning and consents take place over 6 months, the land development takes place over 12 months and the construction of buildings occurs over 10 years.³⁴ Total development period of 11.5 years.
- I have applied land development costs obtained from other development projects I have been involved in, and assumed that the planning, design and consenting indicatively equates to 1% of land development costs.

Future explanation, assumptions and caveats of my approach are set out in Appendix D. In summary, using multiplier analysis, Table 4.1 shows the indicative direct, indirect, induced and total economic impacts of the construction of the proposed Industrial Zone. I estimate that the proposal could:

1. Contribute \$₂₀₂₀16 million in value added to the COD economy over 11.5 years.
2. Generate wages/salaries for COD households to the value of \$₂₀₂₀7 million over 11.5 years.
3. Sustain employment for around 118 FTE-years across a broad range of sectors in COD (or equivalent to around 10 full-time workers (on average) for 11.5 years).

Table 4.1 – Direct, Indirect, Induced and Total Economic Impacts of the Proposed Industrial Zone Development on the CO Economy (\$2020)

	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Design/Planning/Consents				
FTEs (annual average)	0.2	0.1	0.1	0.4
Value Added (\$ ₂₀₂₀ m)	\$ 0.01	\$ 0.01	\$ 0.01	\$ 0.03
Gross Household Income (\$ ₂₀₂₀ m)	\$ 0.01	\$ 0.00	\$ 0.00	\$ 0.01
Land Development				
FTEs (annual average)	5	8	4	17
Value Added (\$ ₂₀₂₀ m)	\$ 0.7	\$ 1.0	\$ 0.6	\$ 2.3
Gross Household Income (\$ ₂₀₂₀ m)	\$ 0.5	\$ 0.5	\$ 0.2	\$ 1.2
Commercial Construction				
FTEs (annual average)	2	6	2	10
Value Added (\$ ₂₀₂₀ m)	\$ 2.8	\$ 7.4	\$ 3.0	\$ 13.3
Gross Household Income (\$ ₂₀₂₀ m)	\$ 1.2	\$ 3.7	\$ 1.2	\$ 6.1
Total Project				
FTEs - Years	25	67	26	118
Value Added (\$ ₂₀₂₀ m)	\$ 4	\$ 8	\$ 4	\$ 16
Gross Household Income (\$ ₂₀₂₀ m)	\$ 2	\$ 4	\$ 1	\$ 7

Source: StatisticsNZ, Savvy Consulting. Results are in \$2020 and employment terms.

³⁴ This may be longer, but the economic impacts will be the same.



The above economic impacts do not include the ongoing economic impacts of the businesses that may establish in the proposed zone. Those economic impacts are additional and long term. There are other tangible and intangible economic benefits of the proposal that could be included here, but they are discussed further in Section 5.

The purpose of quantifying the above economic benefits is to contrast them with the economic benefits foregone (i.e. costs) of using the site for industrial activities rather than protecting it for land-based primary production.

Where land offers feasible potential for primary production (either now or in the future), this can be modelled using a range of assumptions. However, I rely on the assessment by PPG which concludes that the proposed site is unlikely to overcome the constraint of access to water (such as would be needed for irrigation). As such, the land is considered to have negligible potential for land-based primary production over the long term, and therefore no further modelling is warranted.

As the proposed rezoning offers economic benefits for COD (of which only some have been quantified), and there are no foreseeable costs from utilising the LUC 3 land for industrial development, I consider that the third test of clause 3.6(4)(c) has been met.



5 Conclusions

This final section of the report considers the locational attributes of the site for industrial development, as this relates directly to the NPS-UD requirement for councils to provide development capacity that is commercially feasible and reasonably expected to be realised. In the context of business land, the term 'suitable' is often substituted for feasible. This is followed by a summary of economic costs and benefits of the plan change request, and final conclusions.

5.1 Location Attributes of Proposed Industrial Zoning

This sub-section examines the suitability of the proposed site from a development or developer perspective. The NPS-UD provides flexibility on how 'suitability' is determined, but at a minimum, must include suitability in terms of location and site size. This assessment adopts a Multi Criteria Analysis (MCA) approach in keeping with the guidance under the earlier NPS-UD.³⁵ While MCA is typically used to compare multiple options, it is still a useful framework to evaluating a single option – in this case, the proposed site.

MCA requires key metrics (criteria) to be identified that are important in the selection and development process for different land uses. Typically, each criterion is independently weighted (before being scored) in consultation with the council and other development stakeholders to determine which criteria should play a large or small role in the development and locational decision relevant to that district. In the absence of this consultation, I have excluded weighting for the purposes of this assessment and have also used a qualitative rather than numeric scale for scoring each criterion.

Table 5.1 contains criteria that are commonly applied for the assessment of sites for industrial development. I have scored each criterion using a 7 point scale (ranging from very positive through to very negative). The MCA shows that there are no negative attributes of the proposed site from an industrial development perspective. Overall, I consider that the site is suitable for Industrial Zoning and would therefore represent feasible and reasonably expected to be realised development capacity if approved.

³⁵ I have developed and applied MCA frameworks for HBAs in both Queenstown Lakes District and Rotorua District. The MCA in this section adopts criteria for industrial land development published in HBAs prepared by Market Economics Limited (where I was previously a Director and led the respective HBA/MCA projects).



Table 5.1 – Multi Criteria Analysis of the Suitability of the Proposed Industrial Zone

Criterion	Evaluation
Ability to buffer adverse effects from residential and sensitive activities	Very Positive – the site is separated from residential zoning by State Highway 8.
Access to major road/ transport routes	Very Positive – State Highway 8 is adjacent the site.
Co-location or clustering with complementary business activities	Somewhat Positive – some industrial activities are opposite the site.
Distances to freight ports	Neutral – no site in COD is particularly close to freight port.
Exposure and profile for future businesses	Very Positive – many sites will have signage visible from Springvale Road.
Flat site, large and contiguous parcels, supports efficient subdivision	Moderately Positive – the site is flat. While not large, it is appropriate in scale for a local industrial zone role and relative to local demand.
Single / simple ownership structure	Very Positive – the site is in single ownership.
Represents vacant capacity / greenfield	Very Positive – the site is bare land.
Low level of traffic / congestion in vicinity	Very Positive – the nearby roads and intersections do not suffer from congestion.
Low natural hazard risk	Moderately Positive – see S32A Report.
Proximity to labour force	Moderately Positive – the site is adjacent to the third largest township in COD by population.



Proximity to resident household customers	Very Positive – Residential Zoning is located on the other side State Highway 8 and Rural Residential zoning is located south of Springvale Road.
Proximity to specialist demand sectors	Moderately Positive – horticulture and farming occurs in the rural areas surrounding Clyde.
Serviceable with network infrastructure	Moderately Positive – the site can be connected to urban infrastructure (see s32A Report).
Total Suitability	Suitable for Industrial Development

5.2 Economic Benefits

Based on the analysis carried out for this assessment and the discussion contained in previous report sections, the economic benefits of the proposed rezoning can be summarised as follows:

- Development of the land and future construction of new buildings will generate value added in the COD economy, sustaining jobs and household incomes.
- Provides a range of additional jobs in the Clyde township and therefore provides opportunities for some current and future residents of Clyde to work close to where they live. Reduced commuting travel compared to the status quo.
- Provides a range of industrial services in the Clyde township, improving the accessibility of these services for current and future residents of Clyde (with reduced road travel compared to the status quo of travelling to Alexandra (most likely) for those services). Increased local functional amenity (attractiveness of Clyde as a place to live).
- Increases the self-sufficiency and resilience of the Clyde community while still maintaining economic and social connections with Alexandra (being the higher-order urban area).



- Potential to attract net additional businesses and investment in the Vincent Ward, including net additional households (business owners and staff). Flow on benefits for local businesses and service providers.
- Supports a competitive industrial land market by introducing a new landowner to the market, and an alternative location to meet demand.
- Supports the provision of at least sufficient Industrial Zone capacity in Clyde, the Vincent Ward and district overall to meet projected short and medium term demand for Industrial Zoned land.

5.3 Economic Costs

The economic costs of the proposed rezoning can be summarised as follows:

- Introduces a new area of Industrial Zone in the district where the effects of industrial activities (externalities) need to be managed. Dispersal of industrial activities over a greater number of locations. However, as discussed in other documents supporting the plan change request, the site is appropriately located to avoid any significant adverse effects, and other effects can be appropriately remedied or mitigated.
- Occupies LUC 3 land and therefore removes the productive capacity of the land for land-based primary production. However, the site is unlikely to support land-based primary production due to permanent constraints. As such, this cost is theoretical only and does not apply in practice.
- May result in distributional effects on the Alexandra Industrial Zones. This is expected to be limited to re-capture of a portion of Clyde demand back to Clyde. Any adverse distributional effects are considered to be minor in the context of the scale of Alexandra's Industrial Zones.
- May result in opportunity costs for the take up vacant industrial land in Alexandra's Industrial Zones. That is, it may slow the rate of growth in Alexandra by providing a local Industrial Zone in Clyde. However, this extends the capacity of the Alexandra Industrial Zones to meet demand from its extensive catchment over the short term (a benefit), but does not remedy a medium term shortfall of capacity in Alexandra that will also need a zoning response.



5.4 Efficiency Conclusions

In a general sense, it is more economically efficient to consider options for expansion of existing industrial zones before creating new ones, to ensure that the adverse effects of industrial activities are consolidated in relatively few locations. However, this is not always practicable where other land uses have developed around existing Industrial Zones as they have in Alexandra, foreclosing further expansion. Further, this approach must be balanced with the need to provide for industrial activities in locations of demand.

Clyde is an urban area that already sustains industrial activity, but in the absence of a local Industrial Zone (such as provided in most other towns and settlements of the district) the Clyde community has been reliant on supply of industrial activities in Alexandra. This urban form is increasingly inefficient as Clyde grows – and Clyde *has* been identified as an area that is constrained by a lack of local employment and yet, can support substantial residential growth in the medium and long term.

Providing for future housing growth in Clyde as set out in PC19 and the Spatial Plan without also providing increased employment opportunities and business land, will not support a well-functioning urban environment in my view.

I consider that the proposed site is a suitable and effective location for an Industrial Zone that will contribute to a well-functioning urban environment. I do not consider there to be any other more practicable or feasible alternative locations to provide the equivalent development capacity in the locality. Providing a local Industrial Zone in Clyde responds to an insufficiency (absence) of industrial development capacity in the Clyde urban area and assists with an insufficiency of industrial development capacity in the Alexandra urban area in the short-medium term. Zoning of the proposed site will support the provision of at least sufficient Industrial Zone capacity in the Vincent Ward and district overall.

While the site includes LUC 3 land, there are no foreseeable costs to the productive capacity of the district associated with the proposed urban zoning. Having considered the economic costs and benefits of the proposal, I conclude that the economic benefits far outweigh any potential costs. I support the rezoning from an economic perspective.



Appendix A – Industrial Zone Profiles

Cromwell

1 Digit ANZSIC Description	Industrial Zone Business Count 2018	Industrial Zone Business Count 2023	Growth 2018-2023 (n)	Growth 2018-2023 (%)	Industrial Zone Employment Count 2018	Industrial Zone Employment Count 2023	Growth 2018-2023 (n)	Growth 2018-2023 (%)	Industrial Zone Business Count 2023 Distribution (%)	Industrial Zone Employment Count 2023 Distribution (%)	Total Town 2023 Business Count	Total Town 2023 Employment Count	Industrial Zone Share of Total Town Business Count 2023	Industrial Zone Share of Total Town Employment Count 2023
Agriculture, Forestry and Fishing *	1	4	2	192%	8	9	1	18%	1%	0%	19	32	18%	28%
Mining	-	-	-	0%	-	-	-	0%	0%	0%	-	-	0%	0%
Manufacturing	40	36	-4	-10%	291	318	27	9%	13%	17%	63	383	57%	83%
Electricity, Gas, Water and Waste Services	4	7	4	106%	146	68	-78	-54%	3%	4%	9	69	83%	98%
Construction	35	57	22	63%	546	591	44	8%	21%	32%	235	947	24%	62%
Wholesale Trade	32	40	8	26%	180	291	111	61%	15%	16%	54	325	74%	90%
Retail Trade	5	4	-1	-15%	13	16	2	18%	2%	1%	52	488	9%	3%
Accommodation and Food Services	2	6	4	146%	3	14	11	321%	2%	1%	50	318	12%	4%
Transport, Postal and Warehousing	15	15	0	2%	225	186	-39	-17%	6%	10%	41	242	37%	77%
Information Media and Telecommunications	-	2	2	0%	-	1	1	0%	1%	0%	6	35	25%	3%
Financial and Insurance Services	7	8	1	17%	1	2	1	163%	3%	0%	36	27	21%	8%
Rental, Hiring and Real Estate Services	29	43	14	49%	24	49	25	102%	16%	3%	183	110	24%	44%
Professional, Scientific and Technical Services	12	17	5	40%	70	124	55	78%	6%	7%	70	218	24%	57%
Administrative and Support Services	3	7	4	136%	3	21	18	590%	2%	1%	34	59	20%	35%
Public Administration and Safety	2	1	-1	-45%	18	3	-15	-83%	0%	0%	5	27	23%	11%
Education and Training	1	2	1	120%	3	28	24	712%	1%	2%	11	269	20%	10%
Health Care and Social Assistance	4	6	2	40%	9	29	20	230%	2%	2%	29	223	21%	13%
Arts and Recreation Services	1	2	1	100%	25	27	2	7%	1%	1%	19	65	11%	42%
Other Services	9	13	4	51%	33	59	27	82%	5%	3%	43	157	30%	38%
Total Industries	201	269	68	34%	1,597	1,834	237	15%	100%	100%	958	3,994	28%	46%
Indicative Industrial Zone Industries	155	202	47	30%	1,419	1,510	91	6%	75%	82%	604	2,108	33%	72%

Source: StatisticsNZ Business Demography Statistics YE February, Savvy. * With the exception of Agricultural and forestry support services, agriculture business and employment have been removed as these are likely a result of SA1 defined areas including rural land on the fringe of each area.

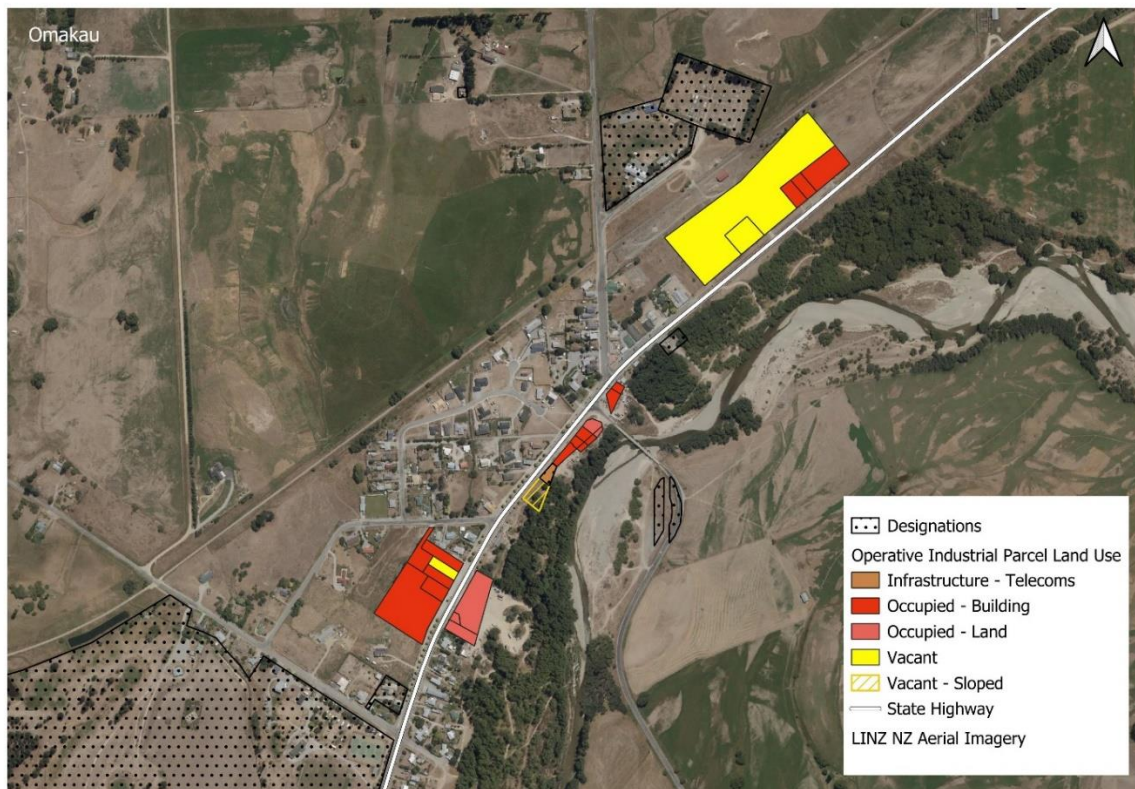
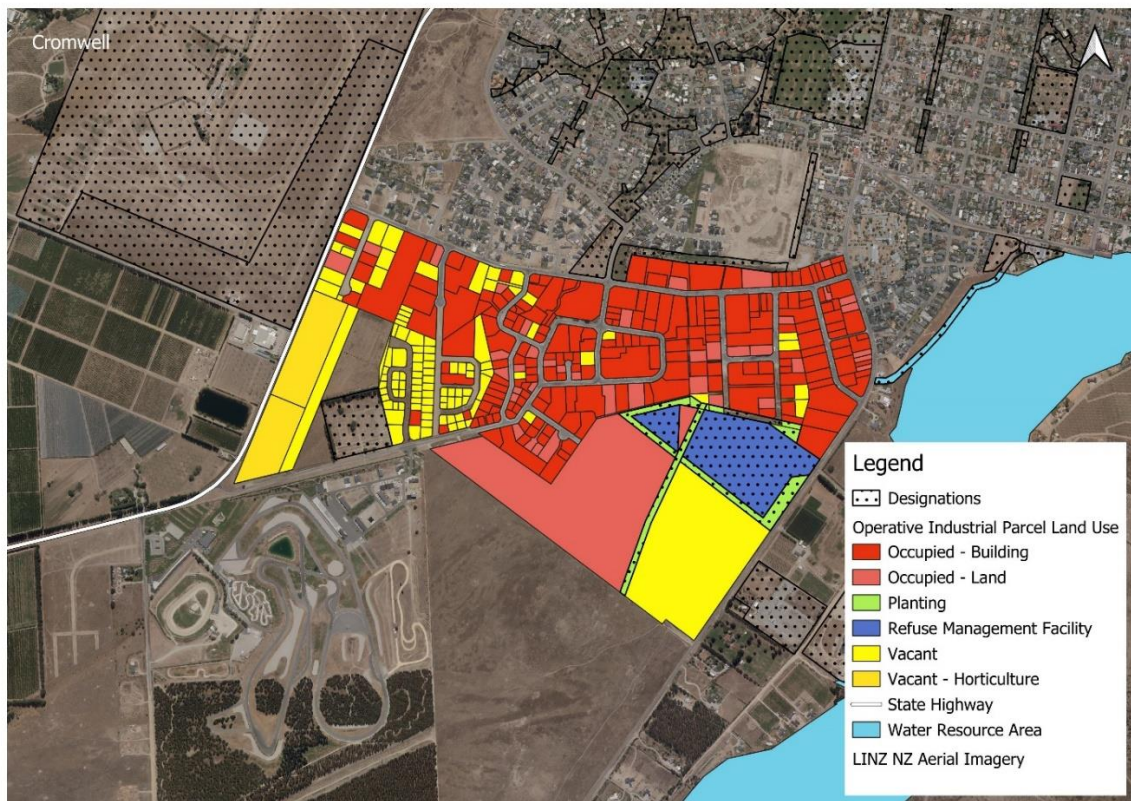
Alexandra

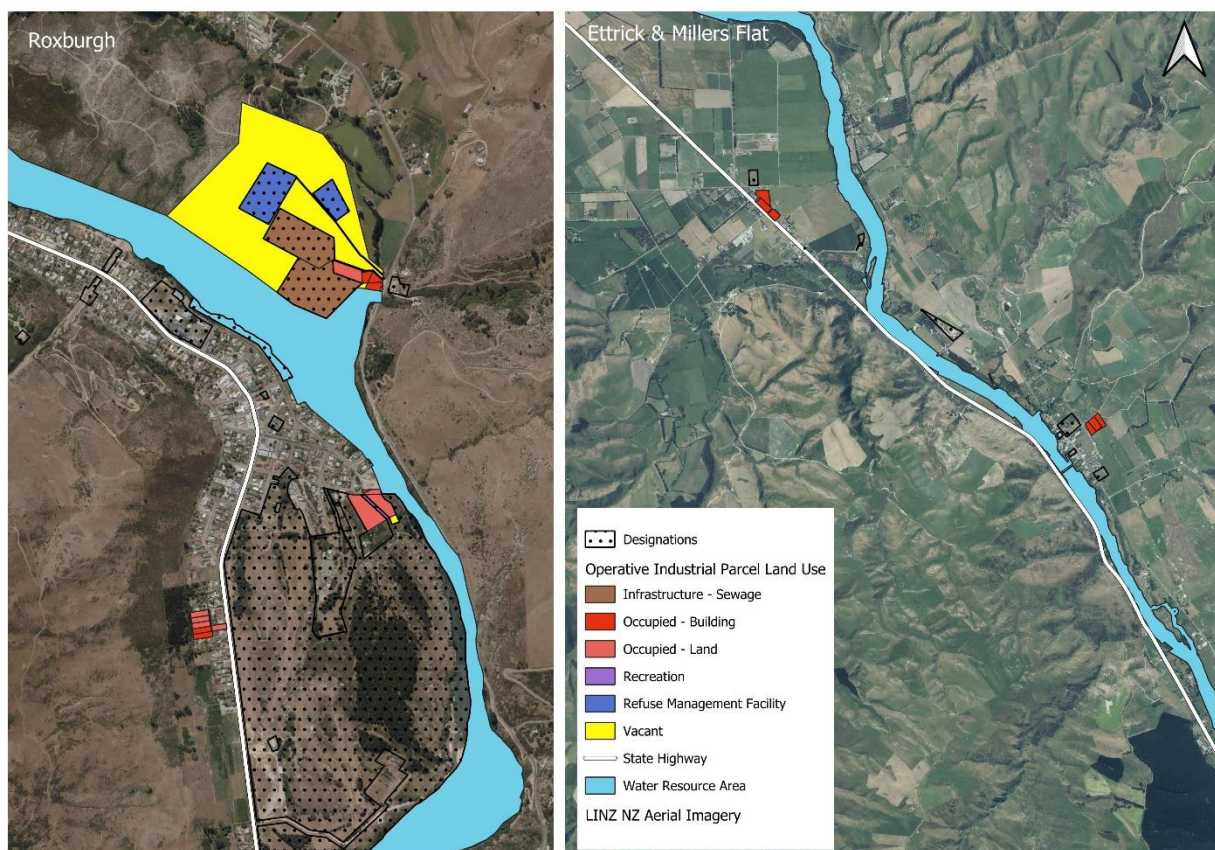
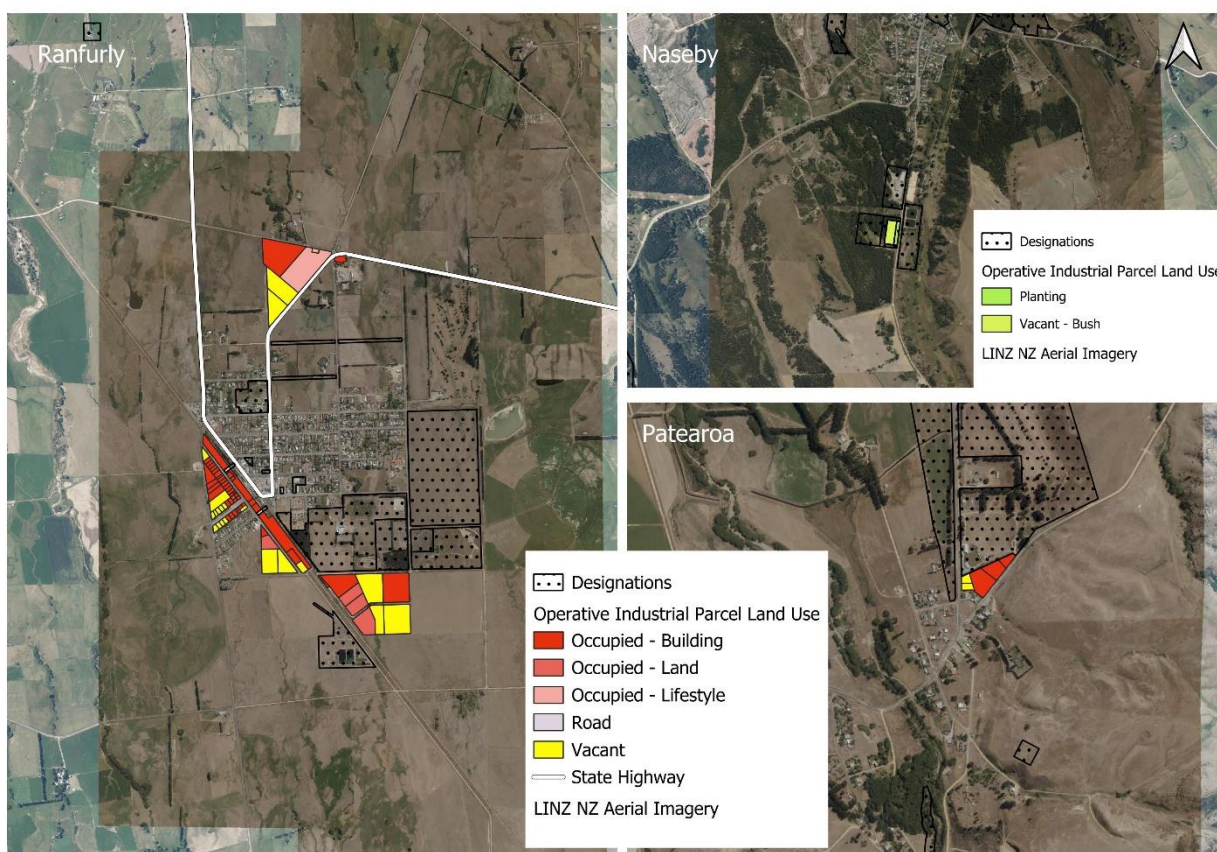
1 Digit ANZSIC Description	Industrial Zone Business Count 2018	Industrial Zone Business Count 2023	Growth 2018-2023 (n)	Growth 2018-2023 (%)	Industrial Zone Employment Count 2018	Industrial Zone Employment Count 2023	Growth 2018-2023 (n)	Growth 2018-2023 (%)	Industrial Zone Business Count 2023 Distribution (%)	Industrial Zone Employment Count 2023 Distribution (%)	Total Town 2023 Business Count	Total Town 2023 Employment Count	Industrial Zone Share of Total Town Business Count 2023	Industrial Zone Share of Total Town Employment Count 2023
Agriculture, Forestry and Fishing *	6	6	0	7%	29	34	5	16%	5%	3%	26	93	23%	36%
Mining	-	-	-	0%	-	-	-	0%	0%	0%	1	1	0%	0%
Manufacturing	13	10	-2	-18%	84	46	-38	-45%	8%	4%	32	114	32%	41%
Electricity, Gas, Water and Waste Services	1	2	1	143%	12	3	-9	-74%	1%	0%	4	40	40%	8%
Construction	15	19	4	29%	400	502	102	25%	16%	48%	135	869	14%	58%
Wholesale Trade	11	11	1	5%	74	54	-20	-27%	9%	5%	26	82	44%	66%
Retail Trade	5	4	-1	-20%	30	37	7	23%	3%	4%	64	565	6%	7%
Accommodation and Food Services	1	2	1	82%	2	30	29	1800%	2%	3%	42	276	5%	11%
Transport, Postal and Warehousing	4	4	1	-19%	124	64	-61	-49%	3%	6%	20	121	18%	53%
Information Media and Telecommunications	2	-	-2	-100%	1	-	-1	-100%	0%	0%	7	26	0%	0%
Financial and Insurance Services	2	4	1	61%	1	1	0	25%	3%	0%	52	74	7%	1%
Rental, Hiring and Real Estate Services	18	22	4	21%	6	11	5	83%	18%	1%	160	82	14%	13%
Professional, Scientific and Technical Services	12	19	8	65%	45	69	24	53%	16%	7%	80	310	24%	22%
Administrative and Support Services	4	5	1	26%	74	79	5	6%	4%	8%	30	876	18%	9%
Public Administration and Safety	2	1	-2	-63%	4	12	8	188%	1%	1%	13	243	7%	5%
Education and Training	3	3	0	-4%	28	13	-14	-52%	2%	1%	17	260	15%	5%
Health Care and Social Assistance	4	3	-2	-41%	43	46	3	7%	2%	4%	34	373	8%	12%
Arts and Recreation Services	3	2	-2	-48%	24	20	-4	-17%	1%	2%	15	64	11%	31%
Other Services	7	6	-1	-16%	48	30	-17	-37%	5%	3%	57	194	10%	16%
Total Industries	112	121	9	8%	1,027	1,049	22	2%	100%	100%	815	4,661	15%	23%
Indicative Industrial Zone Industries	67	74	7	10%	729	713	-16	-2%	61%	68%	404	1,401	18%	51%

Source: StatisticsNZ Business Demography Statistics YE February, Savvy. * With the exception of Agricultural and forestry support services, agriculture business and employment have been removed as these are likely a result of SA1 defined areas including rural land on the fringe of each area.



Appendix B – Vacant Capacity

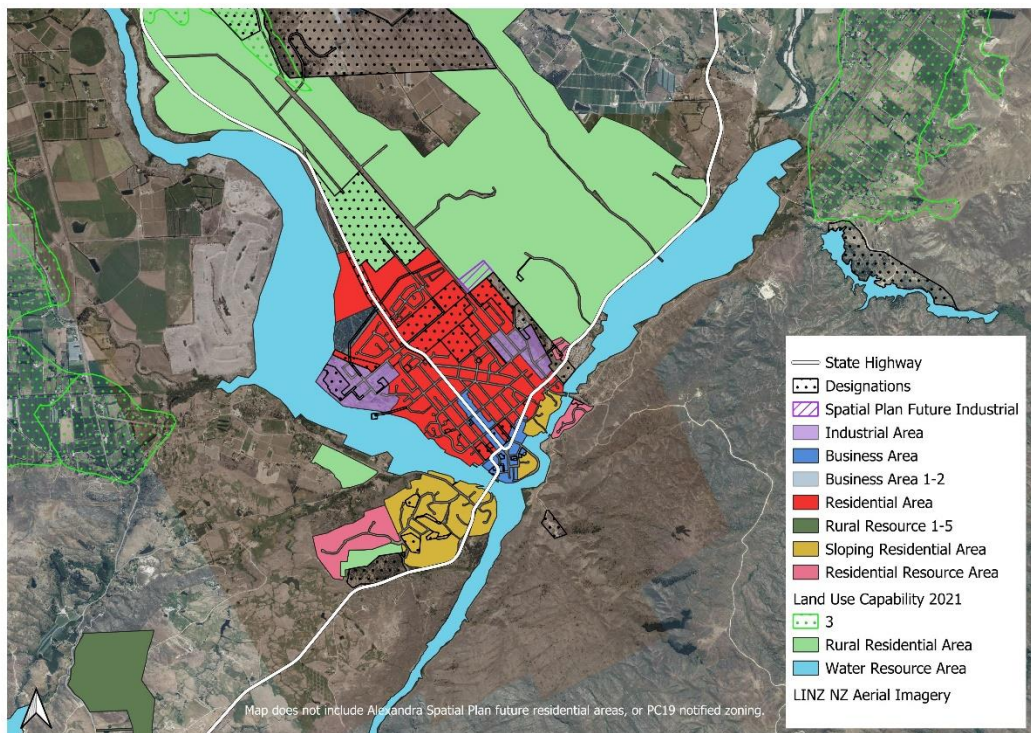




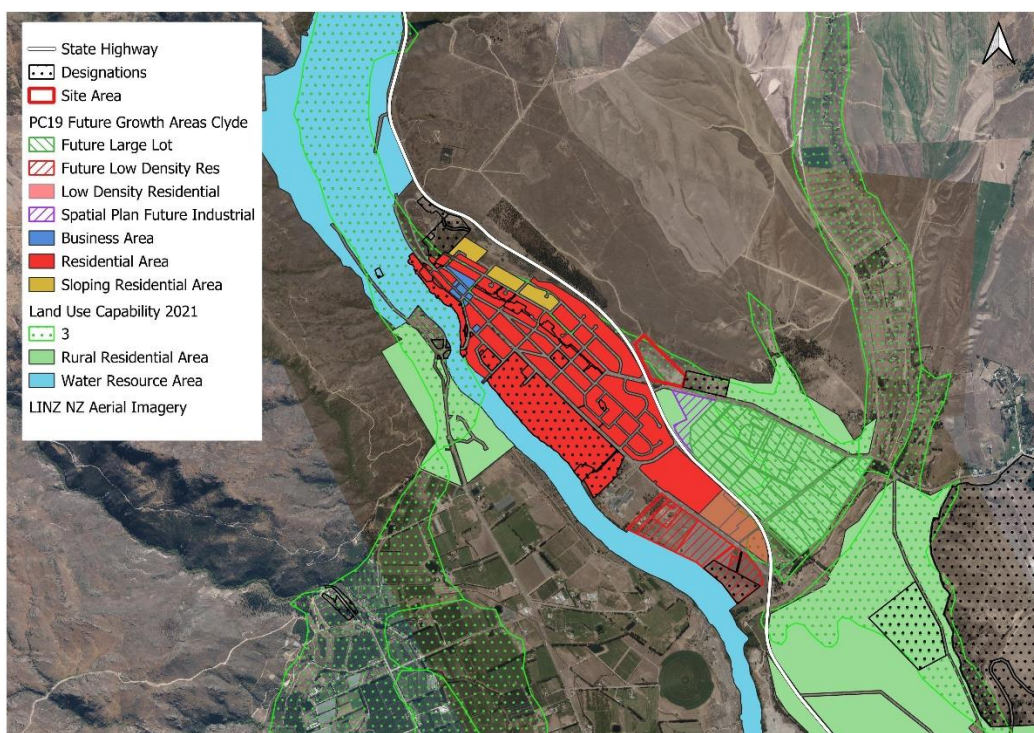


Appendix C – HPL Maps

Alexandra



Clyde





Appendix D – Economic Impact Terminology & Assumptions

Multiplier analysis is a commonly used modelling technique for measuring economic impacts. Direct, indirect and induced economic impacts can be estimated using multipliers derived from regional or national input-output tables. Multipliers are summary measures of the economic interdependence between industries and final demand. The contribution of an industry to an economy is not limited to the value it creates directly. This is because an increase in final demand for an industry has repercussions throughout the whole economy, causing increases in output beyond the initial change in demand. This is known as the multiplier effect. The higher the multiplier the more far-reaching the local value added and employment impacts are likely to be from an increase in demand.

The most common limitations of all input-output based modelling (including multiplier analysis) is the historical and fixed nature of multipliers which are typically calculated from input-output tables from surveys undertaken several years earlier. Therefore, they may not accurately reflect the relationships between sectors in the current economy.³⁶ This assessment relies on the latest national input-output table prepared by StatisticsNZ³⁷ which reflects the economy in the year ending June 2020. While the construction sector has faced significant cost increases since 2020, it is considered that the supply chain structure of all industry sectors (including the construction sector) is still broadly relevant today.

This assessment includes the following types of economic impacts:

- a) Direct effects – which capture onsite and offsite activities directly engaged by the proposed project;
- b) Indirect effects – which arise when businesses working directly on the project stimulate the creation of further demand through the purchases that they make in other sectors of the economy; and

³⁶ In the real world, technical relationships will change over time. These changes are driven by new technologies, relative price shifts, product substitutions and the emergence of new industries. For this reason, input-output analysis is generally regarded as suitable for short-run analysis, where economic systems are unlikely to change greatly from the initial snapshot of data used to generate the base input-output table.

³⁷ Accessed, with thanks, from Insight Economics.



- c) Induced effects – which arise from the increased demand for goods and services made by households who have received increased income as a result of the direct and indirect effects of the project.

These economic impacts have been measured in terms of:

- Contributions to value-added (akin to GDP). Value added is the principal measure of economic activity, and is estimated as operating surplus, wages and salaries paid to staff and working proprietors, depreciation, taxes and subsidies.
- The number of FTEs employed – which is measured in terms of full-time equivalent workers (FTEs) for a 12-month period.
- Total wages and salaries paid to workers, which are often labelled 'gross household incomes'.

Assumptions and Modelling Inputs

For simplicity, I have adopted the multipliers from the following industry sectors contained in the national input-output table:

- Design/planning/consents – 100% to the 'Scientific, architectural and engineering services' sector.
- Land development – 100% to the 'Heavy and civil engineering construction' sector.
- Commercial construction – 100% to the 'Non-residential building construction' sector.

Other key assumptions for the modelling are as follows:

- Anticipated expenditure is deflated to June 2020 prices prior to applying the June 2020 multipliers. This is done using the Producers Price Index.
- Economic impacts are expressed in 2020 dollar and employment terms. It is not appropriate to re-inflate economic impacts to dollars of the day.
- The national multipliers are assumed to represent the multipliers that applied in the COD in June 2020. That is, it is assumed that industries in the COD economy have the same interdependencies with other industries as they do nationally.
- All direct expenditure on the proposed development, including indirect and induced spending, is assumed to be with business located in COD. That is, 100% of the impact is assumed to accrue to the COD economy, with no leakage to other districts or regions.



Caveats

These district economic impacts apply to the proposed development. It is important to acknowledge that these same or similar impacts would arise from a development of a similar scale and composition in another location in COD and are not entirely unique to this proposal/site.

Furthermore, some of these impacts would be a result of expenditure that is transferred from other locations in the district. Specifically, if the proposal was not approved for development, one would typically expect that the demand for industrial activities would be satisfied in another location within the district. This means that at a district level much of the economic value associated with the proposal may not be net additional or new, as this value would occur regardless of whether the proposed development occurs or not.

That said, to the extent that the proposal addresses a shortfall in industrial zone capacity in the locality of demand, that may not necessarily be addressed through other planning processes in a timely manner, then more of the economic impact can be considered net additional. This is because a shortfall of industrial zone capacity may result in some business growth being directed elsewhere (or being suppressed). In this light, the proposed development can be seen as enabling projected growth.

Development is also contingent on available land in suitable locations for urban growth, landowners willing to develop that land, and landowners having the financial capability and experience to develop – such as the applicant. These combined attributes are rare in any district, and this means that more, rather than less, of the estimated economic impacts can be treated as net additional and specific to the proposal.



could (at the very least) help remove the constraints applied to Clyde's growth, and population (and subsequently dwelling) growth assumptions could be elevated (relative to current projections) as a result. A minor to moderate increase in reported medium and long term dwelling growth in Clyde township would be reasonably anticipated under a scenario where the proposed private plan change is approved.

3.1.2 PC19 Implications

Despite only modest (and potentially conservative) growth in dwellings projected for Clyde by Rationale, CODC has identified significant additional residential development capacity in and around Clyde in the Alexandra-Clyde Spatial Plan, which is being implemented by PC19.

Figure 3.2 illustrates the changes proposed (notified) in PC19 for Clyde beyond the existing Residential Zone area. While not shown, PC19 also provides for a Medium Density Residential Zone in and around the town centre (extending to Whitby Road) which will encourage intensification (infill and redevelopment) over time.

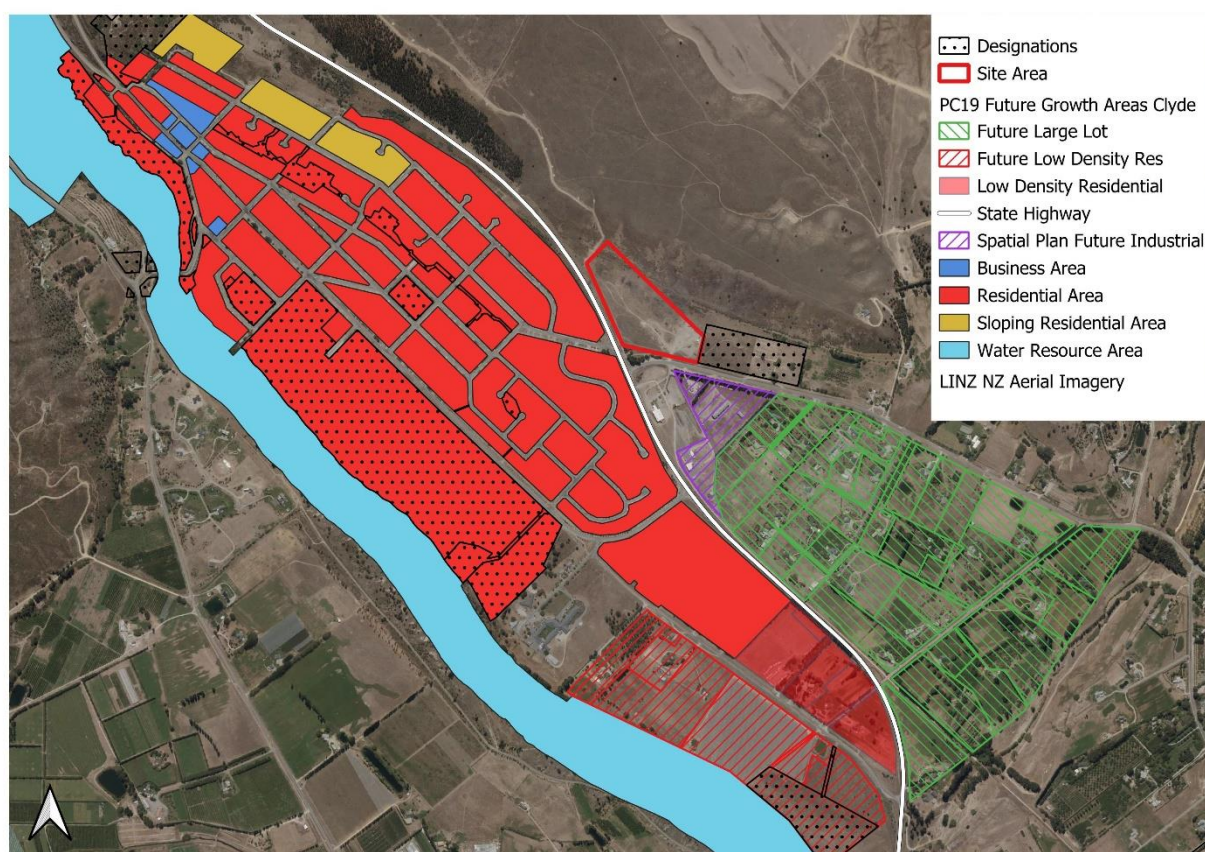


Figure 3.2 – PC19 Proposed Residential Zoning (Outside Existing Residential Zone)

Hartley Road Partnership

**Private Plan Change
Springvale Road, Clyde**

Transportation Assessment



CARRIAGEWAY
CONSULTING

traffic engineering | transport planning



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1. Introduction

- 1.1. Hartley Road Partnership is lodging a private plan change request for its site at Springvale Road, Clyde (**the site**). The site is presently zoned as Rural in the Central Otago District Plan, and the plan change seeks that this is changed to Industrial.
- 1.2. This Transportation Assessment sets out an evaluation of the transportation issues associated with the development that would be facilitated by the rezoning, including changes in travel patterns that are likely to arise. Where potential adverse effects are identified, possible ways in which these can be addressed are set out.
- 1.3. This report is cognisant of the guidance specified in the New Zealand Transport Agency's '*Integrated Transport Assessment Guidelines*' and although travel by private motor vehicle is addressed within this report, in accordance with best practice the importance of other transport modes is also recognised. Consequently, travel by walking, cycling and public transport is also considered.





2. Site Overview

2.1. Location

- 2.1.1. The site is located on the eastern side of Clyde, immediately east of the State Highway 8 / Springvale Road intersection.
- 2.1.2. The location of the site in the context of the local area is shown in Figure 1 and in more detail in Figure 2.

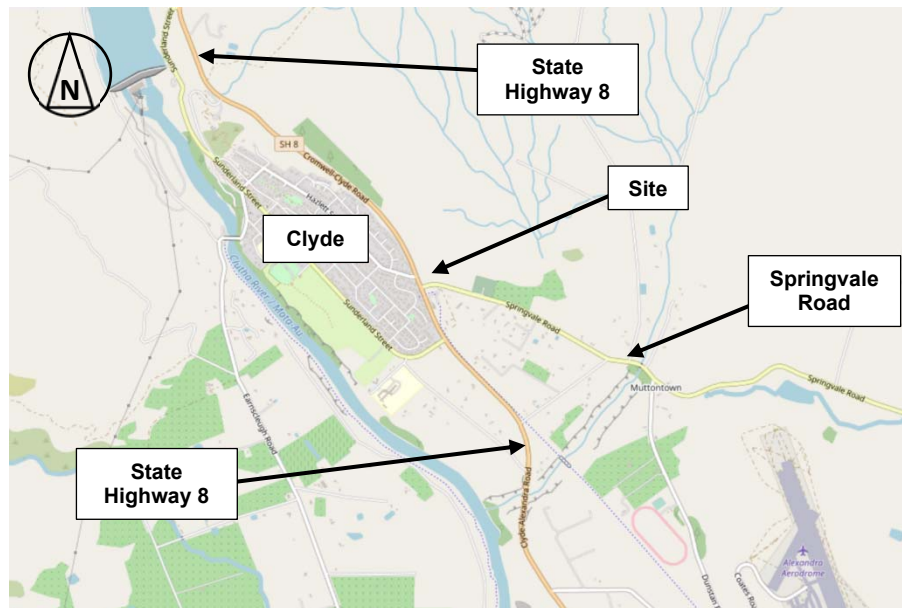


Figure 1: General Location of Site



Figure 2: Aerial Photograph of Site and Environs



2.2. Road Hierarchy

- 2.2.1. Under the District Plan roading hierarchy, State Highway 8 is classified as a highway and Springvale Road is an Arterial Road. Although the District Plan does not define road types, the New Zealand Transport Agency Waka Kotahi (**Waka Kotahi**) specifies that state highways have a “*nationally strategic purpose in moving people and goods*”, with the One Network Road Classification setting out that Arterial Roads “*make a significant contribution to social and economic wellbeing [and] link regionally significant places, industries, ports or airports*”.
- 2.2.2. Hazlett Street is an Urban Local Road, and such roads typically carry lower traffic flows and provide a high degree of property access.



3. Current Transportation Networks

3.1. *Roading Network*

- 3.1.1. Although the site has frontage onto State Highway 8, the topography (a difference in levels) means that it is challenging to achieve any access onto it. Accordingly, no access is proposed onto the highway and rather, will be gained from Springvale Road only.
- 3.1.2. The site presently has one access point, located around 140m from the state highway. This is formally constructed with a metalled road surface and a gate at the site boundary.



Photograph 1: Site Access Looking East

- 3.1.3. Adjacent to the site, Springvale Road has a flat alignment which curves gently from its intersection with the highway. The road provides one traffic lane in each direction of 3.5m width, and has a centreline and edgeline markings, with edge marker posts also present. The width of the sealed shoulder is variable, between 0.3m and more than 2m, the latter being on the northern side of the road just east of the highway.
- 3.1.4. Springvale Road is subject to an 80km/h speed limit and has a legal width of 40m, which widens to more than 80m nearer to the highway.



Photograph 2: Springvale Road Looking East

- 3.1.5. The very wide legal road width creates an unusual scenario whereby there is an informal access to the extra road reserve width that lies around 60m east of the highway and is formed with a very wide (40m) splay, enabling cars can turn into an unformed car parking area between the site boundary and the formed road.



Figure 3: Road Reserve Towards Southwest of Site



Photograph 3: Informal Access to Wide Road Reserve Looking East

- 3.1.6. To the immediate east of the site, the road alignment straightens but continues with the same cross-section. It provides access to a number of rural residential properties before terminating at State Highway 85 approximately 8m east of the site.
- 3.1.7. Opposite the site access is a small access road that serves a small number of activities including a Department of Conservation base for the Rail Trail (discussed further below) and fire service offices. There is also a roadway that runs parallel to Springvale Road for a distance of around 230m.



Photograph 4: Access opposite Site Access, Looking East

- 3.1.8. At the southwestern corner of the site, Springvale Road meets State Highway 8 at a priority ('give-way') intersection. Approximately 90m to the north, Hazlett Street joins the highway from the west at a 'stop' controlled intersection, and the two operate as offset (staggered) tee-intersections. The intersection is constructed with a high-capacity layout and consequently there are auxiliary right-turn lanes for the movements from State Highway 8 to Springvale Road (south to east) and State Highway 8 to Hazlett Street (north to west), and a left-turn lane for

the movement from State Highway 8 to Hazlett Street (south to west). The Springvale Road approach is also constructed with an auxiliary left-turn lane, separating this movement from the movement onto State Highway 8 (north) and Hazlett Street.

- 3.1.9. There is no auxiliary turning lane for the State Highway 8 to Springvale Road (north to east) movement, but there is a wide (3m) shoulder marked with diagonal shoulder markings (MOTSAM 2.04) which in practice is used by drivers as a left-turn lane, with southbound traffic remaining in the formally marked traffic lane. This shoulder is well over 100m in length.



Photograph 5: Wide Shoulder on State Highway 8, North of Springvale Road

- 3.1.10. State Highway 8 is subject to a 100km/h speed limit, but sight distances for all turning movements at the State Highway 8 / Springvale Road and State Highway 8 / Hazlett Street intersections are appropriate for this speed environment.



Photograph 6: State Highway 8 / Springvale Road Intersection Looking North

3.1.11. Towards the south, the highway has a flat and gently curving alignment, and provides access to Alexandra, terminating towards the south of Dunedin. To the north of Hazlett Street, the highway curves towards the northwest and starts to rise. It provides access to Cromwell but continues further to the northwest, terminating at Timaru.

3.2. *Non-Car Modes of Travel*

3.2.1. Given the current rural nature of the land, there is no specific infrastructure for pedestrians in the immediate area of the site. However, there grassed verges can be used for walking.

3.2.2. The Central Otago Tail Trail commences/terminates within the area immediately opposite the at the eastern site access, know as the Clyde Railhead. The route itself does not pass the site, but rather, runs southwards from this location alongside the state highway, but the accessway provides access to the car park for those that are starting (or ending) the trail.

3.2.3. There is also an underpass beneath the highway, located 50m to the south of Springvale Road, which provides a route for pedestrians and cyclists to cross the highway, and connects the Rail Trail with the minor road network within Clyde township.



Photograph 7: Underpass below State Highway 8

3.3. *Future Changes*

3.3.1. There are no known changes to the roading infrastructure in the vicinity of the site.

4. Current Transportation Patterns

4.1. Traffic Flows

4.1.1. Waka Kotahi carries out regular traffic counts on the state highway network throughout the country. The closest counter locations to the site are located alongside Lake Dunstan (around 6km north of the site) and near Alexandra Golf Club (5km south of the site). Neither location is likely to be fully representative of traffic volumes at the site but both are helpful indicators of traffic flows.

4.1.2. The two-way traffic flows recorded at each counter in 2023¹ are as follows:

- North of the site (counter id: 00800313):
 - o Average Annual Daily Traffic: 6,140 vehicles
 - o Weekday morning peak hour: 490 vehicles
 - o Weekday evening peak hour: 600 vehicles
- South of the site (counter id: 00800325):
 - o Average Annual Daily Traffic: 6,550 vehicles
 - o Weekday morning peak hour: 510 vehicles
 - o Weekday evening peak hour: 630 vehicles

4.1.3. It can be seen that the traffic flows near Alexandra are greater than those north of Clyde. This is likely to be due to the Alexandra counter recording movements by residents between Clyde and Alexandra, which will therefore not occur to the north of Clyde (or past the site). However the difference between the values is only in the order of 5%.

4.1.4. As part of this commission, weekday peak hour traffic flows were observed at the State Highway 8 / Springvale Road and State Highway 8 / Hazlett Street intersections. The surveys were carried out in February 2024, and the results are shown below.

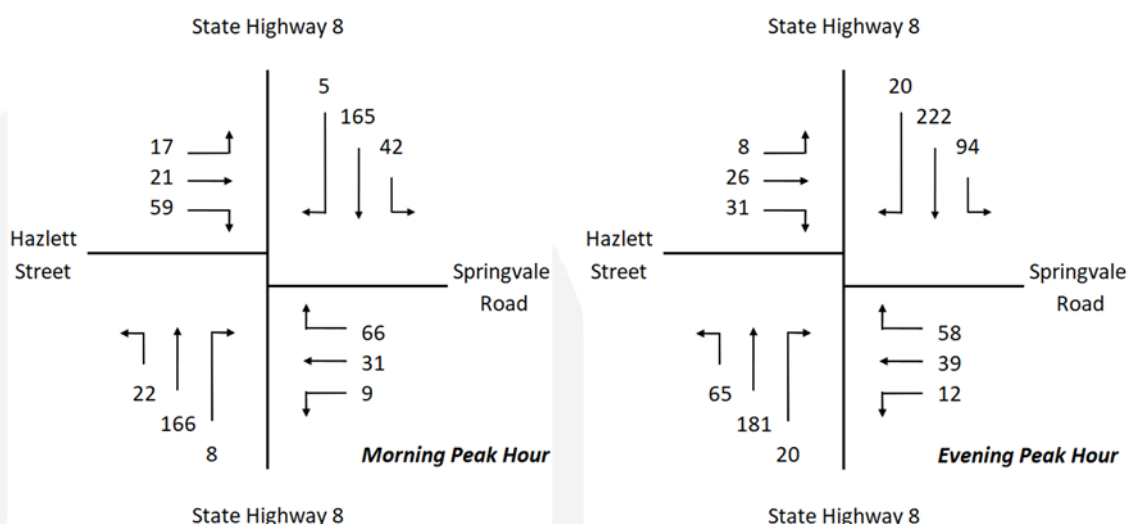


Figure 4: 2024 Traffic Flows at the State Highway 8 / Springvale Road / Hazlett Street Intersections (without Plan Change)

4.1.5. The survey results noted above show the maximum volumes turning through the intersection, which does not necessarily coincide with the maximum volumes on the highway at the counters. However when the counter towards the north is considered, the observed traffic

¹ Rounded to the nearest 10 vehicles)

counts vary by only 2.5% from the volumes recorded by the automatic traffic counter further north. It can therefore be concluded that the observed traffic flows are typical of the prevailing traffic volumes on the network.

- 4.1.6. The traffic counters show that over the past ten years, volumes have grown by 4.0% per annum to the north and 2.6% per annum towards the south of the site (expressed as a percentage of 2023 volumes). For the purposes of this assessment, a mean value of 3.3% growth per annum has been applied. The same factor has been applied to the minor approaches.
- 4.1.7. The intersection has been modelled with these 2024 observed traffic volumes (factored by ten years to a 'design year' of 2034) and using the computer software package Sidra Intersection. The results are summarised below. For this exercise the presence of a left-turn lane has been modelled, as this is the way that drivers use the highway.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 8 (south)	L	9.0	0.0	A	9.0	0.0	A
	R	8.6	0.0	A	9.0	0.1	A
Springvale Road	L	7.9	0.0	A	8.4	0.1	A
	T	13.7	1.5	B	21.2	2.2	C
	R	16.2	1.5	C	23.3	2.2	C
State Highway 8 (north)	L	8.7	0.2	A	8.8	0.4	A
	R	8.6	0.0	A	8.7	0.1	A
Hazlett Street	L	5.6	0.1	A	5.6	0.0	A
	T	9.5	1.1	A	12.5	1.0	B
	R	12.7	1.1	B	17.4	1.0	C

Table 1: Peak Hour Levels of Service at the State Highway 8 / Springvale Road / Hazlett Street Intersections (without Plan Change)

- 4.1.8. It can be seen that the intersection provides a good level of service with only small queues and modest delays.
- 4.1.9. The Austroads Guide to Traffic Management Part 6 (*'Intersections, Interchanges and Crossings'*) sets out warrants for when auxiliary turning lanes are required, based upon peak hour traffic flows and speeds. In this case, turning lanes are provided for all movements off the state highway other than the left-turn into Springvale Road.
- 4.1.10. The warrants set out that a left-turn lane is assessed using the volume of traffic turning left and the volume of through traffic travelling in the same direction of the left-turning vehicles. For the combination of 253 southbound vehicles and 94 left-turning vehicles, an auxiliary left-turn lane is presently required. The absence of the turning lane is therefore an existing shortfall in the roading network.

4.2. Non-Car Modes of Travel

- 4.2.1. Given that the area around the site is largely rural, it can reasonably be expected that it will be relatively infrequently used by pedestrians and cyclists. As such, the current levels of provision are considered to be adequate.



- 4.2.2. There are no scheduled public transport services that operate adjacent to the site, although there are longer-distance services that pass on the state highway.

4.3. Road Safety

- 4.3.1. The NZTA Crash Analysis System has been used to establish the location and nature of the recorded traffic crashes in the vicinity of the site. All reported crashes on the roading network within 250m of the State Highway 8 / Springvale Road / Hazlett Street intersections, and for a distance of 250m from the site eastern boundary, were identified for the period 2019 to 2023 plus the partial record for 2024.

- 4.3.2. This showed that five crashes had been reported:

- Three crashes occurred at the State Highway 8 / Springvale Road intersection:
 - o One crash occurred when a driver turned right out of Springvale Road (intending to travel straight ahead into Hazlett Street) but failed to give-way to a southbound vehicle on the highway. The crash resulted in minor injuries.
 - o One crash occurred when a driver turned right out of Springvale Road and struck a vehicle that had just turned right out of Hazlett Street. The crash resulted in minor injuries.
 - o One crash occurred when a driver turned right out of Springvale Road and struck a cyclist that had turned right out of Hazlett Street. The crash resulted in minor injuries.
- Two crashes occurred at the State Highway 8 / Hazlett Street intersection:
 - o One crash occurred when a driver turned right out of Hazlett Street but failed to give-way to a northbound vehicle on the highway. The crash did not result in any injuries. The police report noted that the car on the highway was following close to a large truck and was not easily visible.
 - o One crash occurred when a driver turned right out of Hazlett Street and struck a vehicle that had just turned right out of Springvale Road. The crash did not result in any injuries.

- 4.3.3. It is not considered that the crash record indicates any inherent safety related issues at the intersections. The crash rate at the two intersections is low, and generally have different contributing factors. It is plausible however that the crash record at the State Highway 8 / Springvale Road is influenced by the lack of the required left-turn lane (discussed above).

5. Proposal

- 5.1. The Site is approximately 6.4ha in size, and the rezoning which is sought is for Industrial.
- 5.2. Since the nature of a plan change is for a rezoning of the site, no specific layout plan for the future subdivision of the site is available. However an indicative plan has been prepared, which is useful in order to ensure that all transportation-related matters have been properly considered. This is shown below.

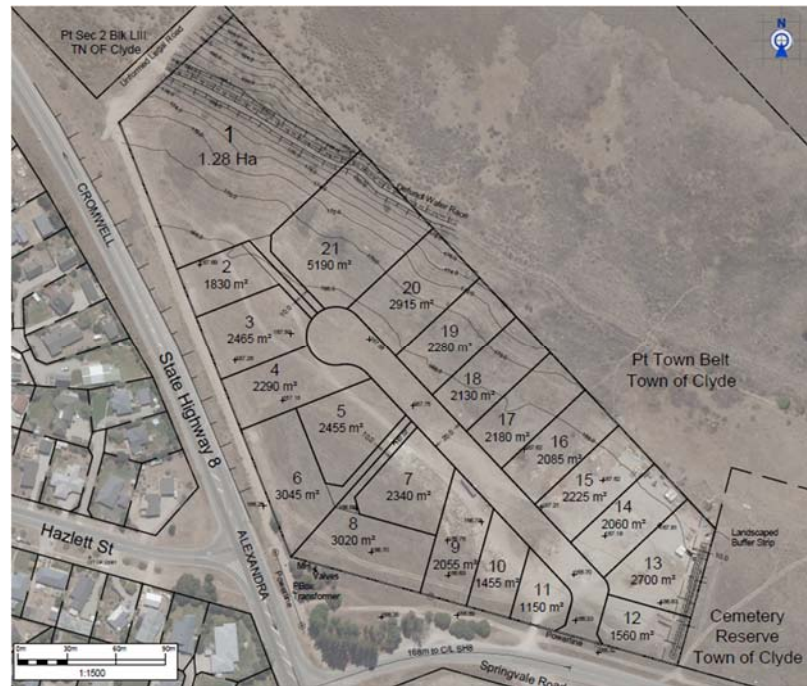


Figure 5: Indicative Subdivision Layout (Extract from Paterson Pitts Drawing)

- 5.3. As set out previously, the topography does not support any access onto the highway and therefore all access is gained from Springvale Road.

6. Traffic Generation and Distribution

6.1. Traffic Generation

- 6.1.1. The bulk of standard traffic generation rates for industrial activities are based on floor areas rather than total site area, and since there is no specific layout for the site, this is not known. However other plan changes have adopted the following traffic generation rates.

Industry Type	Trip Generation Rates (Vehicle Movements Per Hectare)					
	Morning Peak Hour		Evening Peak Hour		Daily	
	In	Out	In	Out	In	Out
Light	13.9	2.5	5.4	12.7	53.5	53.5
Heavy	8.5	7.3	4.9	5.5	40.5	40.5

Table 2: Traffic Generation Rates for Industrial Activities

- 6.1.2. It can be seen that light industrial activities typically have a greater traffic generation than heavy industrial activities. For a robust assessment, the use of the site for light industrial activities has been allowed for within this analysis. Thus the traffic anticipated to arise is as follows:

Time Period	Traffic Generation	
	In	Out
Morning Peak Hour	89	16
Evening Peak Hour	35	81
Total	342	342

Table 3: Traffic Generation of Full Development of Rezoned Site

6.2. Trip Distribution

- 6.2.1. Because of the location of the site, it is considered likely that the bulk of drivers would seek to travel to/from the state highway, meaning that the majority of traffic will pass through the State Highway 8 / Springvale Road / Hazlett Street intersection. In order to ensure that the assessment of this intersection is robust, all generated traffic has been assigned to pass through the intersection. In practice, some will be associated with travel to/from the east, which will reduce volumes passing through the intersection and meaning that queues and delays are lower than anticipated in the subsequent analysis.
- 6.2.2. During the morning and evening peak hours, the majority of vehicles are associated with travel between home and employment purposes (and are therefore light vehicles). Depending on the nature of the activities that may establish within the site, employees may live towards the west (in Clyde), north (Cromwell) or south (Alexandra), but this will depend on the nature of the activities. Consequently the generated traffic has been apportioned in accordance with the current distribution of traffic.
- 6.2.3. The traffic generation of the Site is therefore as follows:

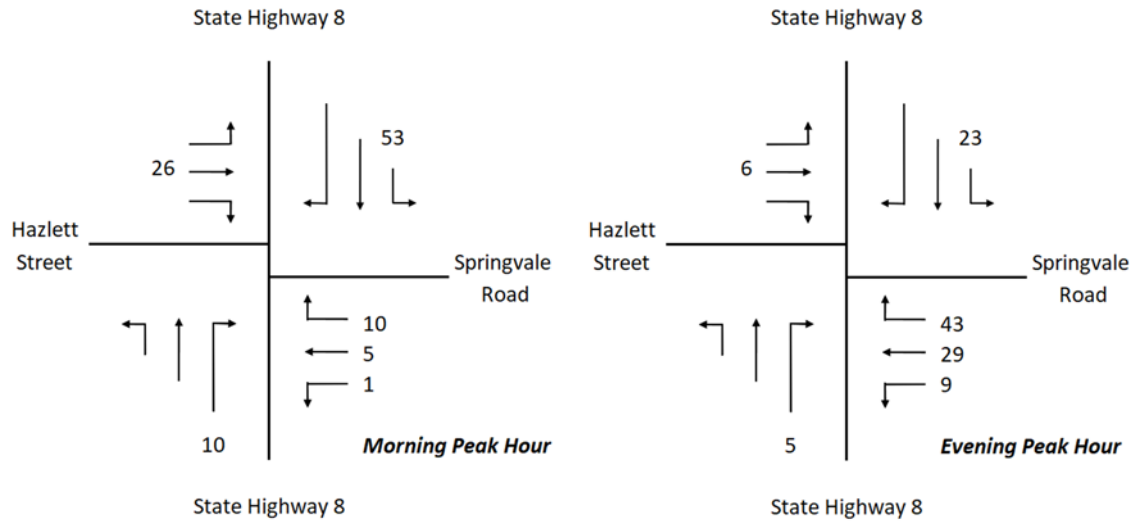


Figure 6: Traffic Flows Generated at Full Development of Site

7. Effects on the Transportation Networks

7.1. Roading Network Capacity

7.1.1. The State Highway 8 / Springvale Road and State Highway 8 / Hazlett Street intersections have been remodelled using the computer software package Sidra Intersection, with the 'design year' traffic flows plus development of the rezoned site. The results are summarised below.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 8 (south)	L	9.0	0.0	A	9.0	0.0	A
	R	8.6	0.1	A	9.0	0.1	A
Springvale Road	L	7.9	0.0	A	8.4	0.1	A
	T	15.4	2.0	C	30.6	5.0	D
	R	18.9	2.0	C	33.2	5.0	D
State Highway 8 (north)	L	8.9	0.3	A	8.9	0.4	A
	R	8.6	0.0	A	8.7	0.1	A
Hazlett Street	L	5.6	0.1	A	5.6	0.0	A
	T	10.3	1.5	B	13.1	1.1	B
	R	13.8	1.5	B	19.2	1.1	C

Table 4: Peak Hour Levels of Service at the State Highway 8 / Springvale Road / Hazlett Street Intersections (with Plan Change)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 8 (south)	L	-	-	-	-	-	-
	R	-	+0.1	-	-	-	-
Springvale Road	L	-	-	-	-	-	-
	T	+1.7	+0.5	B to C	+9.4	+2.8	C to D
	R	+2.7	+0.5	-	+9.9	+2.8	C to D
State Highway 8 (north)	L	+0.2	+0.1	-	+0.1	-	-
	R	-	-	-	-	-	-
Hazlett Street	L	-	-	-	-	-	-
	T	+0.8	+0.4	A to B	+0.6	+0.1	-
	R	+1.1	+0.4	-	+1.8	+0.1	-

Table 5: Difference in the Peak Hour Levels of Service at the State Highway 8 / Springvale Road / Hazlett Street Intersections (with and without Plan Change)

7.1.2. As would be expected, queues and delays increase due to the traffic generated by the rezoned site. In practice though, there a minimal effects on each turning movement other than for Springvale Road in the evening peak hours, where queues increase by up to 3 vehicles and additional delays are in the order or 10 seconds per vehicle. Given that this is associated with



the right-turn movement from a minor approach (which is always the turn and approach that experiences the greatest delays), this outcome is not unusual.

- 7.1.3. The greatest level of service is D in each case, which is not unreasonable for an intersection in the peak hour (especially noting that the analysis allows for ten years of ambient traffic growth plus full development of the site using the higher of the trip generation rates and for all traffic to pass through this location).

7.2. *Revisions to Existing Roads and Site Access*

- 7.2.1. As set out previously, there is currently an existing shortfall in the intersection geometry because there is no left-turn lane from State Highway 8 (north) to Springvale Road. As traffic volumes grow due to ambient growth, the need for this turning lane will also increase. Waka Kotahi typically prefers to have left turning lanes separated from the through traffic lane in order to ensure that left-turning vehicles do not obstruct the visibility of any other through traffic, meaning that the formed width of the lane is greater than if the lane was constructed to be immediately adjacent to the through lane.
- 7.2.2. However, in this case the southbound traffic lane of State Highway 8 is separated from the site boundary by more than 19m, meaning that there is ample width for an appropriate left-turn lane to be constructed wholly within the existing legal highway corridor. That is, no additional land is required within the site in order for the turning lane to be constructed.
- 7.2.3. No revisions are required to be made to the formed width of the state highway as a result of the additional traffic generated by development of the site.
- 7.2.4. The site access will need to be upgraded and formed as a road, but there are no impediments to achieving an appropriate layout. Applying the warrants for turning lanes noted previously, it is unlikely that any auxiliary lanes will be required due to the relatively low traffic flows, but this can be assessed further at time of subdivision. Springvale Road in this location has a 40m legal width, which is ample for widening the seal to provide turning lanes, in the (unlikely) event that they were to be required.
- 7.2.5. As noted above, the traffic lanes on Springvale Road are each 3.5m wide, but the shoulder width is variable, between 0.3m and more than 2m. Arterial Roads are not considered within the Council's Engineering Code of Practice, but Collector Roads are expected to have a 7.0m carriageway width and metalled shoulders of 0.25m. Springvale Road provides this carriageway width and has sealed shoulders. It is therefore considered that the current formation of Springvale Road is appropriate for the expected increase in traffic associated with development of the site.
- 7.2.6. If any widening is required, this can be considered further when land use / subdivision consents are sought. The legal width of the road is easily able to accommodate any minor improvements in the width.

7.3. *Non-Car Modes of Travel*

- 7.3.1. It is unlikely that development of the site will lead to increased volumes of walking and cycling, as the nature of industrial activities is that they tend to be focussed on movement of goods and materials using motorised vehicles. If there are movements associated with employee travel, these will be moderate (due to the size of the site) and consequently it is not considered that any additional infrastructure is required for pedestrians or cyclists. The underpass beneath



the highway also provides a viable way in which movements can be carried out between the site and the district roads within Clyde.

- 7.3.2. However, it is commonly accepted that pedestrians will walk for a maximum of 1km to a destination, and cyclists will travel for a maximum of 3km. Anticipating that all movement via the underpass, approximately 35% of the residential areas of Clyde are within a viable walking distance of the site with all of Clyde being within a 3km cycling distance. The site is therefore well-located for these modes of travel, with the routes being lightly-trafficked district roads subject to a slow (50km/h) speed limit.
- 7.3.3. The size of the subdivision is not sufficient that it will give rise to the need for a public transport service.

7.4. Road Safety

- 7.4.1. The crash history in the vicinity of the site does not indicate that there are any particular features or factors that would be affected by development permitted under the rezoning.
- 7.4.2. The site access can be expected to meet current guides and standards, and therefore is highly unlikely to give rise to an adverse road safety effect.
- 7.4.3. It is anticipated that the proposed access to the Site will meet current guides and standards, and as such, can be expected to function safely. For a speed limit of 80km/h, sight distances of 210m would be expected under the Austroads Guide to Road Design Part 4A ('Unsignalised and Signalised Intersections'). This is achieved towards the east. Towards the west, the presence of the intersection with the highway serves to reduce the sight distances but vehicles approaching from this direction must have slowed to negotiate the intersection geometry (to avoid losing control) and will therefore not be travelling at the posted 80km/h speed limit. The sight distance provided will be in the order of 160m, which is appropriate for an operating speed of 70km/h. Appropriate sightlines will therefore be provided in each direction for traffic turning to and from the site.



8. Statutory Framework

8.1. Introduction

- 8.1.1. There are a number of statutory documents that are relevant to plan change requests. These are discussed in detail below, together with an assessment of whether the plan change request aligns with the strategic guidance given.

8.2. Otago Regional Land Transport Plan 2021-2031

- 8.2.1. The purpose of the RLTP is to support a vision of *“a transport system providing integrated, quality choices that are safe, environmentally sustainable and support the regions wellbeing and prosperity”*.

- 8.2.2. The key long-term strategic objectives are to:

- Enable inclusive access by improving the transport choices people across Otago and Southland have to connect with each other and participate in society;
- Invest in healthy and safe people by prioritising investment in areas of highest risk to reduce injury and support active travel;
- Support the regions' transition to net zero carbon emissions for improved environmental sustainability;
- Develop greater understanding of risk from natural and human-made hazards and improve the regions' assets for better resilience and security, and
- Contribute to Otago and Southland's economic prosperity by investing in network deficiencies that limit the movements of people and products, and create a resilience risk to economic activity.

- 8.2.3. The site is well located in respect of Clyde, with walking and cycling being viable transport choices. If there was to be a local bus network within Clyde in future, or if longer-distance services were to stop nearby, then one location would be in the vicinity of the State Highway 6 / Springvale Road intersection. This would therefore result in the site being accessible by public transport.

- 8.2.4. Traffic generated by development of the plan change area can be accommodated on the roading network with appropriate levels of service, and so there are no reasons to anticipate that adverse road safety effects would arise nor that matters relating to the resilience of the transport network would be generated with regard to efficiency.

- 8.2.5. The site gains access onto an Arterial Road which connects to a state highway. This aligns with the main function of these roads, to support the movement of goods and support economic wellbeing.

8.3. Otago Regional Public Transport Plan 2021-2031

- 8.3.1. This Plan focusses on areas with higher numbers of residents, such as the Wakatipu Basin and Dunedin. As such, there is little mention made of Clyde or surrounding areas. However the plan change request does not preclude the ability to implement public transport in future.



8.4. Central Otago District Plan

8.4.1. The District Plan sets out a number of transportation-related rules with which any development is expected to comply. Although the proposal is for a plan change, consideration of these rules is important at this stage in order to identify whether the plan change provisions should seek to exempt development from any rules, or conversely, to introduce new rules specific to the site.

8.4.2. Consequently an assessment of the plan change provisions against these rules has been undertaken and the results are summarised below.

8.4.3. District Plan Part 12.7.1: Access Standards from Roads: Part (ii): Sight Distances

8.4.3.1. Under the District Plan, assuming that roads within the site are subject to a speed limit of 50km/h then each lot requires a sight distance of 40m at its access. This can be achieved through careful site layout design.

8.4.3.2. A sight distance of 200m is required at the proposed new intersection serving the site. As discussed above, this will not be achieved towards the west due to the presence of the state highway, but the sight distance available will be appropriate for the prevailing vehicle speeds.

8.4.4. District Plan Part 12.7.1: Access Standards from Roads: Part (iii): Access to Rural Arterial Roads

8.4.4.1. This part of the District Plan requires accesses to be constructed to particular layouts. These can be achieved.

8.4.5. District Plan Part 12.7.2: Parking: Part (i): Number of Spaces

8.4.5.1. At this stage, no detailed layout has been produced for the site. However their likely size means that each will be able to provide a range of car parking spaces, meeting Plan requirements.

8.4.6. District Plan Part 12.7.2: Parking: Part (ii): Parking in Excess of Three Spaces

8.4.6.1. It is likely that lots will provide more than three parking spaces, but the design is able to achieve the provisions of this rule.

8.4.7. District Plan Part 12.7.3: Loading and Manoeuvring: Part (i): Servicing Activities

8.4.7.1. The proposal is for industrial activity and so the loading and unloading of goods is likely to occur frequently. There is no reason why loading would need to be carried out from the road, and the site will be designed to accommodate the expected types of larger vehicles that may be present.

8.5. Council's Engineering Code of Practice

8.5.1. The Council has a Code of Practice which sets out appropriate widths for the internal roads within the plan change site. It is not considered that there are any reasons why these could not be met.

8.6. Waka Kotahi Planning Policy Manual

8.6.1. The Planning Policy Manual sets out that there is expected to be a separation distance between any access onto a side road and a state highway. This can be achieved.



8.7. Other Matters

8.7.1. The Austroads Guide to Road Design Part 4 (Parts B.2.2) sets out that it is desirable for intersections to be separated from one another by five seconds of travel time in order to allow drivers to process the intersection and road layout. As set out above, it is unlikely that drivers would approach the site from the west at speeds of 80km/h because of the need to negotiate the geometry of the intersection with the state highway. However even allowing for this speed, this would mean that a separation of 115m would be required between the proposed site access and the highway, and this can be achieved.

8.8. Summary

8.8.1. It is considered that the plan change request is aligned with the strategic objectives of the Otago Regional Land Transport Plan, as relevant to this particular area. The Otago Regional Public Transport Plan is not particularly relevant due to the focus on other areas, but the plan change request is not contrary to it.

8.8.2. The site layout is likely to be able to comply with all the transportation requirements of the District Plan, other than in respect of Part 12.7.1(ii) Sight Distances. However the non-compliance with the sight distance arises due to the proximity of the site to the State Highway 8 / Springvale Road intersection, with the intersection geometry also meaning that vehicle speeds will be reduced in the immediate area, which in turn means that shorter sight distances will be adequate.

8.8.3. In view of the situation, it is not considered that the plan change proposal needs to include any specific transportation-related Rules. Rather, the existing Rules of the District Plan are appropriate, and resource consent applications can be made in the event that the detailed site layout design introduces non-compliances with these.



9. Conclusions

- 9.1. This report has identified, evaluated and assessed the various transportation matters of a private plan change request to rezone a site at Springvale Road to from Rural to Industrial zoning.
- 9.2. Overall it is considered that the traffic generated by the rezoned site can be accommodated on the adjacent roading network without capacity or efficiency issues arising. Modelling of the State Highway 8 / Springvale Road / Hazlett Street intersection shows that under a 'worst case' scenario of all development within the site being light industrial, and all traffic passing through the intersection, delays for vehicles turning right out of the site in the evening peak hour would remain modest with low queues. However, it is more likely that a mix of light and heavy industrial activities would establish, and that a proportion of traffic would travel to/from the east, meaning that delays will be lower.
- 9.3. There is an existing shortfall in the geometry of the State Highway 8 / Springvale Road intersection, as an auxiliary left-turn lane is required under current traffic volumes but one is not provided (although drivers use the existing wider shoulder as a de-facto turning lane). Modelling of the intersection has been based around a left-turn lane (whether formal or informal) being in place. The legal highway here is wide and development within the site would not limit the ability for Waka Kotahi to construct a turning lane.
- 9.4. The legal width of Springvale Road is also substantial and ample for widening the seal as appropriate for the site access.
 - 9.4.1. It is unlikely that development of the site will lead to increased volumes of walking and cycling, as the nature of industrial activities is that they tend to be focussed on movement of goods and materials using motorised vehicles. However in respect of employee travel, approximately 35% of the residential areas of Clyde are within a viable walking distance of the site with all of Clyde being within a 3km distance. The site is therefore well-located for these modes of travel.
- 9.5. The crash history in the vicinity of the site does not indicate that there would be any adverse safety effects from the requested rezoning. New intersections and roads can be constructed to meet current guides and standards, and as such, can be expected to function safely. Sight distances will be appropriate for the prevailing vehicle speeds.
 - 9.5.1. The plan change request is aligned with the strategic objectives of the Otago Regional Land Transport Plan, and the site layout is likely to be able to comply with all the transportation requirements of the District Plan, other than in respect of Part 12.7.1(ii) Sight Distances. However the non-compliance with the sight distance arises due to the proximity of the site to the State Highway 8 / Springvale Road intersection, but this also reduces vehicle speeds and means that shorter sight distances can be supported.
- 9.6. Overall, and subject to the preceding comments, the development facilitated by the plan change request can be supported from a traffic and transportation perspective, and accordingly it is not considered that there are any traffic/transportation reasons why the plan change could not be recommended for approval.

Carriageway Consulting Limited
May 2024



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Appendix 'H' - Soil Contamination Assessment



27 March 2024

Hartley Road Partnership
c/- Patterson Pitts Group
8 Skird Street
Alexandra 9320

Preliminary Environmental Site Investigation at the Corner of Springvale Road and State Highway 8, Clyde

Our Reference: 24002

1 Introduction

Peter Dymock of Paterson Pitts Group (PPG) requested, on behalf of Hartley Road Partnership, that JKCM Ltd, trading as Insight Engineering (IE), undertake a preliminary environmental site investigation (PSI) of the property at the northern corner of the intersection of Springvale Road and State Highway 8, Clyde (herein referred to as “the site”) as outlined in our Short Form Agreement (reference P24002, fully executed on 2 February 2024).

Figure 1 (under Appendix 1) indicates the location of the site, which we understand is proposed to be the subject of a Private Plan Change application to rezone the site from Rural to Industrial. A plan provided by PPG is provided in Appendix 2.

The purpose of this PSI was to assess the suitability of the site for industrial / commercial use, according to the Resource Management (*National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*) Regulations¹ (herein referred to as the NES). This investigation was undertaken in general accordance with the Ministry for the Environment (MfE) *Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand*².

2 Objectives of the Investigation

The objective was to determine if potentially contaminating historical activities pose an unacceptable risk to human health if the land was to be used for industrial or commercial purposes.

2.1 Approach

IE completed the following scope of work to satisfy the investigation objectives:

2.1.1 Review of Site Information

Several sources were contacted for information relating to the sites past and present uses and to identify any other environmental issues which may be on record. This consisted of:

- Undertaking a walkover inspection of the site, as well as the immediate surrounding area, to describe current conditions and assess whether any visual or olfactory evidence of contamination is present at the site;
- Interviewing the current owner of the property, to obtain information relating to potentially contaminating activities that may have been undertaken at the site and surrounding area;
- Review of publicly available data describing the local geology and hydrogeology;
- Review of the Otago Regional Council Hazardous Activities, Industries and Bore Search database in terms of any property specific records of hazardous activities or industries that are held in their database of potentially contaminated sites;
- Reviewing the Central Otago District Council NES Records Search statement to determine whether any records of contamination at the site are held in their database;
- Reviewing the current and historical Certificates of Title; and
- Reviewing publicly available historical aerial photographs and maps of the site and surrounding area.

3 Site Description

Site information is summarised in Table 1.

Table 1: Site Information

Location	Northern corner of Springvale Road and State Highway 8
Legal Description	Section 1 Block XXXIV Town of Clyde, Part Block XXXIV Town of Clyde, Part Block XXXIII Town of Clyde, Block XXXII Town of Clyde and Part Block XXXI Town of Clyde
Property Ownership	Leon Francis Van Boxtel, Jane Marie Scott, Christine Elizabeth Ramage and Lianneke Mechelina Adriana Lodge
Current Site Use	Firewood production
Proposed Site Use	Industrial / Commercial
Site Area	Approximately 65,901 m ² (6.5901 ha)
Territorial Authorities	Central Otago District Council (CODC) Otago Regional Council (ORC)
Zoning	RU (RR): Rural Resource Area and Rural Residential

The site setting is summarised in Table 2.

Table 2: Site Setting

Topography	The majority of the site is either flat or slopes gently towards the south. The northern and north eastern portion of the site rises moderately to steeply towards the north.
Local Setting	The site is located on the eastern fringe of Clyde. The surrounding area consists generally of disused land (north), a cemetery (east), standard residential (west, beyond SH8) and commercial (south, despite the area being zoned Rural Residential).

Table 2: Site Setting (cont.)

Nearest Surface Water & Use	The Clutha River / <i>Mata-Au</i> is located approximately 930 m south west of the site. The Clutha River / <i>Mata-Au</i> is used as a source of potable water as well as for recreational, electricity generation and irrigation purposes.
Geology	The GNS New Zealand Geology Webmap³ indicates that the site is located within the Late Pleistocene river deposits geological unit, described as <i>“Unweathered to slightly weathered, loose, sandy to silty, well rounded gravel usually on large outwash plains”</i>. The surface material observed during the site visit is broadly described as light brown sandy, silty gravel.
Hydrogeology	According to a report completed by ORC ⁴ , the site is located within the unconfined Dunstan Flats Aquifer which consists of highly permeable sandy gravel. Groundwater is considered likely to flow towards the south west at a RL of 141 m above mean sea level (amsl), which is approximately 30 m below ground level (bgl).
Groundwater Abstractions ⁵	No groundwater abstraction permits were found to be located within 250 m of the site boundaries.
Discharge Consents ⁵	No current or historical discharge consents have been approved for properties within 250 m of the site.

3.1 Current Site Conditions

Claude Midgley of IE completed a site walkover inspection on 8 February 2024. Observations made at that time are summarised in Table 3 and photographs are presented in Appendix 3.

Table 3: Current Site Conditions

Visible signs of contamination	A small stockpile of treated timber boards and pegs was observed on the eastern side of a caravan located in the north eastern portion of the site. The treated timber covered an area estimated to be less than 10 m². Stockpiles of imported soil were observed in the south eastern portion of the site. Two small oil stains were observed in the area near to the caravan and another oil stain was observed in the area where four engine oil containers were stored near to the firewood production area west of the caravan. No other indicators of contamination were evident within the site boundaries.
Surface water appearance	No surface water was present at the time of the site walkover inspection.
Current surrounding land use	Residential, commercial and reserve land surrounds the property.
Local sensitive environments	No sensitive environments are located within 200 m of the site.
Visible signs of plant stress	Apart from evidence of dry, summer conditions, no visible signs of plant stress were noted.

3.2 Interview with Current Owner

Leon Van Boxtel (*pers. comm.*), owner of the site, provided the following information:

- Mr Van Boxtel's parents, Franciscus and Francisca Van Boxtel, owned the site until he and the other owners inherited the land in 2003.
- Mr Van Boxtel's parents managed a poultry farm that included use of the site until 1980.
- No rabbit control has been undertaken, and no waste has been buried, at the site.
- As far as Mr Van Boxtel is aware, none of the activities undertaken at the site could have resulted in contamination impacts.

3.3 Certificates of Title

Historical Certificates of Title (Appendix 4), provided by PPG, were reviewed by IE. Note that not all text could be deciphered due to the high contrast of the scanned images which resulted in loss of parts of the letters in some words. Ownership records indicate the following:

- 1872: James Hazlett purchased a property that includes the site. According to The Cyclopedia of New Zealand⁶, Mr Hazlett conducted a large general merchant business in the Otago goldfields between 1863 and 1878, after which he moved to Dunedin to join a Mr Mackerras in the firm of Mackerras and Hazlett (merchants and importers).
- 1914: Transmission to Bridget Agnes, William Thomas Hazlett and Luke Clyde Hazlett.
- 1915: Transmission to William Thomas Hazlett and Luke Clyde Hazlett.
- 1954: Transmission to Luke Clyde Hazlett as survivor.
- 1964: Transfer to William Lewis Holdom, a carpenter from Clyde.
- 1964: Transfer to Roy Walker, a farmer from Alexandra.
- 1965: Transfer to Franciscus Antonius Van Boxtel, a poultry farmer from Clyde and Francisca Martina Van Boxtel, his wife.
- 1980: Transfer to Francisca Martina Van Boxtel as survivor.
- 1984: Gazette Notice declaring part of the land (2,005 m²) is acquired for road and shall vest in the Crown.
- 1995: Transfer to Leon Francis Van Boxtel, a pipelayer from Clyde, Jane Marie Scott, a married woman from Kurow, Christine Elizabeth Ramage, a married woman of Clyde and Lianneke Mechelina Adriana Lodge, a married woman from Christchurch.

3.4 ORC Property Database

IE reviewed the ORC Hazardous Activities, Industries and Bore Search database⁷ on 7 February 2024. The search confirmed that the site is not recorded on the database.

The nearest property recorded on the database is located approximately 275 m south east of the site:

- An orchard at 52 Springvale Road (HAIL.02009.01) is recorded due to the presence of an orchard. The property has not been investigated, but contamination impacts (if any) are not considered likely to have the potential to migrate to the site.

3.5 CODC NES Records Search

The NES Records Search (Appendix 5) completed by Adam Vincent, Planning Officer - Consents, on 14 February 2024. The following information was provided:

- No resource consents are associated with the site.
- Seven building consents were issued between 1958 and 1972 for the construction of a poultry house, two egg rooms with an associated packing and store room, two hen houses, additions to the existing poultry house and a shed.
- Council's aerial photographs, dating back to 2003, indicate the presence of stored timber (2023 photograph).

The NES Records Search also confirms that no preliminary or detailed site investigations could be found on the property file.

3.6 Review of Historical Aerial Photographs and Maps

Photographs in the Crown Collection⁸ and Google Earth⁹, as well as topomaps on the MapsPast¹⁰ website, have been reviewed to obtain information on the past uses of the site. Aerial photographs taken between 1958 and 2023, as well as maps created between 1929 and 2019, have been reviewed. Table 4 summarises the features visible in each image.

Table 4: Historical Aerial Photographs

1929 ¹⁰	The site, which contains the letter 'E' from the label for Clyde, is located near to the north eastern town belt which is indicated by a dark black line broken intermittently by single black dots. A railway line is located south and west of the site. A creek towards the south east is labelled "Mutton Town Gully". No significant features are visible at the site or in the surrounding area.
1939 ¹⁰	No significant changes are apparent at the site or in the surrounding area.
1949 ¹⁰	The railway line is now depicted with a thick black line. No significant features are visible at the site or in the surrounding area.
1958 ⁸	The site is visible as an undeveloped area between the Clyde Cemetery and the town of Clyde. Springvale Road, which extends unbroken into Clyde, is visible at the southern site boundary. A water race is visible in the norther portion of the site. In the surrounding landscape, the cemetery is visible towards the east. The land on the southern side of Springvale Road appears to be used for growing pasture as linear features likely to represent flood irrigation mounds are visible in that area. There are no other significant features at the site or in the surrounding area.
1966 ⁸	Two rows of poultry shelters are visible at and near to the north western site boundary. The shelters are visible as small square objects and several of them are located on the adjacent land towards the west, which is now State Highway 8. Tracks are visible between the poultry shelters and a large rectangular building located approximately 145 m west of the western site boundary. Linear features resembling flood irrigation mounds have been established across approximately the southern half of the site, however the mounds do not extend into the south eastern corner of the site. No other significant features are visible at the site or in the surrounding area.
1968 ⁸	The poultry shelters have been repositioned so that all but two are located in two rows near to the centre of the site, within the area where flood irrigation mounds are visible. No other significant features are visible at the site or in the surrounding area.
1969 ¹⁰	A water race is marked with a blue line in the northern portion of the site. The blue line includes blue arrows pointing towards the west. The cemetery is labelled towards the east of the site and black squares in the area west of the site indicate the presence of buildings. Springvale Road is marked as 'Hartley Road' and the railway line is visible as a bold black line with intermittent dashes perpendicular to the line. No other significant features are visible at the site or in the surrounding area.
1974 ⁸	The row of poultry shelters has been moved again. This time, the shelters are positioned in one row at the original location of the shelters in the 1966 photograph. Apart from scrub vegetation growing further south of the water race than in the previous photograph, there are no other significant changes at the site or in the surrounding area.

Table 4: Historical Aerial Photographs (cont.)

1976 ⁸	No significant changes are apparent at the site or in the surrounding area.
1977 ⁸	No significant changes are apparent at the site or in the surrounding area.
1978 ⁸	The row of poultry shelters has been shifted towards the south west and is no longer present on the site. The south eastern corner of the site has been covered with a large, light-coloured stockpile resembling gravel. The neighbouring property towards the south has been cleared of vegetation and covered with a light-coloured material resembling gravel. No other significant changes are apparent at the site or in the surrounding area.
1979 ⁸	The gravel stockpile in the southern eastern corner of the site has halved in size. The neighbouring property at the western boundary (State Highway 8) has been covered with a light-coloured material resembling gravel. Gravel is also visible on the site, extending between 40 and 50 m east of SH8 in the south western two-thirds of the site. Further south of the site, the asphalt-sealed portion of SH8 is visible extending towards the south east. No other significant changes are apparent at the site or in the surrounding area.
1979 ¹⁰	Apart from the realignment of Sunderland Street towards the north east, along the north western site boundary and a new road between the site boundary and the railway line, there only other significant change is a black square which indicates the presence of a building on the southern property.
1981 ⁸	The gravel stockpiles no longer being present on the site. The intersection of Springvale Road and SH8 has been formed and SH8 is completely sealed beneath asphalt. A large rectangular building has been constructed on the neighbouring property towards the south. A railway line with a few train carriages is visible east of the large rectangular building. No other significant changes are apparent at the site or in the surrounding area.
1982 ⁸	No significant changes are apparent at the site or in the surrounding area.
1984 ⁸	A new track has been established between Springvale Road and the south western corner of the site. The track terminates at a light-coloured rectangular area that appears to have been cleared of vegetation. No other significant changes are apparent at the site or in the surrounding area.
1985 ⁸	No significant changes are apparent at the site or in the surrounding area.
1989 ¹⁰	There are no significant changes compared with the 1979 map.
1999 ¹⁰	There are no significant changes compared with the 1989 map.
2005 ⁹	The majority of the site remains undeveloped. The light-coloured rectangular area visible in the 1985 photograph is no longer present. Three soil stockpiles, an unidentifiable narrow rectangular object, a vehicle / caravan and additional smaller unidentifiable objects are visible in the south eastern corner of the site, where the gravel stockpiles had been placed in 1978. New dwellings have been constructed in the area west and south west of the site. No other significant changes are apparent at the site or in the surrounding area.
2007 ⁹	With the exception of a vehicle and two unidentifiable objects in the area south west of the stockpiles, there are no significant changes apparent at the site or in the surrounding area.
2009 ¹⁰	There are no significant changes compared with the 1999 map.

Table 4: Historical Aerial Photographs (cont.)

2010 ⁹	The image is in monochrome. The south eastern portion of the site remains relatively unchanged. A track has been established between the site entrance and the water race in the north western portion of the site. The water race appears to have failed in the area where the track terminates. The lighter-coloured ground surface in that area suggests that reconstruction works may have been undertaken to repair the water race. No other significant changes are apparent at the site or in the surrounding area.
2011 to 2019 ⁹	The south eastern portion of the site becomes progressively more utilised between 2011 and 2019. The area is covered with additional gravel, two orange-brown stockpiles of material resembling sawdust or firewood appear, truck trailers are parked near to the south eastern corner of the site, two caravans are parked near to the north eastern corner of the site. Additional soil stockpiles are placed west of a track that leads from the site entrance to the western portion of the site. By the end of 2019, only one caravan and the soil stockpiles remain. Long dark-coloured linear objects resembling water pipes are visible in the western portion of the site. No other significant changes are apparent at the site or in the surrounding area during this time.
2019 ¹⁰	Apart from Springvale Road being labelled, there are no other significant changes compared with the 2009 map.
2021 ⁹	With the exception of the dark linear objects no longer being located on the site, no significant changes are apparent at the site or in the surrounding area.
2023 ⁹	Several vehicles are visible in the area west of the caravan at the north eastern corner of the site. Several felled trees are visible in stacks further west of the vehicles. The stacks of timber are surrounded by stockpiles of orange-brown material resembling firewood. No other significant features are visible at the site or in the surrounding area.

3.7 Summary of Identified Hazardous Activities and Industries

The following activities noted on the MfE Hazardous Activities and Industries List ¹¹ (HAIL) have been identified at the site during review of the site history:

Category A17 – Storage tanks or drums for fuel, chemicals or liquid waste.

- This category is represented by the presence of small (~20L) containers of engine oil stored on site. The risk to health from these sources is considered to be low.

Category A18 – Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside.

- This category is represented by the presence of small stockpile of treated timber posts adjacent to the caravan near to the north eastern corner of the site. The risk to health from this source is considered to be low because of the limited scale of the potentially impacted area and the low likelihood of food to be grown in that area for human consumption.

Category G5 – Waste disposal to land.

- This category is represented by the importation of soil from unknown sources and placement of the soil in stockpiles on the site. The risk to health from these sources is unknown.

According to Regulation 5 of the NES, the Regulations apply if a HAIL activity has been undertaken, or currently is being undertaken on the property.

4 Preliminary Contamination Screening

To ascertain whether any indicators of gross contamination were present at the site, ten soil samples were collected from areas of interest then scanned by E3 Scientific using a calibrated X-Ray Fluorometer (XRF) to estimate the heavy metals concentrations.

XRF works based on the principle of the interaction between X-rays and atoms in a sample. When a material is exposed to X-rays, it undergoes a process called X-ray fluorescence. This process helps identify and quantify the elements present in the sample. The technique is widely used in various fields, including geology, archaeology, environmental science and materials science for non-destructive and rapid elemental analysis of diverse samples.

The accuracy of XRF analysis using a portable machine is generally considered to be quite good, but the level of accuracy can vary depending on several factors including calibration standards, the composition of the sample matrix, sample homogeneity and environmental conditions such as soil moisture.

XRF Survey

The following was undertaken during the XRF survey:

- IE collected samples from the areas of interest at the site (refer to Figure 2) using a new pair of nitrile gloves for each sample. The equipment (hand trowel) was decontaminated using a triple wash procedure with potable water, Decon 90 solution and deionised water between samples. The samples were placed directly into new ziplock bags and labelled with the name corresponding to each individual sample location. The bags were agitated in an attempt to homogenise the samples.
- Samples were delivered to E3 Scientific staff who completed the XRF scans and provided IE with data for a suite of heavy metals (As, Cu, Cr, Pb, Ni and Zn).
- Areas of interest (refer to Figure 2) are summarized as follows: SP (soil stockpile); TT (treated timber storage area); PP1 (poultry pen); NCB (north corner background).

4.1.1 Quality Assurance / Quality Control

The quality assurance / quality control (QA / QC) procedures employed during the works included:

- E3S calibrated the XRF before and after scanning the samples; and
- During the site investigation every attempt was made to ensure that cross contamination did not occur through the use of the procedures outlined within this document.

4.2 Investigation Criteria

4.2.1 Soil Criteria

Human Health Criteria

The investigation criteria referenced in this report have been selected from the NES to assess risks to human health. Where a soil contaminant standard (SCS) was not available, the hierarchy detailed in the *MfE Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values*¹² was used to select applicable criteria.

SCSs, or other appropriate criteria for industrial / commercial land use have been selected considering the proposed end use of the site. Industrial / commercial SCSs were also used to assess the risks to human health during the disturbance of soil associated with excavation activities such as installation / maintenance of underground services and other construction works required as part of the site development.

Ecological Health Criteria

Landcare Research and Hawke's Bay Regional Council produced a report¹³ which updates the database of naturally occurring (referred to as background) concentrations of heavy metals in New Zealand. The database provides a range of expected concentrations of selected heavy metals in New Zealand, accessed online via an interactive map interface. XRF results less than the upper estimates for each of the heavy metals in the database, at the site location, are considered to qualify as 'cleanfill' according to the MfE definition¹⁴. Furthermore, the background concentrations represent criteria that are considered appropriate for the protection of ecological receptors.

4.3 Results

4.3.1 Soil Encountered

Near surface soil encountered across the majority of the site was described as light brown sandy silty gravel.

4.3.2 XRF Survey

Table 5 compares the estimated soil contaminant concentrations in the samples with the adopted investigation criteria described in Section 4.2.1.

Table 5: XRF Estimates Compared with Investigation Criteria

Analyte	Investigation Criteria		Investigation Results									
	Ecological Health Criteria	Human Health Criteria	SP1	SP2	SP3	SP4	SP5	SP6	SP7	TT1	PP1	NCB
Land Use	Predicted Background Concentrations (Cleanfill Criteria) ^A	Industrial / Commercial and Excavation Activities ^B										
Heavy Metals												
Arsenic	5.9	70	<u>9</u>	<u>11</u>	<u>10</u>	<u>10</u>	<u>9</u>	<u>9</u>	<u>15</u>	<u>32</u>	<u>9</u>	4
Chromium ^D	25	6,300	ND	ND	<u>97</u>	ND	ND	ND	ND	ND	ND	<u>60</u>
Copper	23.5	>10,000	ND	ND	ND	ND	ND	ND	10	22	ND	8
Lead	17.2	3,300	<u>23</u>	18	12	8	17	8	9	<u>84</u>	14	16
Nickel	14.3	6,000 ^C	ND	ND	12	ND	13	10	<u>22</u>	ND	14	14
Zinc	62.9	400,000 ^C	58	35	<u>67</u>	54	59	42	<u>70</u>	<u>81</u>	55	36

Notes:

All values in mg/kg.

Bold text indicates concentration exceeds the Industrial / Commercial and Maintenance / Excavation Criterion.

Underlined text indicates concentration exceeds the estimated background concentration.

ND Indicates that the contaminant is not detected within the XRF limits of detection.

A Determining background soil concentrations of trace elements across New Zealand ¹³.

B The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health ¹.

C Australian National Environmental Protection Council (NEPC) National Environmental Protection (Assessment of Site Contamination) Measure Schedule B(1): Guideline on the investigation levels for soil and groundwater¹⁵. Health Investigation Level: HIL D (commercial / industrial).

D Criteria for Cr₆ presented as criteria for Cr₃ are non limiting.

5 Discussion

The XRF used in this assessment was used by trained staff and was calibrated before and after scanning the samples. The results are able to be interpreted in a meaningful way, even though laboratory verification of accuracy has not been undertaken during this screening exercise.

The results are considered representative of the contaminant conditions at the various sample locations, but the actual concentrations could be a few mg/kg higher or lower than the XRF estimates.

Given the fact that the SCSs for industrial / commercial land use are significantly higher than the concentrations estimated by the XRF survey, it is considered highly unlikely that the actual soil contamination concentrations exceed the industrial / commercial SCSs.

The XRF estimates are not considered likely to be inaccurate enough to result in actual significant contamination impacts not being detected at the sample locations. However, due to the background concentrations of most of the metals assessed in this investigation being relatively low, it is considered possible that areas with minor contamination impacts (above background, but below industrial / commercial SCSs) may not be detected.

6 Conceptual Site Model

A contamination conceptual site model, presented in Table 6, consists of three primary components to allow the potential for risk to be determined. These are:

- Source of contamination;
- Pathway to allow the contamination to mobilise; and
- Sensitive receptors which may be impacted by the contamination.

Table 6: Conceptual Site Model

Source	Pathway	Receptor
Naturally occurring heavy metals	Inhalation of dust Dermal absorption (direct contact) Ingestion of soil and / or produce grown in the soil	Maintenance / Excavation workers Site workers Current and future residents
Acceptable risk to human health?	Earthworks Associated with Land Development and Future Industrial / Commercial use Yes: Visual assessment of the site, as well as XRF screening of soil samples from locations of interest suggest that contamination impacts at the site do not pose a significant risk to human health when developing the site and when undertaking industrial / commercial activities.	

7 Conclusions

Information obtained as part of this investigation (refer to Section 3) indicates that the site has been used for commercial poultry farming (1960s and 1970s), storage of inert construction materials (gravel in the early 1980s) and production of firewood (2010s-2024).

Evidence was found that three HAIL¹¹ activities have occurred within the site boundary, therefore IE undertook preliminary contamination screening by collecting samples from ten areas of interest (refer to Figure 2) and submitting them to E3 Scientific for XRF scanning. The results confirmed that minor contamination impacts have occurred because concentrations of one or more heavy metals (arsenic, chromium, lead, nickel and / or zinc) marginally exceed the naturally occurring concentrations in all samples. As a result, soil from the site cannot qualify for use as cleanfill.

None of the heavy metals assessed in this investigation were found at concentrations near to the industrial / commercial SCSs. The XRF data is considered to be appropriate to demonstrate that the site is highly unlikely to contain contamination impacts that pose a significant risk to human health when undertaking industrial / commercial activities, as well as when excavating soil at the site.

Based on the current contamination status of the site, given the potential sources identified, it is considered highly unlikely that there will be a risk to human health if the Zone was changed to industrial / commercial.

Furthermore, given the following factors, the risk to ecological receptors is considered negligible:

- Marginal contamination impacts (slightly above natural concentrations);
- The significant depth of groundwater at the site (approximately 30 m bgl); and
- The lack of a significant surface watercourse within 200 m of the site.

8 Recommendations

It is recommended that the application to rezone the site for industrial / commercial use be approved because no contamination impacts exceeding the industrial / commercial SCSs have been discovered in the ten areas of interest identified during the site history and site walkover assessments.

Advice from ORC confirms that their Consent required for soil disturbance at a site where the contaminant concentrations exceed the naturally occurring levels and also pose an immediate or long-term hazard to the environment. As the risks to the environment were considered to be negligible at this site, soil disturbance at the site does not meet the criteria to require Consent under Rule 5.6.1 of the Regional Plan Waste¹⁶

9 References

1. Ministry for the Environment 2012: Users' Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
2. Ministry for the Environment 2021: Contaminated Land Management Guidelines No.1: Reporting on Contaminated Sites in New Zealand
3. GNS Webmap Institute of Geological and Nuclear Sciences 2013: 1:250,000 Geology. Viewed at: <http://data.gns.cri.nz/geology/>
4. Otago Regional Council 2012: Alexandra Groundwater Basin Allocation Study.
5. Otago Regional Council 2024: Otago Regional Council Resource Consent Database. Viewed at: <http://data.orc.govt.nz/>
6. The Cyclopedia of New Zealand 2024: Mr James Hazlett. Viewed at: <https://nzetc.victoria.ac.nz/tm/scholarly/tei-Cyc04Cycl-t1-body1-d2-d17-d19.html>
7. Otago Regional Council 2024: Otago Regional Council – Mapping Resource. Hazardous Activities, Industries and Bores Search. Viewed at: <https://maps.orc.govt.nz/portal/apps/MapSeries/index.html?appid=052ba04547d74dc4bf070e8d97fd6819>

8. Local Government Geospatial Alliance 2024: Retrolens - Historical Image Resource Project. Viewed at: <http://retrolens.nz>
9. Google Earth v7.3.6.9796. Clyde, Central Otago, New Zealand. -45.192551° lon, 169.335855° lat, Eye alt 477 m. Airbus 2024. <http://www.earth.google.com>. [March 2024]
10. Mapspast 2024: Current and Historical Topographic Maps (Topomaps) of New Zealand. Viewed at: <http://www.mapspast.org.nz/>
11. Ministry for the Environment 2011: Ministry for the Environment Hazardous Activities and Industries List
12. Ministry for the Environment 2011: Contaminated Land Management Guidelines No.2 - Hierarchy and Application in New Zealand of Environmental Guideline Values.
13. Landcare Research New Zealand Limited and Hawke's Bay Regional Council 2023: Determining background soil concentrations of trace elements across New Zealand.
14. Ministry for the Environment 2002: A Guide to the Management of Cleanfills.
15. Australian National Environmental Protection Council 2013: National Environmental Protection (Assessment of Site Contamination) Measure Schedule B(1): Guideline on the investigation levels for soil and groundwater.

10 Limitations

- i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Hartley Road Partnership, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.
- ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.
- iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.
- iv. This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.
- v. This report is not to be reproduced either wholly or in part without our prior written permission.

Preliminary Environmental Site Investigation – Cnr Springvale Road and SH8, Clyde

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on 021 556 549 if you require any further information. The author is a Certified Environmental Practitioner (CEnvP) under the Environment Institute of Australia and New Zealand (EIANZ) accreditation system.

Report prepared by



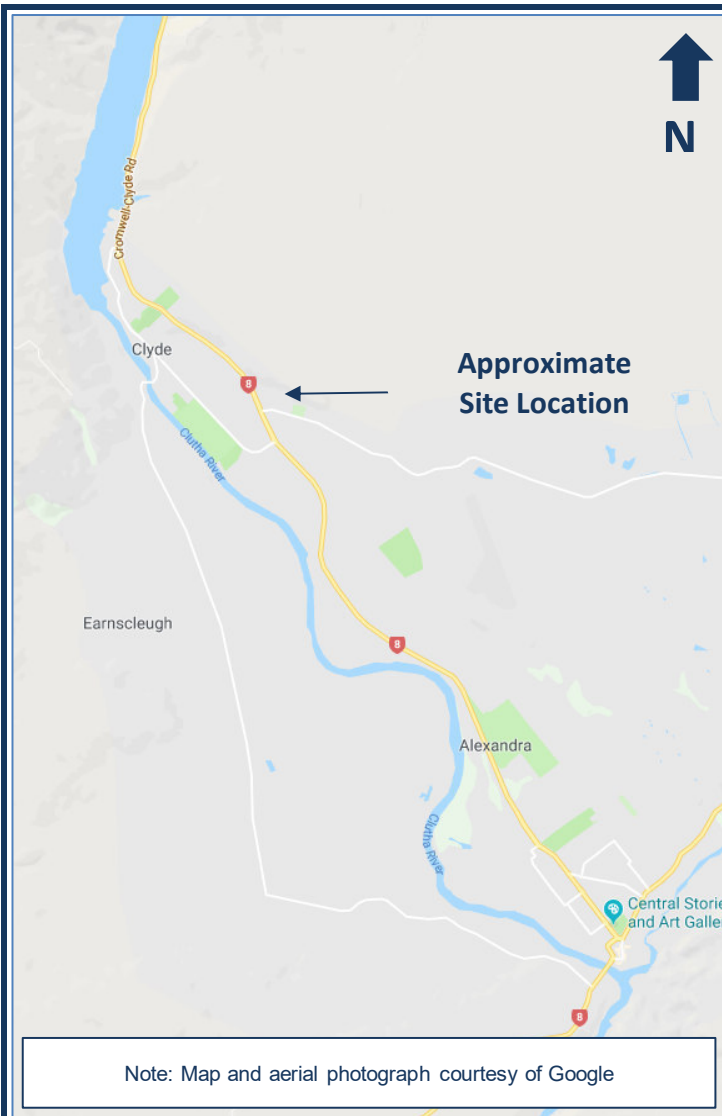
Claude Midgley, CEnvP

Associate Environmental Scientist



APPENDIX 1

Figures



Description	Site Location Plan	Figure Number	1	
Project	Preliminary Environmental Site Investigation at the Corner of Springvale Road and State Highway 8, Clyde	Date	Mar-24	
Client	Hartley Road Partnership	Drawn by	CM	
Project Number	24002	Approved by	JK	



Description	Sample Location Plan	Figure Number	2	
Project	Preliminary Environmental Site Investigation at the Corner of Springvale Road and State Highway 8, Clyde	Date	Mar-24	
Client	Hartley Road Partnership	Drawn by	CM	
Project Number	24002	Approved by	JK	

APPENDIX 2

Proposed Private Plan Change Area



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!

No direct access to SH8 or
Springvale Road for any lot.

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8 Skird Street
Alexandra 9320

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

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Client & Location:

Hartley Road Partnership

Purpose & Drawing Title:

CONCEPT PLAN

FOR INFORMATION

Surveyed by:	BD	Original Size: A3	Scale: 1:1500	
Designed by:	.			
Drawn by:	KWG			
Checked by:	PD		DO NOT SCALE	
Approved by:	PD			
Job No:	Drawing No:	Sheet No:	Revision No:	Date:
A5202	PLAN	1	A	29/01/2024

APPENDIX 3

Site Photographs



Photo 1: Site viewed from the entrance in the south east, facing north



Photo 2: Treated timber stored near to the caravan in the north eastern portion of the site.



Photo 3: Treated timber stored near to the caravan.



Photo 4: Treated timber stored near to the caravan.

Description	Site Photographs	Photos	1 to 4	
Project	Preliminary Environmental Site Investigation at the Corner of Springvale Road and State Highway 8, Clyde	Date Taken	8/2/24	
Client	Hartley Road Partnership	Taken by	CM	
Project Number	24002	Approved by	JK	



Photo 5: Sample SP1, viewed from the north west facing south east.



Photo 6: Sample SP2, viewed from the south east facing north west.



Photo 7: Caravan and firewood production area, viewed from the east facing north west.



Photo 8: Minor surface soil stains near to the caravan.



Photo 9: Firewood production area west of the caravan.



Photo 10: Engine oil containers and minor staining of the surrounding soil.

Description	Site Photographs	Photos	5 to 10	
Project	Preliminary Environmental Site Investigation at the Corner of Springvale Road and State Highway 8, Clyde	Date Taken	8/2/24	
Client	Hartley Road Partnership	Taken by	CM	
Project Number	24002	Approved by	JK	



Photo 11: Site viewed from the north west facing south east.



Photo 12: Inert construction materials stored in the eastern portion of the site.



Photo 13: Sample location PP1, viewed from the north facing south.



Photo 14: Sample location NCB, viewed from the north facing south.

Description	Site Photographs	Photos	11 to 14	
Project	Preliminary Environmental Site Investigation at the Corner of Springvale Road and State Highway 8, Clyde	Date Taken	8/2/24	
Client	Hartley Road Partnership	Taken by	CM	
Project Number	24002	Approved by	JK	

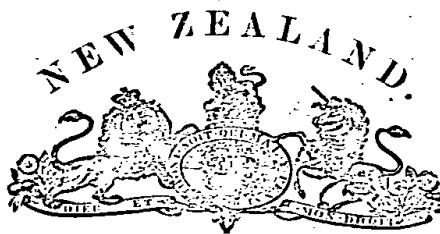
APPENDIX 4

Historical Certificates of Title

CANCELLED

Application No. 493.

(C)



(CERTIFICATE OF TITLE.

Register Book,

Vol. 2 Folio 366

2/366

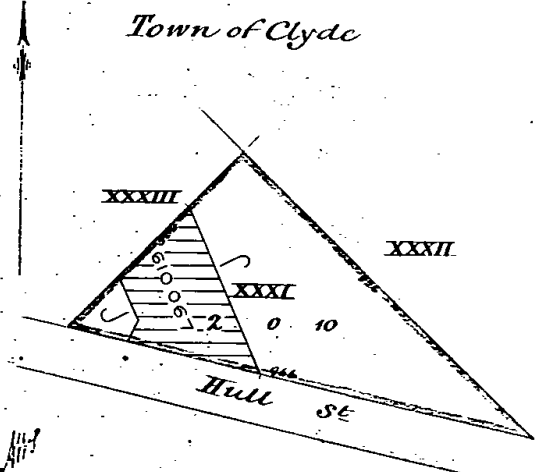
James Haylett of the Town of Clyde in the Province of Otago and Colony of New Zealand Merchant is now desirous of an Estate in the said Colony of New Zealand in such circumstances and interests as are notified by Memorial under written or indorsed thereon in that piece of land situated in the Town of Clyde and containing by measurement two (2) Acres and ten (10) poles more or less as the same is delineated on the plan drawn at the foot hereof with all the rights and appurtenances thereto belonging which said piece of land is the same estate marked Block thirty one (XXXI) delineated in the Public Map of the said Colony and in the office of the Commissioner of Crown Lands at Dunedin originally granted the twenty fifth day of April 1871 under the hand and seal of Sir George Grey Governor of New Zealand to John Cox of Clyde above said and his heirs and assigns in which said Memorial I have hereunto signed my name and affixed my seal this twentieth day of March one thousand eight hundred and ninety two

Signed in the presence of
the 20th day of March 1892

District Land Registrar
of the District of Otago



EQUIVALENT METRIC
AREA IS 8347 m²
610 067 2005 m²
6342 m²



Transmission No. 9500 to Bridget Agnes Haylett, William Thomas Haylett and Luke Clyde Haylett entered 9th July 1914 at 12.15 p.m.

Transmission No. 9968 to William Thomas Haylett and Luke & Clyde Haylett entered 30th September 1915 at 11.10 a.m.

Transmission 36474 to Luke Clyde Haylett as survivor. Entered 31st August 1954 at 10.12 a.m.

Transfer 190076 Luke Clyde Haylett to Brian Forbes Limited produced 31st August 1954 at 10.13 a.m.

Mortgage 156637 Brian Forbes Limited to Luke Clyde Haylett produced 31st August 1954 at 10.20 a.m.

DISCHARGED

238040 Transmission of Mortgage 156637 to The Permanent Trustee Estate and Agency Company of New Zealand Limited as mortgagees entered 19.9.1961 at 2.21 p.m.

212681 Transfer to William Lewis Holdom of Clyde, Carpenter - 8.6.1964 at 2.3 p.m.

273953 Transfer to Clarence Roy Walker of Alexandria Farmer - 10.7.1964 at 9.55 a.m.

277183 Implication Agreement pursuant to section 13 of the Public Works Act 1926 entered 30.9.1964 at 10.0 a.m.

DISCHARGED

Signature

C.T.

2/366

287842 Transfer to Francisca Antonia Van Bortel
of Clyde Pipelay, Farmer and Francisca Martina
Van Bortel his wife - 1.7.1965 at 11.5 am

287843 Mortgage to ~~Francisca Antonia Van Bortel~~
at 11.10 am

314632 Mortgage to Bank of New Zealand.
30.5.1967 at 2.24 pm

2/366

875902/3 Transfer of the part Lot 12 DP
24206 herein to Leon Francis Van Bortel of
Clyde Pipelayer, Jane Marie Scott of Kurow
Married Woman Christine Elizabeth Ramage of
Clyde Married Woman and Lianneke Mechelina
Adriana Lodge of Christchurch Married Woman
- 16.2.1995 at 9.22am

THIS REPRODUCTION (ON A REDUCED SCALE)
CERTIFIED TO BE A TRUE COPY OF THE
ORIGINAL REGISTER FOR THE PURPOSES OF
SECTION 215A LAND TRANSFER ACT 1952.

J. J. McBurney A.L.R.

SACN

483128 Proclamation defining the middle
line of a portion of State Highway (Timaru-
Milton) entered 15.8.1977 at 9.39 am
(affects part).

Pursuant to Section 238 (1) (a) Resource
Management Act 1991 the part Lot 13 DP 24206
herein is vested in the Central Otago
District Council as road

875902/15) New CT 16B/204 issued for the
A.L.R. 16.2.1995) part Lot 12 DP 24206 herein

491480 Compensation Certificate pursuant
to Section 17 of the Public Works Amend-
ment Act 1977 entered 10.2.1978 at 11.46 am

875902/20) Cancelled and new CT 16B/208
16.2.1995) issued for the balance herein

540558 Transmission to Francisca Martina
Van Bortel as survivor entered 27.8.1980 at
1.53 pm

DUPLICATE DESTROYED

16/2/1995

610067 Gazette Notice declaring part of the
within land (2005m²) shown hatched black on
the diagram hereon is acquired for road and
shall vest in the Crown on 9 February 1984 -
20.2.1984 at 2.02 pm

DISTRICT LAND
REGISTRAR

Cancelled

OTAGO
NEW ZEALAND

627969 Gazette Notice hereby
declaring that part of State Highway
No 8 (Timaru to Milton via Cromwell)
adjoining the within Land to be
a Limited Access Road - 20.12.1984
at 11.53 am. (pages 3 + 5)

A.L.R.

LSP 21.12.1984

875902/2 Discharge of Mortgage 314632 as to
Part Lots 12 and 13 DP 24206 herein -
16.2.1995 at 9.22am

A.L.R.

APPENDIX 5

CODC NES Records Search

NES RECORD SEARCH

Application

JKCM Limited	Number	NES240004
PO Box 456, Cromwell 9342	Application date	9/02/24
	Phone	
	Mobile	021556549
	Email	claud@insighteng.co.nz

Property

Valuation No.	2846140100
Location	Springvale Road, Springvale
Legal Description	Section 1 Block XXXIV Town of Clyde, Part Block XXXIV Town of Clyde, Part Block XXXIII Town of Clyde, Block XXXII Town of Clyde and Part Block XXXI Town of Clyde
Area (hectares)	6.5901

Resource consents

Resource Area: Rural Resource Area
Consents:
<i>No information in relation to the above could be found on this record.</i>

Building

Consents/Permits/Compliance Schedules:	
28/09/1972	Building Permit 3225: Erect a new shed <i>No information in relation to HAIL activities could be found on this record.</i>
23/07/1962	Building Permit 1538: Erect a new hen-house <i>No information in relation to HAIL activities could be found on this record.</i>
23/07/1962	Building Permit 1540: Erect a new egg room <i>No information in relation to HAIL activities could be found on this record.</i>
02/11/1961	Building Permit 1461: Additions to existing poultry house <i>No information in relation to HAIL activities could be found on this record.</i>
08/01/1961	Building Permit 1477: Erect a new hen house <i>No information in relation to HAIL activities could be found on this record.</i>
22/04/1960	Building Permit 1188: Erect a new egg room, packing and store room <i>No information in relation to HAIL activities could be found on this record.</i>
05/05/1958	Building Permit 851: Erect a new poultry house <i>No information in relation to HAIL activities could be found on this record.</i>

Preliminary Site Investigations and Detailed Site Investigations

<i>No information in relation to the above could be found on this record.</i>

Aerial Photographs

Council's aerial photographs for the site date back to 2003. Aerial photographs indicate the presence of areas of stored timber. The bulk outdoor storage of treated timber is Item A18 on the HAIL and may trigger NES-CS requirements if undertaken on the site.



Figure One: Outdoor timber storage (Source: CODC Aerial Photographs dated 2023)

Other Land Features

No information in relation to the above could be found on this record.

Disclaimer: The Council does not hold records directly relating to activities on the Hazardous Activities and Industries List (HAIL). In the event some information is available it cannot be guaranteed as correct or complete and therefore may not satisfy your request. We therefore recommend you undertake further investigation to determine whether any HAIL activities exist on the site.

Prepared by



Adam Vincent
Planning Officer - Consents
Date: 14 February 2024

Appendix 'I' - Infrastructure Assessment



HARTLEY ROAD PARTNERSHIP PLAN CHANGE APPLICATION INFRASTRUCTURE REPORT

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

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Dunedin 9058.

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REVISION / APPROVAL PANEL

Rev:	Date:	Prepared By:	Reviewed By:	Comments:
0	20 May 2024	MG	SW & PLD	Initial
1	28 May 2024			Final
2				

Prepared by:
Paterson Pitts Limited Partnership
(Cromwell Office)
30 The Mall
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Job No: A5202
Date: May 2024
Report Prepared for: Hartley Road Partnership

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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 new sewer pump station discharging to the sewer manhole at the intersection of Muttontown & Hospital Roads would be acceptable. The pump station is to be sized to accommodate development along Springvale Road that could take place under Plan Change 19.

A preliminary plan showing the location of this pump station is attached as **Appendix 3**.

2.3 Water Supply

The District Council has recently installed a new water reticulation network for the Clyde and Alexandra townships. Indications are that this is available for connection to by the proposed development. 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 adjacent trunk main was acceptable with the view that this connection could be extended along Springvale and Dunstan Roads to service land affected by Plan Change 19.

A preliminary plan showing the layout of this connection is attached as **Appendix 3**.

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 topography 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/m² 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."

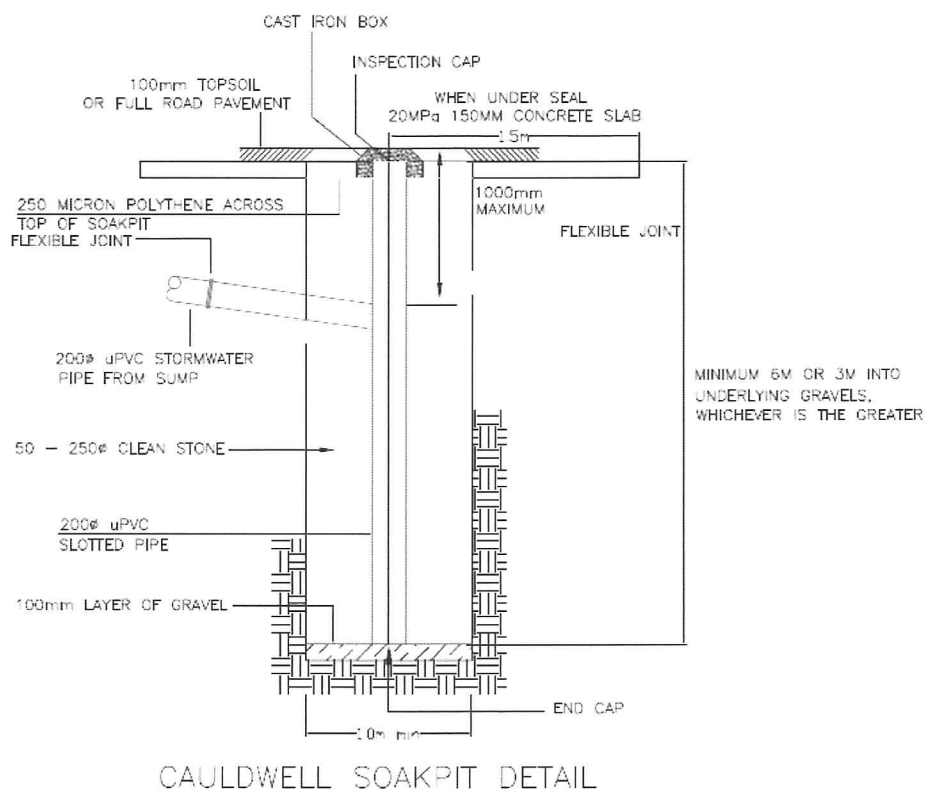
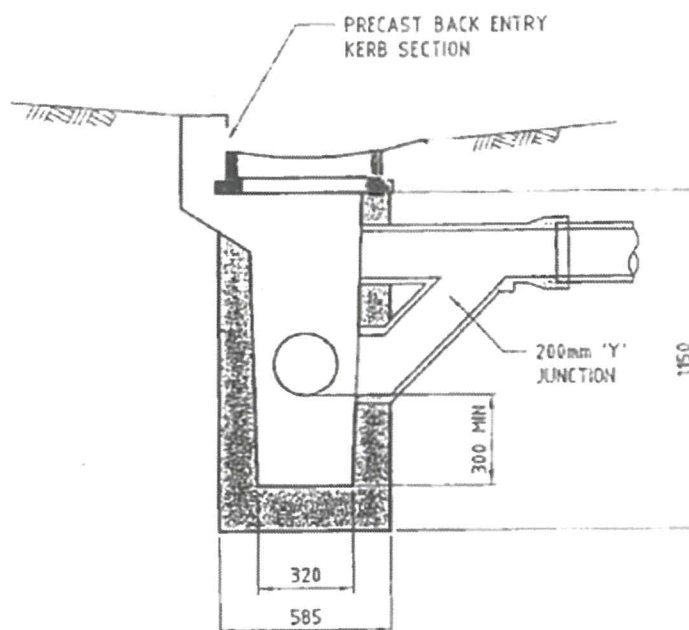


Fig 1

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.

Where road swales are used, these provide a measure of pre-treatment of stormwater before discharge into mud tanks. 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 1m³ of soak pit volume is required for every 50m² 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

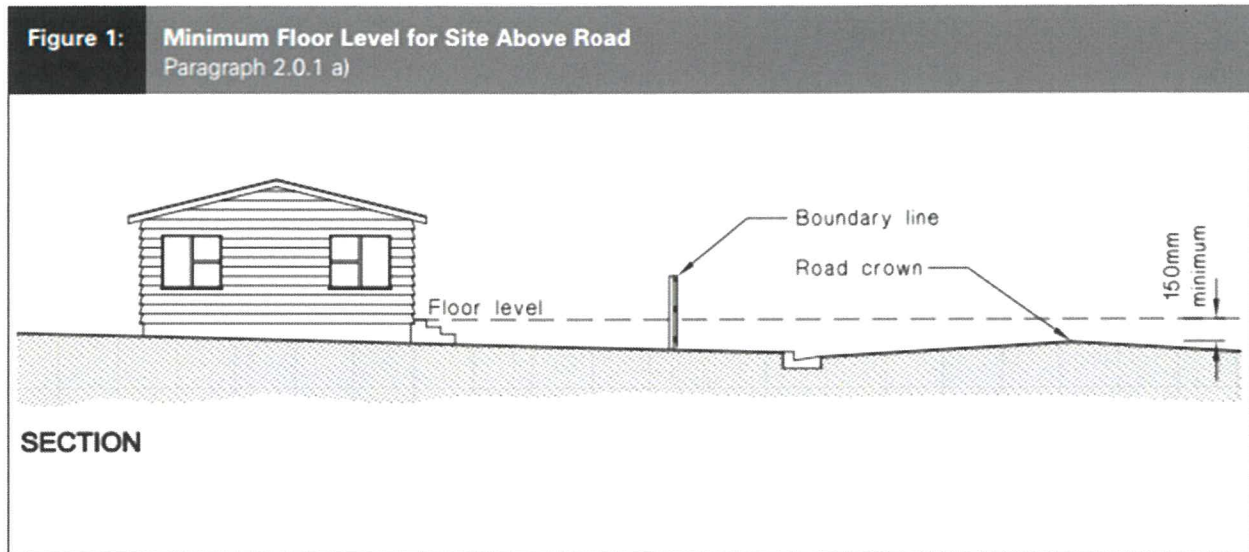


Figure 3

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

A sewer pumping station to service the development as well as potential further development along Springvale Road has been discussed and agreed with Council (see 2.2 above).

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) given. The proposed route and location is shown on the attached **Appendix 3** plan.

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

As advised in Sec 2.3 above, Council officers have advised that a water impact assessment is not required for the site and that the adjacent trunk main can be utilised for servicing the site.

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 proposed to be re-zoned under Plan Change 19. Council officers were accepting of this approach.

The route of the main will be determined at the subsequent detailed engineering design and approval stage under NZS 4404:2004. The 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.

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:

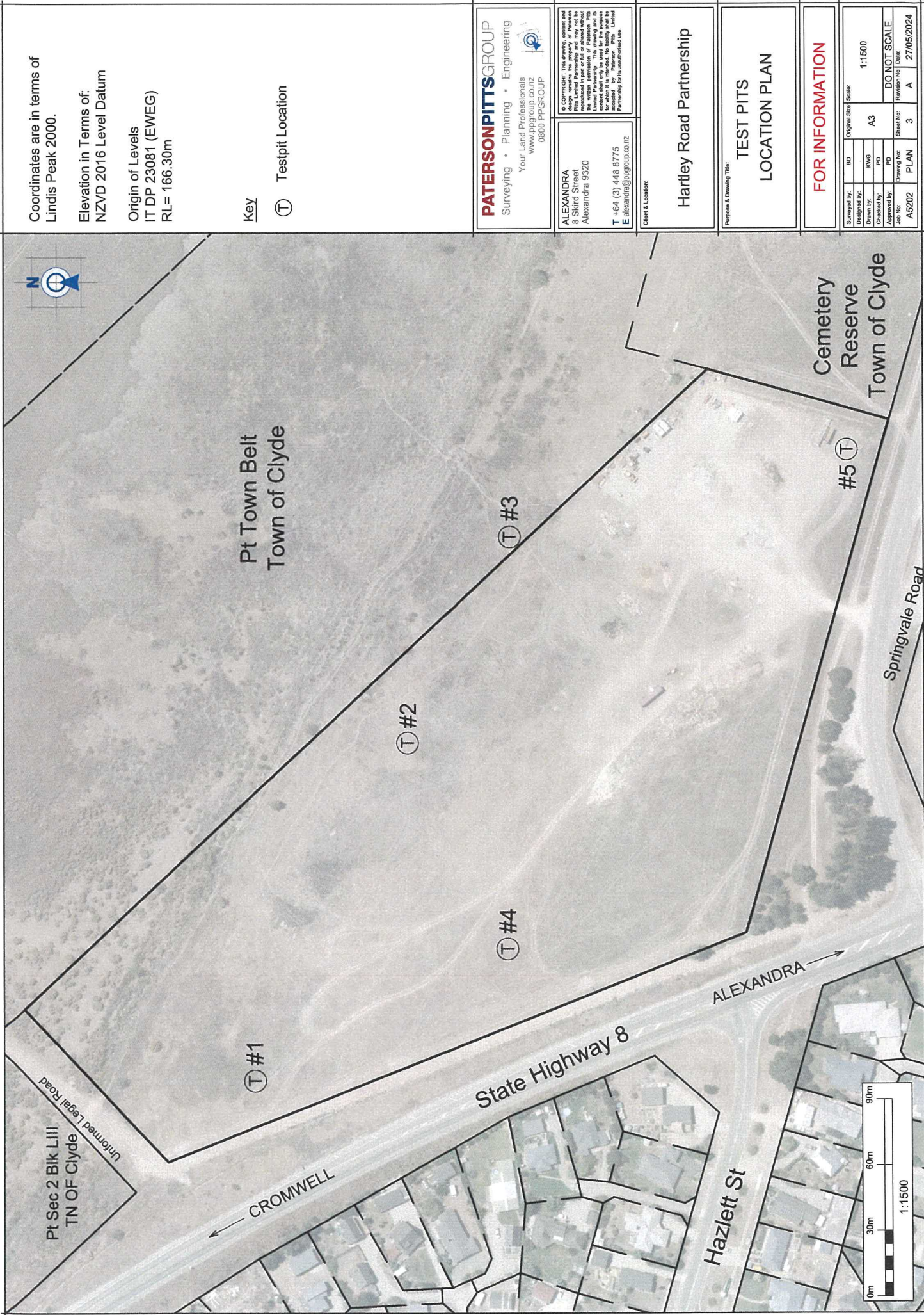
Steve Winter

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

PATERSONPITTSGROUP
Surveying • Planning • Engineering
Your Land Professionals
www.ppgroup.co.nz
0800 PPGROUP

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8 Skird Street
Alexandra 9320
T +64 (3) 448 8775
E alexandra@ppgroup.co.nz

Client & Location:

Hartley Road Partnership

TEST PITS
LOCATION PLAN

FOR INFORMATION

Surveyed by:	BD	Original Size:	Scale:
Designed by:	KWG	A3	1:1500
Drawn by:	PD	DO NOT SCALE	
Checked by:	PD	Revision No:	Date:
Approved by:	PD	Sheet No:	3
Job No:	A5202	Drawing No:	PLAN
		Revision No:	A
		Date:	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		NAME
mN	mE	mN	mE	
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

[illegible]

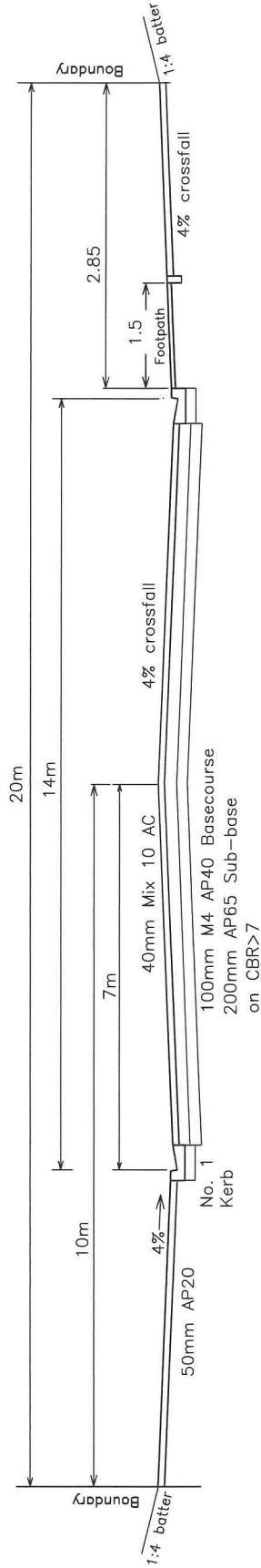
A5202 Stormwater Calcs

[illegible]



APPENDIX 4

Roading Typologies



Road Typology
Not To Scale

PATERSONPITTSGROUP
Surveying • Planning • Engineering
Your Land Professionals
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**

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

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.

This email was sent by: Chorus New Zealand Limited 1 Willis Street Wellington CBD, Wellington 6011 New Zealand. We will deal with your information in accordance with our privacy policy (<https://www.chorus.co.nz/terms-and-conditions/our-privacy-policy>). The content of this email (including any attachments) is intended for the addressee only, is confidential and may be legally privileged. If you've received this email in error, please immediately notify the sender and delete this email. This email is not a designated information system for the purposes of the Contract and Commercial Law Act 2017.

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 CLYDE, 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 Supply¹ (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

A handwritten signature in black ink, appearing to read "Niel Frear".

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



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

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

APPENDIX 6

Confirmation of Power Supply

Hartley Road Partnership
1 Jennings Way,
Earnsclough 9391
CC' Peter Dymock (Patersons)

Attention: Leon Van Boxtel

Geological Review and Natural Hazards Assessment State Highway 8 and Springvale Road, Intersection

1.0 Introduction

This report summarises the results of a preliminary geological review and natural hazards assessment completed for a proposed plan change to a property on the corner of State Highway 8 (SH8) and Springvale Road, Clyde. This report is intended to support the plan change application to Council.



Photo 1. Panoramic site photo looking northwest across the proposed area for plan change.

The assessment was completed for Hartley Road Partnership in accordance with GeoSolve Ltd.'s Short Form Agreement (Ref no. 240038) dated 19th of January 2024, which outlines the scope of work and conditions of engagement.

2.0 Proposed Development

It is proposed to re-zone the existing property from a rural to industrial land use on the Central Otago District Plan. Access to the development will be via Springvale Road.

Preliminary geological and natural hazards information is required from GeoSolve to support an application to Council for plan change. Confirmatory subsurface investigations have not been undertaken as part of this report but are recommended later as part of the resource consent or design phase. Sufficient engineering geological information exists at this stage of the process.

A conceptual plan outlining what a potential future development might look like on the property should it be re-zoned to industrial is presented on Figure 2 attached.

3.0 Preliminary Geological Review

The GNS Science 1:250,000 geological map area of the Wakatipu indicates that the property is underlain by glacial outwash gravels (Q4a and Q12a). These soils are in turn underlain by over-consolidated Bannockburn Formation lake sediment of the Manuherikia Group (mMm) at an unknown depth. Regionally extensive schist bedrock is exposed on the range northwest of Clyde Township and will underlie the site at considerable depths.

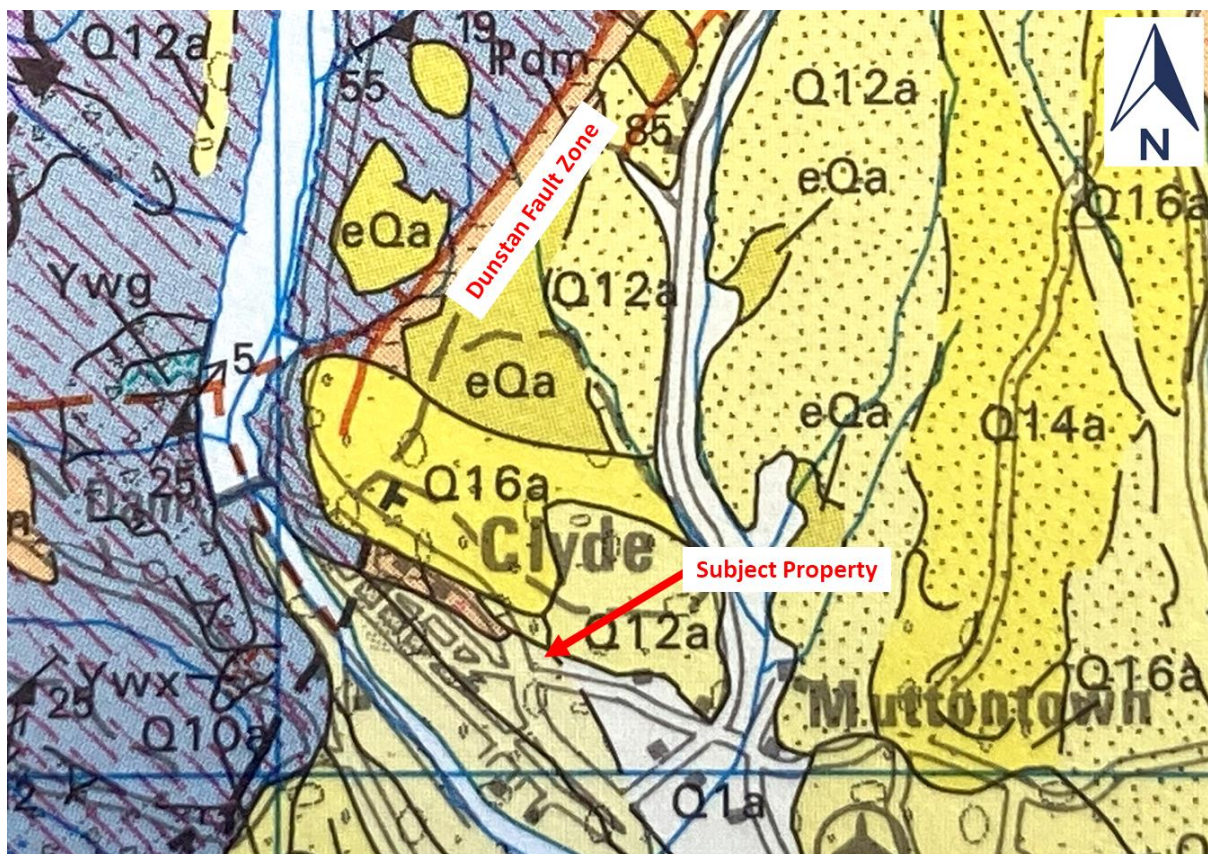


Figure 1. Image taken from the GNS Science 1:250,000 geological map of the property and surrounding area.

An outwash terrace riser strikes northwest oblique to the northeast site boundary. The terrace riser marks the change from the upper Q12a outwash surface compared to the

lower degraded Q4a outwash surface. Site inspection confirmed the presence of four small alluvial fans which have formed along the base of the terrace riser. The fan alluvium is likely to grade between silt, sand, and gravel. An engineered fill batter borders the western edge of the property beneath the state highway.

No spring flows or groundwater seepages were observed within the property and are unlikely in this terrain. An ORC registered borehole (G42/0117) drilled on the opposite side of Springvale Road around 190 m south of the property encountered the regional groundwater table at 26 m below ground level (bgl).

LiDAR contour data for the property and wider area is presented on Figure 2 attached.

4.0 Natural Hazards Assessment

Geological field mapping and relevant features discussed in the following subsections are shown on Figure 2 attached.

Alluvial Fan and Flooding:

Four relatively small alluvial fans terminate within the boundaries of the property. The fans have formed via localised runoff from the upper outwash surface and overlie the lower degraded terrace. Subdued ephemeral gullies dissect the face of the terrace riser above the fans. No evidence of recent sedimentation was observed, and the fans are currently inactive, although this doesn't suggest renewed activity in the future isn't possible. However, given the limited upslope catchment area it's likely the fans have formed due to extreme rainfall (i.e. >500-year return period), alternatively they could be geologically very old having formed immediately post glaciation.

Either way the defunct water race shown on Figure 2 cuts through the head of the fans and forms an effective cut-off trench to capture and divert upslope run-off away from future development. The water race trench ranges around 0.8-1 m deep and is now no longer used. Localised surface run-off from the ephemeral gullies and terrace slope during heavy rainfall is expected to be the primary issue rather than sedimentation.

An existing stormwater channel, shown below in Photo 2, runs alongside the state highway and discharges near the northwestern corner of the property along the edge of the fill batter. The channel collects upslope runoff from an even larger ephemeral gully further northwest along the outwash terrace. Stormwater runoff is currently dispersed via an elongated dispersion swale roughly 2000 m² in area between the toe of the batter and the western site boundary. We understand that Patersons have considered stormwater runoff and dispersion from the channel outlet as part of their scheme plan development.



Photo 2. Looking southeast along the stormwater channel towards the development area beyond.

The location of the stormwater channel and dispersion swale alongside the highway are also shown on Figure 2.

Slope Stability:

Given the gentle gradients within the property there are no slope instability issues for the development. The inclination of the terrace riser is also less than the upper repose angle of 36° for a cohesionless outwash gravel. Earthworks cuts will be required to form sub-horizontal construction platforms on gently sloping ground.

Rock-Roll:

Albeit relatively isolated, there is some potential for localised rock-roll into the development area originating from the upslope terrace riser. Several outwash boulders of variable size and embedment have become exposed by erosion and in some instances could be re-mobilised via seismic shaking or gradual weathering. The two example boulders shown below in Photos 3 & 4 have the most potential to be dislodged from the slope. However, this issue is straightforward to remediate using an excavator or hand tools to pluck the boulders from the slope well in advance of future development. Boulders which are partially embedded within the slope, preventing rock-roll, should be left untouched to avoid undue slope disturbance.



Photos 3 & 4. Example boulders with the most potential to become dislodged from the terrace slope. Geological hammer for scale.

No evidence of historic rock-roll is present on the ground surface within the development area along the base of the terrace.

Seismic Stability/Risk from Active Faults:

Active fault traces were not observed onsite although the Dunstan Fault Zone is mapped as a series of active fault structures within 3 km northwest of the property (refer Figure 1 above). However, due to the estimated >5,000 to $\leq 10,000$ years average return periods for earthquakes on this fault zone, the seismic risk posed by this structure is considered relatively low. Furthermore, the property is situated outside the active fault entity area associated with the Dunstan Fault Zone, an inferred area of land potentially subject to ground surface rupture during fault movements.

The Alpine Fault, located approximately 140 km to the northwest, runs along the western foothills of the Southern Alps, and is likely to present a more significant seismic risk in the short term. There is a high probability that a major earthquake of Magnitude 8 or more will occur along the Alpine Fault within the next 50 years and such a rupture is likely to result in moderate ground shaking in the vicinity of Clyde-Alexandra. The Alpine Fault is considered to provide the governing seismic risk for the site from a geotechnical and planning perspective.

Seismic Liquefaction:

The ORC natural hazards database indicates the site is situated within mapped liquefaction category Domain A with low to no liquefaction potential. This has been categorised on the basis that the site is inferred to be predominantly underlain by rock or firm sediments i.e., Bannockburn Formation. Owing to the depth to regional groundwater (approximately 26 m bgl), GeoSolve considers the risk of seismic liquefaction at this site to be low. No further assessment is necessary with respect to this hazard.

5.0 Foundation Bearing Capacity and Subsoil Category

Glacial outwash deposits comprising sand and gravel are likely to predominate beneath future building foundations, although loess and variable fan alluvium are also likely. Outwash gravel typically meets the minimum requirements for NZS 3604:2011 “good ground” conditions, however a range of bearing capacities can be expected on this site and will need to be confirmed via subsurface investigation. For sloping lots (i.e. Lots 1 and 17-21) requirements with regards to foundation footings and the adjacent sloping ground surface will need to be considered.

The site is likely to comprise “Class C” (shallow soil site) or “Class D” (deep soil site) in accordance with NZS 1170.5:2004 seismic provisions. The allocation of Class C or D subsoil category at this site is based on ORC registered boreholes located on the wider Clyde Terrace and the inferred depth to Manuhirikia Group (very weak rock). If assurance of subsoil class is required for detailed design a deep borehole investigation would be required to confirm the depth to Manuhirikia Group rock beneath the development area.

6.0 Recommendations and Considerations

Site-specific subsurface geotechnical investigations are recommended during resource consent and design stages for future building foundations. Test pitting and Scala penetrometer testing is required to confirm soil parameters and bearing capacity for foundation and earthworks design. Site investigations will also need to assess temporary and permanent batter slopes into sloping ground and any associated retaining parameters.

Future construction will need to consider the effects of surface water run-off and ponding from the upslope terrace riser, ephemeral gullies, and highway stormwater channel. The defunct water race shown on Figure 2 will form an effective cut-off trench to capture and divert upslope run-off away from future development. It is recommended that the defunct water race is assessed to ensure it can take the required overland flow volumes and that it should be upgraded then maintained to serve this purpose. The water race also needs to be checked to confirm any potential for leakage or run-off into the development during flow. Standard floor level elevations and additional cut-off drains can also be utilised to mitigate any residual run-off issue. Additional cut-off drains will need to be incorporated into the stormwater design for the wider development. It's important that design provisions for the highway stormwater channel be considered now as part of the scheme plan. A stormwater runoff assessment is recommended to be undertaken at the resource consent stage to address all the stormwater issues discussed above. Viable options to manage and mitigate site runoff issues are available.

Problematic boulders on the terrace riser above the development should be plucked/ removed from the slope in advance of future development. However, boulders with partial embedment should be left untouched to prevent undue slope disturbance. Removal of problematic boulders should be confirmed by a geotechnical practitioner at a later stage once the plan change application has been granted. We assume the removal of problematic boulders can be readily facilitated given their location within the town belt (refer Figure 2).

We don't foresee any site-specific constraints with respect to the prevailing geotechnical conditions or natural hazards which would prevent industrial development of the property; noting the recommendations provided above. A risk of seismic activity is present in the region from the Alpine Fault and appropriate allowance should be made for seismic loading during detailed design of any future building, foundations, retaining walls and earthworks.

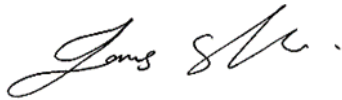
Based on the current assessment, the development is technically feasible from a geotechnical perspective; noting that site-specific ground investigations and stormwater assessment, reporting and design will be required during the resource consent and design phases.

7.0 Applicability

This report has been prepared for the benefit of our client, Hartley Road Partnership, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Please do not hesitate to contact the undersigned if we can provide any further assistance with this project.

Report prepared by:



.....
James Stewart
Engineering Geologist

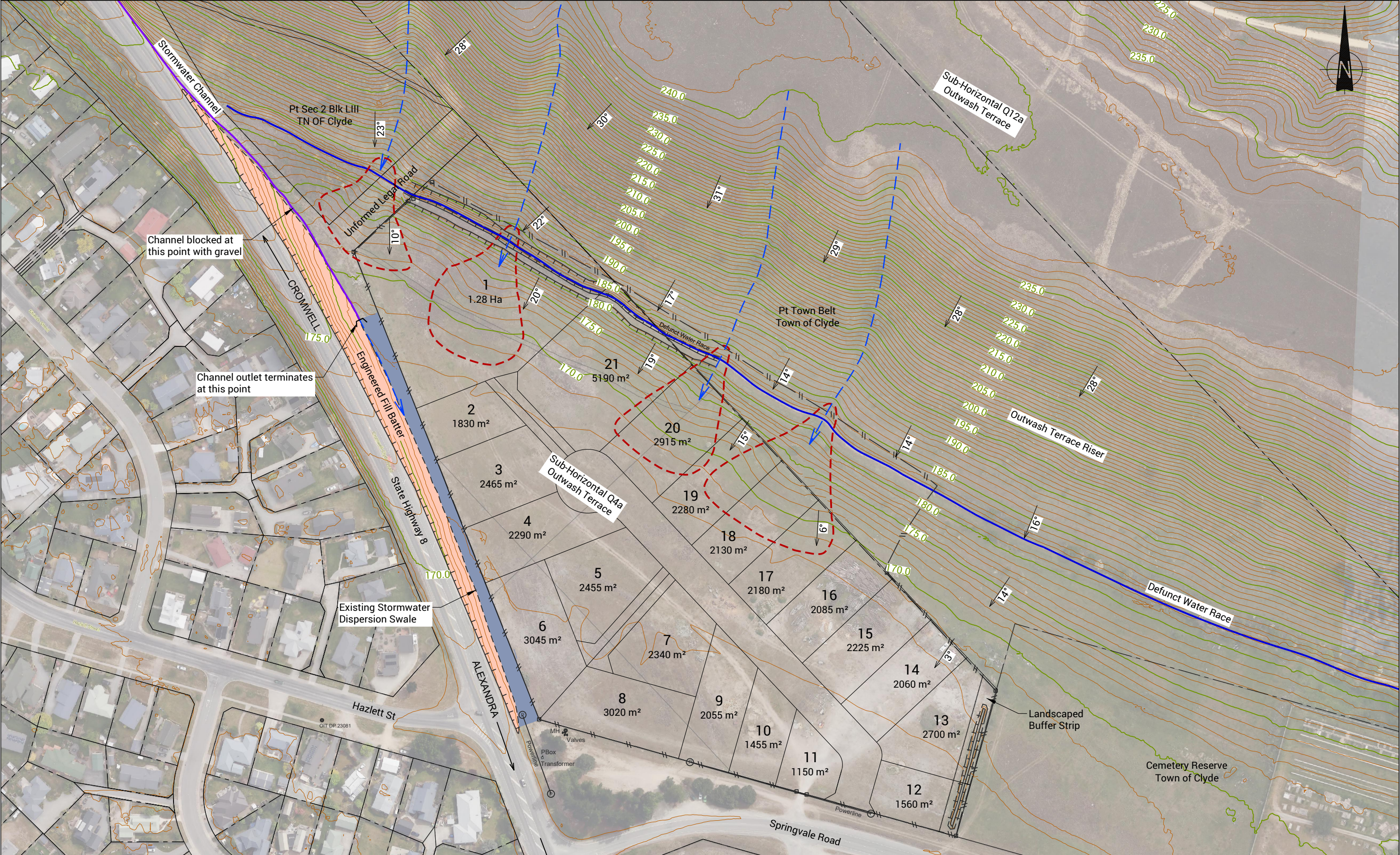
Reviewed for GeoSolve Ltd by:



.....
Fraser Wilson
Senior Engineering Geologist

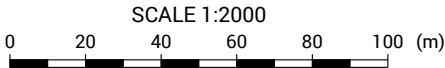
Attachments:

- Subdivision Scheme and Field Mapping Plan (Figure 2).



Notes:
1. These drawings have been prepared for the benefit of Hartley Road Partnership with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

- Legend:
- Alluvial Fans
 - Engineered Fill Batter
 - Ephemeral Flow Paths
 - Existing Stormwater Dispersion Swale
 - Defunct Water Race
 - Stormwater Channel
 - Slope Direction and Angle



GEOSOLVE
Level 1, 70 MacAndrew Road, South Dunedin
www.geosolve.co.nz

DRAWN	WCG	Jun.24
DRAFTING CHECKED	JAS	Feb.24
APPROVED	FAW	Feb.24
CADFILE: 240038.dwg		
SCALES (AT A3 SIZE): 1:2000		
PROJECT No: 240038		

FIG No:
Figure 2

Hartley Road Partnership
Corner of SH8 and Springvale Road, Clyde
Geotechnical Assessment
Site Plan

REV.
0

Appendix 'K' - Landscape Assessment

Proposed Industrial Zone Plan Change, Corner, State Highway 8 & Springvale Road, Clyde

Landscape Effects Assessment Report

5 June 2024



Prepared by

MIKE MOORE

BSc, Dip LA, MRRP, ANZILA

LANDSCAPE ARCHITECT

Po box 5076, Dunedin

Tel (03)479 0833 . fax (03) 479 0834 . cell 0274 360 163

Email mike@mmla.co.nz

Introduction

Hartley Road Partnership is applying for a private plan change to rezone a 6.6 ha site at the intersection of State Highway 8 and Springvale Road at Clyde from Rural to Industrial in the Central Otago District Plan (CODP).

This report has been commissioned by the applicants to address the landscape effects of the proposed rezoning and will be structured as follows:

- Methodology
- Site and area description.
- Landscape Values.
- The proposed rezoning
- Recommended mitigation measures
- Landscape effects.
- Statutory provisions assessment.
- Conclusion.

Methodology

This assessment follows the concepts and principles outlined in the New Zealand Institute of Landscape Architects (NZILA) Best practice guidelines¹, and has been informed by a review of the relevant statutory provisions and a site visit on 27 February 2024.

¹ Te Tangi a te Manu, Aotearoa New Zealand Landscape Assessment Guidelines, Tuia Pito Ora New Zealand Institute of Landscape Architects, July 2022.

Site and area description

Site description

As illustrated in **Figure 1**, the property is located to the northeast side of the intersection of State Highway 8 and Springvale Road at Clyde. Other than for a small area at its northern end which extends onto a terrace face, the site is relatively flat with gentle falls to the southwest and the geology is relatively recent river gravels².

The site is bounded by the State Highway embankment which rises to the west, a steep approximately 60m high natural terrace face to the north-east, and Springvale Road to the south. Its south-eastern end abuts the Clyde Cemetery Reserve, although the historic walled cemetery is approximately 160m distant. An abandoned pre-1900 water race runs along the lower slopes of the terrace face to the north-east of the site and runs through the northern portion of the property.

The land is zoned Rural in the CODP. It is not irrigated and is largely under rough grassland cover. It is currently partly used as a contractor's storage yard.

The landscape context

The site is located adjacent to the settlement of Clyde at the southwestern end of the Manuherikia Basin. The Clutha River / Mata-Au issues from the Cromwell Gorge at this point and has created various river terraces. The site nestles against a distinct approximately 60m high terrace face which rises to its north-east and which is under rough pasture cover. This terrace is part of the Clyde Town Belt, is zoned Rural, and is mainly covered by a Significant Amenity Landscape (SAL) overlay in the CODP.

The Cemetery Reserve which adjoins the site to the east is also zoned Rural and has heritage and notable tree values recognized in Schedule 19.4 of the CODP noted as 'Clyde cemetery and walls' and 'Umbrella (or Stone) Pine, Maritime Pine and Scotts Pine.

² Turnbull I M, 2000, Geology of the Wakatipu Area

Across State Highway 8, Clyde township is zoned residential in the CODP and has a suburban residential character. On the opposite side of Springvale Road the land is zoned Rural Residential but the properties directly opposite the site are industrial and commercial in character, being a storage yard for Contact Energy Ltd, and a cycle hire and cycle tour business at the terminus for the Otago Central Rail Trail.

Figures 2 - 8 illustrate the character of the site and area.

Landscape Values

The NZILA Landscape Assessment Guidelines define 'landscape' as follows:

Landscape embodies the relationship between people and place. It is the character of an area, how the area is experienced and perceived, and the meanings associated with it.

Landscape values are defined as:

The reasons a landscape is valued.

Values are embodied in certain attributes.

The site itself has no landscape value recognition in the CODP but the terrace face to its northeast is covered by an SAL overlay. The Plan provides no values statements for SAL's however, my assessment is that this terrace has amenity values based on its distinctive outwash terrace landform which retains moderately high levels of legibility under predominantly grassland cover and / or due to naturalistic vegetation patterns. The pre-1900 defunct water race near its base modifies its naturalness to a small extent.

Rural landscape values expressed in the CODP include open space and natural character, with particular mention of the 'open natural character' of the hills and ranges³. In this area, whilst openness and naturalness values are relatively strongly expressed on the terrace face, they are modified generally, by the presence of the township of Clyde across the Highway, and by the greater built density in the Rural Residential area across Springvale Road. The site itself, is currently open and devoid of built elements.

³ CODP Objective 4.3.3 & Policy 4.4.2

The adjacent cemetery has heritage values of noted significance and the rural character of the site contributes to the cemetery setting to a degree, providing a sense of openness and for views toward the Cairnmuir Mountains. It also provides for views of traffic moving on State highway 8 and of modern housing in Clyde however.

The proposed rezoning

It is proposed to rezone the site in the CODP from Rural to Industrial, with no changes to the objectives or policies of the Industrial Resource Area chapter of the Plan. The existing Industrial Resource Area rules and performance standards are also proposed to be adopted. In terms of landscape effects, the key implications for this site are as follows:

- Subdivision is a controlled activity with matters of control including the mitigation of adverse effects on adjoining resource areas.
- No front or side yards required.
- Building heights of up to 10m are permitted.
- Signs are permitted as follows:
 - on buildings but no higher than the road façade part of the building.
 - A free-standing sign may be higher than the highest point of the roof.
 - 1 double sided sign with a maximum height of 7.5m and a maximum area of 14m² per side.
 - Signs may be illuminated but not moving or flashing.
- Car parking is required at a rate of 1 park / 100m² gross floor area.
- Light-spill must not exceed 10 lux at the road boundary or neighbouring property.

It is assumed that there will be one access point to the property and that this will be as existing at present, off Springvale Road.

The land use permitted under this zoning will potentially result in a major change in character from the currently open rural site, that will be significantly less open and natural. As noted in Section 9.3.1 of the CODP environmental standards are set at '*a lower level than in other resource areas*'. Despite this Objective 9.1.1 is:

‘Protection of Amenity Values’ including (b) ‘Amenity values of neighbouring resource areas are maintained’.

Recommended mitigation measures

The site does not directly adjoin any residential zone but it is adjacent to a major highway and a cemetery with noted heritage values. Additionally, the residential environment of Clyde is close-by, across State Highway 8, and there is Rural Residential zoned land across Springvale Road.

To mitigate the adverse effects of industrial land use on the landscape values in the vicinity, and to provide for a reasonable level of visual amenity within the proposed zone, the following rules are recommended, with reasons given.

Rule XXX

Within the Lot 1 D.P.600773 Industrial Zone a landscape buffer strip with a minimum width of 10m shall be provided alongside the State Highway 8, Springvale Road and Clyde Cemetery boundaries, as well as the boundary of the unformed legal road to the north of the site below the water race. This shall be planted and managed to provide rapid and effective visual screening and softening of the industrial activities within the zone from road, cemetery, residential and rural residential viewpoints surrounding.

Rule XXX

Within the Lot 1 D.P. 600773 Industrial Zone, there shall be no buildings, or earthworks undertaken that would impact the integrity of the pre-1900 water race intersecting the site, nor on the slopes above this.

Reasons

The rezone site has high levels of visibility from a major highway, cemetery and a significant local road. A framework of trees is required to soften and screen views of

industrial buildings, yards and signs etc. It will also assist to mitigate effects of lighting from these viewpoints.

The proposed restriction of building and earthworks on the higher part of the site above the water race is to limit visual impact of industrial activity from beyond the site and to maintain the remaining landform coherence of the terrace face. As a pre-1900 historic structure the water race must be retained anyway and will act as a physical barrier to development.

Landscape effects

Landscape effects are defined as follows:

*'An adverse or positive outcome for a landscape value as a consequence of changes to a landscape's physical attributes.'*⁴

I assess the landscape effects of the development against the landscape values discussed above, and those inherent in the relevant statutory provisions. Landscape effects may be positive or adverse in nature, and I rate the degree of effect in terms of the following 7-point rating scale. The relationship of this scale to the relevant RMA terminology is also shown.

Degree of effect assessment scale

<i>Very low</i>	<i>Low</i>	<i>Low-mod</i>	<i>Moderate</i>	<i>Mod-high</i>	<i>High</i>	<i>Very high</i>
<i>Less than minor</i>		<i>Minor</i>	<i>More than minor</i>		<i>Significant</i>	

Physical effects

The proposed rezoning will provide for a change in the character of the site from rural to industrial. The current openness and dominance of natural elements (vegetation) over built elements within the site will potentially change significantly. The land is largely flat

⁴ Te Tangi A Te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. Tuia Pito Ora New Zealand Institute of Landscape Architects, July 2022.

however, and amenable to development for industrial uses without need for major earthworks. Development will not extend onto the terrace face slopes and will be contained by this natural landform feature.

As regards urban form, the current containment of the urban area of Clyde, on the southwestern side of State Highway 8, will be lost as the land is zoned for industrial uses on the other side of the highway. This urban containment to the southwest of the highway appears more significant on the zoning maps than in reality however, as development on the Contact Energy and Cycle trail yard sites already has a semi commercial / industrial character with large buildings, storage yards and car parks.

I assess physical effects on landscape values as adverse / low-moderate. The nature of the change is adverse because in relation to the current rural character, industrial development involves reduced naturalness and is likely to result in an environment significantly defined by large buildings and 'clutter' associated with stockpiles, signage and vehicle parking. The low-moderate degree of effect reflects the low sensitivity of the site and area to change of this nature. The site is largely flat and has no landscape, natural character or rural amenity values of any special significance. Rural character in the area is also already modified by its peri-urban location.

Visual effects

The following tables provide an analysis of the visual effects of the proposed zone change from representative public viewpoints in the areas surrounding. The viewpoint locations are illustrated in Figure 1.

State Highway 8 to the northwest (see Figures 2 and 3)

Relevance of viewpoint	State Highway 8 is a major highway
Approx. distance to the site	920m – Viewpoint 2 160m – Viewpoint 3
Existing view	Figures 2 and 3 illustrate views toward the proposed zone change site from State Highway 8 to the northwest. These viewpoints are elevated to various

	degrees and provide an overview of the site in its surroundings. The site is seen in the context of the township of Clyde on the opposite side of the highway and with the well treed rural residential area behind. The large buildings on the Contact Energy and Rail Trail sites are also visible as immediate backdrop. The site has an open rural character and large scale in contrast with areas immediately adjacent and nearby.
Effects of the proposed zone change	Industrial development on this site will extend the footprint of urban Clyde and potentially large buildings will be visible. Rural amenity values will be lost with this change in character but adverse amenity effects in general will be mitigated by the softening provided by the proposed landscape buffer plantings. In this context, adjacent to an existing urban area, industrial land use will integrate acceptably.
Nature / degree of effect on values	Adverse / Low-moderate

State Highway 8 to the south (see Figures 4 and 5)

Relevance of viewpoint	State Highway 8 is a major highway
Approx. distance to the site	550m – Viewpoint 4 215m – Viewpoint 5
Existing view	Figures 4 and 5 illustrate views toward the proposed zone change site from State Highway 8 to the south. In general, the site is well screened from the highway to the south by intervening development including development of a commercial / industrial character on the Rail Trail depot and Contact Energy properties. Where visible, it is significantly screened by existing trees on the road reserve at the corner of Springvale Road and SH8 and is dominated by the rural slopes of the terrace face behind.
Effects of the proposed zone change	Industrial development will result in potentially large buildings being visible, semi-screened by the existing trees. The proposed landscape buffer plantings will extend this screening / softening effect as they mature. The semi commercial / industrial character of the existing development on the Rail Trail depot site in the foreground, also assists to mitigate the degree of adverse effects associated with the proposed zone change. Built development will be seen against the dominant backdrop of the terrace face.
Nature / degree of	Adverse / Low-moderate

effect on values	
------------------	--

Hazlett Street close to its intersection with State Highway 8 (see Figure 6)

Relevance of viewpoint	This viewpoint is indicative of views of the site from the highway directly adjacent.
Approx. distance to the site	55m
Existing view	The open grassland of the site is in the foreground from this viewpoint with the terrace face being the major feature behind. The character of the view is currently strongly rural. The photograph slightly understates the visibility of the site from the highway as the viewpoint is slightly lower.
Effects of the proposed zone change	Industrial development such as large buildings, yards and stockpiles etc will significantly change the character of views in this area and rural amenity values will be lost. Amenity values in general will be mitigated by the proposed landscape buffer planting. Effects on road users will be transitory and short-lived.
Nature / degree of effect on values	Adverse / Moderate-high initially, transitioning to Adverse / Low-moderate once planting provides an effective screen. Assuming establishment of suitable trees with rapid growth characteristics, I anticipate that this transition is possible within 10 years.

Springvale Road (see Figure 7)

Relevance of viewpoint	Springvale Road is a major highway
Approx. distance to the site	165m
Existing view	The site is currently viewed as open rural land with the terrace face behind. The Contact Energy depot on the southern side of the road modifies rural character to some degree. The township of Clyde has low visibility due to screening by the State Highway 8 embankment and trees.
Effects of the proposed zone change	Industrial development on the site will change its character and result in a loss of rural character and a reduction in amenity values. Adverse effects will be progressively mitigated as the proposed landscape buffer plantings mature. The existing semi commercial / industrial character of the land on

	the southern side of the road helps to lower sensitivity to the proposed change.
Nature / degree of effect on values	Adverse / Low-moderate

Clyde Cemetery (see Figure 8)

Relevance of viewpoint	Clyde Cemetery is an important community facility with recognized heritage values.
Approx. distance to the site	The Cemetery Reserve is directly adjacent to the site. The developed part of the cemetery is 170m distant.
Existing view	Westward views from the cemetery are currently across open rural land (including the site) to the State Highway and the township of Clyde, with the Cairnmuir Mountains forming an attractive natural backdrop.
Effects of the proposed zone change	Industrial development will reduce the openness and reduce the current rural amenity. The proposed landscape buffer plantings will form an effective screen that will contribute to the setting of the cemetery and provide qualities of seclusion. They will screen views of not just the proposed industrial development but also the highway. The plantings will also reduce the views available out to the mountains however.
Nature / degree of effect on values	Adverse / Moderate – transitioning to Adverse / low once the landscape buffer is providing effective screening.

Visual effects from private properties

There are residential properties within Clyde, across State Highway 8 from the proposed zone change site. North of its Hazlett Street intersection, the highway is located on an embankment that rises progressively and effectively screens eastward views toward the site from the adjacent residential properties. Highway planting also contributes to this screening. To the south of Hazlett Street, State Highway 8 intersection, the properties adjacent to the highway are at a greater distance and the site is mainly screened by highway plantings and fences.

It is my observation that there are a few properties near the Hazlett Street / State Highway intersection that have views with varying extents of screening, of the proposed

zone change site. These include 17 Albert Drive, 145 Hazlett Street, 147 Hazlett Street, and 156 Hazlett Street. Of these, I consider that 156 Hazlett Street is the most potentially impacted, being the closest (approx. 40m) and with limited existing landform or vegetative screening.

Industrial development on the site will have adverse effects on current rural amenity values from these properties where visible. As the proposed landscape buffer plantings mature these effects will be screened and softened. The highway and moving traffic on it already reduce amenity from these viewpoints and overall, I rate effects on landscape values as adverse / moderate, reducing to adverse / low as the planting buffer becomes effective.

Landscape effects conclusion

Overall, industrial development will inevitably change the current rural character and will have adverse effects on existing (rural) amenity values. I consider however, that with the mitigation proposed, amenity effects can be acceptably managed and that the change in land use proposed can integrate acceptably, with effects that are no greater than adverse / low-moderate (minor) in the medium – long term.

Statutory provisions assessment

In the tables below, I copy the provisions I consider most relevant to landscape matters associated with the proposed zone change in the relevant statutory documents and provide brief comment.

Central Otago District Plan

Objective / Policy	Comment
4.3.3 Objective – Landscape and Amenity Values <i>To maintain and where practicable enhance</i>	The proposed zone change will entail a change in the character of the site from rural to industrial. Rural character is already modified in the area by

<i>rural amenity values created by the open space, landscape, natural character and built environment values of the District's rural environment, and to maintain the open natural character of the hills and ranges.</i>	the proximity to Clyde and by the presence of development with a semi commercial / industrial character on the properties across Springvale Road. There are no rural amenity, landscape, natural character or built amenity values of any significance that will be impacted by the proposed rezoning. The site is located within a valley setting and does not impact the character of the hills and ranges, nor will it impact the terrace face adjacent.
4.4.2 Policy – Landscape and Amenity Values <i>To manage the effects of land use activities and subdivision to ensure that adverse effects on the open space, landscape, natural character and amenity values of the rural environment are avoided, remedied or mitigated through:</i> <i>a. The design and location of structures and works, particularly in respect of the open natural character of hills and ranges, skylines, prominent places and natural features,</i> <i>b. Development which is compatible with the surrounding environment including the amenity values of adjoining properties, ...</i> <i>g. Encouraging the location and design of buildings to maintain the open natural character of hills and ranges without compromising the landscape and amenity values of prominent hillsides and terraces ...</i>	See comments with regard to Objective 4.3.3 above. Effects on the amenity values of adjoining and nearby properties will be effectively managed by the proposed landscape buffer plantings.
4.4.8 Policy – Adverse Effects on the Amenity Values of Neighbouring Properties <i>To ensure that the effects associated with</i>	Industrial activities have the potential to adversely affect the outlook from a few adjacent and nearby properties. In recognition of this, a

<i>some activities including (but not limited to):</i> <i>c. A reduction in visual amenity due to excessive signage and the storage of goods or waste products on the site, ... do not significantly adversely affect the amenity values and privacy of neighbouring properties ...</i>	planted buffer is proposed
4.4.10 Policy – Rural Subdivision and Development <i>To ensure that the subdivision and use of land in the Rural Resource Area avoids, remedies or mitigates adverse effects on:</i> <i>a. The open space, landscape and natural character amenity values of the rural environment in particular the hills and ranges,</i> <i>b. The natural character and values of the District's wetlands, lakes, rivers and their margins,</i> <i>c. The production and amenity values of neighbouring properties, ...</i>	The proposal is for a zone change to provide for industrial development. The proposal provides for buffer plantings to mitigate adverse amenity effects on surrounding areas. In general, however, there are no significant landscape or natural character values that will be impacted. The site is adjacent to the existing urban area of Clyde, in a valley floor location and development will not extend onto the adjacent terrace face, which is a natural feature in the area.
6.3.2 Objective – Amenity Values <i>To manage urban growth and development so as to promote the maintenance and enhancement of the environmental quality and amenity values of the particular environments found within the District's urban areas.</i>	The proposed plan change will result in an expansion of the urban area of Clyde across State Highway 8, but for a discrete industrial enclave. The highway and the proposed landscape buffer will protect residential amenity values within the current urban area.
6.4.2 Policy - Expansion of Urban Areas <i>To enable the expansion of urban areas or urban infrastructure in a manner that avoids, remedies or mitigates adverse effects on:</i> <i>(a) Adjoining rural areas.</i> <i>(b) Outstanding landscape values.</i>	The site is a somewhat isolated block of flat rural land between urban Clyde, an area of Rural Residential zoned land, the cemetery, and the steep terrace face. Other than the terrace face, it is poorly linked with other rural land. There are no outstanding landscape areas, water bodies or

(c) <i>The natural character of water bodies and their margins....</i> (h) <i>The intrinsic values of areas of significant indigenous vegetation and habitats of significant indigenous fauna.</i>	significant indigenous vegetation impacted.
9.1.1 Objective - Protection of Amenity Values <i>To manage industrial activities to ensure that:</i> (a) <i>Adverse effects on other land uses are avoided, remedied or mitigated, and</i> (b) <i>Amenity values of neighbouring resource areas are maintained</i>	The proposed plan change, including the recommended landscape buffer, will manage the development of industrial activities to acceptably mitigate adverse effects on the amenity of surrounding areas
9.2.1 Policy - Provision for Industrial Activities <i>To provide for the location of industrial activities to avoid, remedy or mitigate adverse effects on other land use activities.</i>	The site is buffered from the residential area of Clyde by the State Highway 8 embankment. The proposed planted strip will reinforce this and will also provide an effective buffer from the cemetery, the adjacent roads, and the rural residential area to the south.
9.2.2 Policy - Maintenance of Visual Amenity Values <i>To avoid, remedy or mitigate the adverse visual appearance that some industrial areas and activities can have by:</i> (a) <i>Ensuring appropriate separation and screening from adjacent resource areas.</i> (b) <i>Ensuring that the bulk and location of buildings does not dominate adjacent resource areas.</i> (c) <i>Reducing the visual intrusion of signs.</i>	The proposed planted buffer will ensure that adverse visual amenity effects of the industrial activities (as controlled by the CODP rules) are effectively mitigated.

Partially operative Otago Regional Policy Statement 2019

Objective / Policy	Comment
Objective 4.5 <i>Urban growth and development is well designed, occurs in a strategic and coordinated way, and integrates effectively with adjoining urban and rural environments</i>	The proposed industrial zone site is a relatively discrete enclave, poorly linked with productive rural land but well buffered from existing residential areas in Clyde. Whilst separated from the existing urban area by the State Highway, it will be seen as linked with this in terms of urban form, and not as an isolated or sporadic node.
Policy 4.5.1 Providing for urban growth and development <i>Provide for urban growth and development in a strategic and co-ordinated way, including by: ...</i> <i>h) Restricting urban growth and development to areas that avoid reverse sensitivity effects unless those effects can be adequately managed;</i>	Potential reverse sensitivity effects include adverse effects on visual amenity from residential and rural residential areas surrounding, as well as the Clyde Cemetery. The proposed planting buffer will effectively mitigate these effects.
Policy 4.5.3 Urban design <i>Design new urban development with regard to:</i> <i>...</i> <i>b) A built form that relates well to its surrounding environment; ...</i>	See comments in relation to Objective 4.5 above.

Proposed Otago Regional Policy Statement 2021

Objective / Policy	Comment
Objectives UFD-O1 – Form and function of urban areas	Expansion of urban Clyde and provision for industrial land use in the area proposed will not

<i>The form and functioning of Otago's urban areas: ...</i> <i>(2) maintains or enhances the significant values and features identified in this RPS, and the character and resources of each urban area.</i>	have any adverse effects on areas with significant landscape or natural character values. The proposed structure plantings will also ensure that adverse effects on the visual amenity of surrounding / nearby zones are acceptably mitigated.
UFD–O2 – Development of urban areas <i>The development and change of Otago's urban areas: ...</i> <i>(3) respects and wherever possible enhances the area's history, setting, and natural and built environment,</i> <i>(4) delivers good urban design outcomes, and improves liveability,</i> <i>(6) minimises conflict between incompatible activities, ...</i>	Whilst seen as an extension to urban Clyde, the proposed industrial development will be appropriately separated and buffered from residential land use by the highway and proposed plantings, and will not extend onto, or impact the steep terrace landform to its north. Adverse effects on surrounding areas will be mitigated by the proposed buffer plantings.
UFD–O4 – Development in rural areas <i>Development in Otago's rural areas occurs in a way that:</i> <i>(1) avoids impacts on significant values and features identified in this RPS, ...</i> <i>(3) only provides for urban expansion, ..., in locations identified through strategic planning or zoned within district plans as suitable for such development; and</i> <i>(4) outside of areas identified in (3), maintains and enhances the natural and physical resources that support ..., rural character, ...</i>	The proposal will change the zoning on the site from rural to industrial. This site has no significant landscape, natural character or rural amenity values.
UFD–P4 – Urban expansion <i>Expansion of existing urban areas is facilitated where the expansion: ...</i> <i>(2) will not result in inefficient or sporadic patterns of settlement and residential growth,</i>	The site is adjacent to the urban area of Clyde and in terms of urban form, will read as part of the township, albeit with a distinct industrial character, and will be appropriately screened. Reverse sensitivity visual effects will be

... <i>(7) locates the new urban/rural zone boundary interface by considering:</i> <i>(a) adverse effects, particularly reverse sensitivity, on rural areas ...and</i> <i>(b) key natural or built barriers or physical features, significant values or features identified in this RPS, or cadastral boundaries that will result in a permanent, logical and defensible long term limit beyond which further urban expansion is demonstrably inappropriate and unlikely, ... or</i> <i>(c) reflects a short or medium term, intermediate or temporary zoning or infrastructure servicing boundary ...</i>	mitigated by the proposed buffer planting. The development will not extend onto the steep terrace face and is constrained on all other sides by roads and the cemetery.
---	--

Conclusion

This application is for a change from Rural to Industrial zoning of a 6.6 ha site adjacent to State Highway 8 on the eastern side of Clyde. The site is largely flat and isolated from productive rural land by a steep terrace face to the north and the Clyde Cemetery to the east. There is Rural Residential zoned land to its south across Springvale Road. There are no landscape, natural character or rural amenity values of any particular note and in my assessment, the sensitivity of the site to the change proposed is low.

Adoption of the CODP Industrial Zone provisions is proposed to control development. However, this report recommends some extra provisions particular to this site. These involve the establishment of a planted landscape buffer around the road and cemetery boundaries, and a restriction on the extent of development on the terrace face.

Assuming adoption of the proposed development controls, I assess the effects of the proposed plan change on landscape values as adverse in nature but low-moderate (minor) in degree. I consider that the zone change is generally consistent with the statutory provisions relating to landscape values and effects.

A handwritten signature in black ink, appearing to read 'Mike Moore', with a stylized, flowing script.

Mike Moore

Registered NZILA Landscape Architect



Figure 1: Proposed Industrial Zone, Clyde. Site and Photo-points Location Plan



Figure 2: View toward the site from State Highway 8 approx. 920m to the northwest

Camera: Camera EOS 80D
Image: Stitched photographs – focal length 50mm



Figure 3: View toward the site from State Highway 8 approx. 160m to the northwest

Camera: Camera EOS 80D
Image: Stitched photographs – focal length 50mm



Figure 4: View toward the site from State Highway 8 approx. 550m to the south

Camera: Camera EOS 80D
Image: Stitched photographs – focal length 50mm



Figure 5: View toward the site from State Highway 8 approx. 215m to the south

Camera: Camera EOS 80D
Image: Stitched photographs – focal length 50mm

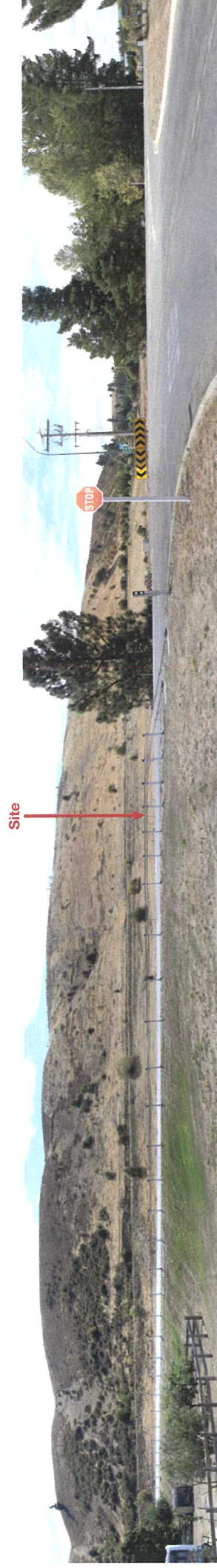


Figure 6: View eastward toward the site from Hazlett Street, close to its intersection with State Highway 8

Camera: Camera EOS 80D
Image: Stitched photographs – focal length 50mm

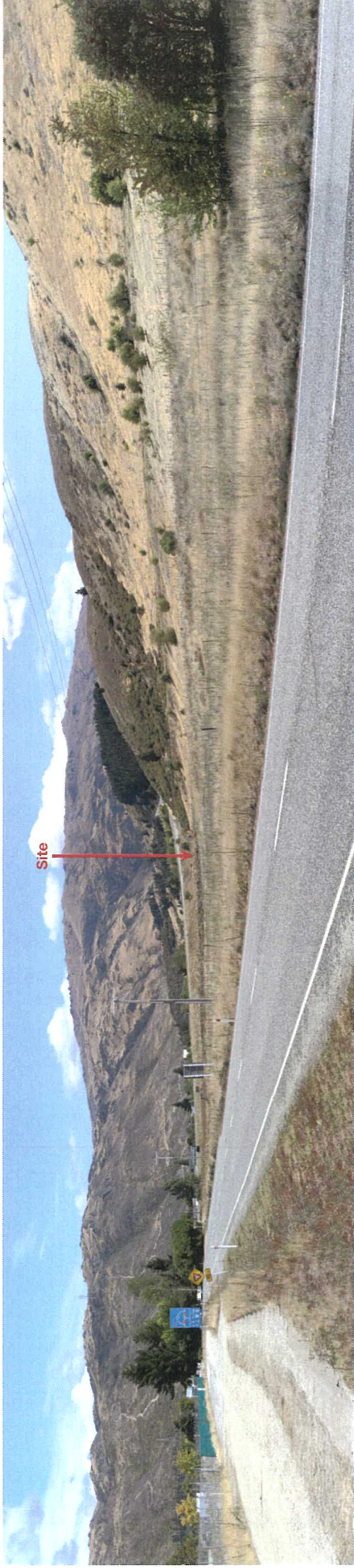


Figure 7: View north-westward toward the site from Springvale Road, approx. 165m from the site boundary

Camera: Camera EOS 80D
Image: Stitched photographs – focal length 50mm



Figure 8: View toward the site from Clyde Cemetery

Camera: Camera EOS 80D
Image: Stitched photographs – focal length 50mm

Landscape Buffer Strip Performance Standard

The landscape buffer strip is to be 10m minimum width and is to be planted to provide rapid and effective screening and softening of the industrial activities within the zone (buildings, yards, stockpiles, signage etc) from viewpoints surrounding.

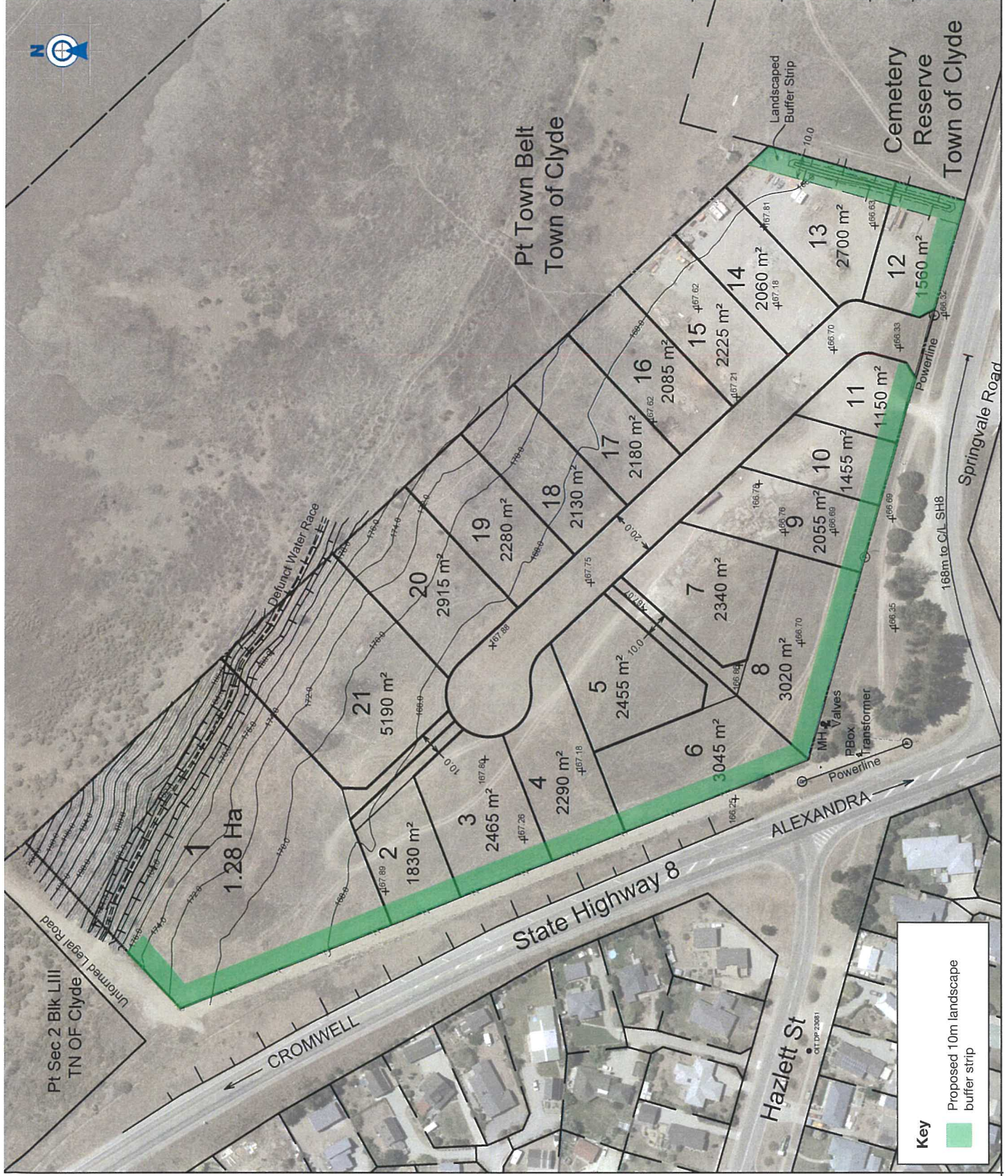


Figure 9: Proposed Industrial Zone – Clyde. Landscape Mitigation Concept Plan

Scale 1:500 (A3)

Appendix 'L' - Land Productivity



HARTLEY ROAD PARTNERSHIP

REQUEST FOR A CHANGE TO THE OPERATIVE CENTRAL OTAGO DISTRICT PLAN LAND PRODUCTIVITY REPORT

PROJECT:	Springvale Road, Clyde, Request for a Change to the Operative Central Otago District Plan
PRINCIPAL:	Hartley Road Partnership
OUR REF:	A5202
DATE:	May 2024

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REVISION / APPROVAL PANEL

Rev:	Date:	Prepared By:	Reviewed By:	Comments:
0	2 May 2024	PLD	DW	Initial Draft
1				Final

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Report Prepared For Hartley Road Partnership

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1.0 Scope

Paterson Pitts Limited Partnership (PPLP) has been engaged by Hartley Road Partnership to provide a land productivity report to support a private plan change request that seeks to re-zone 6.6ha of land at Springvale Road and SH8, Clyde from Rural Resource Area to Industrial Resource Area.

Part of the site is mapped as Land Use Capability ("LUC") Class 3 by Landcare Research NZ Ltd. Refer to the Landcare mapping at **Appendix "1"**. The request is therefore subject to the National Policy Statement for Highly Productive Land 2022 ("NPS-HPL") in accordance with sec 3.5 (7) of the NPS-HPL.

This report analyses the productive land capacity of the site and addresses the application of the NPS-HPL to the Request. The report needs to be read in conjunction with the Landscape, Geotechnical and Soil Contamination reports that support the Request.

2.0 The Site

A topographic plan and soil type map of the site is attached at **Appendix "2"**. The site is described in some detail in the above reports. Approximately $\frac{1}{4}$ of the site consists of the lower southwest facing slopes of a 120m high terrace riser above the site with the slope angle varying from 15 degrees to 30 degrees. This slope is traversed by the remains of a defunct water race which is to be retained as a stormwater intercept channel.

The southerly aspect and steepness of this slope make it unsuitable for intensive productive use for viticulture or horticulture.

The remainder of the site is a sandy flat covered in depleted dryland pasture and bare ground, part of which is currently used as a contractors storage yard. Part of the site was formerly used as a poultry farm for a time, but the site has otherwise never historically been used for productive rural use.

The area of the site suitable for intensive productive rural use is approximately 4.5ha.

There is nothing in the soil contamination report that would prevent the 4.5 ha of flat from being used for productive rural use.

The site is a pocket of rural zoned land isolated from other land used for productive rural purposes by roads, the terrace riser, the Clyde urban area, the Clyde cemetery, land used for industrial purposes by Contact Energy, the Central Otago Rail Trail terminus and life-style blocks along Springvale Road.

3.0 Soils

The site's soils have been mapped by Landcare Research and the ORC's "Grow Otago" database . The "Grow Otago" mapping is however derived from the Landcare mapping . The soil types are strongly correlated with topography as shown in the plan at **Appendix "2"**

The Landcare and ORC soil mapping and supporting information is attached at **Appendix "3"**

The lower sandy flat soil is classified as Molyneuxf (Sib 8) by Landcare Research being very a semi-arid , shallow sandy soil , well drained with a Plant Available Water (PAW) profile of 86mm . Grow Otago classifies the soil as Mx3aG being Molyneux stoney sand, flat to gently undulating with low PAW . This soil is utilised elsewhere in the region for horticulture and viticulture , but requires significant irrigation application to realise this potential

The gentler slopes at the foot of the terrace riser are classified as Molyneuxf (Sib 5) by Landcare Research being a very shallow well drained sandy soil with a PAW of 106mm . Grow Otago classifies the soil as Rp3aR being Ripponvale stoney sand, rolling with low PAW . This soil is commonly used for viticulture and horticulture , but likewise requires significant irrigation . However , the southerly aspect of this soil on this sloping site make it generally unsuitable for viticulture

The steep (30 deg) slopes of the upper terrace riser are classified as Molyneuxf (Sib 10) by Landcare Research being a shallow sandy well drained soil with a PAW of 78mm . Grow Otago classifies the soil as Lt2sS being Letts shallow sand , steep with low PAW . These soils are formed on the distinctive steep terrace risers in the Upper Clutha and Lower Manuherikia Valleys which are far too steep to allow any highly productive use , being generally used for very low intensity dryland grazing .

4.0 Climate

From the Otago Regional Council's "grow Otago" data base at **Attachment "4"** :

- Growing Degree Days (GDD) for 10deg C base are 951-1000hours
- Median Annual Rainfall is 401-450mm
- Dry summer rainfall is 61-80mm
- Median Summer Rainfall is 101-120mm
- Median potential evapotranspiration (Nov-Dec) is 231- 235mm
- Median potential evapotranspiration (Jan-Feb) is 206-210mm

The high GDD of the site makes it very suitable for intensive productive use of the flatter parts of the site , most likely for viticulture and horticulture , including cherries and all types of pip and stone fruit.

However , given the very high summer moisture deficit of the site , significant Irrigation application is essential to realise this productive potential as is the norm for highly productive land throughout Central Otago . This is particularly so given the site's very high potential evapotranspiration rate over the summer growing season and low Plant Available Water (PAW) of the site, due to its light sandy/gravelly soils.

5.0 Irrigation/Frost Fighting Water Requirements and Water Supply Availability

The Otago Regional Council has prepared a report **Guidelines for Reasonable Irrigation Water Requirements in the Otago Region C15000** dated 24/07/2017

(the “Aqualinc Report”) . Relevant extracts from the Aqualinc Report are at **Appendix “5”**

The relevant irrigation water demand from the report is as follows

Crop	Area (ha)	Maximum Daily Demand (mm)	Maximum Daily Demand (m3)	Seasonal Demand (mm) 90%	Seasonal Demand (m3)90%
Pasture	4.5	4.8	216	773	37,785
Viticulture	4.5	2.42	109	217	9,765
Stone & Pip fruit	4.5	5.3	239	724	32,580

As a check on these Otago specific requirements , Irrigation NZ’s generic New Zealand wide on-line calculator (prepared by Aqualinc) at **Appendix “5”** gives the following very similar results :

Pasture – 238m3/day & 33,786m3/year

Viticulture – 99m3/day & 7,160m3/year

Stone fruit – 225m3/day & 31,869m3/year

Significant amounts of water will also be required for frost fighting for viticulture and horticulture , given that the proximity of the site to the Clyde Township will prevent the use of frost fans . At an allowance of a 6mm/hour application rate over a 6 hour frost event over 4.5ha for up to 8 events per season will require 12,960m3 of water per season . As the application period is much less than the irrigation daily application period , storage is normally required . This will require a storage dam of approximately 8500m2 , further reducing the area available for crop growing .

In conclusion , large amounts of irrigation and frost fighting water will be required to realise any highly productive use of the site . However the site does not have access to an irrigation supply , either from a reticulated irrigation scheme or from a potential groundwater source . Please refer to the attached letter at **Appendix “6”** from the Manuherikia Irrigation Co-operative Society Ltd dated 18 January 2000 which stated that the site had no water entitlement from the Manuherikia Scheme . The Requestor advises that the situation has not changed since then . Given that the upcoming setting of a minimum flow for the Manuherikia River under a new Regional Land and Water Plan will almost certainly result in a reduction in the scheme’s allowable take out of the river , it is highly unlikely that a block of water will be available from the scheme in the future . An attempt was made on 23 December 1999 to drill for water on the site by the then McNeil Drilling Company Ltd . The well was dry and the Requestor was advised that there was “no groundwater potential from clay bound gravels “ . See bore log at **Appendix “6”**

6.0 Reverse Sensitivity Effects

Frost fans will not be able to comply with the noise requirements of standard 4.7.6 E (c) of the Operative District Plan (“ODP”) due to the proximity of the site to the Clyde Residential Area which includes Dunstan Hospital and a retirement village. A further constraint on the use of the site for horticulture and viticulture is that audible bird deterrent devices will also not be able to comply with noise standard 4.7.6E(b) of the ODP due to the aforementioned proximity. Other potential reverse sensitivity effects on the Clyde Residential Area include spray drift, night shooting for rabbit control and machinery noise, particularly at night.

In general horticulture and viticulture are incompatible with closely adjoining residential neighbourhoods. The use of frost fans and audible bird scaring devices in particular are a persistent and ongoing source of controversy and complaints to the Central Otago District Council from residents in the Cromwell, Clyde and Alexandra townships, Pisa Moorings, Bannockburn etc and their surrounding lifestyle blocks.

7.0 National Policy Statement on Highly Productive Land 2022 (NPS-HPL)

The Landcare LUC mapping in Attachment A shows the site to be subject to LUC Class 3 and LUC Class 6 classification. The mapping does not correlate well with the detailed topography of the site in that the steep unproductive terrace riser within the site is mapped as LUC class 3 while half of the potentially productive lower flat is classed as LUC 6. However this is likely a consequence of the small (1:25,000) regional scale of the mapping.

7.1 Policies and Objectives

The Objectives and Policies of the NPS-HPL are :

Objective 2.1 : *Highly productive land is recognised as a resource with finite characteristics and long-term values for land-based primary production.*

Policy 2.2 (1) : *Highly Productive land is recognised as a resource with finite characteristics and long – term values for land-based primary production.*

Comment : It is acknowledged that part of the site is potentially suitable for highly productive use. However the lack of a suitable irrigation supply and potential reverse sensitivity effects with the adjacent Clyde residential area effectively prevents this potential from ever being realised

Policy 2.2 (4) : *The use of highly productive land for land-based primary production is prioritised and supported.*

Comment : See above comments under policy 2.2 (1)

Policy 2.2 (5) : *The urban re-zoning of highly productive land is avoided , except as provided for in this National Policy Statement*

Comment : See discussion below under clauses 3.6 , 3.9 ,3.10 of the NPS-HPL for an explanation of how the Request complies with the exception provisions of the NPS-HPL

Policy 2.2 (8) : *Highly Productive Land is protected from inappropriate use and development*

Comment : Given that it is not possible to realise the productive potential of the site , re-zoning the site for industrial activity is not an inappropriate use of the site

Policy 2.2 (9) : *Reverse Sensitivity effects are managed so as not to constrain land-based primary production activities on highly productive land*

Comment : The site is an isolated pocket of rural zoned land which is at least a kilometre away from any other land used for land-based primary production on highly productive land . Zoning the site industrial will have no reverse sensitivity effects on highly productive land . In fact , the opposite is the case as the proximity of the Clyde residential area creates reverse sensitivity effects within Clyde consequent on the use of the site itself for highly productive use .

7.2 Clauses 3.6 (4) & (5)

These clauses provide that :

(4) Territorial authorities that are not Tier 1 or 2 may allow urban rezoning of highly productive land only if :

- (a) The urban zoning is required to provide sufficient development capacity to meet expected demand for housing or business land in the district; and*
- (b) There are no other reasonably practical and feasible options for providing the required development capacity ; and*
- (c) The environmental , social, cultural and economic benefits of re-zoning outweigh the environmental , social and economic costs associated with the loss of highly productive land for primary based production , taking into account both tangible & intangible values*

(5) Territorial authorities must take measures to ensure that the spatial extent of any urban zone covering highly productive land is the minimum necessary to provide the required development capacity while achieving a well-functioning urban environment

Comment : As outlined in the Economic Assessment prepared by Savvy Consulting there is a requirement for sufficient development capacity to be provided at Clyde for industrial use and this site is the best practicable option and of sufficient size to provide that capacity . There is other land on the opposite side of Springvale Road that is currently used for industrial purposes under a scheduled activity in the ODP . However use of this land is restricted to the scheduled activity (Clyde Storage Shed) associated with the Clyde & Roxburgh Hydro Dams . The Economic Assessment also finds that the economic benefits of re-zoning outweigh the economic costs associated with the loss

of highly productive land . Given that it is not possible to realise the primary based productive capacity of the land in any case , there will be no actual loss of highly productive land and therefore no environmental , social and economic costs associated with the loss of highly productive land .

7.3 Clause 3.9 (3)

This clause provides that

Territorial authorities must take measures to ensure that any use or development on highly productive land :

- (a) Minimises or mitigates any actual loss or potential cumulative loss of the availability and productive capacity of highly productive land in their district; and*
- (b) Avoids if possible , or otherwise mitigates any actual or potential reverse sensitivity effects on land-based primary production activities from the use or development*

Comment: There is no actual loss of highly productive land , given the land's productive potential cannot be realised. The site is remote from other land used for highly productive rural purposes , therefore no reverse sensitivity effects arise from Industrial use of the site

7.4 Clause 3.10 Exemption for highly productive land subject to permanent or long-term constraints

This clause provides that :

(1) Territorial authorities may only allow highly productive land to be subdivided, used , or developed for activities not otherwise enabled under clauses 3.7,3.8, or 3.9 if satisfied that :

- (a) There are permanent or long-term constraints on the land that mean the use of the highly productive land for land-based primary production is not able to be economically viable for at least 30 years ; and*

Comment : The lack of a suitable irrigation supply and reverse sensitivity effects with the adjoining Clyde township are permanent and fatal constraints on the use of the site for highly productive land-based primary production .

(b) The subdivision ,use, or development :

- (i) Avoids any significant loss (either individually or cumulatively) of productive capacity of highly productive land in the district ; and*
- (ii) Avoids the fragmentation of large and geographically cohesive areas of highly productive land ; and*
- (iii) Avoids if possible , or otherwise mitigates , any potentially reverse sensitivity effects on surrounding land-based primary production from the subdivision use , or development ; and*

Comment : As the site cannot be used for highly productive purposes, there is no actual loss of highly productive land . The site is not part of a large and geographically cohesive area of highly

productive land . The site is remote from any other area of highly productive land subject to the NPS-HPL , therefore no reverse sensitivity issues arise

- (c) the environmental , social , cultural and economic benefits of the subdivision, use or development outweigh the long-term environmental , social , cultural and economic costs associated with the loss of highly productive land for land-based primary production , taking into account both tangible and intangible values*

Comment : refer to the comments under clause 3.6(4) (c) in para 7.2 above

- (2) In order to satisfy a territorial authority as required by subclause 1 (a) , an applicant must demonstrate that the permanent or long term constraints on economic viability cannot be addressed through any reasonably practicable options that would retain the productive capacity of the highly productive land , by evaluating options such as (without limitation) :*

- (a) alternate forms of land-based primary production:*
- (b) improved land management strategies:*
- (c) alternative production strategies:*
- (d) water efficiency or storage methods:*
- (e) reallocation or transfer of water and nutrient allocations:*
- (f) boundary adjustments(including amalgamations):*
- (g) lease arrangements*

Comment : The fundamental issue at stake is that any form of highly productive land-use in Central Otago , be it horticulture , viticulture , cropping , market gardening or pastoral use requires irrigation regardless of what land management strategy or alternative production strategy is used . The site does not have access to an irrigation water supply and there are no alternative water allocations available and it is highly unlikely they will ever be available , given the likely outcome of the upcoming new Regional Policy Statement and Land and Water Plan. A boundary adjustment with other adjoining land is not an option .

- (3) Any evaluation under subclause (2) of reasonably practical options :*

- (a) must not take into account the potential economic benefit of using the highly productive land for the purposes other than land-based primary production; and*
- (b) must consider the impact that the loss of the highly productive land would have on the landholding on which the highly productive land occurs ; and*
- (c) must consider the future productive potential of land-based primary production on the highly productive land, not limited by past or present uses*

Comment : This evaluation does not consider the economic benefit of the use of the land for industrial purposes . As the landholding cannot actually be used for land-based highly productive purposes, there is no adverse impact on the landholding (“landholding” as defined in in the Resource Management (National Environmental Standard for Freshwater) Regulations 2020). This evaluation does not consider past or present uses of the site in assessing its productive land use capacity.

- (4) The size of the land holding in which the highly productive land use is not of itself a determinant of a permanent long-term constraint.*

Comment : This evaluation does not consider the size of the land holding as a constraint on its productive capacity . It is acknowledged that 4.5ha of highly productive land is a viable unit for horticulture , in particular cherries , or viticulture.

8.0 Conclusion

Although the topography of a large part of the site and the site's climate and soils make it suitable for highly productive use , the lack of an irrigation and frost fighting water supply means that this productive potential cannot be realised. Potential reverse sensitivity issues with the adjacent Clyde Township , including a hospital and retirement village, further inhibit realisation of the site's productive potential .

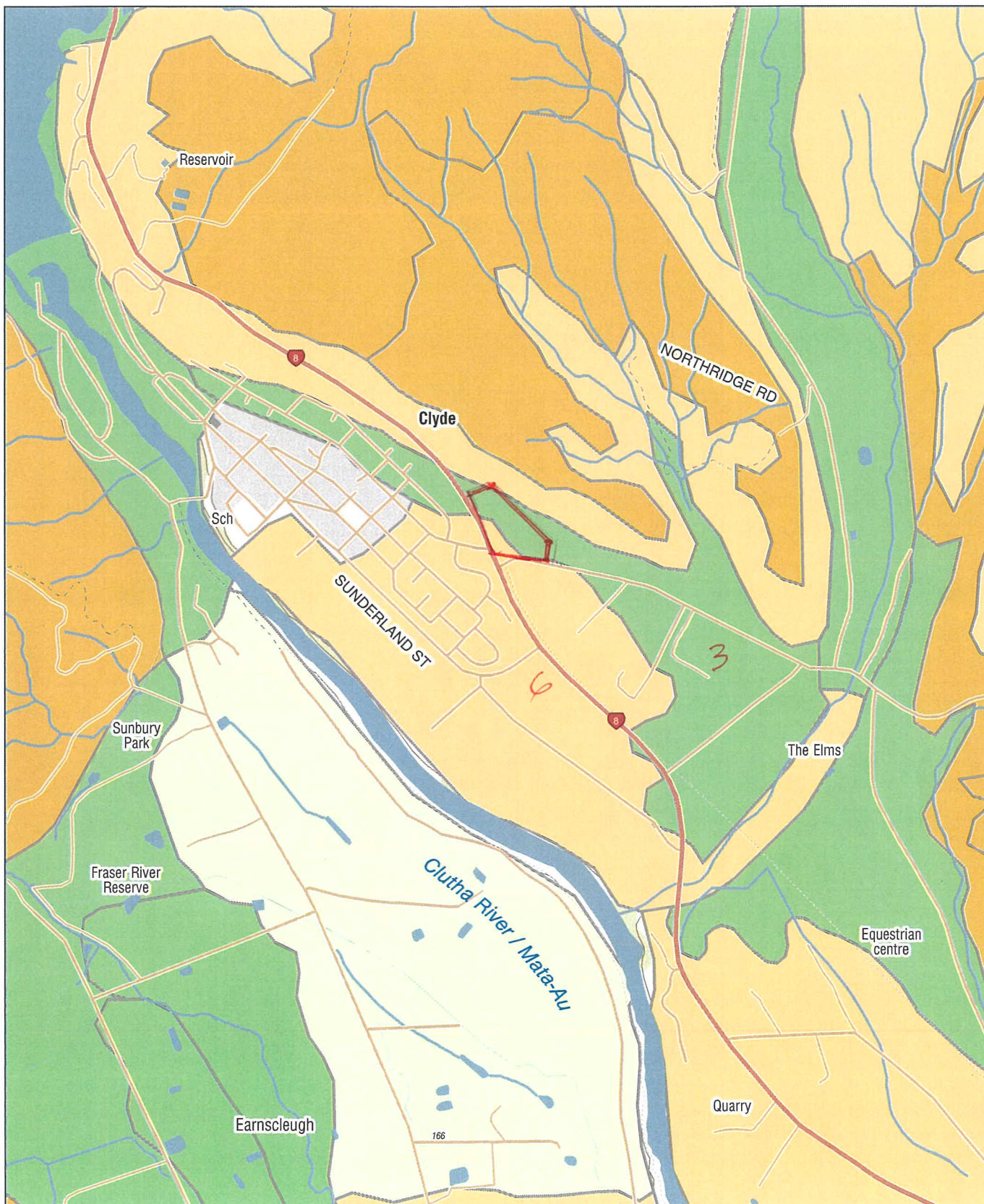
The Request complies with all of the exception criteria in the NPS-HPL that enables Council to rezone a site of highly productive land for non-rural use .



Peter Dymock
B.Sc, Dip Mgt, R.P. Surv, MNZIS, CSNZ
Paterson Pitts Limited Partnership

APPENDIX 1

Landcare LUC Mapping

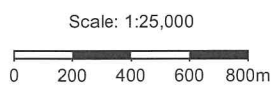


OURENVIRONMENT



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Legend

Land Use Capability

-  LUC Class 1
-  LUC Class 2
-  LUC Class 3
-  LUC Class 4
-  LUC Class 5
-  LUC Class 6
-  LUC Class 7
-  LUC Class 8

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APPENDIX 2

Topographic Plan & Soil Type Map

NOTES:

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

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ALEXANDRA
8 Skird Street
Alexandra 9320
T +64 (3) 448 8775
E alexandra@ppgroup.co.nz

Client & Location

Hartley Road Partnership

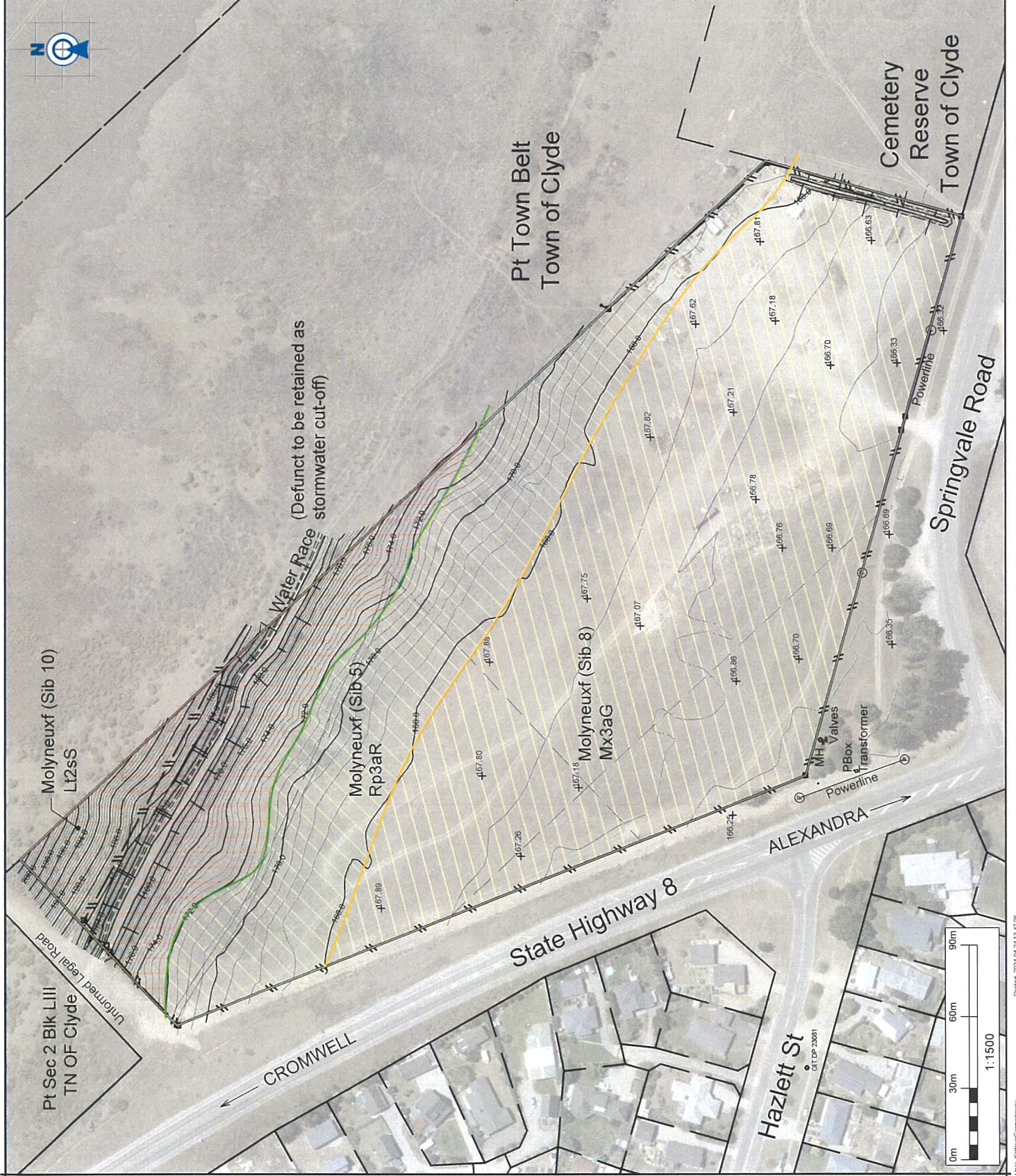
Purpose & Drawing Title

TOPO PLAN
& SOIL TYPE

FOR INFORMATION

Surveyed By	BD	Original Size	Scale
Designed By	KMG	A3	1:1500
Checked By	PD		DO NOT SCALE
Approved By	PD		Revision No (Date)
Job No	TOPO	2	A
Drawing No	A5202		24/04/2024

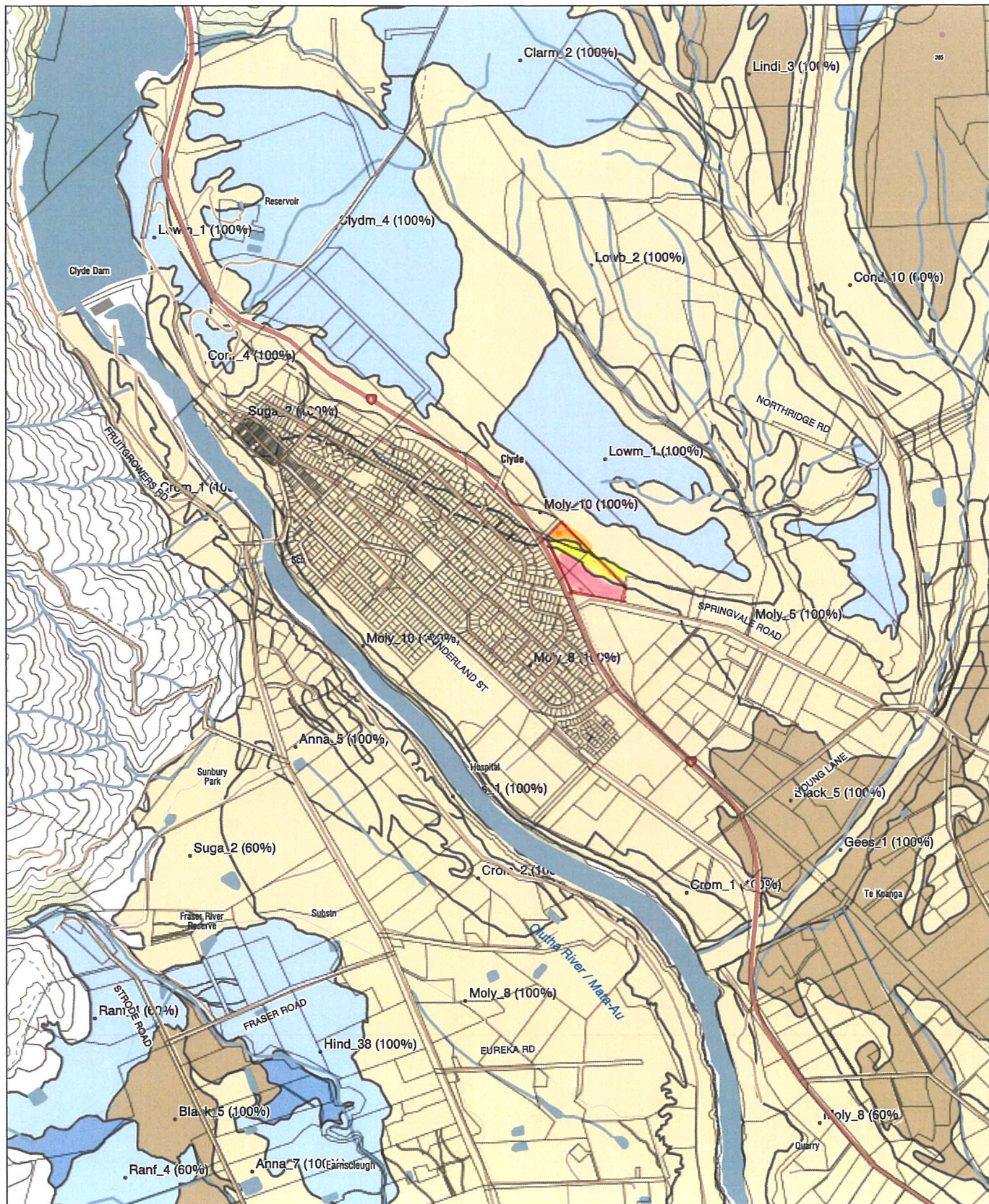
Filename: J:\A_2202 Hartley Road\Gis\A5202_TOPO_2A.dwg



APPENDIX 3

Landcare & ORC Soil Mapping

Molynauxf (Sib8) Molynauxf (Sib5)
Molynauxf (Sib10)



S-MAPONLINE



Manaaki Whenua
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Scale: 1:25,000



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Legend

Soil Drainage

-  Very Poorly Drained
-  Poorly Drained
-  Imperfectly drained
-  Moderately well drained
-  Well drained

Polygons & Labels

-  S-map soil data

S-MAPONLINE



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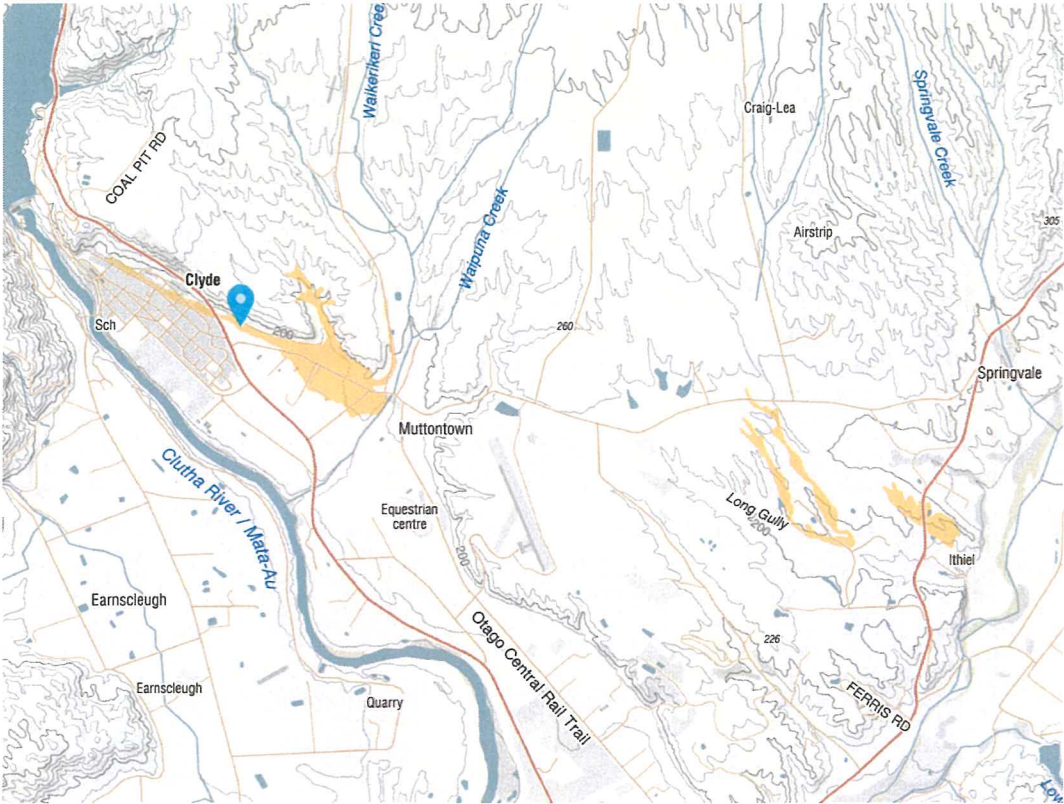
Printed: 09:42:40 AM Thu, 18 Apr 2024

Molyneux (Sibs)

Soil map unit factsheet

Report generated: 18/04/2024 from <https://smap.landcareresearch.co.nz/maps-and-tools/app/?gislayer=Otago&soilmapuc=Rp3aR&factsheetType=undefined&siblingNumber=undefined&objectId=undefined&pinCoordinate=1312142.8149154412%2C4989172.7>

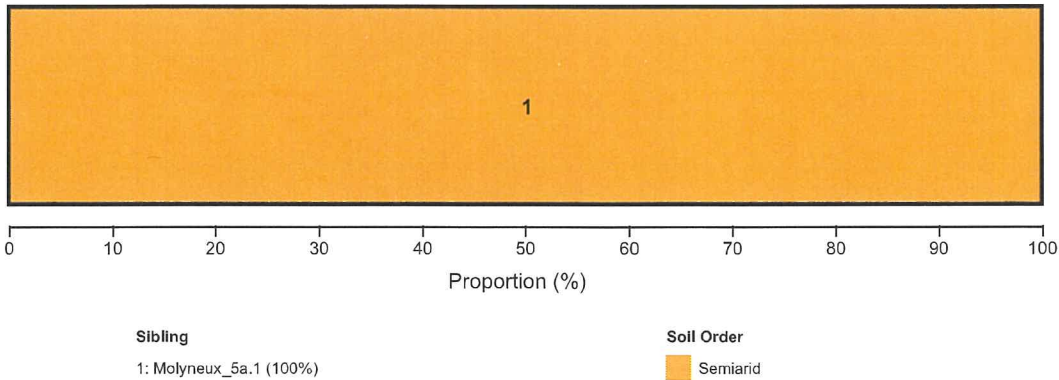
Areas with Otago\Rp3aR map unit code are shown on the map below. A soil map unit is a collection of areas that have the same soils (i.e. siblings) in the same proportion.



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Proportion of siblings in this map unit

Graph is coloured according to the NZSC soil order of each sibling within this map unit.



Soil properties of the siblings within the soil map unit

This table shows the details of the soil siblings within the map unit. The profile available water (Paw) is a measure of the capacity of the soil sibling to store water to a depth of 1 metre. Click the links below to find out more about each item:

[Soil Order](#), [Drainage Class](#), [Depth Class](#)

No.	Smap name	Proportion (%)	Depth	Texture	Drainage class	PAW (mm)	Order
1	Molyneux_5a.1	100	Very Shallow	sand	Well drained	106.5	Semiarid

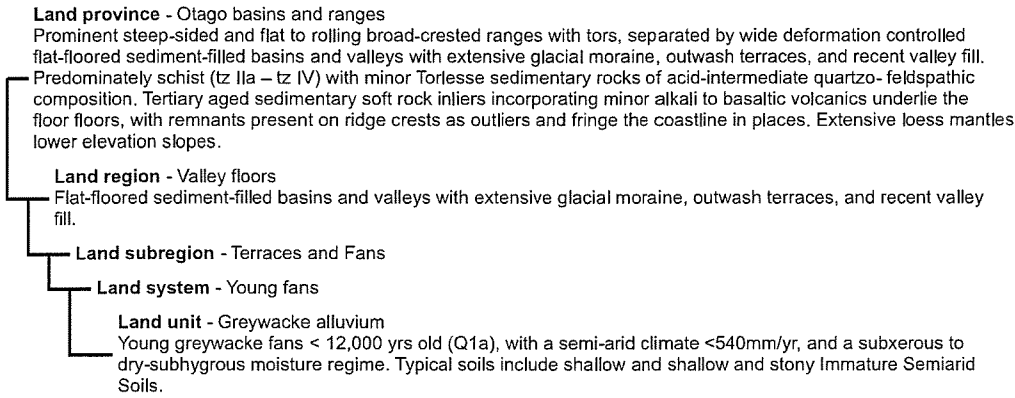
Soil Survey

This soil mapunit was mapped within the following soil survey:

Survey Title: Grow Otago
Survey Scale: 50000
Survey Date: 2010 to 2014
Origin: legacy update major
Map Unit Delineation Method: Hand-drawn
Map Unit Labelling Method: Observations
Sibling Base Property Classification Method: Observations
Description: Low to moderate predictability, minimal soil observations, or a relatively coarse mapping for the scale of variation.

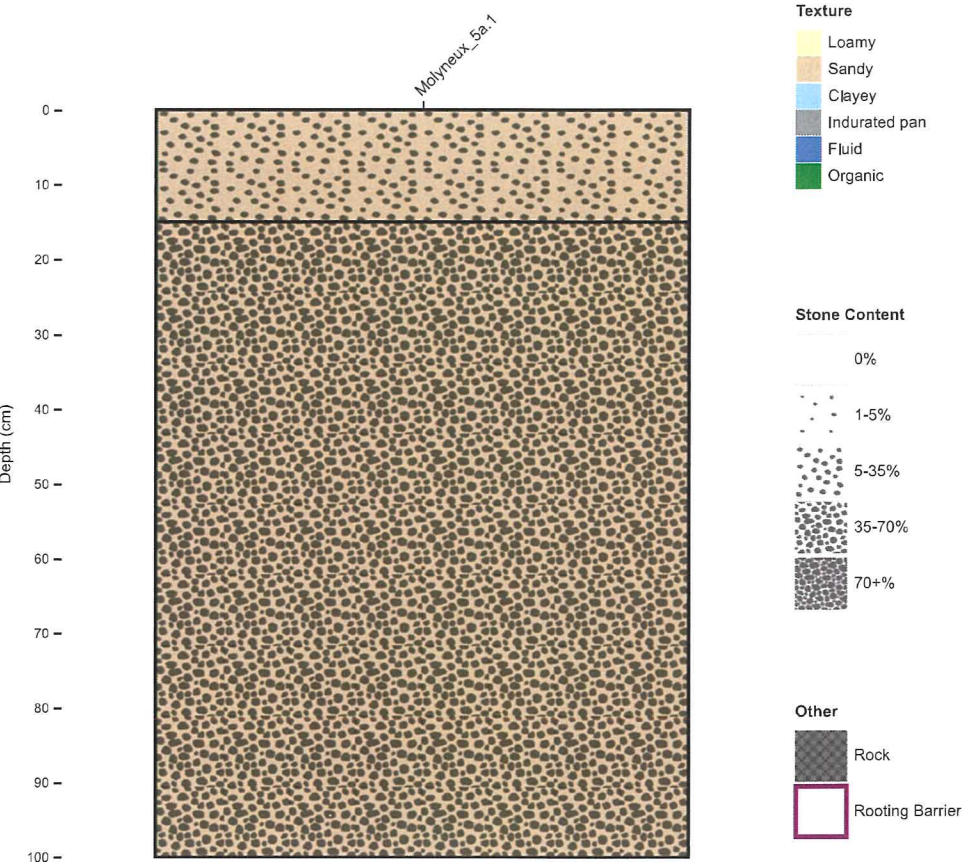
Landform

The landform tree hierarchy below shows where the selected soil mapunit fits within the wider landscape



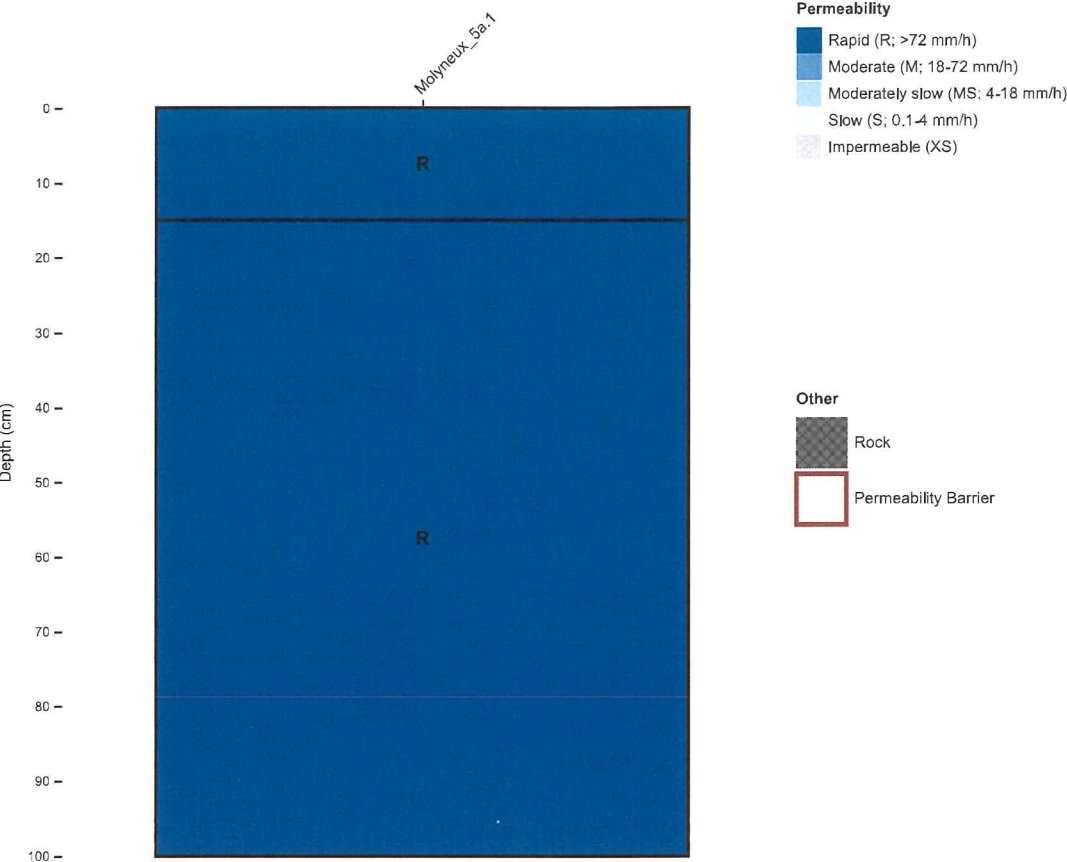
Texture graph

This graph shows the texture profile of the siblings found in the map unit. Each horizon is coloured according to its texture.



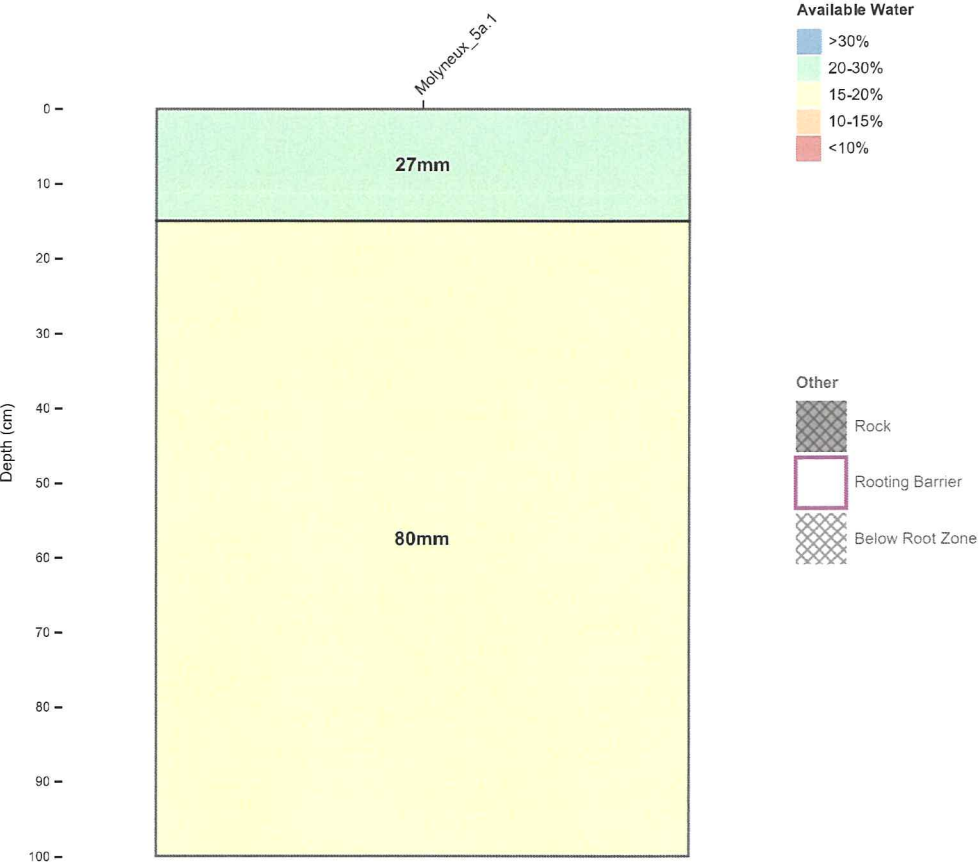
Permeability graph

This graph shows the permeability profile of the siblings found in the map unit. Each horizon is coloured according to its permeability. Click [here](#) for more information on permeability.



Available Water Graph

This graph shows the available water profile of the siblings found in the map unit. This is capacity of the soil to hold water that is available to plants. Each horizon is coloured according to its percent available water content. Click [here](#) for more information on available water.



About this publication

- This information sheet describes the typical average properties of the specified soil map unit.
- For further information on individual soils, contact [Landcare Research New Zealand Ltd](#)
- Advice should be sought from soil and land use experts before making decisions on individual farms and paddocks.
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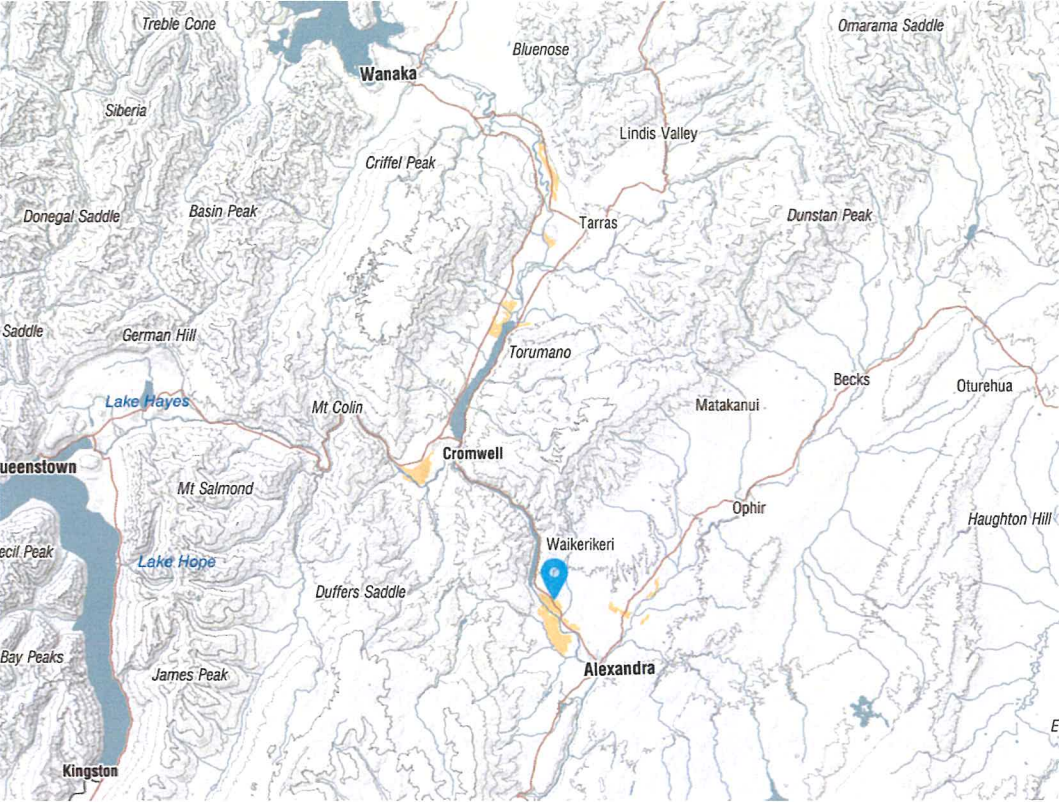
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Molyneux f (Sib 8)

Soil map unit factsheet

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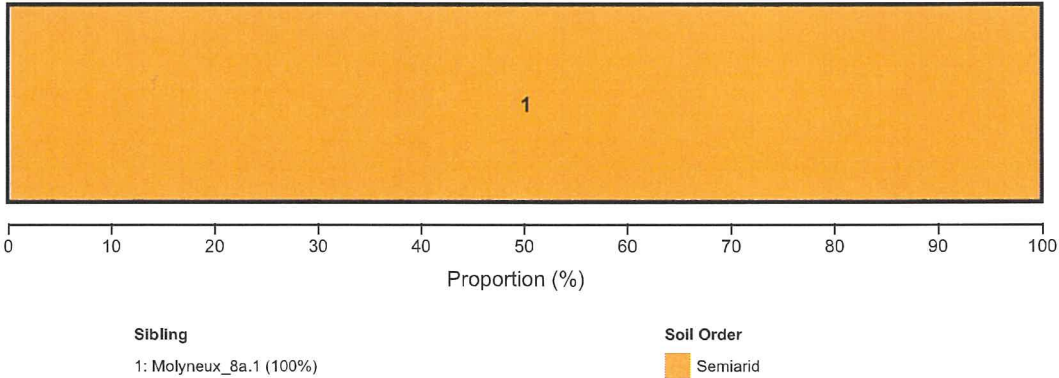
Areas with Otago\Mx3aG map unit code are shown on the map below. A soil map unit is a collection of areas that have the same soils (i.e. siblings) in the same proportion.



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Proportion of siblings in this map unit

Graph is coloured according to the NZSC soil order of each sibling within this map unit.



Soil properties of the siblings within the soil map unit

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[Soil Order](#), [Drainage Class](#), [Depth Class](#)

No.	Smap name	Proportion (%)	Depth	Texture	Drainage class	PAW (mm)	Order
1	Molyneux_8a.1	100	Very Shallow	sand	Well drained	86.2	Semiarid

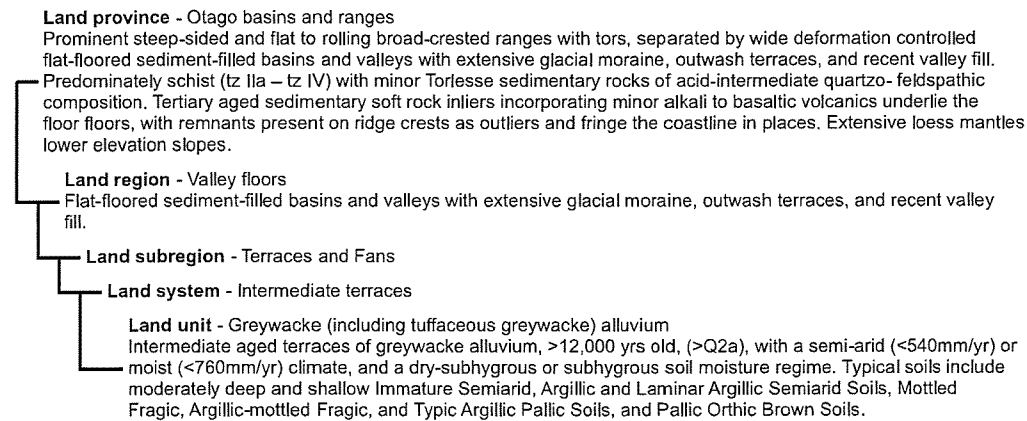
Soil Survey

This soil mapunit was mapped within the following soil survey:

Survey Title: Grow Otago
Survey Scale: 50000
Survey Date: 2010 to 2014
Origin: legacy update major
Map Unit Delineation Method: Hand-drawn
Map Unit Labelling Method: Observations
Sibling Base Property Classification Method: Observations
Description: Low to moderate predictability, minimal soil observations, or a relatively coarse mapping for the scale of variation.

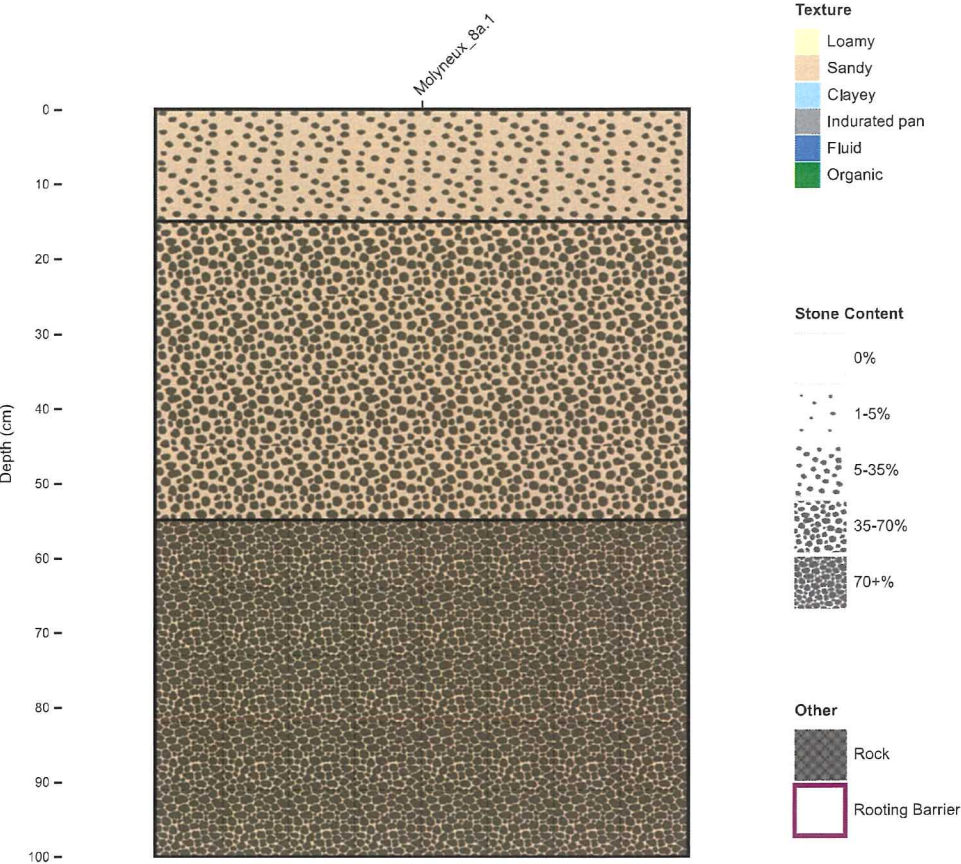
Landform

The landform tree hierarchy below shows where the selected soil mapunit fits within the wider landscape



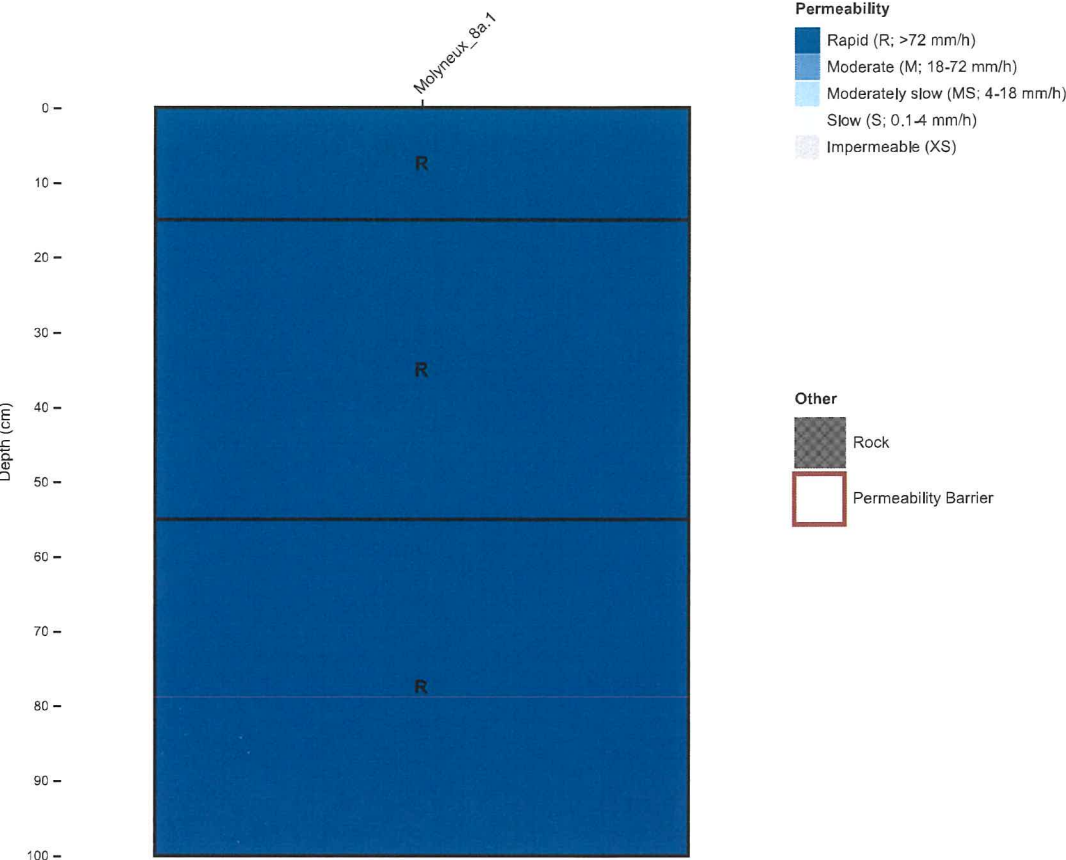
Texture graph

This graph shows the texture profile of the siblings found in the map unit. Each horizon is coloured according to its texture.



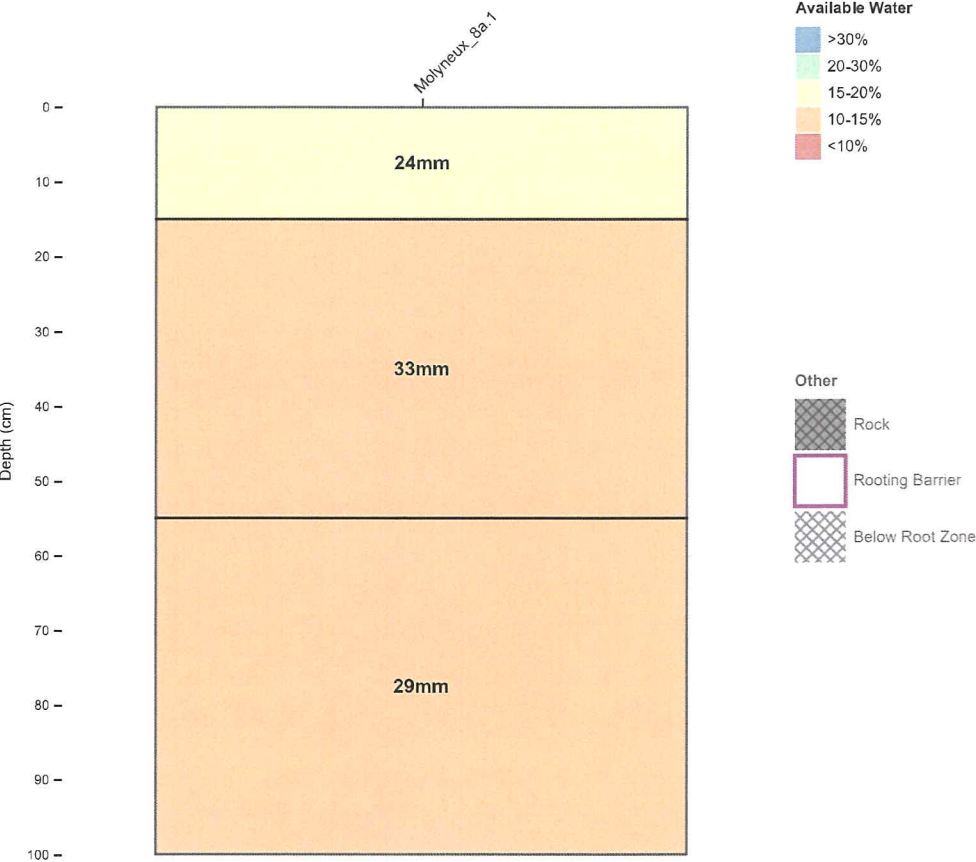
Permeability graph

This graph shows the permeability profile of the siblings found in the map unit. Each horizon is coloured according to its permeability. Click [here](#) for more information on permeability.



Available Water Graph

This graph shows the available water profile of the siblings found in the map unit. This is capacity of the soil to hold water that is available to plants. Each horizon is coloured according to its percent available water content. Click [here](#) for more information on available water.



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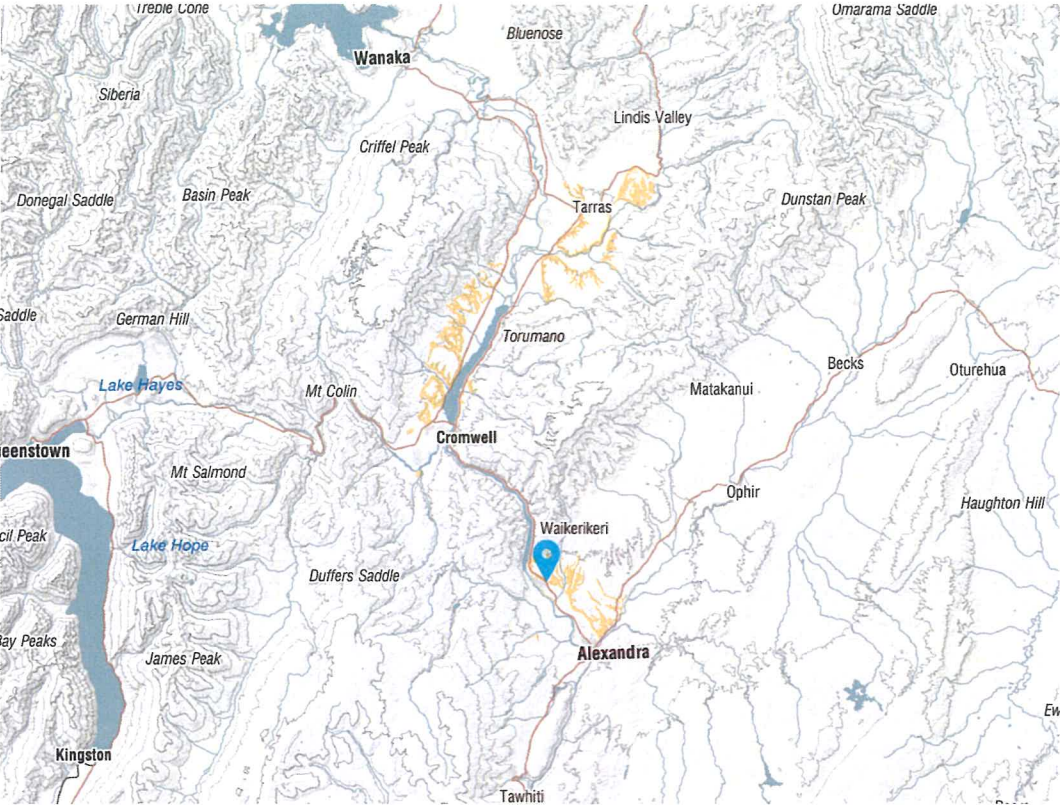
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Molyneux f (Sis10)

Soil map unit factsheet

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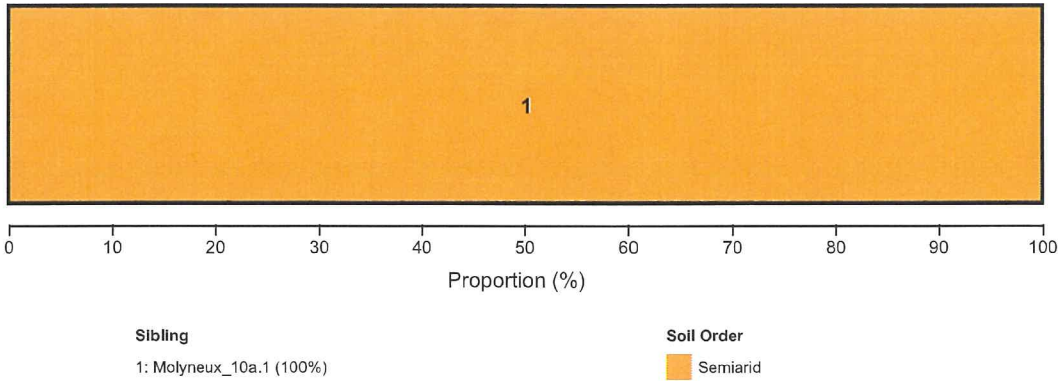
Areas with Otago\Lt2sS map unit code are shown on the map below. A soil map unit is a collection of areas that have the same soils (i.e. siblings) in the same proportion.



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Proportion of siblings in this map unit

Graph is coloured according to the NZSC soil order of each sibling within this map unit.



Soil properties of the siblings within the soil map unit

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[Soil Order](#), [Drainage Class](#), [Depth Class](#)

No.	Smap name	Proportion (%)	Depth	Texture	Drainage class	PAW (mm)	Order
1	Molyneux_10a.1	100	Shallow	sand	Well drained	78.6	Semiarid

Soil Survey

This soil mapunit was mapped within the following soil survey:

Survey Title: Grow Otago

Survey Scale: 50000

Survey Date: 2010 to 2014

Origin: legacy update major

Map Unit Delineation Method: Hand-drawn

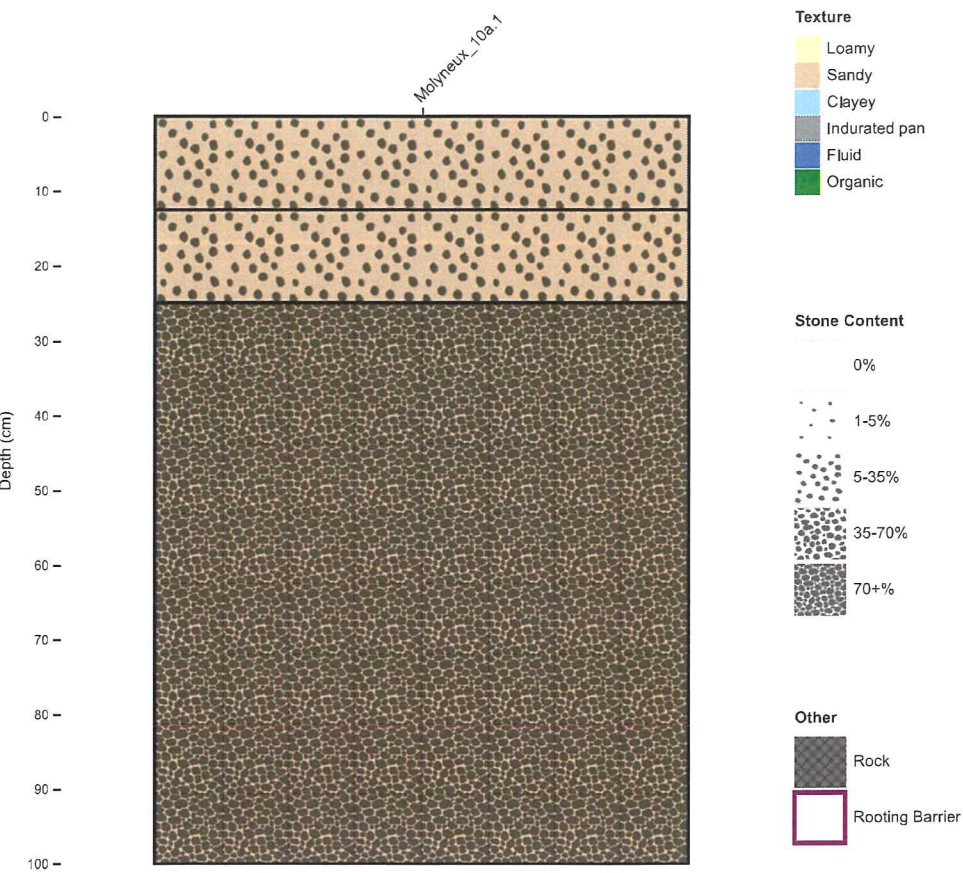
Map Unit Labelling Method: Observations

Sibling Base Property Classification Method: Observations

Description: Low to moderate predictability, minimal soil observations, or a relatively coarse mapping for the scale of variation.

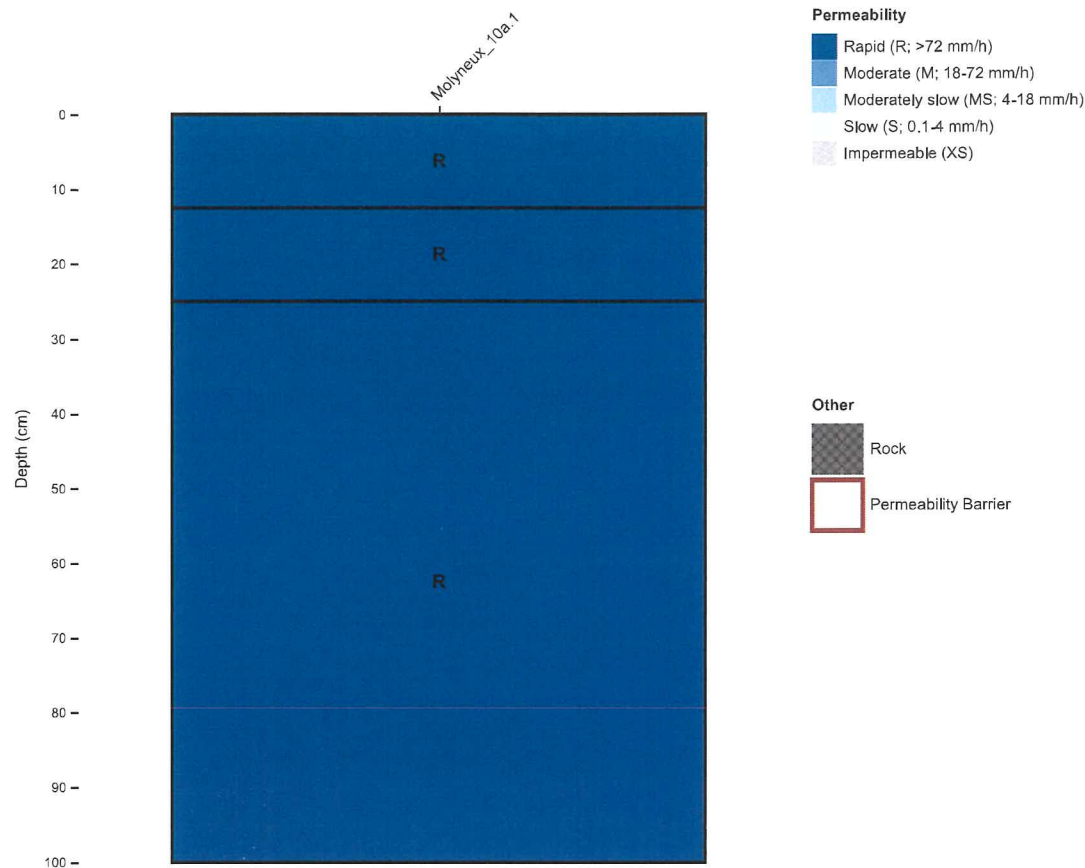
Texture graph

This graph shows the texture profile of the siblings found in the map unit. Each horizon is coloured according to its texture.



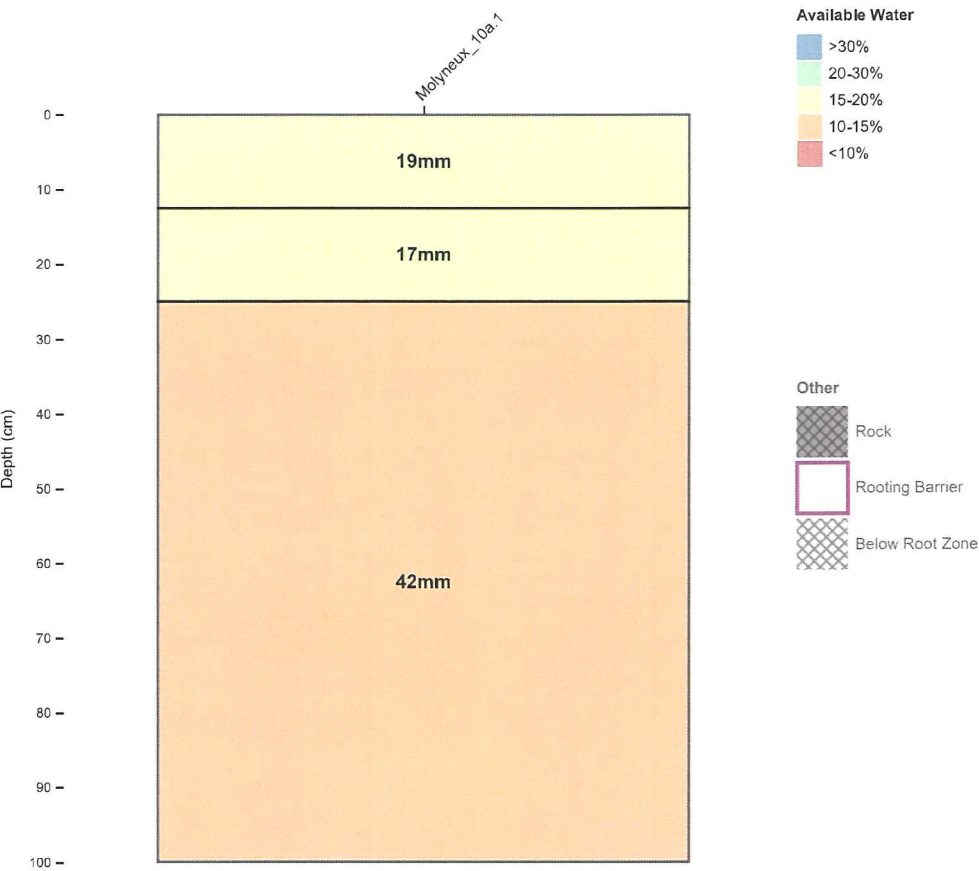
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This graph shows the permeability profile of the siblings found in the map unit. Each horizon is coloured according to its permeability. Click [here](#) for more information on permeability.



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Otago Maps Soils



Semi-arid soils

Soil Type Codes

This Help page shows how to interpret the **GrowOtago** Maps soil codes.

The colours on the soil map show the first two levels, Order and Group, of the New Zealand Soil Classification (NZSC) (Hewitt 1998 Landcare Research Science Series No. 1)

The next section shows how the lowland codes are constructed. The subsequent sections list the codes, both lowland and upland.

Interpreting Lowland Soils Codes

Example: Gd0sU^M

Series	Gd	Gladbrook
Depth	0	deep
Texture	s	sandy loam
Slope	U	undulating
Phase	^M	mottled phase

Gd0sU^M = Gladbrook deep sandy loam, undulating, mottled phase

Depth

0	>90cm	deep
1	45-90cm	moderately deep
2	20-45cm	shallow
3	10-20cm	stony
4	<10cm	very stony

Texture

a	sand
b	loamy sand
b/a	loamy sand on sand
b/z	loamy sand on silt loam
c	clay loam
c/d	clay loam on silty clay
d	silty clay
d/a	silty clay on sand
d/b	silty clay on loamy sand
d/c	silty clay on clay loam
d/s	silty clay on sandy loam
d/z	silty clay on silt loam
e	clay
f	fine sandy loam
f/a	fine sandy loam on sand
f/c	fine sandy loam on clay loam

f/p	fine sandy loam on peaty loam
f/s	fine sandy loam on sandy loam
f/z	fine sandy loam on silt loam
o	peat
o/b	peat over loamy sand
o/d	peat over silty clay
o/f	peat over fine sandy loam
o/p	peat over peat loam
p	peaty loam
p/c	peaty loam over clay loam
p/d	peaty loam silty clay
p/s	peaty loam over sandy loam
p/z	peaty loam over silt loam
q	loamy peat
q/z	peaty loam over silt loam
r/a	slight peaty clay loam on sand
r/b	slight peaty clay loam on loamy sand
r/z	slight peaty clay loam on silt loam
s	sandy loam
s/a	sandy loam on sand
s/c	sandy loam on clay loam
s/z	sandy loam on silt loam
y	loamy silt
y/a	loamy silt on sand
y/b	loamy silt on loamy sand
y/d	loamy silt on silty clay
y/o	loamy silt on peat
z	silt loam
z/a	silt loam on sand
z/b	silt loam on loamy sand
z/c	silt loam on clay loam
z/d	silt loam on silty clay
z/e	silt loam on clay
z/f	silt loam on fine sandy loam
z/o	silt loam on peat
z/p	silt loam on peaty loam
z/s	silt loam on sandy loam
z/y	silt loam on loamy silt

Slope

G	0-3°	gently undulating
H	16-25°	hilly
R	8-15°	rolling
S	>25°	steep
U	4-7°	undulating

Phase

B	bouldery phase
BM	"bouldery, mottled phase"
C	complex
D	disturbed variant

E	eroded variant
G	strongly gleyed variant
J	argillic variant
JM	argillic mottled variant
M	mottled phase
MX	"mottled, weakly saline phase"
MXx	"mottled, moderately saline phase"
P	peaty phase
T	thickened topsoil variant
U	undifferentiated
W	raw variant
X	weakly saline phase
Y	moderately saline phase
Z	strongly saline phase

Lowland Codes

Ab	Abbotsford
Ac	Arcadia
Ad	Ardlussa
Ae	Andrews
Ai	Airedale
Aj	Ardlui
Ak	Akatore
An	Annan
Ao	Arrow
Ar	Arthurton
As	Ainsley
At	Athol
Au	Ardgour
Aw	Awamoko
Ax	Alexandra
Bb	Bannockburn
Bc	Blackmans
Bd	Bendigo
Be	Becks
Beach	Beach
Bi	Bickerstaff
Bk	Brassknocker
Bl	Blackstone
Bn	Benio
Bo	Bortons
Br	Brighton
Bs	Brookstead
Bt	Bungtown
Bw	Berwick
By	Broad Bay
Ca	Charlton
Cb	Camphill-Beck
Cc	Conical Hill

Cd	Cluden
Ce	Carrick
Cf	Chalmers
Cg	Cargill
Ch	Chatto
Ck	Crookston
Cl	Clare
Cm	Claremont
Cn	Clinton
Co	Conroy
Cp	Camphill
Cq	Chapman
Cr	Craigdale
Cs	Chasm
Ct	Chatton
Cu	Clutha
Cv	Clydevale
Cw	Cromwell
Cx	Conroy-Becks
Cy	Clyde
D	Disturbed
Db	Drybread
Dd	Dunedin
Di	Diamond
Dk	Dukes
DI	Darnley
Dn	Dunstan
Dp	Dip
Dt	Dart
Ed	Eden
Ee	Eely
Ef	Enfield
El	Earnsclough

Em	Tima
En	Earnslaw
Estuary	Estuary
Ev	Evansdale
Ew	Eweburn
Ey	Eyre
Fd	Fereday
Fk	Frankton
Fm	Fleming
Fr	Ferndale
Fs	Fraser
Ft	Felton
Gb	Gibbston
Gd	Gladbrook
Gf	Greenfield
Gh	Glenlea
Gi	Glenfield
Gl	Glasnevin
Gn	Glenure
Gr	German
Gt	Georgetown
Gv	Glenavy
Gw	Galloway
Gy	Glenorchy
Ha	Hakataramea
Hc	Harbour Cone
Hf	Hatfield
Hg	Hogburn
Hi	Highcliff
Hk	Hokonui
Ho	Hillock
Hs	Hawksburn
Hu	Hurunui
Hy	Henley
Id	Idaburn
Ja	Janefield
Jn	Jacobstown
Ka	Kauru
Kb	Kaimata
Kc	Kuri
Ke	Kiteroa
Kg	Kaitangata
Kh	Kaihiku
Ki	Koinga
Kk	Kakahu
Kl	Kilmarnock
Km	Komako
Ko	Koau
Kp	Kaherekoau
Kr	Kairaki

Ks	Cass
Ku	Kuriwao
Kw	Kaiwera
La	Landon
Lake	Lake
Lb	Linnburn
Lc	Lochar
Ld	Landslip
Le	Leith
Lh	Lindis
Li	Lintley
Ll	Lammerlaw
Ln	Longridge
Ls	Lismore
Lt	Letts
Lu	Luggate
Lw	Lowburn
Ma	Mataura
Mb	Maude
Md	Middlemarch
Me	Mandeville
Mf	Mayfield
Mg	Maungatua
Mi	Matukituki
Mk	Makarewa
Mm	Momona
Mn	Matakanui
Mp	Mihiwaka
Mq	Motukarara
Mr	Matarae
Ms	Mt Mistake
Mt	Matau
Mu	Manuherikia
Mw	Maungawera
Mx	Molyneux
My	Mt Misery
Nb	Naseby
Nd	Narrowdale
Np	Ngapara
Nt	Nithdale
Oa	Oamaru
Oc	Otakou
Od	Omeo
Oe	Oreti
Ok	Otokia
Om	Otama
On	Otanomomo
Op	Opuha
Or	Otaraia
Os	Okia

Ot	Otikerama
Ou	Oturehua
Ow	Mine workings
Pa	Papakaio
Pb	Portobello
Pd	Paradise
Pe	Pukeawa
Pf	Parata
Pg	Pigburn
Pi	Purakanui
Pj	Pinelheugh
Pk	Pukeuri
Pm	Pomahaka
Po	Patearoa
Pond	Pond
Pq	Pukerangi
Pr	Paerau
Ps	Porteous
Pt	Paretai
Pu	Pukerau
Pv	Puerua
Qi	Quion
Qn	Queenstown
QU	Quarry
RB	Riverbed
Rb	Roseberry
Re	Rees
Rf	Ranfurlly
Rg	Rangitata
Ri	Riversdale
Rk	Rakaia
Rp	Ripponvale
Rw	Rapuwai
RX	Rock outcrop
Sa	Saddle
Sb	Sowburn
Sc	Scotland Poin
Sh	Shotover
Si	Stirling
Sl	Selwyn
Sn	Struan
Sp	Spottis
St	Steward
Sv	Springvale
Sw	Swinburn
Ta	Te-Aneraki
Tc	Taiko
Td	Tokoiti

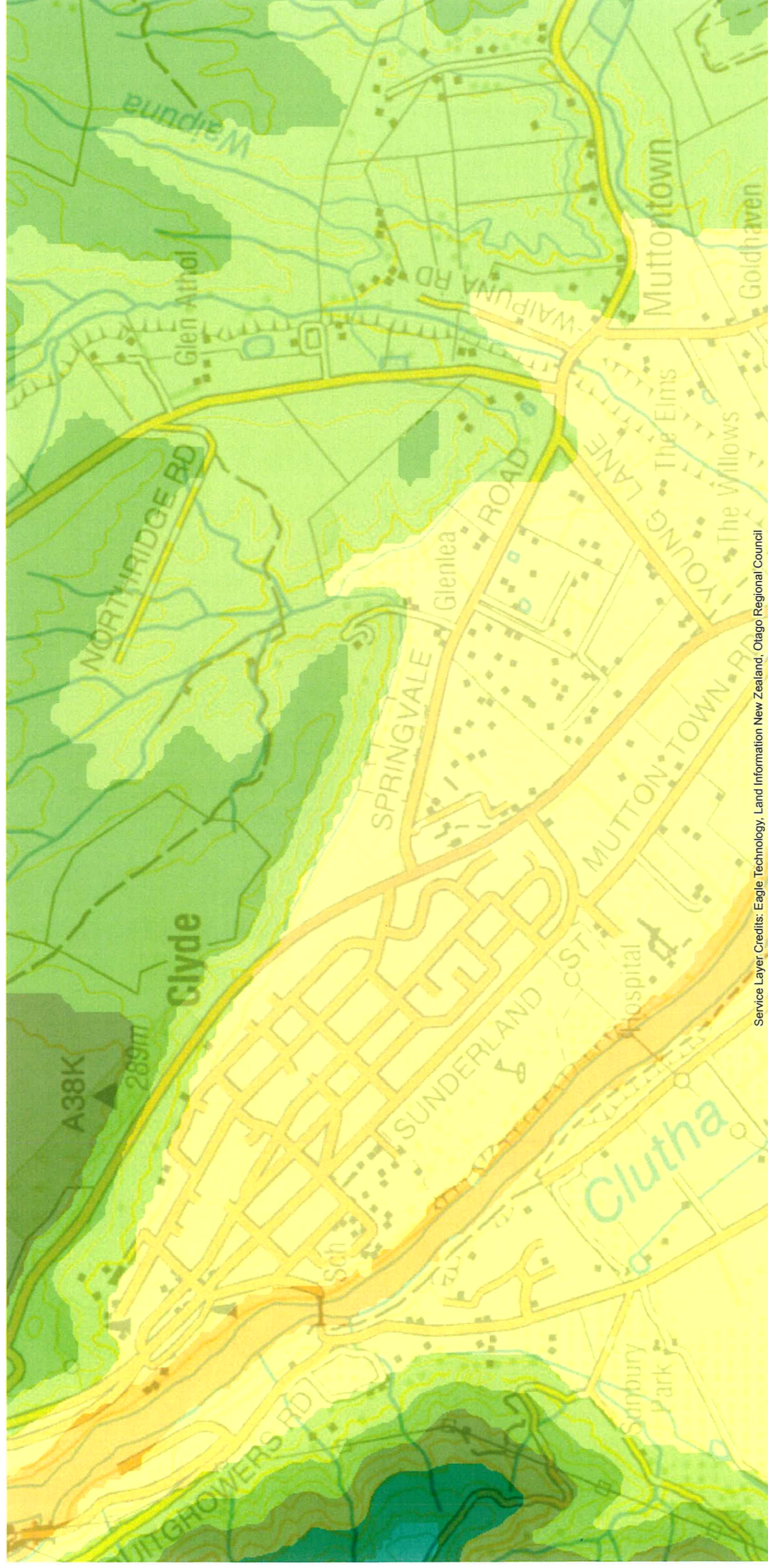
Te	Templeton
Tf	Tuapeka
Tg	Tengawai
Th	Te Houka
Ti	Timaru
Tj	Tomahawk
Tk	Tokomairiro
Tl	Tailings
Tm	Temuka
Tn	Tirohanga
To	Tiroiti
Tp	Titipua
Tq	Taratu
Tr	Tokarahi
Ts	Tarras
Tt	Taitapu
Tu	Tuakitoto
Tv	Teviot
Tw	Tawhiti
Tx	Trotter
Ty	Taieri
Tz	Takitao
Urban	Urban
Ux	Uxbridge
Ve	Venlaw
Wa	Waimakariri
Wb	Wetherburn
Wc	Wanaka
We	Wendon
Wf	Wickliffe
Wg	Wingatui
Wh	Waikakahi
Wj	Wangaloa
Wk	Wakanui
Wn	Waenga
Wp	Wakatipu
Wq	Waikoikoi
Wr	Warepa
Wt	Wetherston
Wu	Waitahuna
Wx	Waikaka
Wy	Waikarara
Ya	Waitati
Yh	Wehenga
Yk	Waiareka
Yp	Waipori
Yt	Waitohi

APPENDIX 4

Grow Otago Extracts

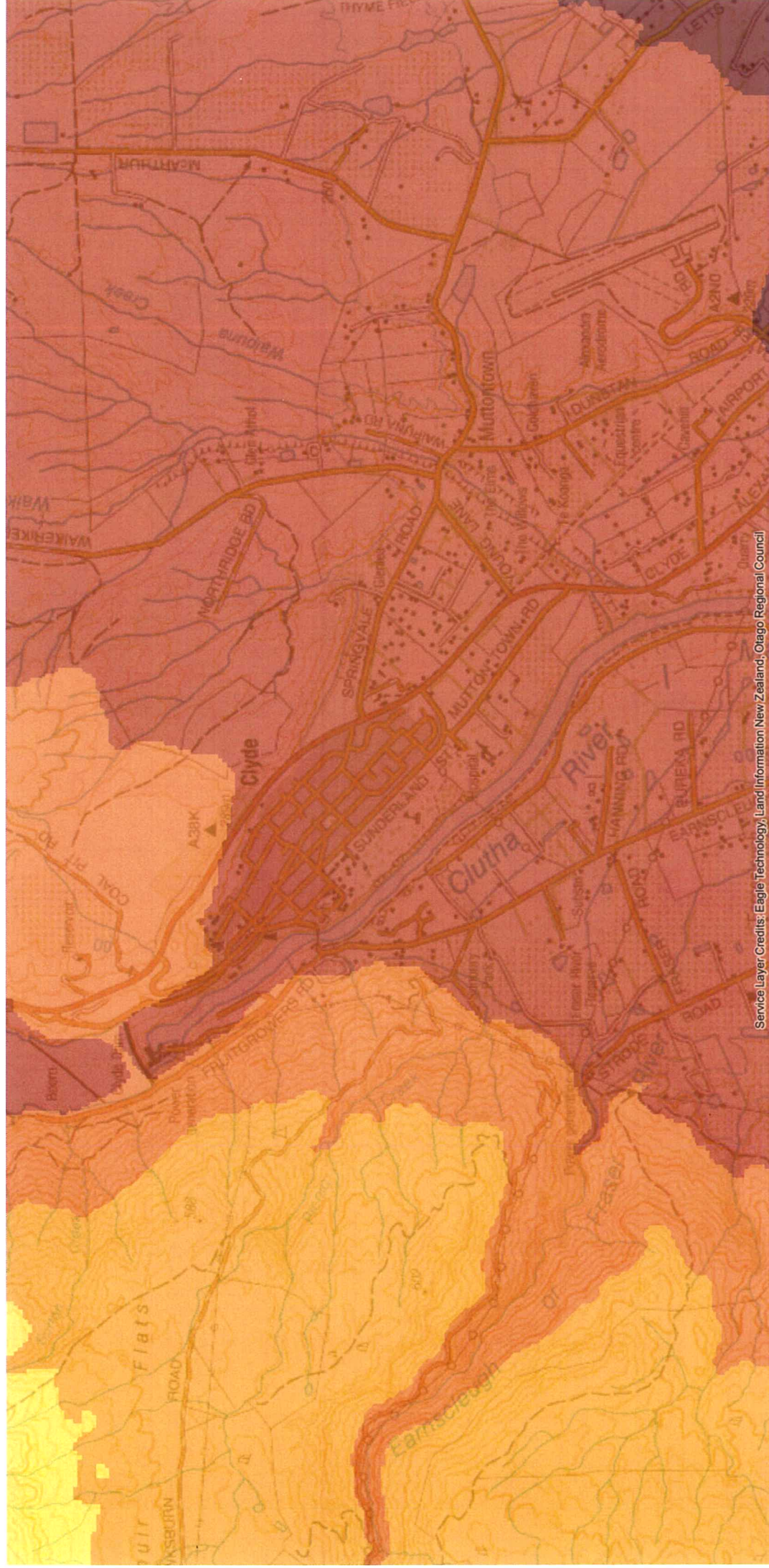
Otago Maps

950 (10% bias)



Otago Maps

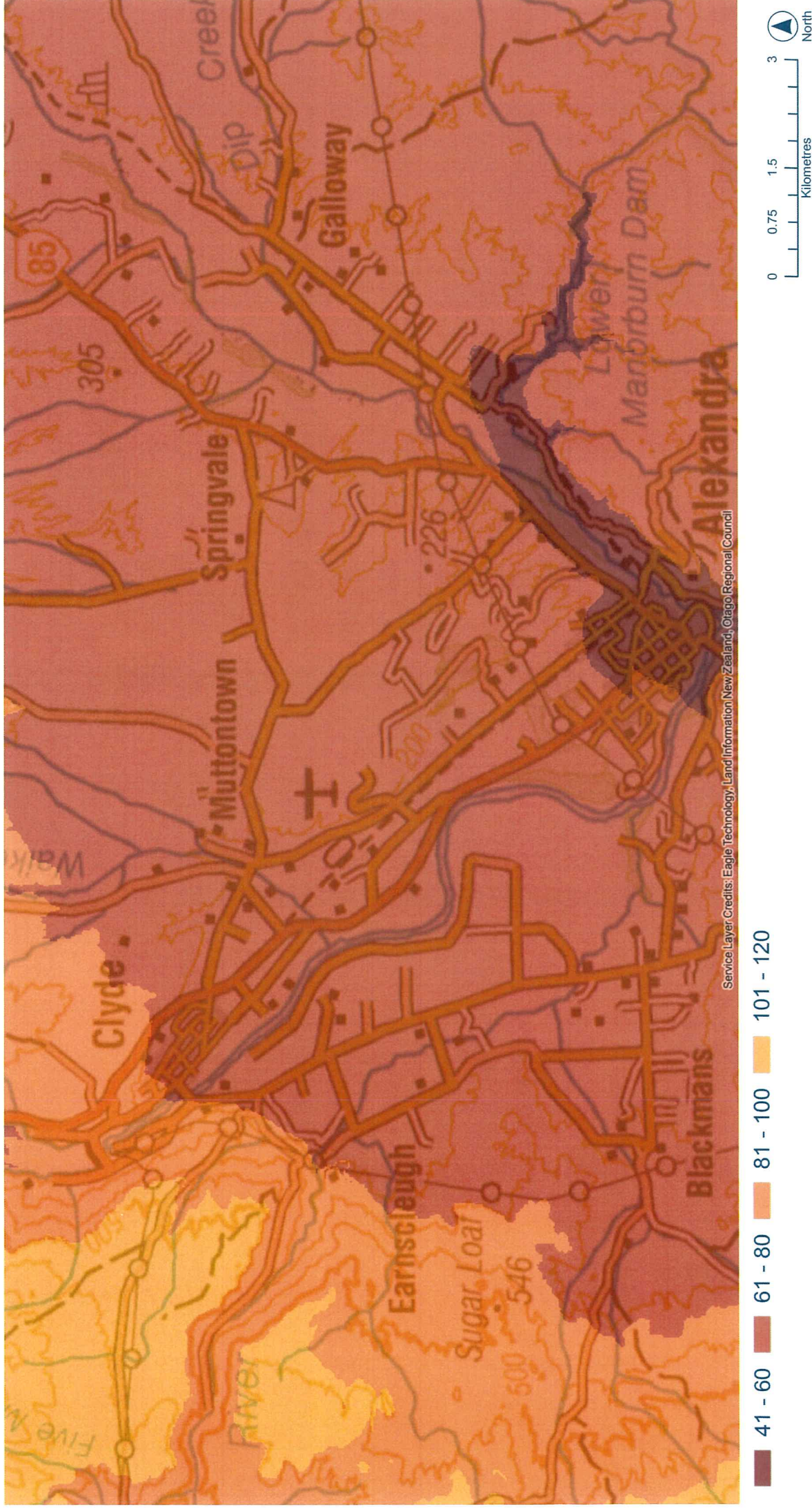
Median Annual Rainfall



- 351 - 400
- 401 - 450
- 451 - 500
- 501 - 550
- 551 - 600
- 601 - 650

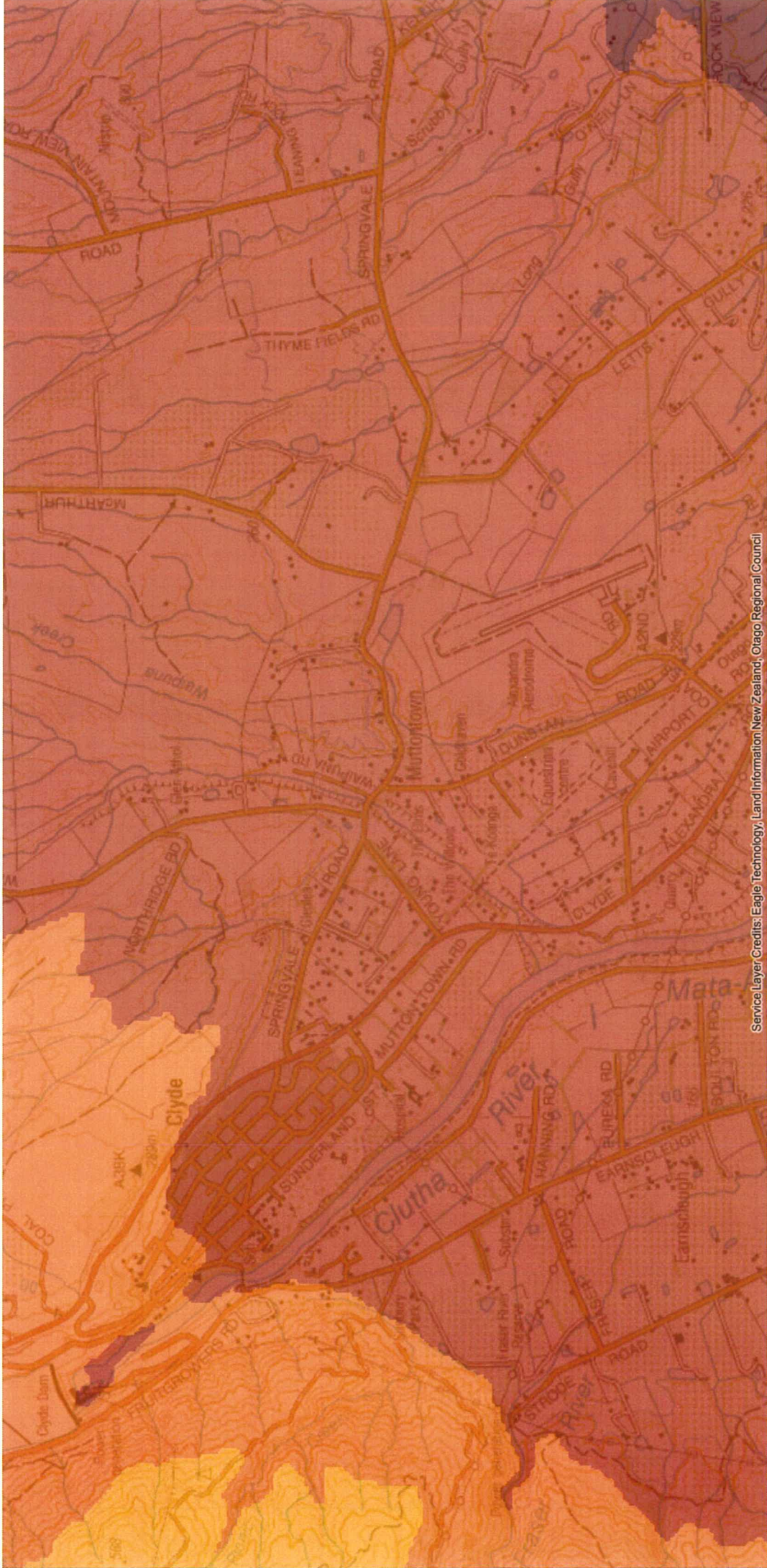
Otago Maps

Dry Summer Rainfall



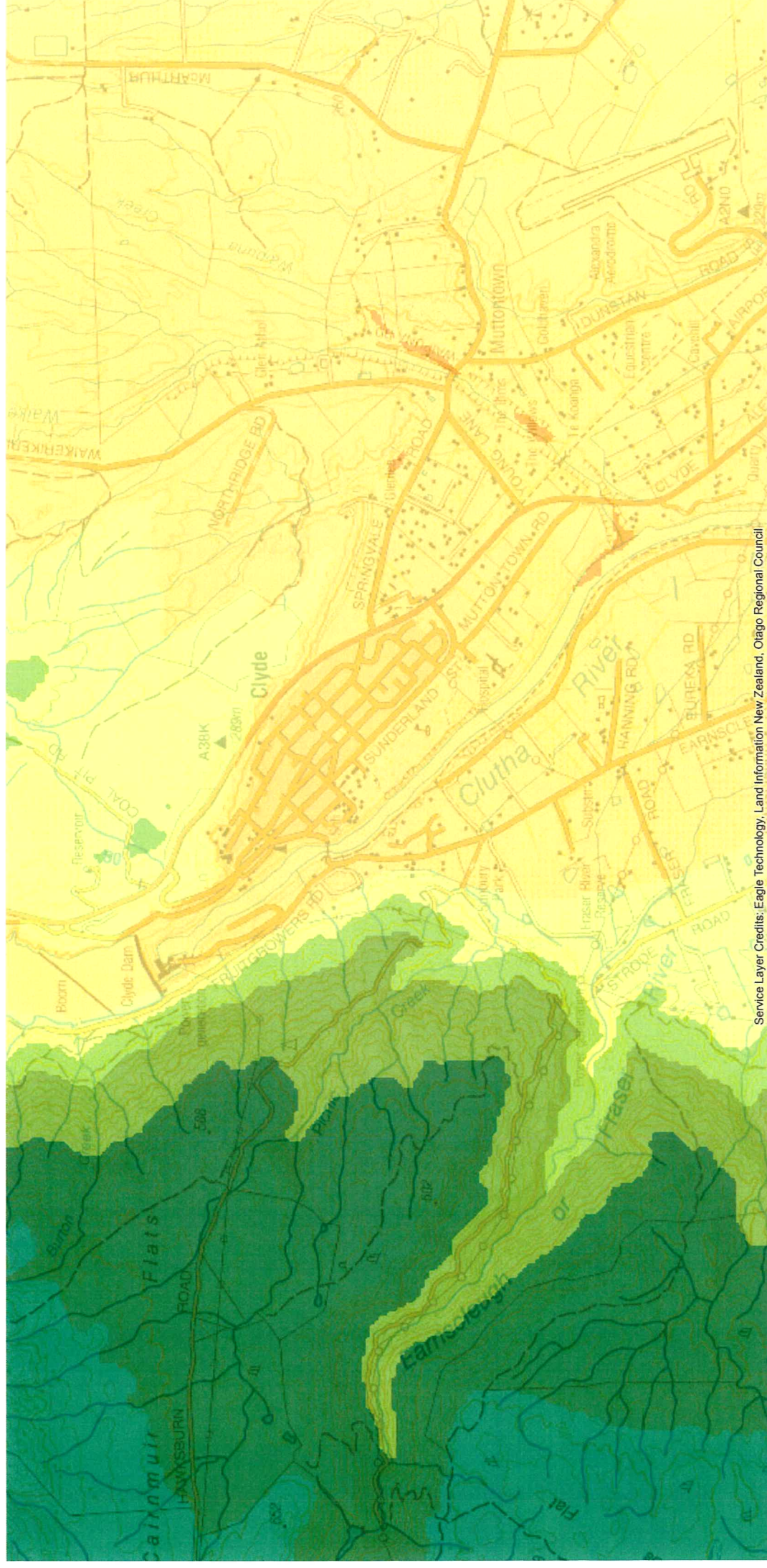
Otago Maps

Median Summer Rainfall



Otago Maps

*Median Potential Evapotranspiration
(Nov-Dec)*



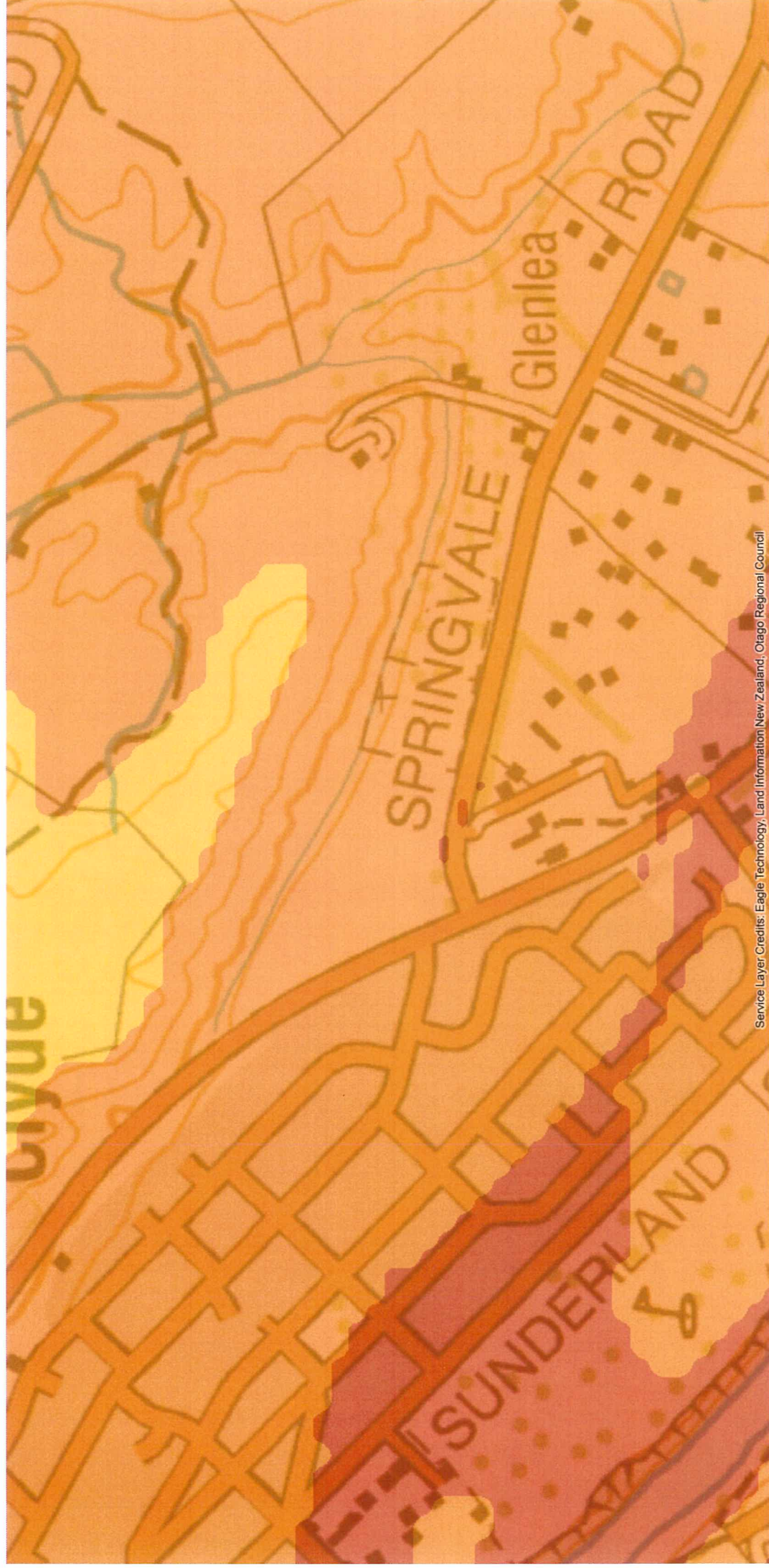
191 - 200 211 - 220 226 - 230 236 - 240
201 - 210 221 - 225 231 - 235

Service Layer Credits: Eagle Technology, Land Information New Zealand, Otago Regional Council



Otago Maps

*Median Potential Evapotranspiration
(Jan - Feb)*



201 - 205 206 - 210 211 - 215



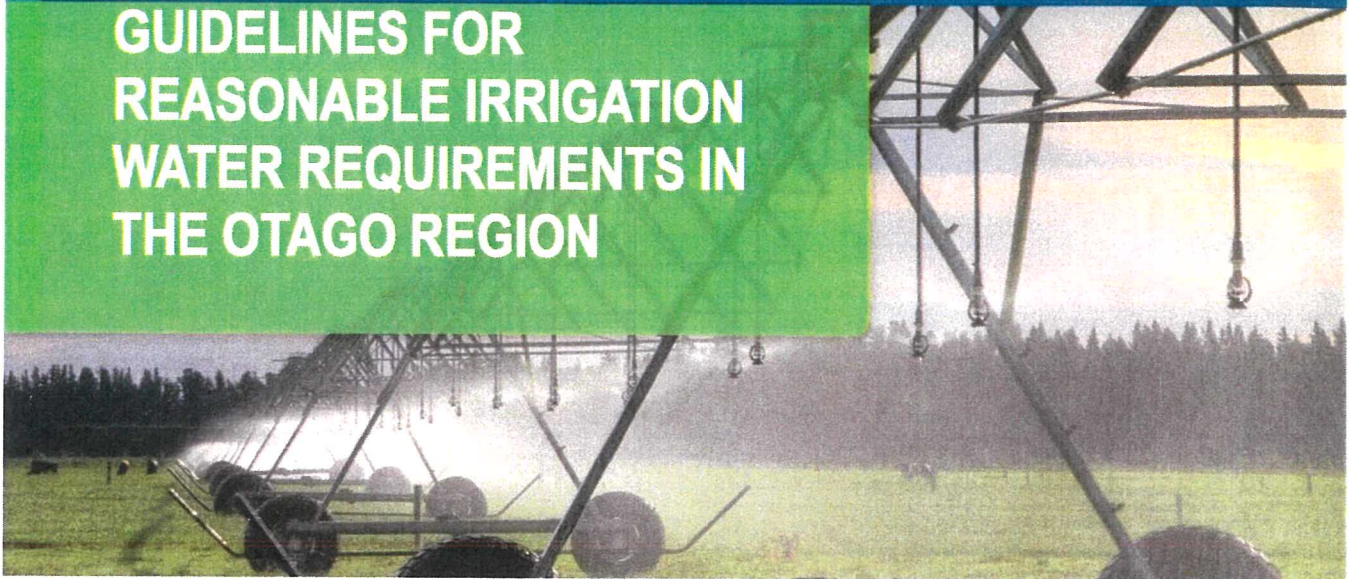
APPENDIX 5

Aqualinc Report extracts and Irrigation Calculator

AQUALINC

Irrigation REPORT

GUIDELINES FOR REASONABLE IRRIGATION WATER REQUIREMENTS IN THE OTAGO REGION



**PREPARED FOR
Otago Regional Council**

C15000
2017/07/24

PREPARED BY
Ian McIndoe
Peter Brown
Channa Rajanayaka
Birendra K.C.

www.aqualinc.com

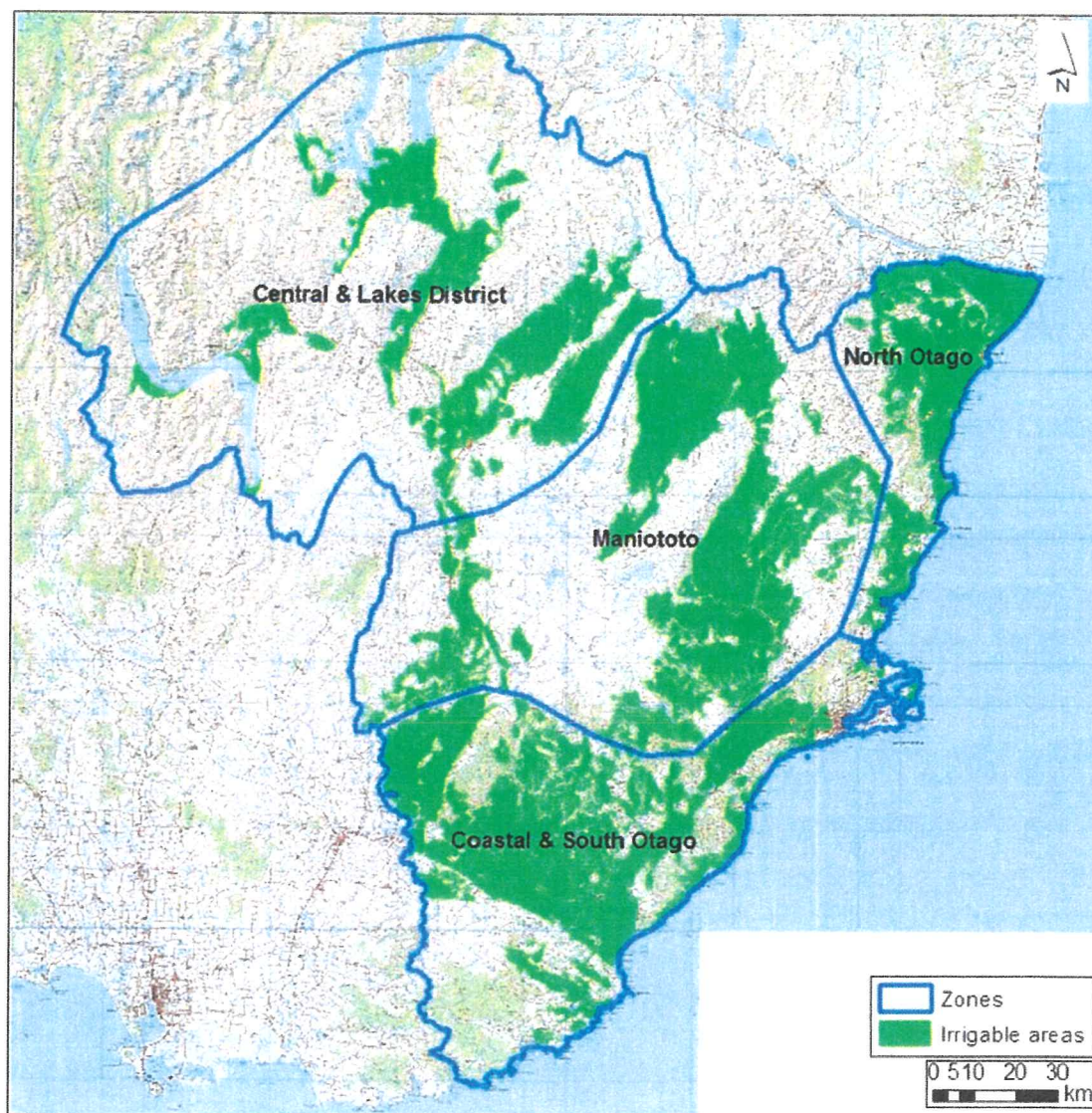


Figure 3: Likely irrigable areas

6 IRRIGATION DEMANDS

ORC and other users should use these values in combination with the map shown in Figure 5 (a digital copy of this map will be provided to ORC on request) to determine the relevant zone and MAR for specific locations to determine reasonable irrigation demands for that area. The relevant soil PAW for a farm can be obtained from S-map, the FSL database or a site specific soil investigation.

6.1 Pasture

A summary of reasonable irrigation water demands for pasture is given in Table 5.

As outlined in Section 5, reasonable irrigation demands have been estimated on the basis that the irrigation system capacities (i.e. peak daily demand) should not result in more than an approximately 0.5% average annual pasture production decrease. The annual (i.e. seasonal) demands are presented for average, 80th percentile (i.e. two-in-ten year drought), 90th percentile (one-in-ten year drought) and maximum situations. These values are calculated based on irrigation water requirements for the 1972-2014 irrigation seasons.

Table 5 : Irrigation water demand for pasture

Zone	MAR (mm/yr)	600 mm PAW (mm)	Peak daily demand (mm/d)	Maximum monthly demand (mm/month)	Annual demand (mm/yr)			
					Average	80 th ile	90 th ile	Maximum
Central & Lakes District	350	40	5.6	174	747	833	866	1,002
		60	5.2	161	734	806	866	988
		90	4.8	149	700	802	835	950
		120	4.4	136	659	752	792	911
		150	4.4	136	635	726	774	942
	450	40	5.5	171	685	787	820	919
		60	5.1	158	668	770	791	913
		90	4.8	149	628	748	773	883
		120	4.2	130	578	714	714	840
		150	3.9	121	547	659	710	796
	550	40	5.5	171	645	754	785	875
		60	5.1	158	629	729	769	877
		90	4.7	146	575	696	729	818
		120	4.2	130	525	660	672	777
		150	3.7	115	489	622	654	714
	650	40	5.4	167	579	673	724	821
		60	4.7	146	552	635	689	785
		90	4.7	146	508	619	649	771
		120	4.2	130	462	580	630	714

Zone	MAR (mm/yr)	600 mm PAW (mm)	Peak daily demand (mm/d)	Maximum monthly demand (mm/month)	Annual demand (mm/yr)			
					Average	80%ile	90%ile	Maximum
750		90	2.9	90	385	466	493	551
		120	2.8	90	348	447	485	510
		150	2.7	84	324	410	460	494
		40	3.9	121	398	492	511	558
		60	3.0	93	373	459	499	543
		90	2.9	90	331	430	464	493
		120	2.8	87	282	392	431	470
		150	2.2	68	257	354	375	405

6.2 Viticulture

Table 6 lists the daily, monthly and seasonal irrigation water demands for grapes. These demands include a 10% system loss that occurs between water take (e.g. pump) and soil surface, which is considered to be reasonable for a well-managed irrigation system. This system loss may include evaporative losses from bare soil or uneven soil characteristics for example.

We recommend an allocation of 2.42 mm/d daily irrigation demand (i.e. 2.2 mm/d irrigation demand plus 10% loss) for grapes.

The mm/d daily demand figures should be applied to the total planted area of the vineyard, including the inter-row area, regardless of planting density.

Assuming that water is applied to the vines using drip irrigation at a planting density of 2500 vines per hectare, the 2.2 mm/d corresponds to 8.8 litres/vine/day.

The demand figures do not allow for irrigation of and uptake of water by the inter-row. If the inter-row is to be irrigated, or the inter-row is likely to be removing significant amounts of water that would have otherwise been available to the vines, additional water could be required.

Table 6 (last column) shows that the available soil moisture (ASM) meets or exceeds the irrigation criteria of exceeding 40% PAW for 90% of the time in the irrigation season (September to April).

Table 6: Irrigation water demand for grapes

Zone	MAR (mm/yr)	900 mm PAW (mm)	Daily demand (mm/d)	Maximum monthly demand (mm/month)	Annual demand (mm/yr)				%ASM > 40%PAW
					Average	80%ile	90%ile	Maximum	
Central & Lakes District	350	40	2.42	75	201	232	258	329	98
		60	2.42	75	188	219	248	332	100
		90	2.42	75	171	201	234	322	100
		120	2.42	77	159	193	222	310	100
		150	2.42	77	147	179	212	300	100
		200	2.42	77	136	173	203	290	100

Zone	MAR (mm/yr)	900 mm PAW (mm)	Daily demand (mm/d)	Maximum monthly demand (mm/month)	Annual demand (mm/yr)				%ASM > 40%PAW
					Average	80%ile	90%ile	Maximum	
	450	40	2.42	75	173	217	239	293	99
		60	2.42	75	157	205	229	281	99
		90	2.42	75	136	182	217	259	100
		120	2.42	77	122	163	203	247	100
		150	2.42	77	110	144	193	237	100
		200	2.42	77	98	131	183	227	100
	550	40	2.42	73	156	196	208	247	99
		60	2.42	75	137	180	198	235	100
		90	2.42	73	112	156	176	208	100
		120	2.42	73	97	140	164	198	100
		150	2.42	73	83	130	150	189	100
		200	2.42	73	72	120	140	174	100
	650	40	2.42	73	125	162	174	215	99
		60	2.42	73	106	146	162	203	100
		90	2.42	73	81	121	144	184	100
		120	2.42	73	67	102	135	165	100
		150	2.42	73	55	89	125	145	100
		200	2.42	73	44	76	110	136	100
	750	40	2.42	73	129	157	169	225	99
		60	2.42	73	109	141	159	213	100
		90	2.42	75	84	113	140	198	100
		120	2.42	73	69	105	130	189	100
		150	2.42	73	57	91	116	179	100
		200	2.42	68	46	81	106	165	100
	850	40	2.42	70	98	126	133	157	100
		60	2.42	70	79	111	123	143	100
		90	2.42	70	56	91	108	116	100
		120	2.42	63	44	73	91	106	100
		150	2.42	58	34	61	77	97	100
		200	2.42	48	25	46	67	87	100
Coastal & South Otago	650	40	2.42	61	56	75	84	109	100
		60	2.42	53	43	64	77	99	100
		90	2.42	44	28	48	60	85	100
		120	2.42	39	19	39	44	77	100
		150	2.42	34	12	24	34	63	100
		200	2.42	34	7	14	24	53	100
	750	40	2.42	58	52	74	80	106	100
		60	2.42	56	38	56	63	94	100
		90	2.42	46	22	41	46	73	100

Zone	MAR (mm/yr)	900 mm PAW (mm)	Daily demand (mm/d)	Maximum monthly demand (mm/month)	Annual demand (mm/yr)				%ASM > 40%PAW
					Average	80%ile	90%ile	Maximum	
		120	2.42	53	21	39	57	97	100
		150	2.42	44	14	24	47	87	100
		200	2.42	39	9	15	33	73	100

Note: Daily demand includes 10% irrigation system losses. Monthly and annual demand also includes this system loss. Modelled minimum return interval is 1 day for PAW's up to 90 mm, and 2 days for PAW > 90 mm.

6.3 Cherries and apricots

A summary of reasonable irrigation water demands for apricots and cherries is given in Table 7. These have been estimated on the basis that the system capacities (i.e. peak daily demand) should maintain available soil moisture (ASM) above 50% PAW in 90% of the time based on October to April irrigation seasons.

These demands include a 5% system loss that occurs between the water take (e.g. pump) and soil surface, which is considered to be reasonable for a well-managed irrigation system. The annual (i.e. seasonal) demands are presented for average, 80th percentile (i.e. two-in-ten drought year), 90th percentile (one-in-ten drought year) and maximum. These values are calculated based on irrigation water requirements for the 1972-2014 irrigation seasons.

Table 7: Irrigation water demand for apricots and cherries

Zone	MAR (mm/yr)	1000 mm PAW (mm)	Daily demand (mm/d)	Maximum monthly demand (mm/month)	Annual demand (mm/yr)				%SAM > 50%PAW
					Average	80% ile	90% ile	Maximum	
Central & Lakes District	350	200	4.9	152	582	664	736	834	90
		150	5.0	155	602	693	751	851	90
		120	5.2	161	619	704	765	868	90
		90	5.4	167	627	703	768	873	89
		60	5.7	177	655	728	786	898	88
	450	200	4.7	146	511	622	680	785	90
		150	4.9	152	536	633	707	803	90
		120	5.0	155	553	646	707	819	90
		90	5.3	164	567	668	724	824	89
		60	5.6	174	605	682	750	847	87
	550	200	4.5	140	466	581	648	737	90
		150	4.8	149	494	602	676	756	89
		120	4.9	152	513	614	675	772	88
		90	5.2	161	533	631	693	786	88
		60	5.5	171	576	656	702	809	86
	650	200	4.4	136	414	538	582	707	90

IRRIGATION REASONABLE USE DATABASE

5 STEPS - TO GET THE IRRIGATION REQUIREMENTS INFORMATION YOU NEED FOR IRRIGATION PLANNING, CONSENTING AND DESIGN



Ministry for Primary Industries
Manatū Ahu Matua
Sustainable Farming Fund



LGA

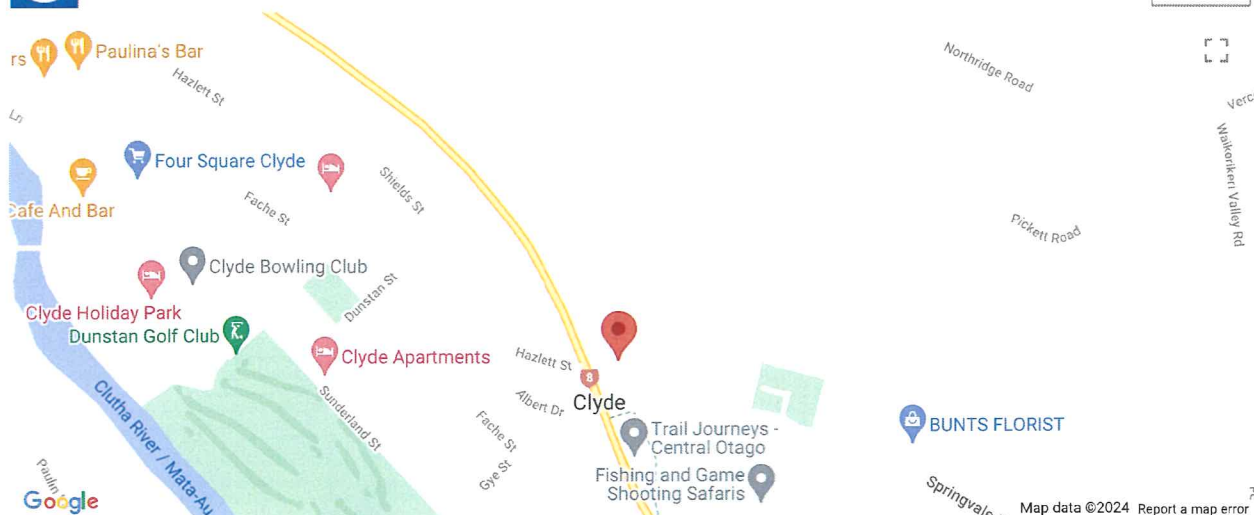


1

Enter the address or coordinates (latitude longitude) of your farm and click 'Locate' or click on the map

-45.193 , 169.335

Locate



2

Select Crop
Pasture

3

Select Plant Available Water
(b) User specified PAW's

4

Select Irrigation Method
80% Efficient Irrigator

5

Fetch Data

Farm Details

Description

Latitude -45.193

Longitude 169.335

Council Otago

Climate Site ID P067049

Distance to Climate Site (km) 2.15

Rainfall (mm) 432

Plant Available Water Details

PAW(mm) 90

Indicative Likelihood 0.3

PAW

PAW

PAW

PAW

PAW

Area (hectares) 4.5

0

0

0

0

0

0

Total area = 4.5

Irrigation Requirements

System Capacity 0.61 (l/s/ha) 2.74 (l/s)

System Capacity 5.3 (mm/day)

Daily Volume 53 (m³/ha) 238 (m³)

7 Day Volume (m³/ha) (m³)

28 Day Volume (m³/ha) (m³)

90% ile Annual Volume 7,508 (m³/ha) 33,786 (m³)

These estimates of irrigation requirements are based on the assumption that the crop you selected can be grown and irrigated at the site you have selected. Constraints such as topography and crop-specific climate requirements are not taken into account.

Irrigation requirements may be less than reported here if your soils are poorly drained or the water table is close to the soil surface.

Detailed Results

Save this Page

User Guide

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IRRIGATION REASONABLE USE DATABASE

5 STEPS - TO GET THE IRRIGATION REQUIREMENTS INFORMATION YOU NEED FOR IRRIGATION PLANNING, CONSENTING AND DESIGN



Ministry for Primary Industries
Manatū Ahu Matua
Sustainable Farming Fund



LGA

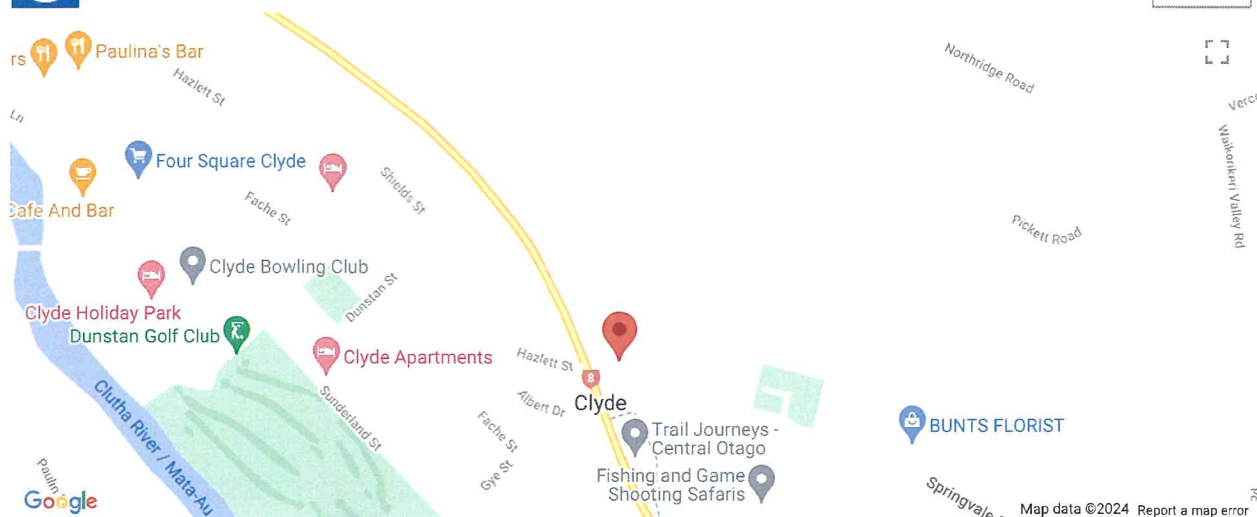


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Enter the address or coordinates (latitude longitude) of your farm and click 'Locate' or click on the map

-45.193 , 169.335

Locate



2

Select Crop
Grapes

3

Select Plant Available Water
(b) User specified PAW's

4

Select Irrigation Method
Micro/Drip

5

Fetch Data

Farm Details

Description

Latitude

-45.193

Longitude

169.335

Council

Otago

Climate Site ID

P067049

Distance to Climate Site (km)

2.15

Rainfall (mm)

432

Plant Available Water Details

PAW(mm)

90

PAW

PAW

PAW

PAW

Indicative Likelihood

0.3

Total area

4.5

Area (hectares)

4.5

0

0

0

0

Irrigation Requirements

System Capacity

0.26

System Capacity

2.2

Daily Volume

7 Day Volume

28 Day Volume

90% ile Annual Volume

Per Hectare

0.26

2.2

22

1,591

Total Area

1.17

99

7,160

These estimates of irrigation requirements are based on the assumption that the crop you selected can be grown and irrigated at the site you have selected. Constraints such as topography and crop-specific climate requirements are not taken into account.

Irrigation requirements may be less than reported here if your soils are poorly drained or the water table is close to the soil surface.

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Sustainable Farming Fund



LGA

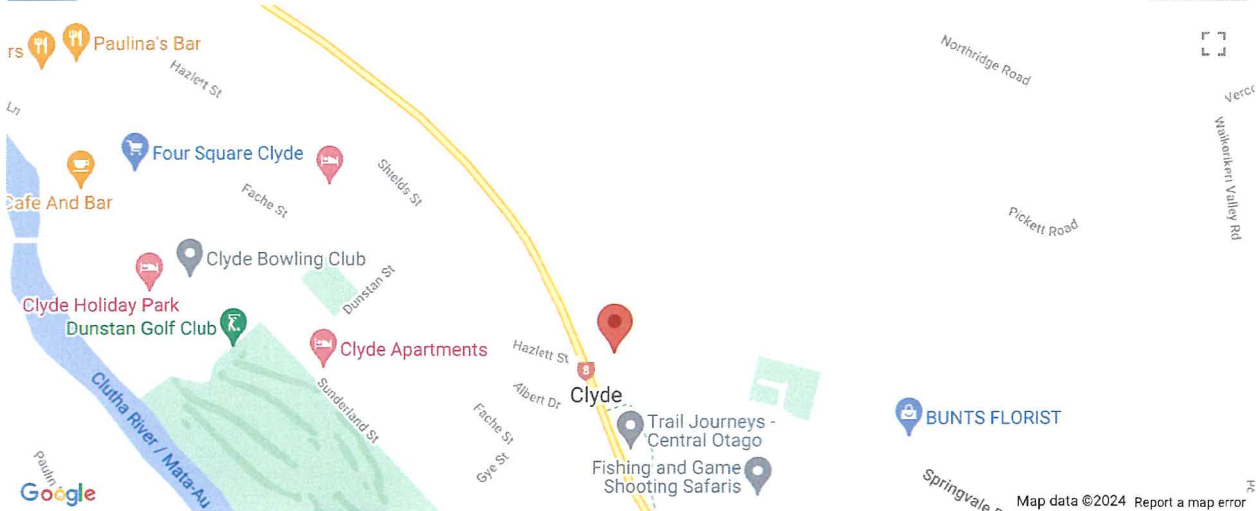


1

Enter the address or coordinates (latitude longitude) of your farm and click 'Locate' or click on the map

-45.193 , 169.335

Locate



2

Select Crop
Stonefruit

3

Select Plant Available Water
(b) User specified PAW's

4

Select Irrigation Method
Micro/Drip

5

Fetch Data

Farm Details

Description

Latitude -45.193

Longitude 169.335

Council Otago

Climate Site ID P067049

Distance to Climate Site (km) 2.15

Rainfall (mm) 432

Plant Available Water Details

PAW(mm)

90

PAW

PAW

PAW

PAW

PAW

Indicative Likelihood

0.3

Total area

Area (hectares)

4.5

0

0

0

0

0

4.5

Irrigation Requirements

System Capacity

0.58 (l/s/ha)

System Capacity

5 (mm/day)

Daily Volume

7 Day Volume

28 Day Volume

90% ile Annual Volume

Per Hectare

0.58 (l/s/ha)

5 (mm/day)

50 (m³/ha)

(m³/ha)

(m³/ha)

(m³/ha)

7,082 (m³/ha)

Total Area

2.61 (l/s)

225 (m³)

(m³)

(m³)

(m³)

(m³)

31,869 (m³)

These estimates of irrigation requirements are based on the assumption that the crop you selected can be grown and irrigated at the site you have selected. Constraints such as topography and crop-specific climate requirements are not taken into account.

Irrigation requirements may be less than reported here if your soils are poorly drained or the water table is close to the soil surface.

Detailed Results

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APPENDIX 6

Manuherikia Irrigation Scheme Letter and Bore Log

Manuherikia Irrigation Co-operative Society Ltd

PO Box 201
ALEXANDRA

Secretary/Treasurer: Allison Sutton
Phone/Fax: (03) 449 2562

18 January 2000

Leon van Boxtel
68 Newcastle Street
CLYDE

Dear Sir

Re: Application for Irrigation water Supply ex AG Raceline

We acknowledge receipt of your letter dated 11 January 2000 wherein you make application for irrigation water for the block of land contained in CT 17D/457 (formerly CT 16B/206).

The block currently has no water entitlement. As you are aware the Society's water resource is fully allocated but blocks of water do become available from time to time.

Your application will be put on file for consideration when the rosters are redrafted for the 2000/2001 season. This will be done in July/August 2000.

Yours faithfully



Allison Sutton
Secretary/Treasurer
(file: 118011)



MCNEILL DRILLING CO. LTD

WATER BORE/WELL SUMMARY FORM

CLIENTS NAME: <i>LEON VAN BOXTEL</i>		BORE SIZE: <i>75mm</i>
FULL ADDRESS: <i>CLYDE</i>		START DATE: <i>23.12.99</i>
RAPID NO:		FINISH DATE:
GRID REFERENCE:		<i>23.12.99</i>
DRILLER: <i>CHRIS DEKONING</i>		MACHINE: <i>EDSON</i>
MEASURED FROM: <i>GROUND LEVEL</i>		DRILL METHOD:
TOTAL DEPTH BORE: <i>36.0 metres</i>		<i>NQ AIR CORE</i>
TOP LEADER:		
SWL: <i>26.5 metres</i>		
SCREEN: SLOT:	-	LENGTH: -
TYPE:	-	SIZE: -
PVC SLOTTED: TOP:	-	BASE: -
SCREEN/LEADER/SUMP:	-	SUMP SIZE: -
TOTAL CASING USED: -		
AIRLIFTED/PUMPED AT: -		
TEST PUMP PERIOD: - HOURS - MIN		
DRAWDOWN FROM SWL: -		
AIR/PUMP INTAKE: -		
BACTERIAL WATER TEST: -		
CHEMICAL WATER TEST: -		
EXTRA NOTES: <i>No GROUNDWATER POTENTIAL FROM CLAY BOUND GRAVELS</i>		
BORE LOG:		
<i>00.000 - 10.60 SANDY SILTY GRAVEL.</i>		
<i>10.60 - 12.80 SAND.</i>		
<i>12.80 - 18.10 SANDY GRAVEL</i>		
<i>18.10 - 18.90 COARSE SANDY GRAVEL.</i>		
<i>18.90 - 23.80 SANDY SILTY GRAVEL</i>		
<i>23.80 - 24.60 LOOSE SANDY GRAVEL</i>		
<i>24.60 - 26.10 SAND</i>		
<i>26.10 - 36.00 VERY SILTY CLAY BOUND GRAVEL.</i>		