

FAST TRACK APPROVAL – CIVIL REPORT



OAKS PROPERTY
THE STATION @ WAITITRI
GIBBSTON VALLEY
QUEENSTOWN



PROJECT INFORMATION

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1. SITE DESCRIPTION

The project is made up of multiple sites which are situated in Gibbston Valley. Each site is made up of multiple titles which have been given a unique name. these blocks are described as follows:

Waitiri

This section is the eastern most block which sits on the northern side of the Kwarau River directly opposite where the Nevis River joins (See Figure 1 below). The topography of the site is an elevated platform which cannot be seen from the highway directly below the site. this platform has a general slope of approx., 5% to the east. the outer edges of the site are steep hills with an average slope of 50%, which matches the surrounding topography in Gibbston Valley. There are currently o public services available for the site.



Figure 1: Waitiri Block

QLDC GIS

Drystone

Drystone sits approximately centrally places within the Gibbston area on the southern side of State Highway 6, east of the Gibbston Tavern. Coalpit road runs adjacent to the western boundary of the site (See Figure 3 below). The site is predominantly covered in old grapevines. There is an existing stream that runs from the western boundary to the northern boundary. The site falls to the north with large flat plateaus to the north and south separated by a small steeper section. This site sits directly opposite the Riverside site separated by State Highway 6. There are no current services provided for the site.

Riverside

The Drystone site sits on the northern side of State Highway 6 and to the north of the Drystone site. (See Figure 3 below) The site is predominantly flat with steeper sections to the north adjacent to the Kawarau Awa. Rafter's Road runs through the site. There are currently no public services available for the site.



Figure 2: Riverside and Drystone Blocks

QLDC GIS

Glenlee/Glenroy

Glenlee/Glenroy is the largest of the sites and sits directly south of the Gibbston Valley Winery & Restaurant (See Figure 4 below). The site is elevated from the State Highway 6 with most of it not being visible from the Highway. There are several Plateaus throughout the site. There are currently no public services available for the site.



Figure 3: Glenlee/Glenroy Block
QLDC GIS

Eastburn

Eastburn lies on the northern side of the Kawarau Awa. This site is accessed off Eastburn Road which comes off Crown Range Road (See Figure 5 below). The site is moderately steep with Flatter plateaus throughout. There are no public services in the area.

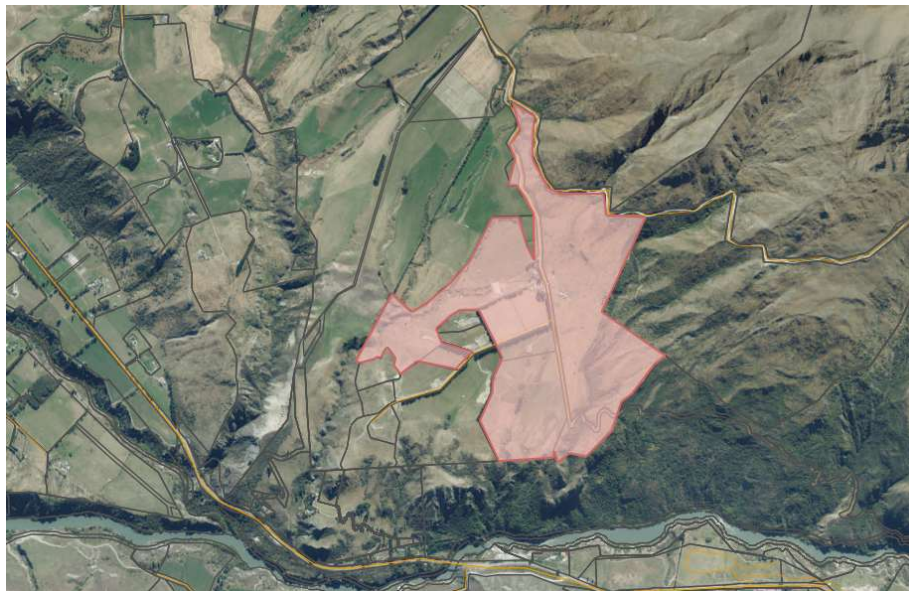


Figure 4: Eastburn Block
QLDC GIS

1.1 EXISTING SERVICES

Currently there are no existing services within the immediate area. Gibbston Valley is a small community of vineyards which utilize private water and wastewater schemes. Fig 6 below shows all the public infrastructure available in Gibbston Valley, none of which is readily available for any on the sites being developed.



Figure 5: Public infrastructure in Gibbston Valley

QLDC GIS

2. EARTHWORKS

2.1 PROPOSED EARTHWORKS

The earthworks for each of the sites is proposed to be minimal and will only be to enable the construction of roads. The layout for each of the sites has been designed to enable efficient use of natural plateaus within the sites. This keeps the natural feel of each site and provides better connected feeling to the local Maunga (mountains)

2.2 EARTHWORKS MANAGEMENT

2.2.1 EROSION AND SEDIMENT CONTROLS

Each site will have detailed Earthworks Management plans completed to ensure best practise erosion and sediment controls are used to manage the potential effects and risks of sediment discharge from each site. This will be completed by a SQEP and approved by Otago Regional Council and Queenstown Lakes District Council.

3. STORMWATER

3.1 EXISTING STORMWATER

There are no existing stormwater controls onsite. Each site is currently un-developed land where water runs directly off. With each site's proximity to the Kowarau Awa, each site is considered to be the bottom of their respective catchments.

3.2 STORMWATER RETICULATION

3.2.1 WAITIRI

This site discharges directly into the Kowarau Awa. The development will consist of the main plateau area at the top of the site. It is proposed to run a piped reticulation network through the site and discharge to the existing flow path locations through the site with the goal of maintaining the existing site stormwater flows. No attenuation is proposed given the site's proximity to the bottom of the catchment that discharges into the Kowarau Awa.

3.2.2 RIVERSIDE

This site discharges directly into the Kowarau Awa. It is proposed to run a piped reticulation network through the site and discharge to the existing flow path locations through the site with the goal of maintaining the existing site stormwater flows. The existing stream will be maintained through the site and will be able to be accessed by all the residents for amenity. No attenuation is proposed given the site's proximity to the bottom of the catchment.

3.2.3 DRYSTONE

This site discharges directly into the stream that runs through the Riverside site. It is proposed to run a piped reticulation network through the site and discharge to the existing flow path locations through the site with the goal of maintaining the existing site stormwater flows. The existing stream will be maintained through the site and will be able to be accessed by all the residents for amenity. No attenuation is proposed given the site's proximity to the bottom of the catchment although this can be provided for if required.

3.2.4 GLENLEE/GLENROY

The stormwater runoff from the roading on this site is proposed to be managed by a series of Swales and soak pits. Each of the lots will discharge their stormwater to private soak pits located with each lot. Each lot will be required to adhere to the New Zealand Building Code and use inert materials for construction. This will ensure no heavy metals enter the ground water from the sites. The road runoff will be managed by a treatment/soakage swale. No attenuation is proposed given the site's proximity to the bottom of the catchment.

3.2.5 EASTBURN

The stormwater runoff from this site is proposed to be managed by a series of Swales and soak pits. Each of the lots will discharge their stormwater to private soak pits located with each lot. Each lot will be required to adhere to the New Zealand Building Code and use inert materials for construction. This will ensure no heavy metals enter the ground water from the sites. The road runoff will be

managed by a treatment/soakage swale. no attenuation is proposed given the sites proximity to the bottom of the catchment.

3.3 FLOODING

All of the sites are elevated from the Kowarau Awa, and no flooding is expected on the sites from the Awa. All the sites will be designed to accommodate for the 100year event within the road reserve or overland flow paths to ensure that the flows do not affect the dwellings. A flood model will be created to model the expected flow depths from upper catchments with all dwellings designed to have the council required freeboard at a minimum.

3.4 CLIMATE CHANGE CONSIDERATIONS

The stormwater management system will take future climate change scenarios into account for anticipated changes in rainfall patterns. This would include larger attenuation basins, sizing of swales to cater for these events, ensuring building platforms have required freeboard for these events.

4. WASTEWATER

4.1 EXISTING WASTEWATER

There is currently no existing wastewater reticulation available on any of the sites. Council has no confirmed plans to provide public networks within the Gibbston Valley.

4.2 PROPOSED WASTEWATER

4.2.1 WASTEWATER RETICULATION/TREATMENT/DISPOSAL

Two private wastewater network solutions are considered: a gravity system and a low-pressure sewer system.

A gravity system:

- Would be preferred for potential future vesting with Queenstown Lakes District Council (QLDC) if this option were to be available in the future.
- This system would discharge to a pumpstation near the low point of the site. This would subsequently pump to the WWTP.

Low-pressure system:

- Is more suitable for private networks, offering reduced treatment requirements due to lower peaking factors due to lower infiltration into the pipes. The result of the lower Peak Factor means less wastewater requiring treatment and discharge.
- This would pump directly into the WWTP.

Hybrid system:

- Both systems could be incorporated to take advantage of benefits from both systems.

4.2.2 WASTEWATER TREATMENT/DISPOSAL

It is proposed to service each site with a Combined works (CW) treatment plant. This CW system is a compact, energy efficient tertiary biological treatment process. The key technical advantages of this system are:

- 75% lower electricity consumption compared to conventional activated sludge
- 35% smaller footprint
- 30–40% lower sludge production
- No chemical dosing required
- Fully automated and remotely monitored
- High resilience to load variations
- Modular expansion capability

With the higher effluent quality being achieved the disposal to ground is not needed to provide treatment but rather as a method to ensure the water has the mana restored to it before eventually joining the Kawarau Awa. See figure 7 for achievable effluent quality comparison.

Parameter	Typical Fast Track Benchmark	CW Achievable
BOD ₅	20 mg/L	< 10 mg/L (typically 6–8 mg/L)
TSS	20 mg/L	< 10 mg/L
Total Nitrogen	7.5 mg/L	≤ 5 mg/L
Total Phosphorus	2.5 mg/L	1.5–2.0 mg/L
E. coli	1,000 MPN/100mL	< 100 MPN/100mL (with UV)

Figure 6: Achievable Effluent Quality Comparison

Raath and Associates Memo

The reliance on the land disposal to filter the water often causes large areas of land to be required to treat wastewater. This is often dependant on ground conditions being ideal and consistent over a large area. the CW treatment plant does all the treatment in the plant and only relies on soakage to ground to restore the mana to the water. The typical required areas for a secondary treated wastewater network compared to CW treatment are listed in Table 1 – Disposal Area Required.

Table 1 – Disposal Area Required

Site	Typical treatment area required	CW disposal area required
Waitiri	2.08Ha	0.24Ha
Drystone	2.40Ha	0.28Ha
Riverside	1.30Ha	1.50Ha

This network will be a privately run network but will be constructed to public standards. This will be run by the developer who has a development management arm. This network can be vested to council if council would prefer this.

4.3 PROPOSED WASTEWATER SUMMARY

There is no existing wastewater network available to the site. Multiple options are available for feasibly conveying wastewater across the site, including a gravity system to a pump station, low pressure sewer system, or a hybrid approach.

A private wastewater treatment plant with disposal field is proposed, with onsite infiltration testing showing good infiltration rates. Preliminary calculations show that there may be capacity to connect with and alleviate pressure from the existing public network by accepting some of their flows, creating a more well connected and resilient system overall.

5. WATER RETICULATION

5.1 EXISTING WATER RETICULATION

There is currently no existing water reticulation available on any of the sites. Council has no confirmed plans to provide public networks within the Gibbston Valley.

5.2 PROPOSED WASTEWATER

A private on-site reticulation network for potable and firefighting water will be required to service the development. The proposal is to abstract up to 2,600 m³/day of water from a combination of deep boreholes and the Nevis Awa.

5.2.1 WAITIRI

The Waitiri site is the site with the most elevation from the surrounding Kawarau Awa. Given its elevation it is unlikely that groundwater bores will be practical. It is therefore proposed to install a water take on the Nevis Awa and pump water up to a storage reservoir above the site. This will provide sufficient storage for all potable reticulation and firefighting purposes and is proposed to be sized to cater for the other sites. This water source will be treated utilizing a containerized treatment solution that will adhere to public drinking standards.

5.2.2 RIVERSIDE/DRYSTONE/GLENLEE/GLENROY

It is proposed to service these from the reservoir on the Waitiri site supplemented with water from a deep bore. The reservoir on the Waitiri site will be at an elevation that no additional booster pumps will be needed to service the Riverside and Drystone sites. Most of the Glenlee/Glenroy site can also be serviced without Booster pumps with a small amount of area potentially requiring booster pumps to achieve council required pressures.

5.2.3 EASTBURN

There are existing privately managed/owned water reticulation networks near the Eastburn site. Similar to those we will utilize a series of bores and Tanks to service the lots with potable water. Each site will require a tank for firefighting purpose.

5.3 WATER CONSERVATION ORDER (KAWARAU)

The Nevis Awa fall within the Water Conservation (Kawarau) Order (WCO). The Water Conservation (Kawarau) Order 1997 is a legal instrument under the Resource Management Act (RMA) designed to recognize and preserve the "outstanding amenity and intrinsic values" of the Kawarau River and its many tributaries.

Key Purposes

The order divides affected waters into two categories:

- Preservation (Schedule 1): Covers waters to be kept in their natural state, such as the upper reaches of the Dart, Rees, Greenstone, and Caples Rivers.

- Protection (Schedule 2): Covers waters that may no longer be entirely "natural" but have outstanding characteristics (like fisheries, wild/scenic values, or scientific importance) that must be protected. This includes the Kawarau, Shotover, and Nevis Rivers.

Main Restrictions & Impacts

- No Damming: One of the most significant effects was preventing hydroelectric dam construction on the Kawarau and Shotover rivers.
- Water Quality & Flow: It sets specific requirements for maintaining water quality and natural flow regimes. For example, it restricts the granting of resource consents that would substantially alter the river's character.
- Fisheries & Recreation: It explicitly recognizes the value of these waters for recreation (like rafting and kayaking) and as habitats for aquatic life (especially trout and salmon).

The proposal will at detailed design stage liaise closely with the relevant councils and affected parties to ensure the WCO is upheld.

APPENDIX A - LANDSCAPE MASTERPLAN

Attached Separately

APPENDIX B - WASTEWATER DESIGN MEMO

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Memorandum

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0	23/02/2026	Final	M Raath	N/A



Dear Sir

- 1. **Executive Summary**

Raath & Associates has undertaken a feasibility review of wastewater treatment and land disposal requirements for the following four development areas:

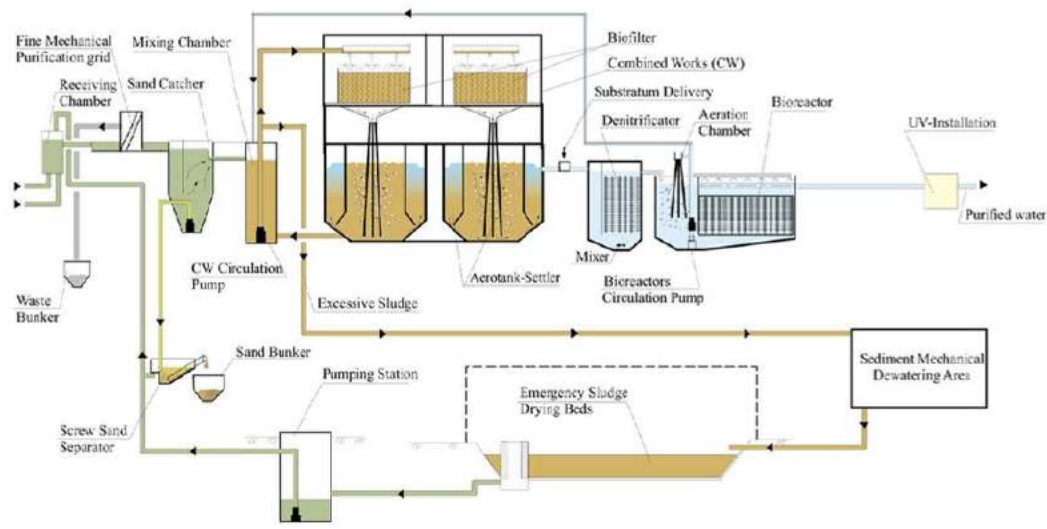
- Waitiri – 208,200 L/day
- Victoria Flats – 130,032 L/day
- Drystone – 244,400 L/day
- Riverside – 130,800 L/day

This memorandum provides:

- Overview of Combined Works (CW) tertiary treatment technology
- Modular plant sizing per site
- Soakage area requirements (based on gravel permeability of 0.1 L/m²/min)
- Hybrid gravity sewer design philosophy to maintain Peaking Factor (PF) = 1.3
- Budget-level CAPEX and OPEX per site
- Phased staging projections (20–30 lots/year)

All four sites are technically feasible with modest disposal footprints and scalable modular infrastructure.

- 2. Combined Works (CW) Treatment Technology



The Combined Works (CW) system is a compact, energy-efficient tertiary biological treatment process integrating:

- Mechanical inlet screening
- Biofiltration
- Aeration tanks with water-jet aeration
- Clarification
- Integrated nitrification and denitrification
- Tertiary disinfection

2.1 Key Technical Advantages

- 75% lower electricity consumption compared to conventional activated sludge
- 35% smaller footprint
- 30–40% lower sludge production
- No chemical dosing required
- Fully automated and remotely monitored
- High resilience to load variations
- Modular expansion capability

2.2 Achievable Effluent Quality

Table 1.

Parameter	Typical Fast Track Benchmark	CW Achievable
BOD ₅	20 mg/L	< 10 mg/L (typically 6–8 mg/L)
TSS	20 mg/L	< 10 mg/L
Total Nitrogen	7.5 mg/L	≤ 5 mg/L
Total Phosphorus	2.5 mg/L	1.5–2.0 mg/L
E. coli	1,000 MPN/100mL	< 100 MPN/100mL (with UV)

The effluent is tertiary quality. Soil is therefore used primarily for hydraulic dispersal rather than biochemical treatment.

- **3. Hydraulic Design Basis**

3.1 Peaking Factor

All sites are designed using:

Peaking Factor (PF) = 1.3

Peak Daily Flow (PDF) = ADF × 1.3

This controlled PF is achievable provided inflow and infiltration (I&I) are strictly managed through network design.

- **4. Hybrid Gravity Sewer – LPS Standard Construction**

To justify PF = 1.3, the sewer network will:

- Operate hydraulically as gravity
- Be constructed to Low Pressure Sewer (LPS) material standards
- Use pressure-rated pipes
- Be fully air and pressure tested
- Incorporate sealed joints
- Minimise manhole infiltration

This hybrid approach delivers:

- I&I performance comparable to LPS
- No household grinder pumps
- Reduced long-term maintenance
- Lower lifecycle cost
- Predictable hydraulic performance

- **5. Site-by-Site Flow & Soakage Calculations**

Permeability provided:

0.1 L/m²/min

Converted:

$$0.1 \times 60 \times 24 =$$

$$144 \text{ L/m}^2/\text{day}$$

$$= \mathbf{0.144 \text{ m}^3/\text{m}^2/\text{day}}$$

All soakage areas are sized using:

Peak Daily Flow (ADF $\times$ 1.3)

- 25% safety margin

5.1 Waitiri

$$\text{ADF} = 208.2 \text{ m}^3/\text{day}$$

$$\text{Peak} (\times 1.3) = 270.7 \text{ m}^3/\text{day}$$

$$\text{Required area} = 270.7 \div 0.144$$

$$= 1,880 \text{ m}^2$$

- 25% safety
 $= \mathbf{2,350 \text{ m}^2}$

5.2 Victoria Flats

$$\text{ADF} = 130.0 \text{ m}^3/\text{day}$$

$$\text{Peak} = 169 \text{ m}^3/\text{day}$$

$$\text{Required area} = 169 \div 0.144$$

$$= 1,174 \text{ m}^2$$

- 25%
 $= \mathbf{1,470 \text{ m}^2}$

5.3 Drystone

$$\text{ADF} = 244.4 \text{ m}^3/\text{day}$$

$$\text{Peak} = 318 \text{ m}^3/\text{day}$$

$$\text{Required area} = 318 \div 0.144$$

$$= 2,208 \text{ m}^2$$

- 25%
 $= \mathbf{2,760 \text{ m}^2}$

5.4 Riverside

6ADF = 130.8 m³/day

Peak = 170 m³/day

Required area = 170 ÷ 0.144

= 1,181 m²

- 25%

= **1,480 m²**

5.5 Soakage Summary Table

Table 2.

Site	Peak Flow (m ³ /day)	Required Area (m ²)	Area +25% (m ²)
Waitiri	270.7	1,880	2,350
Victoria Flats	169	1,174	1,470
Drystone	318	2,208	2,760
Riverside	170	1,181	1,480

All areas are modest for gravel substrates and can be accommodated within distributed soakage basins or trench systems.

• 6. Modular CW Plant Sizing Per Site

6.1 Waitiri

Peak = 270.7 m³/day

Recommended configuration:

2 × 150 m³/day modules

Total installed capacity = 300 m³/day

6.2 Victoria Flats

Peak = 169 m³/day

Recommended:

1 × 200 m³/day module

6.3 Drystone

Peak = 318 m³/day

Recommended:

2 × 200 m³/day modules

Total installed = 400 m³/day

6.4 Riverside

Peak = 170 m³/day

Recommended:

1 × 200 m³/day module

6.5 Physical Plant Footprint Requirements

The CW process is vertically integrated (biofilters located above aeration tanks), resulting in a significantly reduced footprint compared to conventional activated sludge systems.

The following table provides estimated plant footprints including treatment building, inlet works, sludge storage, and circulation clearances (excluding soakage fields).

Table 3. Footprint

Site	Installed Capacity (m ³ /day)	Estimated Treatment Footprint (m ²)	Approximate Dimensions (m)
Waitiri	300	400 – 500 m ²	20 m × 25 m
Victoria Flats	200	300 – 350 m ²	18 m × 18 m
Drystone	400	500 – 650 m ²	22 m × 28 m
Riverside	200	300 – 350 m ²	18 m × 18 m

Notes:

- Footprints include tanks, building, and maintenance access.
- Sludge storage tanks are assumed underground.

- Electrical/control room integrated within main structure.
- Final dimensions subject to detailed structural design.
- These areas exclude the soakage field footprint.

The compact nature of CW allows siting within constrained development areas.

• 7. Budget-Level CAPEX Estimates

Waitiri (300 m³/day)

Estimated total: **\$3.5M – \$3.9M**

Victoria Flats (200 m³/day)

Estimated total: **\$2.8M – \$3.0M**

Drystone (400 m³/day)

Estimated total: **\$4.6M – \$4.8M**

Riverside (200 m³/day)

Estimated total: **\$2.8M – \$3.0M**

• 8. Estimated Annual OPEX

Energy consumption ≈ 18 kW per ML treated.

Approximate Annual OPEX:

Table 3.

Site	Estimated Annual OPEX
Waitiri	\$80,000 – \$100,000
Victoria Flats	\$65,000 – \$80,000
Drystone	\$100,000 – \$120,000
Riverside	\$65,000 – \$80,000

OPEX remains lower than membrane or conventional activated sludge systems.

- 9. Phased Staging Cashflow Projection (20–30 Lots/Year)

The modular CW approach allows staged capital deployment aligned with development growth.

Example – 200 m³/day Site

Table 4.

Year	Lots Added	Module Installation	CAPEX	Cumulative CAPEX
Year 1	20–30	Initial 200 m ³ /day Module	\$2.4M	\$2.4M
Year 2–3	+40–60	Optimisation & balancing	\$0.3M–\$0.5M	~\$2.8M
Year 4–5	+60–90	Expansion if required	\$0.8M–\$1.0M	~\$3.6M

This staged approach:

- Reduces upfront capital burden
- Matches infrastructure to sales velocity
- Provides scalability without oversizing

- 10. Conclusion

Under:

- PF = 1.3
- Hybrid gravity/LPS-standard network
- Gravel permeability of 0.1 L/m²/min
- Modular CW tertiary treatment

All four sites are technically feasible with manageable disposal areas and scalable capital deployment.

The CW solution provides:

- Strong fast-track consent positioning
- Reduced land footprint



- Lower lifecycle costs
- High effluent quality
- Modular expansion capability

Further refinement can proceed upon confirmation of geotechnical testing and detailed layout design.

Yours faithfully

Marno Raath

Managing Director

Principal Water Engineer | s 9(2)(a)

s 9(2)(a)