

Water Infrastructure Assessment Report

Omarama Station

Applicant	Omarama Station Limited
Patersons Ref	P261310
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Version	Date	Prepared by	Reviewed by	Comments
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1. Executive Summary

This report provides a high-level assessment of potential three waters servicing for the proposed Omarama Station rezoning and future subdivision. The assessment considers the indicative staged development of approximately 68 larger Settlement Zone lots followed by a potential higher-density residential stage, and reviews whether credible servicing pathways exist for stormwater, potable water and wastewater at this early planning stage. The report is based on desktop information, preliminary yield assumptions, available flood hazard and consent data, and advice received from Waitaki District Council and Environment Canterbury.

Overall, the assessment indicates that there are no apparent three waters constraints that would fundamentally prevent the proposed development from being serviced, provided further investigation, design and consenting are undertaken as the project progresses. Flooding risk at the property is assessed as low, and stormwater servicing is expected to be achievable through attenuation, controlled discharge and water-sensitive design measures.

Potable water servicing is also considered achievable, although the preferred supply arrangement remains to be confirmed and may require upgrades to the existing public supply, a standalone or restricted community supply, individual sources for lower-density stages, or a combination of these.

Wastewater servicing is expected to require further consideration because the existing Omarama wastewater scheme is understood to be at or near capacity and is unlikely to accommodate the full development without upgrades.

On-site or community-scale wastewater treatment and land disposal may be practicable for lower-density stages, while later residential development is likely to require either a managed community system or upgrade pathway to the public scheme.

The conclusions and recommendations in Section 7 set out these matters in further detail and identify the key investigations and stakeholder engagement required before a preferred servicing strategy can be confirmed.

2. Introduction

2.1 Purpose of Assessment

The purpose of this assessment is to determine whether a credible and practicable infrastructure servicing pathway exists for the proposed development and whether any fundamental infrastructure servicing or earthworks constraints are apparent at this stage of the Fast-track process.

This report presents a high-level analysis of:

- Existing flood risk

- Review of Earth Sciences NZ 1% AEP Flood Hazard mapping
- Review of Earth Sciences NZ flood flow estimates
- Review of ECan flood modelling
- Conclusions

- ▶ Stormwater servicing
 - Estimated pre- and post-development runoff flows and volumes
 - Level of service requirements, including an assessment of critical design storm & outflow restrictions
 - Potential for discharge to ground and/or water bodies
 - Practicable comparison to similar projects, completed and in progress.
 - Location & estimated footprint(s) required for effective & safe stormwater management

- ▶ Water supply servicing
 - Existing system capacity
 - Abstraction potential
 - Domestic use demand and storage requirements
 - Firefighting demand and storage requirements
 - Suggested storage location

- ▶ Wastewater servicing
 - Domestic generation
 - Emergency storage requirements
 - Existing system capacity
 - Land treatment area requirements

2.2 Exclusions

The following matters are excluded at this stage. They can be undertaken during future project stages if and as required:

- ▶ Potable water treatment process design
- ▶ Wastewater treatment process design
- ▶ Potable, storm, and wastewater network layouts, design
- ▶ Transport network layouts, design
- ▶ Earthworks feasibility, design, modelling, cut/fill balancing;
- ▶ Other utility servicing requirements (power, comms, etc)
- ▶ Any other supporting infrastructure necessary to facilitate development.
- ▶ Detailed earthworks
- ▶ Geotechnical investigations and slope stability assessments;

- ▶ Detailed environmental effects assessments;
- ▶ Resource consent assessments; and
- ▶ Final infrastructure staging and asset ownership arrangements.

2.3 Proposed Rezoning, Lot Numbers

The site will be developed in two phases.

- Phase 1 envisions rezoning to Settlement Zone, yielding 68 lots of around 3000m² each.
- Phase 2 envisions rezoning to Residential Zone, yielding around 340 dwellings on lots of around 600m² each

Table 1 presents the basis of the above estimates

Table 1: Lot Yield Estimates

	Rural Lifestyle Zone	Settlement Zone – Unserved (Phase 1)	Settlement Zone – Served (Phase 2)
Total Site Area, ha	16.85		
Roads & Reserves Fraction	20%		
Total Lot Area, ha	13.48	11.47	
Average Lot Size, m ²	10,000	3,000	400
Total Lots	13 (A)	38 (B)	286 (C)
Total Lots – Phase 1 (A+B)	51		
Total Lots – Phase 2 (A+C)	299		

2.4 Information Reviewed

The following information has been reviewed and relied on in preparing this high-level infrastructure assessment:

- **Preliminary rezoning / subdivision yield** information, including proposed staging, indicative lot numbers, road and reserve assumptions, and the proposed Settlement Zone, Residential Zone and Rural Lifestyle Zone extents.
- Available **Waitaki District Plan** information, including the **Operative District Plan flood zoning**, the **Proposed District Plan Flood Assessment Overlay**, and relevant stormwater **objectives, policies, rules and standards**.
- Publicly available **online flood hazard information**, including Earth Sciences New Zealand 1% AEP flood hazard mapping and associated climate change scenarios, and Canterbury Flood Model mapping coverage.

- **Environment Canterbury advice** regarding **flood risk** at the site, including the relative influence of the Ahuriri River, Omarama Stream and runoff from the hill catchments within Omarama Station.
- Land Information New Zealand **1m LiDAR Digital Elevation Model** data, **NZ Topo Map information**, **aerial imagery** and **Google Street View imagery** used for desktop assessment of site topography, drainage paths, existing development and receiving environments.
- Manaaki Whenua Landcare Research **soil information** used to identify soil types, permeability, hydrological soil groups and indicative runoff potential across the study area.
- Earth Sciences New Zealand **High Intensity Rainfall Design System (HIRDS)** rainfall data used to define the adopted 100 year ARI, 24 hour design rainfall event, including climate change allowance.
- Environment Canterbury **Land and Water Regional Plan**
- Environment Canterbury **resource consent information** for the existing **Omarama public water supply** bore field, including consent CRC213794 and associated abstraction limits and low-flow restrictions.
- Environment Canterbury **resource consent information** for the **Omarama Wastewater Treatment Plant**, including consent CRC261547, discharge limits and expiry date.
- **NZS 4404:2010** Land Development and Subdivision Infrastructure and **SNZ PAS 4509:2008** Firefighting Water Supplies Code of Practice, used for high-level potable **water demand**, **wastewater generation**, **storage** and **firefighting** water estimates.

2.5 Assumptions and Limitations

This assessment is preliminary and has been prepared to determine whether a credible infrastructure servicing pathway exists for the proposed rezoning and future subdivision. It is based on information available at the time of preparation and is intended to inform planning feasibility rather than detailed design, construction pricing, consenting, or final asset ownership decisions.

No intrusive investigations or detailed design work has been undertaken. This includes survey verification, geotechnical testing, soakage testing, groundwater monitoring, bore yield testing, water quality testing, wastewater treatment assessment, detailed flood modelling, or detailed water, wastewater or stormwater network modelling.

The proposed subdivision layout, staging, lot yield, zoning extents, impervious area assumptions, road and reserve areas, servicing corridors and stormwater management areas remain indicative and may change as the development concept is refined.

Topographic, catchment and flood hazard assessments are based on desktop information including LiDAR, aerial imagery, topographic mapping, published flood hazard information and Environment Canterbury advice. These sources are suitable for feasibility assessment but do

not replace detailed ground survey, site inspection, drainage verification, site-specific flood modelling, or confirmation of flood levels, depths, velocities and freeboard requirements.

Stormwater estimates are based on the adopted 100 year ARI, 24 hour design rainfall event, NRCS / SCS curve number methodology, assumed lag times, indicative soil groupings and broad land-use assumptions. The assessment assumes that hydraulic neutrality can be assessed at the common discharge point to the SH83 drainage swale; this approach should be confirmed with Waitaki District Council during later planning or consenting stages.

Soil permeability and soakage potential have been inferred from published soil information. Any reliance on infiltration, soak pits, rain gardens, soakage basins or discharge to ground will require site-specific infiltration testing, groundwater separation checks, long-term clogging and maintenance allowances, and confirmation that stormwater disposal areas do not conflict with wastewater disposal areas.

Potable water and wastewater demand estimates are based on NZS 4404:2010, SNZ PAS 4509:2008 where relevant, and preliminary lot yield and occupancy assumptions. They exclude commercial, visitor accommodation, institutional, industrial, large-scale irrigation, or other non-residential demands unless specifically stated.

The potable water and wastewater servicing assessments rely on currently available consent information and advice from Waitaki District Council. They do not confirm source reliability, treatment performance, pressure, fire flow, network capacity, pump station or rising main capacity, treatment plant upgrades, consenting effects, land treatment requirements, nutrient balance, groundwater mounding, or future ownership and maintenance arrangements.

Any future infrastructure solution will require further engagement with Waitaki District Council, Environment Canterbury, Fire and Emergency New Zealand, mana whenua and other stakeholders as appropriate. Future work should confirm consenting requirements, infrastructure funding and vesting arrangements, operation and maintenance responsibilities, staging triggers, resilience requirements and compatibility with wider network upgrades.

All quantities, flows, storage volumes, attenuation footprints and servicing options presented in this report are indicative only and should not be used for detailed design, tendering, construction or final consent conditions without further investigation and design development.

3. The Site

3.1 Location

Omarama Station is a 12,000ha high country property in the Mackenzie Country. It is a part (the "Homestead Block") of the original 74,000ha Omarama Station established in 1858, which was split into ten separate runs in 1915.

The proposed subdivision comprises approximately 40ha of Omarama Station bordering SH83 Omarama – Otemata Road, the Omarama Saleyard, and Ahuriri Drive. Refer to Figure 1

The site is split into two proposed zones – the lower, flatter area is proposed as Settlement Zone, and the upper area as Rural Lifestyle Zone. These areas are subject to change.



Figure 1: Rezoning of ±40ha of Omarama Station

3.2 Existing Land Use

Omarama Station is used to breed and finish merino sheep and beef. A homestay and hydro electricity generation (elsewhere from the proposed development) provide additional income.

3.3 Existing 3 Waters Infrastructure

The site is currently undeveloped with no three waters infrastructure present.

4. Flood Hazard and Stormwater Servicing

4.1 Topography and Drainage Characteristics

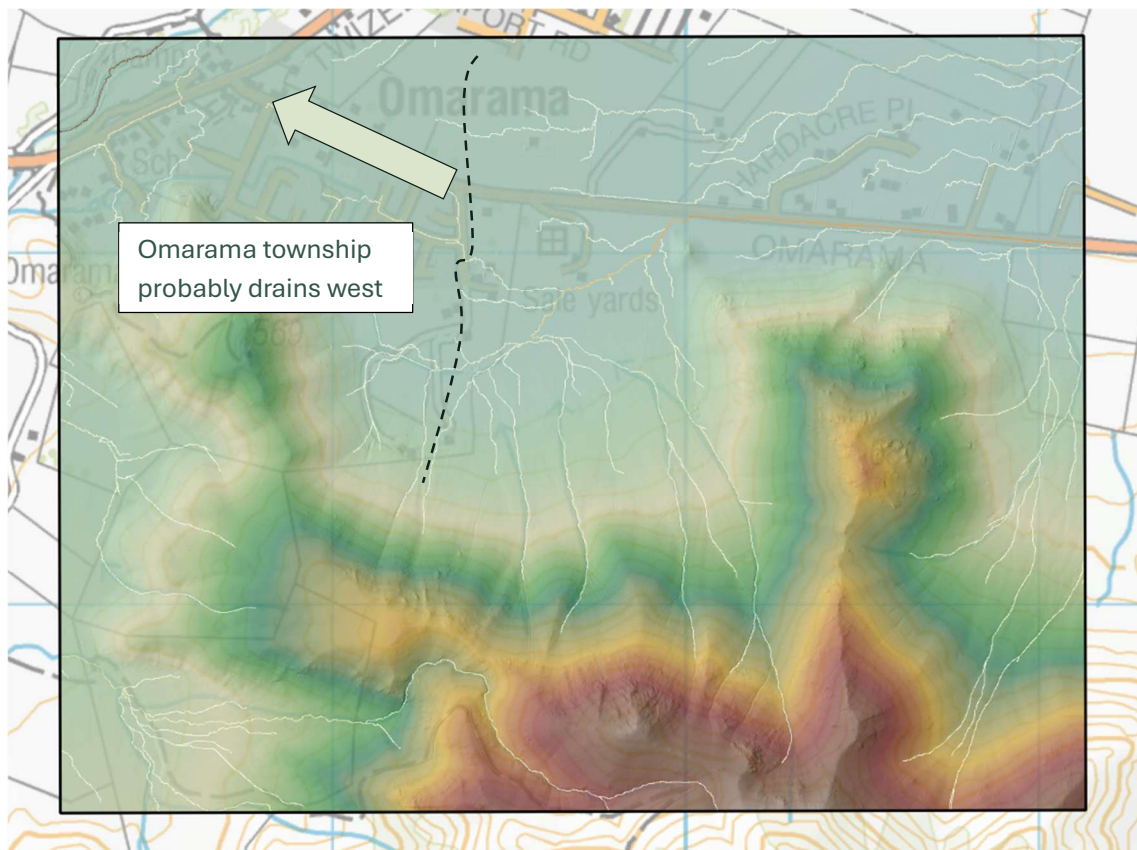


Figure 2: HEC-HMS Streamline Analysis of NZ 1m LiDAR DEM over NZ 1:50k Topo

A streamline analysis of Land Information New Zealand's (LINZ) 1m LiDAR Digital Elevation Model indicates that the site drains toward the northeast, and then away along State Highway 83 and the Alps to Ocean Cycle Trail.

We consider that the analysis does not represent the township itself well, which – from desktop analysis of the NZ Topo Maps and Google Streetview – we believe drains westward to Omarama Stream. Refer to the annotations in Figure 2.

We also note that the soils in this area have excellent permeability and soakage potential. Refer to Section 4.6.3

4.2 Existing Flood Mechanisms

Our desktop analysis suggests that flood risk at the site appears to be largely a result of runoff from the surrounding hills collecting in a bowl at their base, as indicated in the LINZ Topo Map.

Run-on from other areas does not appear to be a factor, and we believe the site sits well outside the maximum probable floodplain of any significant watercourse such as the Omarama Stream or the Ahuriri River.

We note that our assessment was subsequently confirmed by Environment Canterbury - refer to Section 4.3.4.

We also note that the site features very high permeability soils, which will serve to limit runoff significantly in more common rainfall events. Refer to Section 4.6.3 for further details.

4.3 Existing Flood Hazard Information

4.3.1 Waitaki District Plan

The Waitaki District Plan is available in Operative and Proposed versions. Each version defines and maps flood risk differently. **Neither version associates mapped flood risk areas with a specific event or probability of occurrence.**

4.3.1.1 Operative District Plan - Flood Zone

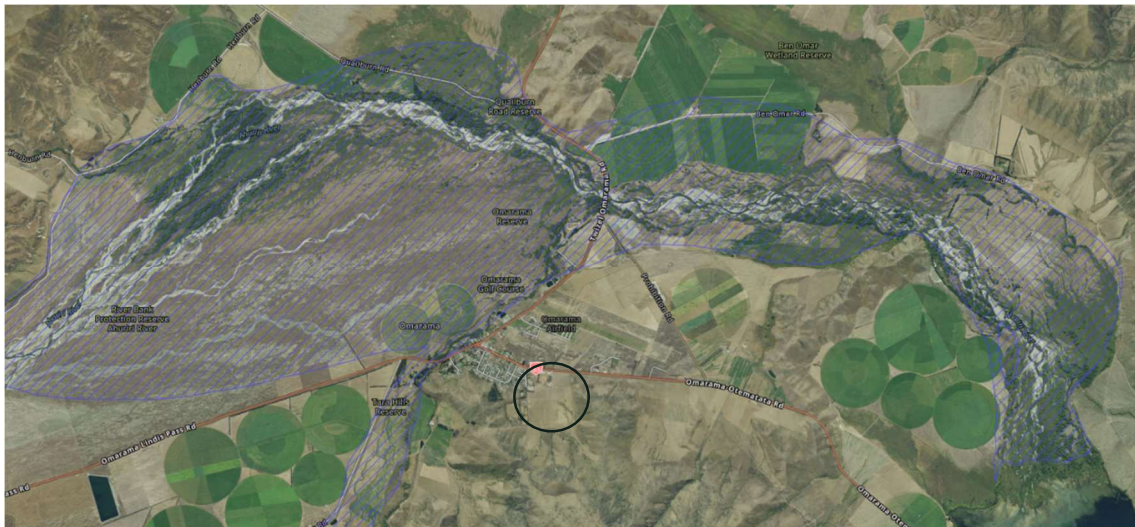


Figure 3: Waitaki District Plan Flood Zone (<https://waitaki.isoplan.co.nz/>)

To the best of our knowledge, and ability to search, the Operative Waitaki District Plan offers no information on the Flood Zone shown in Figure 3, despite this layer being available to view online. We note that the proposed subdivision site sits well outside the mapped Zone.

4.3.1.2 Proposed District Plan - Flood Assessment Overlay

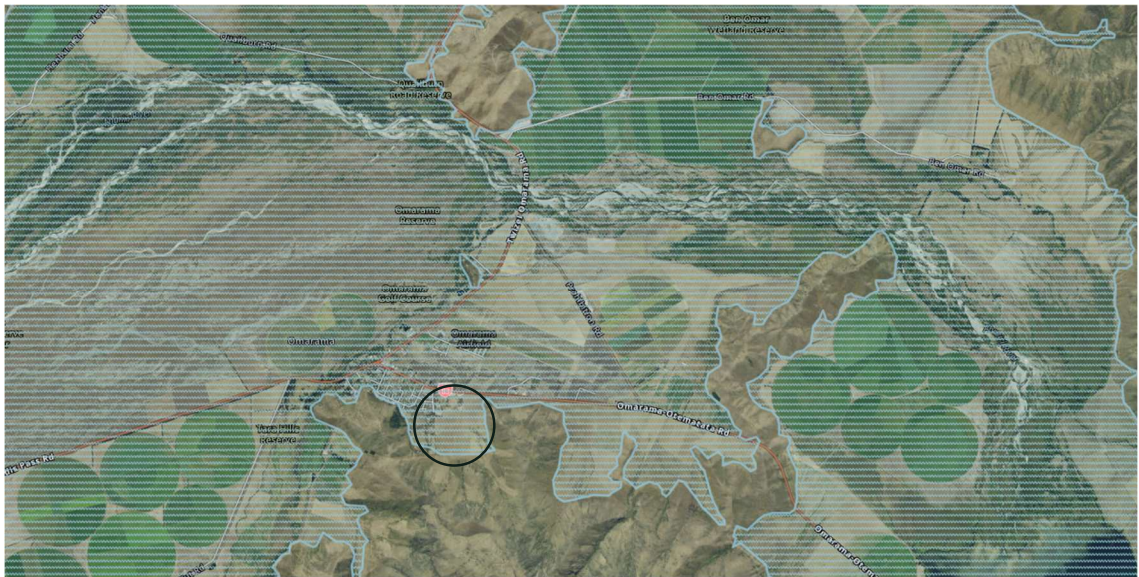


Figure 4: Waitaki District Canterbury Flood Assessment Overlay
(<https://waitaki.isoplan.co.nz/review/property/1478257/1310078.8/5166900.5/4935371/0/72>)

The Proposed District Plan references the Waitaki District Canterbury Flood Assessment Overlay (refer Figure 4). This includes land identified by the Otago and Canterbury Regional Councils where flood hazard may affect public safety, buildings and the infrastructure that supports communities. It collates local authority reviews of historic flooding information with topographic information, staff knowledge, site visits, and computer-based flood modelling in some areas.

The mapping more accurately defines the major floodplains in the Waitaki District, giving a clearer indication of where flooding is possible.

It does not provide any information on how often flooding may happen or how severe it might be. The mapping is intended to identify land where the **potential** for flooding **may** exist and should be investigated further at a site-specific level if subdivisions or buildings are proposed. **Land within the mapped areas has not necessarily flooded in the past.**

4.3.2 Earth Science New Zealand Flood Hazard Map

The Earth Science NZ online flood hazard map provide a nationally consistent modelled representation of New Zealand's flood hazard due to a 1% AEP (AKA 1 in 100yr ARI) rainfall event in our current climate, and with the impact of 1, 2 and 3 degrees of additional warming on that rainfall. The maps do not include the additional effects of sea-level rise or storm surge.

It provides a bird's-eye view across the country (down to street level) to identify areas most at risk – supporting national policy development, risk assessment and investment planning. It also fills gaps for locations that don't already have this information.

The tool was not designed for hazard and exposure analysis at individual property level. Many councils have created high-resolution maps of flooding exposure for this purpose.

In this case, we note the particularly coarse resolution of the flood model grid (estimated at 20-50m cells) at the proposed subdivision site. Thus the results shown in Figure 5 should be viewed as 'very high-level indicative' only.



Figure 5: Earth Science New Zealand 1% AEP flood hazard (worst case 3° warming).
(<https://niwa.maps.arcgis.com/apps/dashboards/8c1db2b8e37841f29a57a38675388897#>)

4.3.3 Canterbury Flood Model

<https://apps.canterburymaps.govt.nz/FloodModelResults/>

The Canterbury Flood Model is a digital mapping tool that predicts flood behaviour, water depth, and potential flood risks across selected areas of the Canterbury region. It combines flood data from Environment Canterbury (ECan), Waimakariri District Council, and Selwyn District Council. **However, it does not cover the Omarama Region nor any part of the Waitaki District.**

4.3.4 Environment Canterbury Advice

We have enquired with ECan directly regarding the above online information. The responding letter dated 07/11/2026 contains the following statement:

“Environment Canterbury has not carried out a detailed investigation into flooding in this area. However, we do not consider the Ahuriri River or Omarama Stream to be a significant flood risk to this land.

While we have no specific information there is likely some risk of flooding arising from runoff originating from the hill parts of the property in extreme rain events. This runoff will collect in the valleys and will flow towards low areas including parts of the area proposed to be rezoned. It is my understanding that such occurred in the July 2022 rain event.

Noting the flat nature of the part of the land to be rezoned, as well as the availability of control mechanisms such as floor levels and stormwater design, such flooding is unlikely to be significant enough to prevent future residential development in this location.

Overall, flooding at the property can be described as low risk.”

4.4 Waitaki District Plan Requirements

The analysis and conclusions in this report address the following clauses of the Proposed Waitaki District Plan.

Objective STORM-O1: Stormwater Quantity Neutrality seeks to prevent any increased flooding risk, or any increase in peak flows, or any change in flow characteristics as a result of subdivision and development in Urban, Settlement, and/or Rural Lifestyle Zones.

Objective STORM-O2: Stormwater Management seeks to protect and/or improve water quality and the health of waterbodies.

Policy STORM-P1: Hydraulic Neutrality seeks to achieve hydraulic neutrality for the critical duration as far as reasonably practicable, or to ensure that any development does not increase flooding related risk to health, safety, property and the environment.

Policy STORM-P2 Stormwater Management mandates ‘efficient and sustainable’ stormwater systems to be designed and installed in a timely manner.

Policy STORM-P3 Stormwater Management Areas encourages the use of stormwater management areas within the subdivision or development, and to allow for multiple uses of these areas wherever practicable.

Policy STORM-P4 Water sensitive design encourages sustainable, water sensitive design principles in subdivision and development, e.g. green infrastructure, site specific indigenous vegetation, imitating natural processes, rainwater harvesting etc.

Rules STORM-R1 and STORM-R2 grant **permitted activity** status to developments in Urban Zones, Settlement Zone and Rural Lifestyle Zones that comply with the following three Standards:

Standard STORM-S1 (Stormwater management) allows for discharge to ground provided that part of the site is not identified on the Planning Maps as being subject to the Moeraki Land Instability Overlay, or inundation, **or be used for the disposal of wastewater.**

Standard STORM-S2 (Increase in impervious surface areas) is met if pervious surface areas do not exceed specified minima in the zone standards; or if hydraulic neutrality can be met in accordance with STORM-S3 and (where disposal to ground is proposed), the land is not identified as being subject to the Moeraki Land Instability Overlay, or inundation, **or be used for the disposal of wastewater.**

We consider that **Standards STORM-S1 and STORM-S2 may be breached** if on-site wastewater disposal systems are proposed.

We consider that **Standard STORM-S2 may be breached** if impervious areas may exceed the zone standards and hydraulic neutrality cannot be provided.

The Proposed Waitaki Plan Map Layers indicate that the site is not subject to the Moeraki Land Instability Overlay.

Standard STORM-S3 (Hydraulic Neutrality) requires all new development to achieve hydraulic neutrality for the critical duration, using an accepted solution. Hydraulic Neutrality is achieved when the post-development peak discharge in a 2 year, 10 year and 100 year ARI (Average Recurrence Interval) event does not exceed the equivalent pre-development peak discharge.

We consider that the Plan's definition of *hydraulic neutrality*, via its definition of *critical duration at the point of discharge to the sea (the Coastal Marine Area)*, is inappropriate: a development of this size and nature (at this location) will have an insignificant, immeasurable effect on the peak discharge at the Waitaki River mouth, some 120km downstream, via Lakes Benmore and Aviemore.

We therefore propose that hydraulic neutrality be achieved at the point of discharge of the development itself.

However, we also propose that we consider events of 24hr duration as opposed to the critical duration for this site. Hydrological modelling has confirmed that this approach results in larger attenuation volumes than would otherwise be required by considering the critical duration, which is in the region of 1 hour.

4.5 Design Rainfall Event

This study considers the worst case **100yr ARI (1% AEP) 24hr duration** storm event.

The total rainfall depth is **158mm**, which is derived from the Earth Sciences New Zealand High Intensity Rainfall Design System (HIRDS). A climate change Residual Concentration Pathway (RCP) Scenario of 8.5 (2081-2100) is applied. This is distributed across 10 minute intervals at varying intensity (between **2.2** and **107mm/hr**) in accordance with the **TP108 / NRCS 'nested' hyetograph**.

This approach departs from a literal interpretation of the Plan for the following reasons:

- In referring to discharges to the Coastal Marine Area, the Plan definition appears to require critical duration to be determined at a scale that is disconnected from the location at which any potential adverse effects of the development's stormwater discharge would occur.
- We consider a more appropriate location at which to define critical duration to be the point of discharge to the SH83 swale, being the immediate receiving environment for the development and its contributing hillside catchment.
- The adopted 24-hour nested design storm incorporates the rainfall depths and intensities associated with a range of shorter design durations, including those likely to govern runoff from the development site and local receiving drainage network. As such, it provides a practical and conservative means of assessing peak discharge responses without separately modelling numerous individual storm durations.

4.6 Catchment Analysis

4.6.1 Methodology

The catchment has been assessed in terms of the United States Department of Agriculture **Natural Resources Conservation Service** method, AKA **NRCS**, formerly Soil Conservation Service or **SCS**. This is commonly used and applicable throughout the world, including NZ.

The hydrological response of a catchment is a function of its Area, NRCS Curve Number, and Lag Time.

The **catchment area** is self-explanatory.

The **Curve Number** is a measure of how much rain will soak into the ground vs how much will run off. It collates data such as soil type, land cover/use and typical slopes to assign a (CN) to a given catchment. Higher CNs mean more runoff - a CN of 100 represents a perfectly impervious, completely frictionless surface with no ponding depressions. Lower CNs mean less runoff - a CN of 0 represents a perfectly pervious surface, or a waterbody with no outlet.

The **Lag Time** is a measure of the catchment's response to rainfall. It is the delay between the 'centroid' of a given rain event hyetograph and the peak runoff at the outlet. It is affected by catchment size, slope, flow path length, soil, ground cover and drainage features.

For a **given depth** of rainfall, a catchment with...:

- ... a **shorter** lag time will generate higher flows from **shorter**, more intense rainfall events
- ... a **longer** lag time will generate higher flows from **longer**, less intense rainfall events

4.6.2 Subcatchment Areas

The study area (refer Figure 6) is subdivided into two areas contributing to runoff from the site at the common outlet on the south side of SH 83, these being:

- the area proposed for development, plus an area of existing development thought to drain in the same direction, totalling 40ha.
- the remaining area, totalling 112ha.

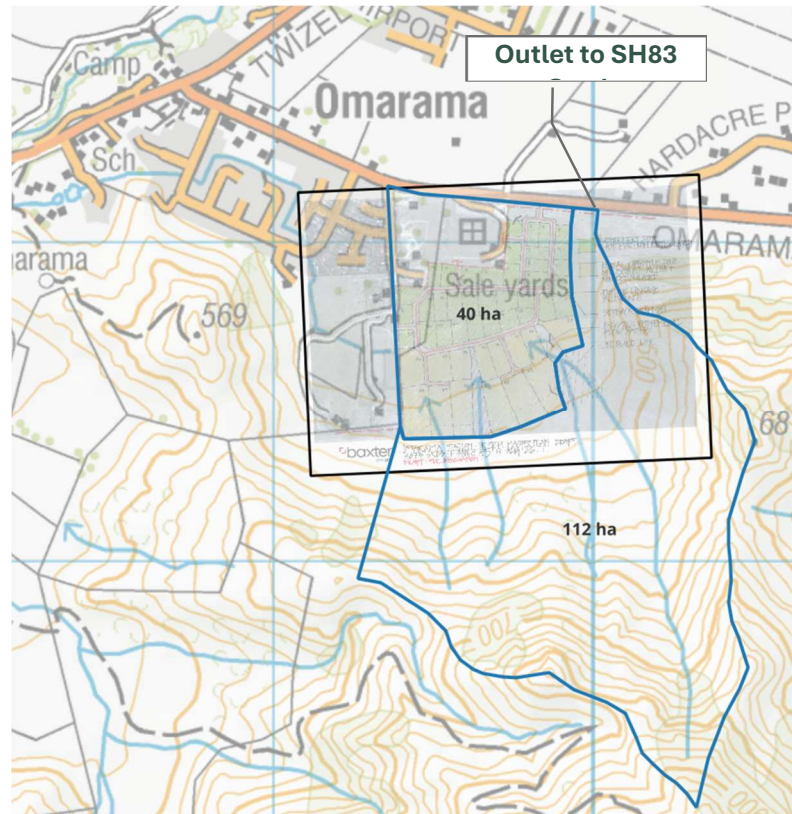


Figure 6: Subcatchments

4.6.3 Soil Data

Manaaki Whenua Landcare Research lists several soil groups with the study area.

Refer Table 2.

The soils range from moderate to rapid permeability, with consequently low to very low runoff potential.

The predominant Hydrological Soil Group is A, i.e. good to excellent permeability.

Combining the soil group with the existing and proposed land use for each subcatchment results in the curve numbers

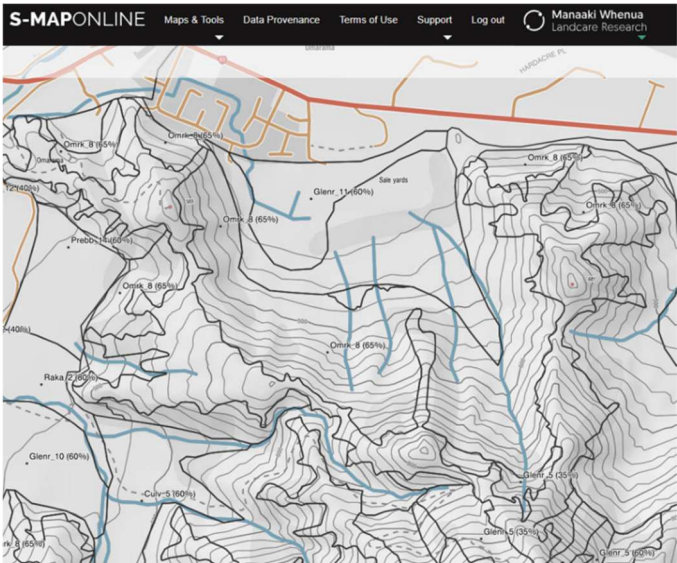


Figure 7: Manaaki Whenua Landcare Research Soils

Table 2: Soil Types, Permeability, Runoff Potential

Soil Type	Permeability of slowest horizon	Hydrological soil group	Relative Runoff Potential at given Slopes				
			VL = Very Low, L = Low				
			0-3°	4 - 7°	8-15°	16-25°	>25°
Barrhill_25a.1	Moderate (4-72mm/h)	B	VL	VL	VL	VL	L
Glenrock_10a.1 & 11a.1	Rapid (>72mm/h)	A	VL	L	VL	VL	L
Haldon_1a.2	Rapid (>72mm/h)	A	VL	VL	VL	VL	L
Mackenzie_8a.1	Rapid (>72mm/h)	A	VL	VL	VL	VL	L
OmaramaRock_8a.1	Rapid (>72mm/h)	A	VL	L	VL	VL	L

4.6.4 Curve Numbers

Table 3: Subcatchment Curve Numbers

Subcatchment	Development Scenario	Area	Curve Number	Lag Time
A Ex	Existing - minimal development: Omarama Sale Yards & 24 Ahuriri Drive	40ha	55	1hr
A Stg 1	Existing & proposed Stage 1 development	40ha	60	1hr
A Stg 2	Existing & proposed Stage 2 development	40ha	65	1hr
B	Existing hillside / grassland	112ha	49	30min

4.6.5 Rainfall & Runoff Results

Figure 8 shows the 100yr event rainfall hyetograph and three runoff hydrographs, one for each development scenario.

In each case we note that the runoff from the hillside will mingle, unavoidably, with runoff from the development. Thus each of catchment A's hydrographs (for differing scenarios) is added to catchment B's (unchanged) hydrograph to give the total runoff at the outlet to the SH83 swale shown in Figure 6.

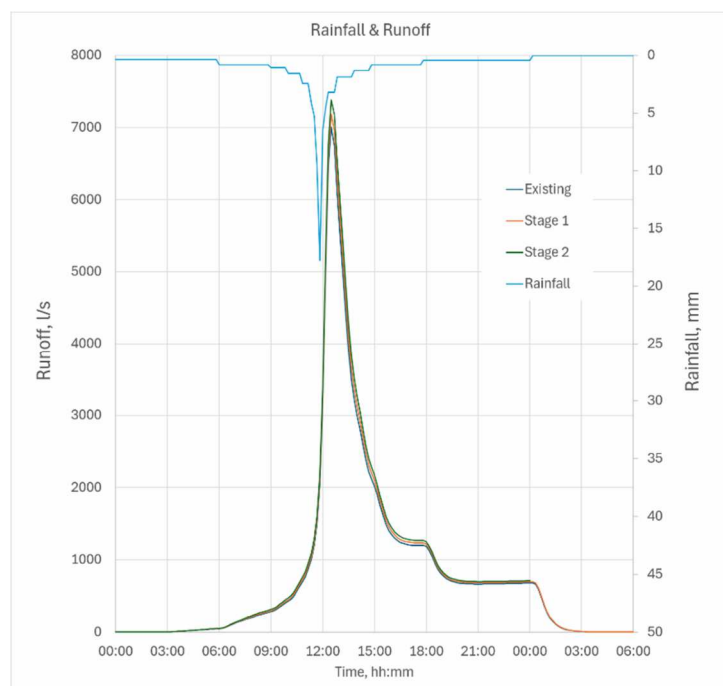


Figure 8: rainfall and runoff, various development scenarios

Scenario	Peak Runoff at Outlet, m ³ /s	Total Runoff Volume, m ³
Existing	7.00	88,100
Stage 1	7.18	91,200
Stage 2	7.38	94,400

4.7 Hydraulic Neutrality and Attenuation Requirements

The Waitaki District Plan requires development to achieve hydraulic neutrality such that post-development peak discharges do not exceed pre-development peak discharges for critical duration storm events. As previously mentioned, **we believe the most appropriate assessment point is the discharge from the site to the SH83 drainage swale.**

The study area includes approximately 40 ha of developable land and approximately 112 ha of steeper hillside catchment which naturally drains through the site via established overland flow paths. The proposed subdivision layout is likely to retain these flow paths within drainage reserve corridors (refer to Figure 6), therefore **runoff from both catchments will combine before discharging to the receiving environment.**

Hydrological modelling indicates that the **hillside catchment responds more rapidly to rainfall** than the flatter development area. Consequently, **peak flows from the two catchments do not occur simultaneously.**

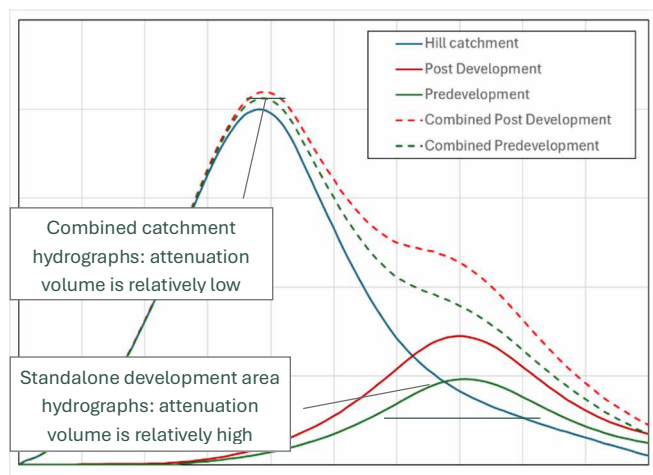


Figure 9: Effect of combining catchments with different responses on attenuation volume

This means that when the hydrographs are combined, **the resulting increase in total discharge attributable to development is substantially smaller than the increase resulting from the development area alone**, because the (critical, controlling) peak from the hillside occurs before the (non-critical, non-controlling) peak from the development. Figure 9 demonstrates this *indicatively*: note the difference in attenuation so required by the combined catchment scenario.

At the site outlet, the modelled 100yr ARI peak discharge increases from approximately 7.00 m³/s under existing conditions to approximately 7.18 m³/s under Stage 1 development and

approximately 7.38 m³/s under full Stage 2 development. The corresponding increase in total runoff volume is modest in comparison with the existing catchment response.

Accordingly, attenuation requirements are strongly influenced by whether hydraulic neutrality is assessed:

- across the entire contributing catchment at the outlet; or
- only across the area whose runoff characteristics are modified by development.

Given that...

- the relevant Plan Objectives relate to downstream flooding risk, peak demand on stormwater systems, and off-site discharges; and
- the hillside catchment will continue to discharge through the site (refer to Figure 6), and attempting to separate this runoff entirely from the development runoff is likely to be difficult and is considered unnecessary.

...assessment of the combined catchment of both the development area and the hillside at the common outlet is considered to provide the most direct measure of the development's effect on the receiving environment.

We reiterate that this proposed approach still reflects a considerable increase in the attenuation volumes that would otherwise be required by a direct interpretation of the District Plan (refer Section 4.4).

4.7.1 Attenuation Volumes and Footprints

Absent the potential effect of any other mitigating devices, such as soakage pits, rain gardens, roof tanks, etc. (refer Section 4.7.2), the attenuation volumes necessary to limit the combined catchment to predevelopment peak flows in the 100yr 24hr design event as follows:

Development Stage	Minimum theoretical volume, m ³	Combined Efficiency & Safety Factor ¹	Proposed volume, m ³	Proposed Attenuation Basin Footprint, m ²
Stage 1	108	2	220	500
Stage 2	329	2	660	1300

We consider that ample area is available to provide these storage volumes at a safe depth in the proposed offset reserve area between the northernmost lots and the state highway. We

¹ Allows for non-trivial uncertainty in the hydrological analysis, and inherently imperfect behaviour of outlet control restrictions such as orifices etc.

consider that these areas can also be made available for multiple uses in accordance with Waitaki District Plan Policy STORM-P3.

4.7.2 Water Sensitive Design, Supporting Measures

In accordance with Waitaki District Plan Policy STORM-P4, we consider some or all of the following measures as practicable, in which case we expect to be able to reduce the aforementioned attenuation volumes accordingly in detail design.

Rain gardens and/or **vegetated swales** can be incorporated within road reserves, drainage corridors, communal landscape areas, or larger private lots to provide distributed stormwater treatment and partial attenuation close to source. These devices would promote infiltration through engineered filter media, reduce effective imperviousness, and improve runoff quality before discharge to ground or to the downstream swale network. Given the generally permeable soils identified across the site, rain gardens are expected to be a practical supporting measure, subject to confirmation of groundwater separation, seasonal water table levels, and soil infiltration rates during detailed design.

Soak pits or soakage trenches could be used to dispose of runoff from roofs, accessways, and other localised hardstand areas where suitable separation from buildings, boundaries, wastewater disposal areas, and groundwater can be achieved. They are likely to be most effective for frequent and moderate rainfall events, reducing both the rate and volume of runoff reaching the main attenuation system. For larger design events, soakage should not be relied on as the sole stormwater control unless confirmed by site-specific infiltration testing and appropriate allowance for long-term clogging, maintenance access, and overflow routing.

Detention tanks may be used at individual lot or communal scale to temporarily store roof runoff and release it at a controlled rate. This would assist in reducing peak discharge from the developed area. Detention tanks are particularly useful where basin footprint is constrained; however, they require clear ownership, inspection, maintenance, and orifice control arrangements to ensure long-term performance. Emergency overflow paths would still be required so that flows exceeding tank capacity are safely conveyed to the wider stormwater management network.

5. Potable Water Supply Assessment

5.1 Water Demand

Waitaki District does not have an Engineering Code of Practice or similar document prescribing the parameters to be used in estimating potable water demand.

Estimates for the Omarama Station development have therefore been based on accepted New Zealand engineering practice – namely, NZS 4404:2010 Land Development and Subdivision Infrastructure – to which we add a reasonable allowance for irrigation demand. These figures should be confirmed with Waitaki District Council – and revised if necessary – during detailed design.

No allowance for commercial demand or non-residential use has been included.

Table 4: Potable Water Demand and Storage Estimates

Parameter		Basis	Stage 1, Low Density	Stage 2, Residential
(1)	Per Person Consumption, l/p.d	NZS 4404:2010 6.3.5.6 (a)	250	
(2)	Persons per dwelling	NZS 4404:2010 5.3.5.1 (a) (iv)	3	
(3)	Irrigation demand per lot, l/d	Estimate	250	
(4)	Total demand per lot, m ³ /day	$[(1) \times (2)] + (3) / 1000$	1	
(5)	Lot Count	Table 1	51	299
(6)	Total Daily Demand, m³/day	(4) x (5)	51	299
(7)	Peak Instantaneous Abstraction Rate, l/s	(6) abstracted over 18 hours, to 2 d.p.	0.79	4.61
(8)	Firefighting Demand, m ³	SNZ PAS 4509:2008, FW2	45	45
(9)	Required Storage, m³	(6) + (7)	96	344

5.2 Existing Water Supply & Capacity

The Omarama town public potable water network is supplied from a bore field² off SH6.



Figure 10: Omarama public water supply bore field, from <https://www.ecan.govt.nz/data/well-search>

ECan Consent **CRC213794**³ limits the take to the four wells indicated above, and at rates not exceeding **60 litres per second**; with a combined volume not exceeding **3,240 m³ per day**; and with a combined volume not exceeding **1,182,600 m³ between 1 July and 30 June** of the following year.

Waitaki District Council have indicated that these abstraction rates can accommodate the proposed development, most of the time. However, there two barriers:

- Consent Condition 4 restricts the take to ‘reasonable’ domestic supply and stockwater requirements whenever the flow in the Omarama Stream at the Bridge is below:
 - 500 litres per second between 1 November and 30 April.
 - 1200 litres per second between 1 May and 31 October.
- Waitaki District Council have informed us that the consented abstraction rates exceed the capacity of the public treatment plant. The plant was recently upgraded, but the Omarama Station development was not taken into account.

5.3 Water Supply Options

Opportunities are discussed below, along with any associated risks or constraints.

Further hydrogeological, environmental, cultural, engineering and consenting assessment will be required to confirm the preferred source or combination of sources.

² StreetView image: <https://maps.app.goo.gl/r4Cp981bEB6ka2Wc8>

³ Consent details: <https://www.ecan.govt.nz/data/consent-search/consentdetails/CRC213794/CRC213794>

5.3.1 Individual bores

Individual lot bores may be feasible for Stage 1, where larger lots can better accommodate bore setbacks, storage and private treatment. They are likely to be less suited to Stage 2, where higher density would increase the number of bores, reduce separation distances and create a less consistent level of service.

Consent requirements would need to be confirmed with ECan, including whether individual or bundled consents are required. Ownership, operation, monitoring and maintenance arrangements would also need to be clearly defined.

Each bore would require water quality testing and appropriate treatment. This option could reduce demand on the public supply, but shifts compliance and maintenance responsibilities to lot owners or a management body. It is perhaps therefore best treated as a potential Stage 1 fallback, rather than the preferred long-term solution.

5.3.2 New groundwater or surface water takes

A new groundwater or surface water take could provide an independent or supplementary source, reducing reliance on the public supply during peak demand or restricted-flow periods. Although the estimated demand is small compared with the existing public supply consent, source reliability, seasonal availability, effects on other users, and links to Omarama Stream would need to be assessed.

A new consent and source-specific treatment process would be required. Groundwater is likely to be more reliable and lower risk than surface water, but would still require yield, quality and aquifer testing. Surface water would likely have greater seasonal, sediment and treatment constraints.

5.3.3 Increase public treatment plant capacity

This option would retain the Omarama public supply as the source, with upgrades to treatment, storage, pumping and controls as needed to meet the additional demand. It would use the existing consented bore field and avoid a separate new source consent, provided the development demand can be accommodated under ECan Consent CRC213794.

The main constraint is that treatment upgrades do not increase the consented or available water volume. As noted in Section 6.1, the take is subject to low-flow restrictions in Omarama Stream, and WDC has advised that the consented abstraction rate exceeds current treatment capacity. This option is plausible, but would need confirmation of low-flow reliability, treatment capacity, storage and network performance for both stages.

5.3.4 Standalone Restricted or Community Supply

A standalone restricted or community supply would involve a dedicated source, treatment system, storage and reticulation network for the Omarama Station development, separate from the existing Omarama township supply. The source could comprise one or more community bores on reserve or utility land, or potentially a private bore field secured within an infrastructure lot or easement.

A restricted supply arrangement would generally provide each lot with a controlled daily allocation rather than unrestricted instantaneous demand. Individual lot tanks, or a combination of centralised and lot-scale storage, would then be used to buffer demand, provide resilience during outages, and provide firefighting requirements. This approach can materially reduce peak abstraction, treatment and pumping rates compared with a fully conventional on-demand supply.

The option is likely to be more practical for Stage 1, where larger lots provide greater flexibility for private tanks, backflow protection, treatment equipment, access and maintenance. For Stage 2, the higher density and increased number of dwellings may favour a more formal community scheme with centralised treatment and storage, monitored water quality, defined pressure zones, dedicated firefighting storage and clear asset management arrangements.

It may provide a useful fallback if upgrades to the public water supply are currently unfeasible. It could be designed so that it either remains viable as a permanent scheme or can be integrated into a future public supply arrangement.

5.4 Storage Options

5.4.1 Onsite Storage / Restricted Supply Scheme (Phase 1)

For Phase 1, a restricted supply arrangement with onsite lot storage may be practicable. Each lot would receive a controlled daily allocation, with private tanks sized to provide domestic buffering, irrigation allowance and any required firefighting reserve.

This approach reduces peak demand on the source and treatment system but requires clear ownership, maintenance and backflow protection arrangements.

5.4.2 Centralised Storage

Centralised storage would provide a more conventional level of service for the full development. Table 4 gives indicative storage requirements of 96 m³ for Stage 1 and 344 m³ for Stage 2, including allowance for daily demand and FW2 firefighting storage.

Final sizing should be confirmed with WDC and FENZ during detailed design, including storage location, pressure zones and resilience requirements.

5.5 Legislation

Given the unlikelihood of a connection to the public system, we consider the following legislation to be particularly relevant but make no guarantee that there are no other applicable rules.

Under the Water Services Act 2021, a community water supply would come under one of the following definitions.

- A **small networked supply** serves 26 to 100 people. It must be registered with Taumata Arowai, it must have a drinking water safety plan, and it must comply with Taumata Arowai's **Level 1** quality assurance rules.
- A **medium networked supply** serves 101-500 people. It must be registered with Taumata Arowai, it must have a drinking water safety plan, and it must comply with Taumata Arowai's **Level 2** quality assurance rules.
- Any Small, Medium or Large networked supplies that use continuous monitoring to demonstrate compliance need to follow continuous monitoring rules G12, G13, G15, G16 and G17.

Further information is available here: <https://www.taumataarowai.govt.nz/drinking-water-suppliers-and-operators/for-drinking-water-suppliers>.

6. Wastewater Assessment

6.1 Wastewater Generation

Waitaki District does not have an Engineering Code of Practice or similar document prescribing the parameters to be used in estimating wastewater generation.

Estimates for the Omarama Station development have therefore been based on accepted New Zealand engineering practice – namely, NZS 4404:2010 Land Development and Subdivision Infrastructure – and should be confirmed with Waitaki District Council during detailed design.

Table 5: Wastewater Flows and Storage Estimates

Parameter		Source	Stage 1, Low Density	Stage 2, Residential
(1)	Per Person Flow, l/p.d	NZS 4404:2010 5.3.5.1 (a) (i)	250	
(2)	Persons per dwelling	NZS 4404:2010 5.3.5.1 (a) (iv)	3	
(4)	Total flow per lot, m ³ /day	$[(1) \times (2)] + (3) / 1000$	0.75	
(5)	Lot Count	Table 1	51	299
(6)	Total Daily Flow, m³/day	(4) x (5)	38	224
(7)	Average Dry Weather Flow, l/s	(6) / 86.4, to 2 d.p.	0.44	2.60
(8)	Combined Peaking Factor	NZS 4404:2010 5.3.5.1 (a) (ii) (iii)	5	
(9)	Peak Wet Weather Flow, l/s	(7) x (8), to 3 s.f.	2.2	13.0
(10)	Emergency Storage, m³	ADWF x 8hrs	13	75

6.2 Existing Wastewater Servicing & Capacity

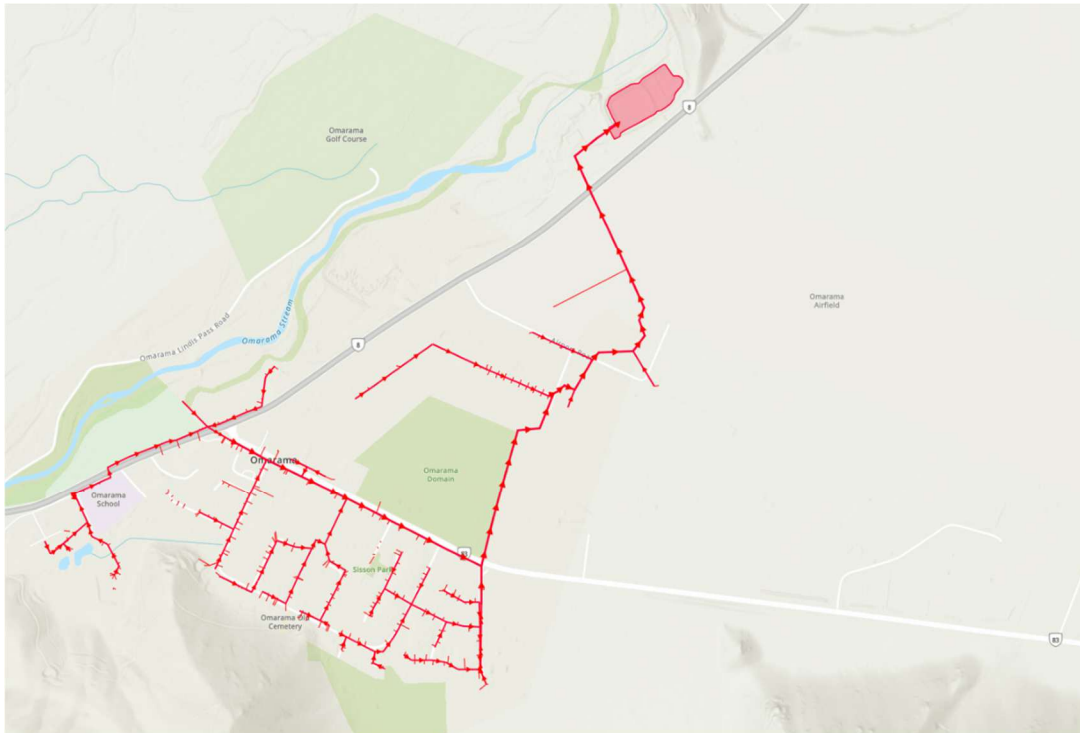


Figure 11: Omarama Wastewater System

The Omarama town wastewater system - shown in Figure 8 - conveys wastewater from the township to the treatment facility to the north. A desktop assessment indicates that the scheme benefits from predominantly gravity driven service. We note an exception in the Ahuririri Drive pump station at the scheme's southernmost extent, and near to the Omarama Station development.

Omarama Wastewater Treatment Plant, at the northern extent of the scheme, operates under ECan Consent **CRC261547**⁴ to discharge contaminants to land via seepage. The Consent expires in 2044.

The Consent limits the instantaneous discharge to **2 litres per second**, and the daily discharge to **132.8 m³**.

Waitaki District Council have advised that the existing scheme is at or near capacity, citing the following:

- The wastewater network will not have the capacity to provide for the full development potential of the site.

⁴ Consent Details: <https://www.ecan.govt.nz/data/consent-search/consentdetails/CRC261547>

- The Ahuriri Drive pumpstation, rising main, and gravity main to the wastewater treatment plant are likely to require upgrades.
- No network upgrades are currently planned.
 - However, annual renewals budgets target end-of-life assets while also allowing for future demand.
- Current discharge volumes are at about 75% of the wastewater discharge consent limit.
- Effluent nitrogen loading is at about 80% of consent limits.
- It is likely that the proposed development would lead to a breach of the current consent.
 - This would accelerate the programme to upgrade the plant to meet the new Wastewater Environmental Performance Standards

6.3 Servicing Options

6.3.1 Expand Existing System

Connection of the proposed development to the existing Omarama wastewater scheme is evidently non-feasible without upgrades to the existing scheme.

Council has advised that the existing network and treatment system are at or near capacity, that the Ahuriri Drive pump station, rising main and downstream gravity main are likely to require upgrades, and that the additional wastewater load from the development would likely exceed the current discharge consent constraints at the treatment plant.

On that basis, expansion of the existing system would require a Council-led and/or developer-funded upgrade pathway to be confirmed before it could be relied on for either Stage 1 or any later residential development. This may necessitate hydraulic analysis of the entire network or its relevant sections.

6.3.2 On-Site Treatment and Disposal

On-site wastewater treatment and land disposal is likely to be a practicable servicing option for the lower-density Stage 1 development, subject to site-specific investigation, detailed design and resource consent approval. The proposed larger lots provide greater flexibility to accommodate individual or clustered treatment systems, reserve areas, disposal fields, setbacks, access for maintenance, and contingency replacement areas. This option would eliminate reliance on the existing Omarama wastewater scheme and could provide a staged servicing pathway while wider public network upgrades are considered.

Published soil information indicates generally moderate to rapid permeability across the study area, which suggests that land application may be feasible. However, this must be confirmed by site-specific soakage testing, soil profile assessment, groundwater separation checks and seasonal groundwater monitoring where necessary.

For Stage 1, individual advanced secondary treatment systems with land application areas may be appropriate, if disposal areas can be located clear of water infrastructure, drainage paths and stormwater infrastructure. Alternatively, clustered or community-scale systems could be provided within dedicated infrastructure lots or reserves, allowing greater control over treatment performance, monitoring, maintenance and compliance.

Community-scale servicing may also simplify future transition to a reticulated public scheme if Council upgrades become available.

The higher-density Stage 2 residential development is less likely to be suitable for individual on-site systems because smaller lots reduce separation distances, constrain disposal field areas and increase the cumulative risk of groundwater mounding, nutrient loading and operational inconsistency.

If on-site or decentralised treatment were considered for Stage 2, it would likely need to be provided as a managed community wastewater scheme with centralised or clustered treatment, dedicated land disposal areas, telemetry, emergency storage, defined maintenance responsibilities and clear long-term ownership arrangements.

Any on-site or decentralised wastewater solution will require confirmation of treatment standard, design loading rates, reserve area requirements, nitrogen and pathogen attenuation, effects on groundwater and neighbouring users, consent activity status, and compatibility with other infrastructure.

6.4 Legislation

Given the high likelihood of a connection to the public system being unavailable, we consider that Rule 5.8 of the Canterbury Land and Water Regional Plan⁵ will apply. Among other requirements, this rule sets limits on maximum allowable daily discharge, minimum treatment standards, and minimum disposal field area.

However, we make no guarantee that there are no other applicable rules.

Accordingly, we consider it likely that Permitted Activity status will not be granted to any proposal for on-site wastewater disposal.

Should a resource consent from ECan for future on-site wastewater disposal to ground systems be required, features such as secondary treatment provision will be a relevant consideration of any consent application. These consent processes, where applicable, will ensure that wastewater discharges to ground are able to occur in a manner that does not result in adverse environmental effects, or an unacceptable risk to human health.

⁵ <https://www.ecan.govt.nz/your-region/your-environment/water/wastewater/rules-for-operating-an-owms>

7. Conclusions, Recommendations & Next Steps

7.1 Stormwater

We expect that adequate stormwater servicing can be provided for the proposed Omarama Station development. Flooding at the property is understood to be low risk, with the relevant runoff mechanisms generally limited to local hillside runoff passing through the site.

The desktop hydrological assessment indicates that hydraulic neutrality can be achieved at the common outlet to the SH83 drainage swale through appropriately sized attenuation and controlled discharge.

Additional water-sensitive design measures, including swales, rain gardens, soakage devices and detention tanks, can further improve the resilience and sustainability of the stormwater management approach, subject to confirmation through later detailed design and site-specific testing.

7.2 Potable Water

We expect that adequate potable water servicing can be provided for the proposed Omarama Station development, subject to confirmation of the preferred supply arrangement through later investigation, engagement and design.

The estimated demand is modest relative to the consented abstraction limits for the existing Omarama public supply; however, Waitaki District Council has advised that current treatment capacity and low-flow restrictions may constrain reliance on that system.

A practicable servicing pathway is therefore expected to involve either upgrades to the public supply, a standalone restricted or community supply, individual bores for lower-density stages, or a combination of these options.

Any preferred solution will require confirmation of source yield and reliability, water quality and treatment requirements, storage, firefighting provision, network performance, ownership, operation and compliance with applicable drinking water legislation.

7.3 Wastewater

We expect that adequate wastewater servicing can be provided for the proposed Omarama Station development, but it is unlikely to be achieved by direct connection to the existing Omarama wastewater scheme without upgrades.

Waitaki District Council has advised that the existing network and treatment system are at or near capacity, with likely constraints associated with the Ahuriri Drive pump station, rising main, downstream gravity main and treatment plant discharge consent.

On that basis, the preferred wastewater servicing pathway will need to be confirmed through future design and consenting work.

Potential options include a Council-led and/or developer-funded upgrade to the public scheme, on-site or community-scale wastewater treatment and land disposal for lower-density stages, or a staged approach that allows transition to reticulated servicing if wider network upgrades become available.

Further work should confirm treatment standards, land disposal suitability, consent requirements, nutrient and groundwater effects, emergency storage, operation and maintenance responsibilities, and compatibility with stormwater disposal areas.



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